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Higher Education
Practices Series

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PEER REVIEWED

> It is a little intimidating - one is being judged ...
>
> one has to find out how to fit in somewhere ...
>
> how is this going to work? What are the others like?

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Series Preface

The publication 'Exploring PBL Group Formation Processes' is part of the Research of Higher Education Practices Series, developed by the Higher Education Research Unit in the Department for Culture and Learning at Aalborg University. Our intention with the series is to produce a timely synthesis of research on Higher education topics of national and international relevance.

This booklet provides a synthesis on research findings on how to handle group formation processes, especially for larger groups in problem-based learning (PBL) over a longer period of time. We discuss and investigate various models for the process of forming student groups, specifically in relation to PBL in higher education. Finally, we provide a synthesis of our research findings specifically on how to handle

PBL-settings taking into consideration the diversity among students. We include theoretical perspectives on how to understand the complexity of student diversity when working with PBL approaches in Higher Education and provide recommendations on how to work with PBL as a framework in order to raise learning potential in diverse student groups. Although the study was done in a PBL setting at Aalborg University, the models of group formation and discussions of the complexity of student diversity is also relevant for other types of learning environments.

Lone Krogh, Antonia Scholkmann og
Tatiana Chemi
Series editors

> So, the subject clearly played a more important role than the social aspects. ... Also, because the social aspects already worked.

> Ah, I do not think it is a good idea that I am in group with him or her.

> I could see that the topic was actually good for me, but there is still reflection about whether I did it for the topic or due to feeling safe with them.

Contents

1 Introduction

An important part of working in groups is the process of their formation, especially with larger groups in problem-based learning (PBL) over a longer period of time. This booklet discusses and investigates various models for the process of forming student groups, specifically in relation to PBL in higher education, but the models are also applicable in other education settings involving group work.

The booklet is part of an initiative at Aalborg University (AAU) in Denmark in 2016 to develop PBL practices from an interdisciplinary perspective with relevance for all university faculties. Although AAU has a shared set of PBL principles (Askehave et al., 2015), the PBL practices of each faculty and education programme vary significantly, including in how the group formation process takes place each semester. There may be pros and cons with the different types of group formation, and not necessarily one right model for all cases, but we need to be explicit about such differences in order to be able to discuss and investigate them.

The author group spans several faculties at AAU, as well as the University College of Northern Denmark (UCN), and all authors have extended experience with PBL group formation processes. Our individual experiences, the different institutional traditions connected to PBL group formation, and the reported and experienced practices differ greatly, so this booklet will hopefully be beneficial in providing a broader cross-institutional and cross-faculty perspective on models of group formation processes in higher education.

In the introduction, we discuss the general problem scenario in relation to group formation. We present the aims of this booklet and give an outline of its main sections.

Problem Scenario and Aims

Group formation is an essential practice in higher education institutions organised according to PBL principles, but other institutions also apply group work in various parts of their educations. Students are expected to participate in groups where they can work on a joint project for a set period of time, and sometimes for a full semester.

Project group work has many difficult aspects and the formation of well-functioning groups is

the first challenge in PBL group work. Although group formation in itself may not take a long time, it is the first step and is likely to set a trajectory for this work. There are many different approaches and models for forming groups. Some models accept groups with only one member, whereas it is the primary focus of other models to place all students in project groups of a certain size. In our experience PBL groups can vary in size from two to eight students but the typical size at AAU is between three and six students in each PBL group.

The sheer number of group formations taking place every semester at AAU indicates the need to understand group formation processes. With more than a hundred education programmes starting new project modules every half year - each with several semesters running simultaneously - the approaches and models used for group formation are reoccurring events for semester organisers and students alike in a PBL institution. Group formation processes are not one of the best developed research areas in higher education or even in the PBL literature. There are exceptions to this, such as Andersen and Heilesen (2015), Olsen and Pedersen (2019) and Mac and Hagedorn-Rasmussen (2018), who deal with the challenges related to group formation processes, but overall research is scarce.

If all group formations ran smoothly, this lack of research and deep vocabulary related to group formation might be understandable; however, there is evidence from student semester evaluation reports in a number of programmes at AAU which suggests that group formation is a troublesome enterprise that causes tensions in the larger group of students and poses serious challenges to seclusion processes based on educational, cultural, life experience based, and expected skill backgrounds. This last dimension of expected skills has been investigated, for example, in Engen et al. (2018).

In many higher education programmes at AAU students in the first year of a programme are dissatisfied and vulnerable to being left to themselves in unsuccessful group formation processes, and this can potentially be linked to the issue of dropout. The organisation of group formation processes is thus a particularly important endeavour in the first semester of each programme, as students will be unfamiliar with the specific educational culture of that programme, and at the same time the student group is often highly heterogeneous and has no joint understanding of educational practices.

Against the background of these challenges and the lack of substantial research in relation to group formation processes, the aim of this booklet is four-fold:

1 To discuss the challenges related to group formation in PBL in the light of existing research.
2 To present and discuss examples of different group formation practices and traditions, and to highlight our findings and data from ex-

periments in relation to these examples from first semesters at AAU.

3 To develop a didactical-conceptual[1] vocabulary about different models of group formation in higher education PBL programmes.

4 To develop and communicate useful recommendations for semester coordinators and supervisors in higher education PBL programmes about how to conduct group formation.

With these aims it is our hope that this booklet can offer some insight and support for semester coordinators and others to make an informed choice about which procedure to choose for group formation in their semesters and programmes, and also to produce knowledge and research in relation to this under-illuminated area of educational planning.

Existing Practices and Experiments

The authors of the booklet have practiced and experienced a variety of different models of group formation, depending on faculty-specific traditions and educational cultures. The models range from very unstructured processes, where the students are left by themselves in a room without interference from coordinators to an absolutely controlled process with administratively constructed groups. The models also vary in relation to the extent to which, for example, project themes, project interests, learning styles, role tests and so on are used in the group formation process.

In the following we will focus on the first semester of a bachelor programme and the first semester of a master's programme (the latter is for convenience often called the seventh semester), as new students are integrated into the PBL model at this point, and group work and group formation in a larger format is – for the most part – completely new to them. In any case, group formation processes always put students under pressure. In the first semester, students are a relatively homogenous group, as they are usually young, have all come more or less directly from high school, but do not have experience of higher education in general. In the seventh semester, many new students from other Danish universities and abroad will enter into AAU to study for their master's degree after completing their bachelor's degree somewhere else. When these master's students come from a non-PBL milieu or from a university college, group formation involves more specific challenges, as the student cohort is a highly heterogeneous group. The first and seventh semesters are thus important and relatively complex to organise in terms of group formation.

The findings presented in the following were obtained through a research design in which we

1 The concept 'didactical' is here applied in the Nordic-Germanic interpretation, which is more general than in the Anglo-Saxon tradition.

applied qualitative and quantitative methods, including experiments in three different programmes, and produced descriptions, reflections and documentation of the progress by involving the semester coordinators. To qualify the results, questionnaires were sent out to the students, followed up by focus group interviews. The specific analytical approaches and methodologies are described in depth in Chapter 3, 4, and 5.

In Chapter 2 (Theoretical perspectives on group formation), we present the theoretical framework in the booklet. Various problems related to the questions about inclusion and exclusion are emphasised, and the concept of social Darwinism is introduced as a part of these perspectives. Participation in social communities of practise in a particular context such as the university is used to describe some of the processes in group formation.

In Chapter 3 (The nine dimensions of group formation processes), we present an analysis of the specific group formation processes at AAU, where we identify nine dimensions. The analysis was based on the practices of two programmes in the first semester: Mathematics and Mathematics-Economics (hereafter "Mathematics") and Organisational Learning, and the seventh semester of Learning and Innovative Change.

In Chapter 4 (Four models of group formation), we classify and describe four specific group formation practices at AAU. These four models vary greatly on each of the nine dimensions described in Chapter 3.

In Chapter 5 (Student experiences with the group formation processes), we report the results of a questionnaire and interview study with students from the first semester of Mathematics and Organisational Learning, and the seventh semester of Learning and Innovative Change. We studied how the students had experienced the aspects of the nine dimensions during various kinds of group formation.

In Chapter 6 (Conclusions and recommendations), we conclude and provide recommendations, particularly for semester coordinators and others in charge of group formation processes.

The contributors to this work should now be acknowledged. The outset of the project was the funding of 200.000 DKK from the Strategic Council for Education at AAU as part of a call for PBL development projects. Our project was called *Modeller for gruppedannelse i PBL / Models for group formation in PBL*. The project initially ran from January 2017 to June 2018. In addition to the authors, Associate Professor Leif Kjær Jørgensen made a significant contribution to the project. We are also grateful for the help with the interviews from research assistant Rune Hagel Skaarup Jensen and from our student assistant Pernille Brogård, who set up a website for some of our results.

Theoretical Perspectives on Group Formation processes

2

As group work is an essential and highly integrated part of problem-based project work at AAU, the formation of groups is an important element of the entire process for the students. It is documented in the yearly quality assurance system at AAU that well-functioning groups are the basis for high quality academic work. Students are very aware of this. As an essential part of the education programs, students acquire the knowledge, skills and competencies at high level, which are described in the curriculum through the PBL group work approach, and these are supposed to match future work qualification requirements, where candidates need to be able to undertake problem solving in teams consisting of a diversity of participants, and across professional boundaries (Krogh, 2013). Becoming used to working in groups (for better and for worse) entails being confronted with the complex processes in collaborative work. Hereby, students achieve a foundation for understanding and practicing the often very challenging teamwork that will be required in their future professional life. Constructive and good group formation processes typically form the direction for the quality of the group work and finally the quality of the professional product. Well-functioning groups typically create high quality results in a project that benefits from the diversity of knowledge, learning approaches and experience represented by members within the group (Katzenbach & Smith, 1993). There are thus many things for students to consider, and they are very often not aware of the importance of group collaboration processes in acquiring the expected knowledge, skills and competences – on average good grades – and in the long term a good job. The group formation process that precedes group work is thus extremely important for the students as this is the start of being part of a group that collaborates to achieve good and study relevant results.

In this chapter, we explore on some of the challenges of this process, drawing on our own comprehensive experiences from this research and from other studies of the phenomenon, such as Christensen (2013), Keldorff (1996), and Mac and Hagendorn-Rasmussen (2018). The latter incorporates social and professional considerations into both the group formation process and project work, from start to end.

Having dialogues with students during group formation processes – and subsequently reading their evaluations of the process afterwards – tells us a lot about the types of challenges the students typically face. Despite an often-apparent consensus between the teacher in charge of organising the group formation (at AAU often called the "semester coordinator") and the students, established before the group formation process, that professionalism, openness, inclusiveness and decency are principles that should characterise the group formation process, it is not always what we see in the situation. On the contrary we have to realise that often informal conversations prior to the group formation processes are taking place, and personal strategies are frequently used to determine who will cooperate with whom. Nevertheless, it is also important to mention that many students actually do their best in order to follow the above mentioned principles for good group formation processes. Many students, however, also do all that is possible to influence with whom they are assigned to collaborate and with whom they definitely do *not* want to collaborate with. When searching for the 'proper' group formation processes and how students should act accordingly it is important to mention, that generally all human beings, here students, have fundamental social-psychological needs for being included in the professional community (Westerling, 2018). Below we illustrate three examples of the difficult nature of group formation based on our research and experience.

Examples of problems in group formation processes

Example 1

This situation is from a first semester. During the first month of the semester, the students have worked in groups that were administratively organised by the Study Administration before the start of the semester. 36 students are now going to begin their first real project work, and they now have to form groups by themselves with support from the coordinator.

Prior to the process, the students read study-related professional literature and collaboratively defined key academic themes, which are going to be the focal points for both the group formation process and for future group work. The coordinator has emphasised and the students have agreed on, that it is professional interests that must govern the group formation process, and thus not primarily personal preferences, although the coordinator is very aware of, that personal preferences play an essential role and cannot be ignored (Mac & Hagendorn-Rasmussen, 2018). The coordinator has also clarified to the students that no groups are considered final until everybody is a member of a group. Subsequently they have been given lectures about ethics and the principles of good and constructive group formation processes, and how to constructively form groups that enable professionalism and diversity – and the kinds of opportunities for the good work that lie within this approach.

To the surprise of the coordinator, nine students claim from the very beginning that they have already formed their groups – and that they are not interested in being part of the formal group formation process. The first group consists of five students, the required number of members in each group, but there are only four students in the other group, so in principle there is room for one more. However, the students in this group state that they are not in any way interested in expanding the group with an additional member, as they have already decided on their topic.

Example 2

A student is unfortunately ill on the day of the group formation process – and he did not make any prior arrangements with other students or the coordinator, who could have taken care of his need to be included in a group. Nobody has heard anything from this student. Late in the evening, after group formation has been finalized, the student contacts the coordinator since he has realised that he has not been included in a group. The coordinator encourages the student to write to the other students on the closed Facebook page about the situation, asking to be invited into one of the established groups. However, no one initially offers an invitation. The next step is that the coordinator suggests the student to be more engaging in terms of saying what he is interested in working with. This new approach results in access to a group who would like to meet and talk with him about possible inclusion in their group. Unfortunately, this meeting did not end up with agreements on collaboration, and the student had to work on a project alone. This ended up not being a very good start for the student.

Example 3

This example is from a research project, examining students with psychosocial problems in Higher Education (The Study life project 2018 – 2021). The student here, who is diagnosed with social anxiety is starting on a master's programme. She has undertaken the first part of her education at a university where group work is not an integrated part of the education. When the student arrives at the new AAU study program, she is being invited to attend the group formation process for the upcoming group work. The student in this example attends in the process and becomes part of a group. Shortly afterwards, she realises that the other students in the group have continued to communicate about their collaboration on social media without inviting her, and furthermore she does not hear from them again. She does not understand what is going on and decides to work with the project alone. Subsequently, a supervisor promises to help and support her. In any case, the student has decided for herself, that she has had difficulties being in and working in a group: "*... now I know that I have to work alone, and I told my supervisor about my problems, and*

he has promised that he will try his best to help me" (Student, 2020).

This last example illustrates a very dark side of a process, where a person, who had decided to share her sensitivity with other students in a very unfortunate way became excluded.[2]

Many other examples could have shed light on the problems related to group formation processes. However, these three examples (all actual events from the experiences of the group of authors) illustrate the diversity of the many things at stake in the group formation processes for each individual student, of both an academic and an emotional nature, which make group formation processes particularly challenging and difficult to handle for many students. At the same time, this process also reflects the inclusion and exclusion processes that emerge in many other contexts where people are selected (to and from). According to Westering (2018), group formation is about something as fundamental as human relations in social communities.

The first example described two groups that completely sealed themselves off. They did not want to include anyone else. As mentioned, many students do all that they can to influence who they are going to collaborate with and who they do *not* want to collaborate with, and they therefore find that additional action is required before the formal group formation process takes place.

The second example illustrates a student who ended in a situation, which becomes very difficult, because the student was ill on the day where the group formation process took place, and at the same time the student had not made any prior agreements with neither fellow students nor the coordinator about securing a group affiliation. The student had not considered that it would be important to have taken this active initiative to make sure that fellow students or the coordinator could have done their best to create a pathway for the student into a group.

The third example illustrates the psychosocial challenges faced by a student suffering from a form of social anxiety as well as the structural challenge arising from changing study programme from one university to another. These two aspects might have intertwined and caused particular problems in terms of deciphering current norms and acceptable behaviours and in being able to gain access to participate. In this example we have elaborated on a student-centered perspective, knowing that a group-perspective would contribute with other dimensions and insights. It illustrates the necessity of keeping focus on students who are not familiar with the norms of group formation at a particular study program.

2 The Study Life Project, https://ruc.dk/forskningsprojekt/studielivsprojektet.

Participation in a learning community

According to Christensen (2013), a lot of group work – including the group formation process – is not explicitly shared knowledge. Cultural competence, which we define as a student's ability to handle social relations in different contexts, is therefore mainly acquired through implicit cultural patterns. Sometimes assumedly small things determine whether someone is in or out. A great deal of surplus professional and social energy is required from the students to participate in the group formation processes. The role of the coordinator is vital in establishing the right and purposeful framework for the students, and we will return to the tools and approaches that educators can use to shape well-functioning group formation processes. First, however, we will delve a little deeper into group formation from a student perspective, in order to understand how it can be a difficult process.

Westerling (2018) points out that group formation requires involvement and presence, which in itself is demanding for anyone, and not being part of it can be associated with high costs. Joining a group is about one's ability to enter social communities, as well as being a part of and working in them. At AAU, group formation processes are an important part of the entrance into highly valuable group work. However, one does not need to have many years of experience as a teacher/supervisor to have seen how painful and difficult this process can be for students (see, for instance, the three cases described above).

Several researchers have described aspects of group work and well-being, including group formation processes at universities as problematic. Henriksen's (2017) research in higher education found that it is primarily the student's popularity as a person, which is tested when forming groups. Students are deeply dependent on each other and they bond with fellow students, who they have identified from the outset as someone desirable to join with in groups, where the chance of success depends entirely on one's social competencies and ability to navigate the complex game in and around group work. The term 'social Darwinism' (Keldorff, 1996; Christensen 2013) has been used to characterise the processes, and Christensen (2013) refers to students who have 'stomach ache' in connection with attending group formation processes. In other words, the processes that students generally perceive as challenging are in fact a permanent component of the group work.

Students with mental or social problems may in particular perceive these processes as both challenging and daunting and it is according to Henriksen (2017) important to be alert: "Group formation must not become a 'school game' where social Darwinism dominates, and you risk being left in the schoolyard again". This attention to vulnerable students also refers to the dynamics between the students in and around group work in general in higher education.

In many ways, group work can be compared to what Lave and Wenger (2004) refer to as situated learning. The term characterises learning as linked to participation in social communities of practice, and as having both a cognitive and a social aspect. It is linked to participation in social practice communities in a particular context, for example the student group and the various groupings, such as changing project groups. Learning is also linked to a process in which a person/student moves from legitimate peripheral participation to full participation in the social community (Lave & Wenger, 2004). It can, for example, involve a student who must move into the work community, represented by the other group members, during a group formation process. For some students, it is both a longer and more difficult process than it is for others.

Learning thus depends on social inclusion. Including a student in the social community gives them access to both social and cognitive learning processes. Learning thus depends on social inclusion and students can learn from each other and from their group supervisor. Repetitions and imitation (from more experienced students or supervisors) enable the 'inexperienced' to gain greater experience and expertise that makes them experienced. The 'inexperienced' are initially at the periphery of a community and move slowly towards the centre of what is called full participation in a group. Students may over time have changing positions in the community and different learning paths and forms of community membership (Lave & Wenger, 2004).

Figure 2.1 below illustrates the move into the community and clarifies students' need to experience themselves as part of a social community. The whole cohort of students here represents the social community - and the project group is a prerequisite to being able to function in the professional and social community. The project group typically consists of students with very diverse backgrounds where learning takes place through integrated interaction, and where students develop themselves through the activities of the social community and learn from each other and the supervisor.

Students cannot optimally participate in such a process if the study environment is not functioning openly and well, making space for the diversity of students in a part of the community. However, the study environment is complex and has a great impact on an individual student's experience of the educational institution and the opportunity for professional and social integration. Qvortrup et al. (2018), examined, based on the institutional-departmental model (Tinto, 2017), the significance of the study environment for drop out. Qvortrup et al. concluded that the institution plays an important role in preventing drop out, especially from a social perspective, and it is recommended that social inclusion is integrated through actions focusing on, for example, group work in teaching that is not simply left to the students themselves to handle.

Figure 2.1: Learning in Communities of Practice (based on Lave & Wenger, 2004).

Qvortrup et al. further emphasises that the quality of the interaction between teachers and students is important for a student's well-being, and that there is a strong correlation between a student's confidence in self-efficacy and well-being, and factors related to the social environment (social infrastructure, contact to teachers and participation in work communities) and well-being.

Considerations prior to group formation

Universities generally aim to educate academics who are capable of stepping in and out of different situations and work communities, who can work individually and alone, who are critical thinkers, and who can lead and collaborate with many different agents within different disciplines and backgrounds. The foundation for these competencies must be created during education, and PBL is a natural environment for the development of these competencies. It is a demanding task for both the overall PBL University and the individual teachers to support students with diverse backgrounds and prerequisites in achieving these competencies in order to be prepared for working life. The university faces a huge task and challenge in teaching the students explicitly how to handle group work, including group formation processes. As noted above, organising constructive and good group formation processes is not a simple task. It requires that both students and teachers (coordinators) should be proactive. Coordinators should em-

phasize the legitimacy of a professional attitude and of having social dimensions in group formation processes on the agenda. This includes student goals and dreams for group work, ambitions and priorities, difficulties and personal battles, explained and discussed in connection with the academic perspectives and priorities.

Above we have discussed different perspectives on the psychological and social dimensions of group formation processes. Our focus in the following will move to the elements that constitute the educational framework of the group formation process, and the coordinator's ability to act supportively for the students during the processes. In Chapter 5 we return with empirical insights into student experiences with group formation processes.

The Nine Dimensions of Group Formation Processes 3

In the spring of 2017, we collected information about how the group formation process takes place at three programmes at AAU: (1) the bachelor's degree in Mathematics and Mathematics-Economics (2) the bachelor's degree in Organisational Learning, and (3) the master's degree in Learning and Innovative Change. These programmes are located in three different faculties (the Faculty of Engineering and Science, Faculty of Social Sciences, and Faculty of Humanities, respectively). At the same time, we collected information about how group formation is done in various places at AAU when the chosen approach is administrative, i.e. administrative staff form the groups instead of the students doing it themselves.

Comparing these processes from an organisational perspective, that is which requirements and conditions are present, revealed the processes to be very different. In order to develop an analytic vocabulary that could encompass the differences in practice we used a bottom-up grounded theory approach (Strauss & Corbin, 1990) through which we gradually identify nine emerging dimensions needed to fully describe the differing conditions and approaches to group formation in relation to PBL group work. The numbers of dimensions grew until we could not any longer find aspects that were not covered by any of the dimensions. During this process, some dimensions were renamed. The nine dimensions serve as an analytical tool for looking more deeply into four different models for group formation in Chapter 4, where we will also exemplify how the nine dimensions may look in practice in four different models for group formation. In this chapter, we outline the nine dimensions and group them into clusters for further clarification.

The nine dimensions

We divide the nine dimensions according to whether or not the educational coordinator in charge of the group formation process has any control or influence over them, or if they involve issues determined by external factors beyond the control of the educator, and in some cases even beyond the control of the university. Let us start out by framing the five dimensions which are often controlled by the coordinator.

(1) Duration

The allocated time to form groups can be understood in many ways. Here we understand *duration* as the period from the first time the coordinator addresses group formation with the students until the conclusion of the group formation. In the cases we studied, there was quite a large difference in duration, varying from a few hours to several weeks of preparation and reflection on group formation.

(2) Subject focus

Another dimension controlled by the coordinator is the extent to which the project theme is addressed as the main driver of group formation. Whether or not the subject focus is defined by the coordinator, study regulations or the student groups themselves, the focus on the subject matter is a major part of the formation of groups.

This approach can vary. In our case, the social sciences students were given the overall theme, "The Welfare Society and its Organisations". Based on subject related input from the teacher, group readings and focused group presentations, the students entered into a process of finding sub-themes that they agreed upon and which became the basis for the chosen groups for the semester. In the humanities case we saw a variation of the model where projects were formed entirely by students within the larger and very broad framework of the field of the educational programme.

In summary, this dimension involves the extent to which the *content/subject* of the future project is a major focus of the group formation or something that is decided upon after the groups are formed. The extremes are "no role at all" and "all focus is on the subject matter" and there is a variety of possible approaches in between that can be more or less controlled by students and the coordinator.

(3) Relational focus

The third dimension runs in parallel to the second dimension and relates to the extent to which the group formation has a *relational focus*. Relational focus here refers to the social sphere among the students in all its complexity of inclusion and participation for the group of students during a group formation process. Group formation with a relational focus can be addressed in many ways. In some cases, it is about the use of a vocabulary of roles in a group (starter, finisher, technician etc.) and reflections around their strengths and weaknesses as a group. In other cases, this dimension can address the coordinator's use of educational backgrounds, nationality, age, gender, children or no children, a student's preferences for learning styles and so on in relation to the group formation process.

This dimension also includes the more overarching reflection initiated by the coordinator with the group of students about what group formation entails and how to address it ethically and responsibly.

(4) Physical frames

The fourth dimension relates to the extent to which the group of students move around in the physical location in a purposeful and focused manner initiated by the coordinator. This dimension thus deals with the use of *physical space* and the *room situation* in general when forming groups. Frames may be used to support group formation, or they may exist but affect group formation processes randomly.

A coordinator's purposeful use of physical space can have many forms. The extremes in the cases we examine in the next chapter vary from "not much" to "planned use of physical space" and the processes connected to different spaces in the group formation. Focused planning by the coordinator can, for example, include the use and arrangement of tables where students can easily meet in the necessary group sizes. Other rooms or halls can be used for the presentation of student ideas for projects, or for a group of students to meet and reflect alone to find out if they are the right match. In summary – the fourth dimension highlight facilitating and nurturing the group formation process through the use of rooms and spatial processes.

(5) Coordinator involvement

The fifth dimension concerns the involvement of the person in charge of the group formation process. At AAU, this will usually be one or two persons coordinating the process, but the group formation process may also incorporate a group of future teachers or supervisors of the students' projects, assistants, or perhaps external involvement from experts in group processes. This fifth dimension is therefore about the *degree of coordinator and supervisor involvement* in the group formation process.

In the cases we have examined, coordinator involvement ranges from being present and active throughout the process to purposely being somewhere else. This means that the fifth dimension is related to both whether or not the coordinator is actually interacting with the group formation process or not, but also to the way in which it happens and the number of people and roles that are involved.

The first five dimensions presented are found in almost any group formation process that a coordinator can plan and influence directly. These five dimensions are thus the dimensions of pedagogical reflection that need to be considered and addressed in the coordination process. There are, however, a variety of other important factors – dimensions of group formation processes – that are usually outside the control or influence of the coordinator but nonetheless play a vital role in the processes. We present four dimensions below to describe this influence on PBL group formations.

(6) Group size

Often external factors decide the number of students in a project group. This includes various faculties' policies on whether or not students

have the right to do a project on their own. There are also faculty regulations concerning minimum supervision hours allocated on average to each student. Restrictions on time and funding may mean that groups generally consist of four or more students. In other educational programmes, the number of group rooms or the accepted number of supervisor hours for supervising a group is the deciding factor for the number of students in each group. This type of structural requirement can therefore have a huge impact on the group formation process.

Another important element in the group size dimension is how the targeted group size can be changed for students with special requirements or challenges in terms of jobs, family, illnesses and so on. In short, the sixth dimension of group formation relates to the explicit and ad hoc rules stipulating *group size* and the extent to which all students must be part of a project group.

(7) Standardised model

The seventh dimension we define concerns the rules, traditions and cultures of group formation processes in a given educational programme or an organisation such as a faculty. This dimension relates to *model-stability* – i.e. does the group formation process take place the same way each time, or does it change over time? Sometimes, a group formation process model is well-established through culture/tradition ("this is how we have always done it"), and at other times through formal faculty procedures. Another question to ask is how the model is changed through political or institutional processes. In some of the cases we examine below, there are very strong long-term traditions, at times even fixed in faculty rules, and in other cases, group formation almost has the character of a development project. In the latter case, the coordinator has an even larger influence on the process.

(8) Number of students

A vital dimension of group formation processes is the number of students involved in the process. This number can vary immensely, and it is obvious that the processes it involves are different, whether we talk about 10 students forming groups or 120 students. Our eighth dimension is thus measures related to tackling the challenges of low, medium and large numbers of students.

(9) Diversity of students

A ninth dimension is introduced to cover the *diversity of the cohort of students* in the semester: to what extent do they form a homogeneous or heterogeneous cohort, and what are their characteristics? Concerning this dimension, we found a difference between group formation processes that at first year university students, many of whom are coming more or less directly from high schools, and are thus usually a highly homogenous cohort, and the variety of other students who are strongly heterogeneous and often make up the cohort in master's programmes.

Examples of heterogeneity include student cohorts with many foreign students, students who are merged into a master's programme from very different bachelor's degree backgrounds in the university, members of minority groups, gender distribution, age and so on. It can also relate to the admittance of professional bachelor's[3] degree students into academic programmes or to the merging of students with and without a PBL background, and so on.

3 In Denmark, bachelor degrees in for instance teacher training, nursing are termed professional bachelor's degrees and take place at University Colleges (*Professionshøjskoler*) and not at universities which offer (academic) bachelor's degrees.

- Number of students: about 50
- Duration: 3 hours

Dimension/Name of model	Self-organising	Subject-centred	Relation-based	Administrative
1. Duration	**Small**	Medium	Large	Small
2. Subject focus	**Medium**	Large	Small	Small
3. Relational focus	**Medium**	Small	Large	Small
4. Physical frames	**Small**	Large	Large	Small
5. Coordinator involvement	**Small**	Large	Medium (yo-yo)	Small
6. Group size	**Large**	Medium	Small	Small
7. Standardised model	**Large**	Medium	Small	Small
8. Number of students	**Large**	Small	Large	Small
9. Diversity of students	**Small**	Medium	Large	Large

Table 4.1: Characteristics of the self-organising model. In Dimensions 1 to 5, small, medium and large reflects the extent to which there is a focused emphasis from the coordinator on a certain group formation dimension. In Dimensions 6 to 9, small, medium and large describes factors that the coordinator has little, or no, control over, and the extent to which the dimension had an impact on the group formation process.

Four Models of Group Formation

4

In this chapter, we present four archetypes of group formation models. They are based on the three education programmes that we investigated over a full semester, and also on what we call the administrative model, which is applied throughout AAU, often at the start of a bachelor programme. The four models do not, however, belong to any specific discipline area, although we use examples from actual programmes. We discuss the specific context in which we observed each model in action, and additionally show – in Tables 4.1, 4.3, 4.5 and 4.7 – how each model is positioned compared to the three other models in relation to the nine dimensions we established in Chapter 3.

The descriptions of each model rest on a bottom-up analysis of reflection papers submitted on our request by the coordinators. We asked the coordinators to fill out a template we had constructed with questions about the format for group formation in advance of the actual group formation, and we interviewed the coordinators prior to the group formation based on what they had written in the template. The focus here was on finding relevant areas to perform an experiment based on the nine dimensions. After the new group formation, we again gave them a template with reflection questions and information to fill out.

The four models of group formation investigated below are: 1) the self-organising model, 2) the subject-centred model, 3) the relation-based model and 4) the administrative model.

The self-organising model

It is essential in this model that students are more or less left by themselves to organise the group formation. The model is characterised in the nine dimensions as follows (Table 4.1).

This example is from a first semester mathematics bachelor's programme.

Preparation before the group formation

The main principle behind the self-organising model is that the students are able to form groups themselves in such a way that everyone joins a group and that each student is satisfied with her or his group to the greatest possible extent. It is necessary for group formation according to the self-organising model that the

students know each other to a certain extent before group formation begins. When the model is used in the first semester, it is used one and a half months after the start of the semester. Right before the group formation, a freshman tour is held where students can get an idea of who gets along with whom socially and perhaps also who they can see themselves collaborating with.

The coordinator informs students about the formal framework for group formation, and in particular, the number of groups that can, or must, be formed, and the requirement that no groups are finally formed before all students are placed in a group. The number of groups should usually be as small as possible, due to supervisor and room resource allocation, but no more than seven students in a group is allowed for economical/structural reasons. In practice, the number of groups to be formed can only be determined on the actual day of group formation as this depends on how many students attend the group formation, since some students drop out. The self-driving model is a long-standing tradition in, for example, mathematics. Student information about how to deal with other students during group formation mostly comes from tutors (older students) who have gone through the process themselves several times.

The academic preparation for group formation involves the coordinator in collaboration with the supervisors preparing a catalogue of project proposals within the framework of the curriculum. Students are expected to have read this project catalogue before the day of group formation, but it will also be presented to them. Common subject interests can thus, in principle, form part of the basis for group formation.

The programme is as follows:

- Presentation of the tutors and supervisors.
- Review of the academic framework for the semester's projects. Review of project proposals.
- Information on other requirements during the semester.
- Attendance check of enrolled students. The number of students is particularly important.
- Review of formal framework for group formation.

This all lasts about 1-1½ hours.

Next comes the most important element, namely the formation of the groups themselves. During group formation, the coordinator and supervisors leave the room, entrusting the group formation to the students, however, they can be called on in case of problems or to answer questions. The groups will often be formed within an hour.

Results of a typical group formation day

Group formation typically leads to everyone joining a group. In most cases, students are generally satisfied with their group, however, some students might have wanted to work in other groups, and one (or more) "residual" groups will usually be formed consisting of students

who have had difficulty becoming members of a group: this could be described as social exclusion for various reasons. Generally, students are very satisfied with the self-organising model, although some students want a little more control over the process.

The pros and cons can generally be summarised as follows:

Pros	Cons
Students will control a substantial part of the group process and the weight of the difficult decisions in group formation will also mainly be handled and learned by the group of students collaborating with each other. This can obviously also be seen as a problem if the process is difficult.	The process, which may involve students being excluded by a group or rejecting others, may be unnecessarily uncomfortable as there is no clear educator presence to relieve the pressure.
Students with high social capital or ambition will have the opportunity to join groups with similarly-minded students, and perhaps with those who have equally high social capital or ambition. This can obviously also be seen as a problem for students with low social capital in the group.	It is difficult to obtain an insight into the academic ambition and academic qualifications of students in the first semester, if the process is too short, comes too early or simply does not address these dimensions. A student can, for example, easily enter a group that does not possess the desired level of ambition. In later semesters this might be less of a problem.

Table 4.2: Pros and cons of the self-organising model.

The subject-centred model

It is essential in this model that students choose a group based mainly on considerations about the content of the projects, and the group formation process assists them in doing so (Table 4.3).

This example is from a first semester Organisational Learning bachelor programme with the following specifics:

- Number of students: about 30
- Duration: 6 hours

Preparation before the group formation

Given that the focus should be on the academic aspects of the group formation process, and a social process, it is – according to the coordinator interviewed about this model – important to highlight these two perspectives to the students, both before the process and during the process.

Dimension/Name of model	Self-organising	Subject-centred	Relation-based	Administrative
1. Duration	Small	**Medium**	Large	Small
2. Subject focus	Medium	**Large**	Small	Small
3. Relational focus	Medium	**Small**	Large	Small
4. Physical frames	Small	**Large**	Large	Small
5. Coordinator involvement	Small	**Large**	Medium (yo-yo)	Small
6. Group size	Large	**Medium**	Small	Small
7. Standardised model	Large	**Medium**	Small	Small
8. Number of students	Large	**Small**	Large	Small
9. Diversity of students	Small	**Medium**	Large	Large

Table 4.3: Characteristics of the subject-centred model. In Dimensions 1 to 5, small, medium and large reflects the extent to which there is a focused emphasis from the coordinator on a certain group formation dimension. In Dimensions 6 to 9, small, medium and large reflects factors that the coordinator has little, or no control over, but the extent to which the dimension has an impact on the group formation process.

The starting point for the process is that the students jointly read a book that covers the key academic aspects of the syllabus in the module. A number of thematic issues and issues relevant to the described learning goals in the module will emerge from the academic context, which the students will be able to prioritise and use to make qualified academic choices when choosing project topics.

Before starting the group formation process, the students are given an overview of the academic topic by the teacher (here the coordinator). Afterwards groups of students read selected chapters in the book based on guidelines from the coordinator. These guidelines refer to how to read the individual chapters, and which chapters each group has to read. The coordinator has also defined (research) questions that the students must address when reading, presenting and discussing the relevant chapters in the group. Finally, there are guidelines for how students should present their chosen themes and the types of questions that might arise from the chapters for their fellow students.

Introduction	Discussion	Seminar	Status	Group formation
Introduction to the fall activities. The rest of the day is spent reading selected chapters ind the book Welfare Society – A Basic Book by Bent Greve	Each group discusses and collects what they have read and prepares the presentations for next lesson. This work is going on in the group you have been with so far.	Seminar on the Welfare Society and its organizations. The seminar leads to the start of the group formation process, where principles of group formation and the process are decided. (NB: it is important to attend to influence the process)	Status of the group formation situation from the morning.	Morning status for the group formation. The group formation process must be completed by noon. 12:00 where ALL must be in groups. In the afternoon the new groups meet and plan the future process.

Figure 4.1: Agenda for the week leading up to group formation

Below is an illustration of the schedule for the whole week, leading up to the group formation.

Results of a typical group formation day

In the case studied most students were initially very positive and deeply engaged in the process when the subject-oriented model was used. The students had to move between rooms in the process, which caused a bit of turmoil, but was otherwise useful for the process. Post-its and posters were used for sharing ideas.

The students wrote themes that were grouped together. Small groups were formed where students could walk between, settle in and supplement them with ideas. Towards the end of the process, one person could not really decide which group to join, but eventually, with a little support from the coordinator, decided on a group. It all worked as a balance between students being on their own and managing the process themselves, and the coordinator keeping an eye on the various inclusive and exclusionary processes going on. Occasionally, the coordinator by own initiative got involved in the conversations and asked in-depth questions. All students ended up being in a group, and all the groups functioned until the exam was over at the end of the semester.

Pros	Cons
The coordinator is present and guides the process. The model focuses directly on the subject and the learning potential of working in groups, without, however, overlooking the relational aspects such as anti- and sympathies towards other students.	Some students arrive at the final group formation event having already formed groups. This poses a serious challenge to this model but also more generally to group formation processes.
The focus is on the importance of everyone getting into the right group. No groups are formed before everyone is in a group.	The coordinator may be forced to spend a considerable amount of time preparing the group formation process itself. In addition the students may not develop abilities and responsibility for self-directed organisation.

Table 4.4: Pros and cons of the subject-centred model.

The coordinator spent a great deal of time on the process, but because the group formation process was not a detached process, but was integrated in the subject-related teaching, it was a good investment. Of course, the process did not go about without problems. Some of the students were very reluctant and apparently not used to being active about mingling in groups. In those cases, the coordinator had to intervene, to talk with them and encourage the process.

The pros and cons can generally be summarised as follows (Table 4.4).

The relation-based model

It is essential in this model that students choose group membership mainly based on considera-

- Number of students: about 85
- Duration: Several weeks

Dimension/Name of model	Self-organising	Subject-centred	Relation-based	Administrative
1. Duration	Small	Medium	**Large**	Small
2. Subject focus	Medium	Large	**Small**	Small
3. Relational focus	Medium	Small	**Large**	Small
4. Physical frames	Small	Large	**Large**	Small
5. Coordinator involvement	Small	Large	**Medium (yo-yo)**	Small
6. Group size	Large	Medium	**Small**	Small
7. Standardised model	Large	Medium	**Small**	Small
8. Number of students	Large	Small	**Large**	Small
9. Diversity of students	Small	Medium	**Large**	Large

Table 4.5: Characteristics of the relation-based model. In Dimensions 1 to 5, small, medium and large reflects the extent to which there is a focused emphasis from the coordinator on a certain group formation dimension. In Dimensions 6 to 9, small, medium and large reflects factors that the coordinator has little, or no control over but the extent to which the dimension had an impact on the group formation process.

tions of their relationships with other students and that the group formation process assists them in that (Table 4.5).

This example is from a seventh semester Learning and Innovative Change master's programme with the following specifics:

Preparation before the group formation

The student cohort in our case is characterised by high diversity (educational background, work experience, age, motivation, geography, family etc.). Group formation in this field depends on diversity and the motivation to learn from diversity, and therefore, the setup is based on learning from diversity, curiosity and challenging preconceptions and prejudices. The preparation before the "group formation day" involves challenging the students on diversity from three different perspectives.

1 Generating ideas (Which topics are relevant in this field of study?)

In initial administrative-based groups, the students were asked to define a research question based on the study field. The groups each had five students and the aim was to generate posters about topics of interest for the group formation process.

2 Identity (Who am I when I work in groups?)

Based on a personality test (Myer-Briggs Type indicator, MBTI; Myers & Myers, 1995), on identity and identity in groups, the students were asked to be curious about the competency they bring into groups.

3 Motivation (which elements are important to me, when I work in groups?)

Based on an identity workshop the students were asked to brainstorm about their motivation for working in a group. These words were printed on the drawing board, and afterwards students picked the three most important words as preparation for the group formation day. The criteria for the class was also shared in the Learning Management System (LMS) (Figure 4.2).

The agenda for the group formation day is as follows:

The students are invited into a room designed to encourage curiosity and exploration, and the day is divided into four major activities, which leads the students through disorganisation to group formation. The students are told that all groups are open until everyone has a group.

The day begins with a presentation of the agenda and a presentation by former students about important things to remember when choosing groups. (Figure 4.3).

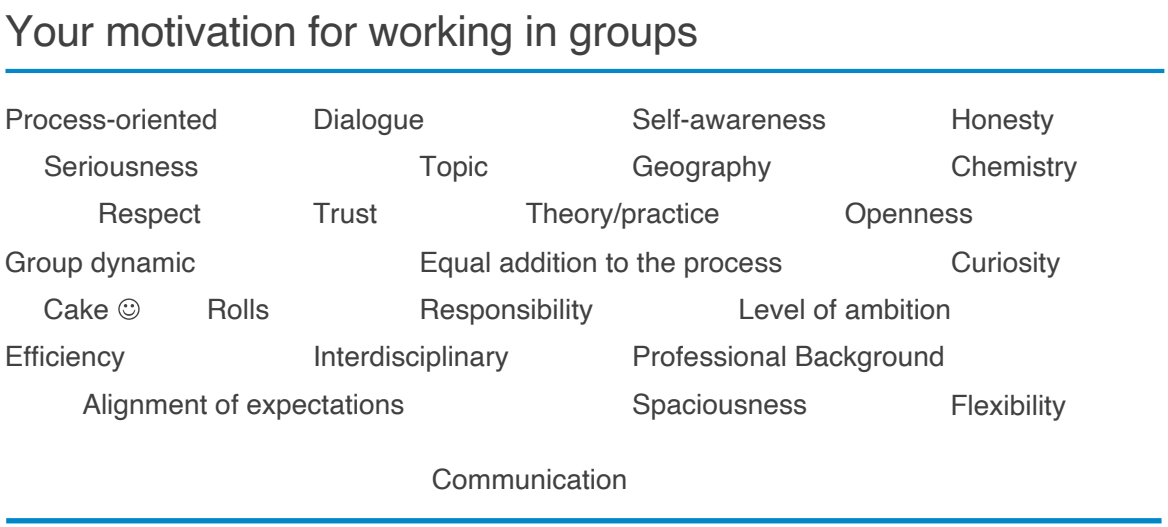


Figure 4.2: Example of motivation-brainstorm

During the four phases of group formation the students are invited to:

- Stay curious
- Be appreciative
- Take as many perspectives in the dialogue about the topics as possible
- Take their group criteria into the decision-making process

The teachers are allocated so as to be in the room answering questions for 15 minutes in each of the four phases. This gives the students ownership of the process, and the teachers will be seen as consultants and not as initiators.

Figure 4.3: Group formation phases

Results of a typical group formation day

The relation-based model is useful for students interested in social and individual processes and learning approaches. The process gives students the opportunity to focus on different aspects of group work, such as their own motivation and that of others, and to find a subject that they find interesting. They are invited to talk about strengths and weaknesses through talking about what group work involves. The process requires the coordinator to focus on when to let the process continue on its own, and when to guide the process. This can be challenging, and therefore the coordinators have to set aside some time for this activity.

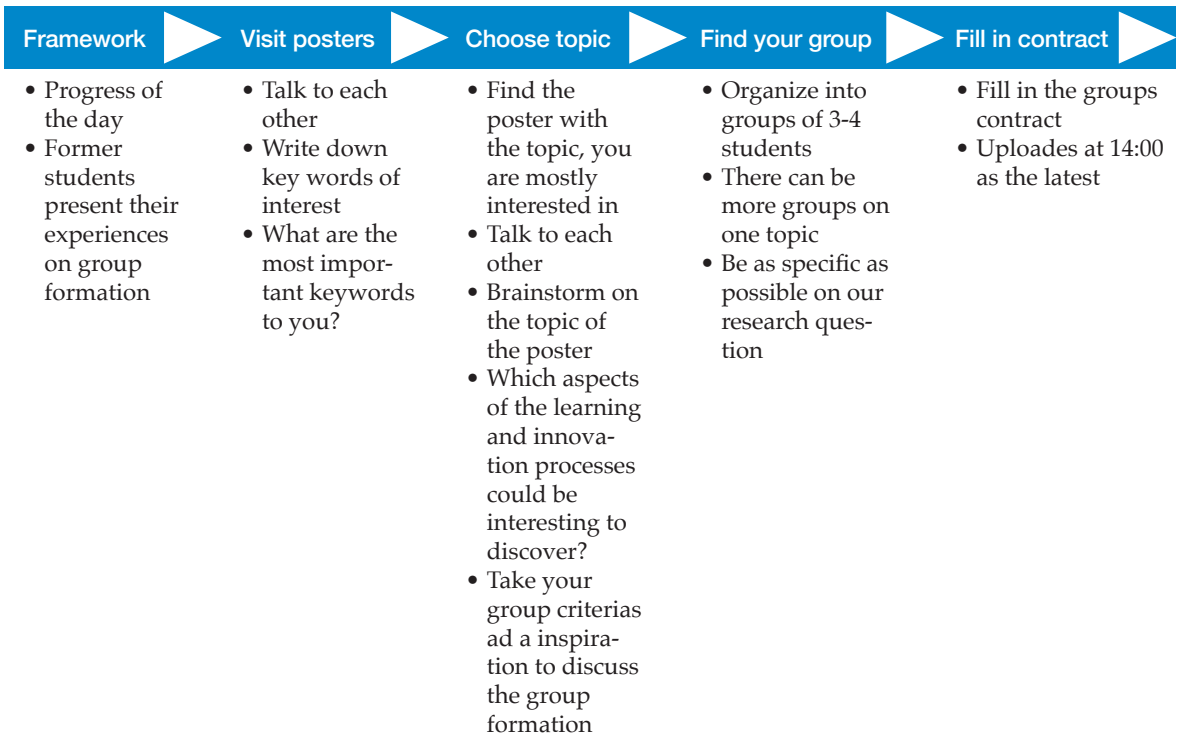


Figure 4.4: Detailed Group formation process.

The following group work benefitted greatly from this process, and only one of the twenty groups had challenges that led to a group split.

The pros and cons can generally be summarised as follows:

The administrative model

In this model students are not involved in choosing their own group as this is done randomly by the administration or according to specific criteria by a coordinator, based on gender, background and so on (Table 4.7. Next page).

Preparation before the group formation

Administrative group formation can be done in all semesters and with any number of students. Typically, administrative group formation is used at the beginning of the first semester. At the faculties of engineering and science at AAU, this is done before the P0 project, which is a small

Pros	Cons
This model especially suits classes with great diversity - by discussing and investigating the diversity of experiences and educational backgrounds, the students are invited to see the benefits of social learning. A great deal of time is allocated to forming groups and to some extent this may result in less experience in high-pressure situations.	Experience shows that students may find the process very long. Large groups of students may prove to be a problem in this respect.
The importance of being transparent about the relational and social conditions for group formation in the presentation and facilitation of the group formation is a key element in this model. Students are given the opportunity to reflect on their professional identity at an early stage.	The model means extensive involvement from the coordinator, and thus takes up more resources.

Table 4.6: Pros and cons of the relation-based model.

Dimension/Name of model	Self-organising	Subject-centred	Relation-based	Administrative
1. Duration	Small	Medium	Large	Small
2. Subject focus	Medium	Large	Small	Small
3. Relational focus	Medium	Small	Large	Small
4. Physical frames	Small	Large	Large	Small
5. Coordinator involvement	Small	Large	Medium (yo-yo)	Small
6. Group size	Large	Medium	Small	Small
7. Standardised model	Large	Medium	Small	Small
8. Number of students	Large	Small	Large	Small
9. Diversity of students	Small	Medium	Large	Large

Table 4.7: Characteristics of the administrative model. In Dimensions 1 to 5, small, medium and large reflects the extent to which there is a focused emphasis from the coordinator on a certain group formation dimension. In Dimensions 6 to 9, small, medium and large reflects factors that the coordinator has little, or no control over but the extent to which the dimension had an impact on the group formation process.

project of a few weeks duration at the start of the first semester. The purpose is that the students gain some experience with group work in PBL and get to know each other. Since only a few know each other in advance, the groups are completely random, however, there is a tradition that there should be at least two same-sex students in a group, so that, for example, if there is a semester with few females or with few males, they will not experience being one female or male alone in a group.

Administrative group formation can also be a relevant model in later projects. In the development project (the empirical work supporting this booklet, see Chapter 5 for details), students in the three programmes were directly asked if they would prefer administrative group formation. Some 14-16% indicated that they preferred administrative group formation (see also Chapter 3 for description of methods). This is clearly a minority, but still a reasonable proportion of students.

At the same time, 46-70% of the same student group stated that they were nervous prior to a group formation day, giving some weight to the argument of avoiding a group formation process in the first place. Another argument in favour of the administrative model relates to real work situations. People do not choose who they will be working with in a real work situation or what skills and backgrounds others should have to be worthy of cooperation. Administrative groups can thus enable that more working life competencies are practiced than using groups which consist of close friends writing several projects together.

There is no group formation day, but students receive letters and/or electronic notification about which group they are in – or they are told at the start of the study, when they are also presented to supervisors and tutors (older students).

Variants of administrative group formation can be based on, for example, personality tests (e.g. Myers & Myers, 1995), thus perhaps ensuring optimal group constellations. Another intermediate variation requires students to choose a co-student freely and these pairs of students are then distributed into larger groups administratively.

The pros and cons can generally be summarised as follows: (Table 4.8).

More than four models

One thing is clear from the above four examples: there does not seem to be *one* way, and probably not even a *right way* to conduct group formation in PBL. All four models have pros and cons, and often traditions, educational cultures and the number of students and educators involved will be deciding factors when choosing the right model.

Pros	Cons
Students are confident that they will be a member of a group. This can mean a less nerve-wracking process than free group formations.	Students may end up in a group without aligned work habits, subject interests, and a lack of mutual investment in the group.
Students practice cooperative competences extensively, since they have not chosen the others. In this sense, the situation resembles the labour market where you do not choose your colleagues.	Students do not have the opportunity to choose a group based on their academic interests. This means that it can be more difficult to develop a specific profile.

Table 4.8: Pros and cons of the administrative model.

In the final chapter of the booklet, we will offer reflections and advice on which considerations to be aware of when forming PBL groups. Before that some additional empirical material focusing on the output from student interviews and questionnaires will be presented.

5

Student Experiences with the Group Formation Process

Although the group of authors had indications of how the group formations were perceived by the students through semester evaluations and our own experiences with students, we found it necessary to learn more about the way students actually perceive group formation. We therefore conducted a study of student experiences with the various types of group formation processes. All the students involved on all three educational programmes received a questionnaire based on the nine dimensions described in Chapter 3 and other items as an online SurveyExact link a few days after the group formation was complete (October 2017). The questions and results from the questionnaire became the basis for interviews with students from each of the three educational programmes later that semester.

Design of questionnaire and interviews

The questionnaire was designed with three questions per dimension (Appendix B) and used a 5-point Likert scale. 1 is Agree, 2 is Partly Agree, 3 is Neutral, 4 is Partly Disagree and 5 is Disagree. Three questions per dimension were used to check for opinion stability without making the questionnaire too long. Towards the end, we asked background questions such as type of high school, education, age, gender, and previous experience with group work (Oppenheim, 2000). The questionnaire was analysed using SPSS. A research assistant performed the interviews with students who had volunteered via the questionnaire. We used a research assistant for these interviews as we anticipated this would allow the students to respond more openly than speaking to their teachers. The interviews were semi-structured and followed an interview guide (Appendix A).

Cronbach Alpha tests revealed the extent to which the three questions in each dimension produced similar scores. It is therefore a method to estimate reliability. Unfortunately, the only dimensions with an acceptable alpha (more than 0.6) were 2, 3, 4, and 7. Despite this, we will report the results of all nine dimensions, as well as how students perceived the administrative model and whether students were nervous prior to the group formation day.

The questions were answered by:

- Between 40 to 46 of 62 Mathematics students, i.e. a 65-74% response rate (MAT, first semester, Faculty of Engineering and Science).
- 21 of 35 Organisational Learning students, i.e. a 60% response rate (OL, first semester, Faculty of Social Science).
- 65 of 84 Learning and Innovative Change students, i.e. a 77% response rate (LIC, seventh semester master, Faculty of Humanities).

Our response rates to the questionnaire were between 60% and 77%, which we consider acceptable (Nulty, 2008). Two students from Mathematics, two students from Organisational Learning, and one student from Learning and Innovative Change were interviewed.

Results of questionnaire and interviews

We first highlight statistical insights from the questionnaire, then we delve deeper in several places into a specific issue or dimension using insights from the student interviews. We start out by commenting on the nine dimensions established in Chapter 3 and then analyse two additional topics – attitudes towards the administrative model and experiences with nervous students. We explain the results from each of the three education programmes, since each represents one of the four different models for group formation process presented in Chapter 4. Since none of the three education programmes represented the administrative model in the semester we studied, all students were asked how they would feel about having administratively formed groups.

In the figures below, each of the three education programmes has its own colour, MAT (■), OL (■), and LIC (■), to make them easier to distinguish. In the footnotes or figure text we provide further statistical insights into the data in the form of M, meaning the mean (average) of the responses, and SD meaning the standard deviation. SD is a measure of how spread out the responses are around the mean. A large SD implies that the responses are far from the mean and a small SD implies that the responses are clustered closely around the mean. SD is therefore a measure of uncertainty. Since SD is in the same unit as the original data, for instance an SD of 1 in our data means that, on average, the responses are -1/+1 away in Likert-steps from the mean.

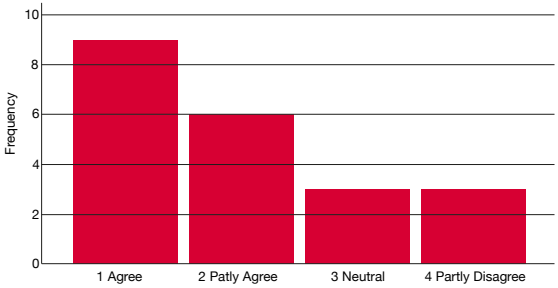
Dimension 1: Duration

The students in all three education programmes found that the time planned for the group formation was appropriate, particularly MAT students[4] (Figure 5.1 illustrating the OL students). The students all disagreed that the process was

4 (LIC: M = 2.26, SD = 2.26) (MAT: M = 1.37, SD = .771) (OL: M = 2.00, SD = 1.095).

rushed[5] and had no preference about whether the time it took to form groups could have been made shorter.[6]

There was an appropriate amount of time for the group formation



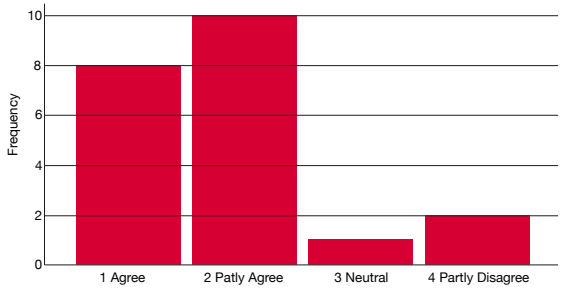
OL: (M = 2.00, SD = 1.095).

Figure 5.1: OL students.

Dimension 2: Subject focus

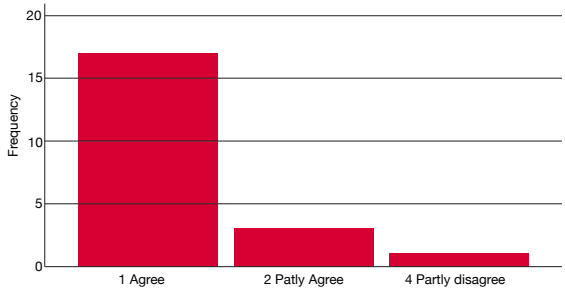
It is very clear that students from the BA in OL mainly chose their groups based on topic (Figure 5.2) and the coordinator also helped to form groups with a strong subject focus, as we saw in Chapter 4.

I chose a group mainly based on which topics were interesting



OL: (M = 1.86, SD = .910).

The subject for my project is very interesting



OL: (M = 1.29, SD = .717).

Figure 5.2: OL students.

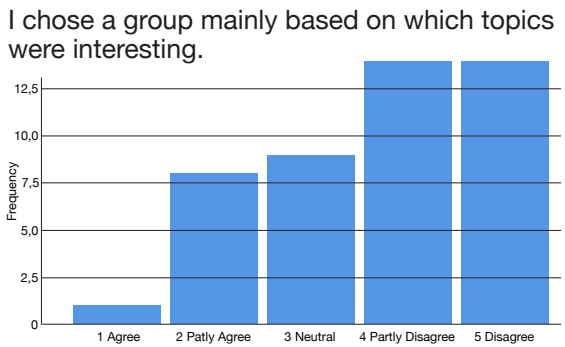
When plotting the answers to these two questions for LIC, we see a very similar pattern.

Although MAT students answered the question concerning how interesting they found the subject in a similar way to those of OL and LIC, we see that they did *not* choose groups mainly based on the subject. However, they still found

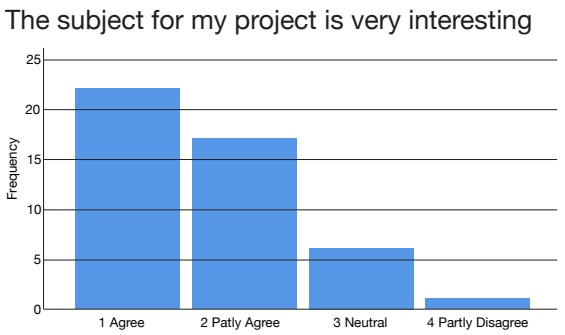
5 (LIC: M = 3.83, SD = 1.353) (MAT: M = 3.50, SD = 1.169) (OL: M = 3.33, SD = 1.065).

6 (LIC: M = 3.00, SD = 1.686) (MAT: M = 3.50, SD = 1.049) (OL: M = 3.10, SD = 1.091).

the subject very interesting, although slightly less so than the OL and LIC students (Figure 5.3).



MAT: (M = 3.70, SD = 1.152),



MAT: (M = 1.70, SD = .785).

Figure 5.3: Answers to two items in Dimension 2 from MAT students. For LIC, the numbers are: (Top: M = 1.89, SD = 1.002) and (Bottom: M = 1.26, SD = .509).

Dimension 3: Relational focus

OL and LIC students replied quite similarly. Clearly personal chemistry played a role during the group formation process, but the personal aspect appears to be less important to the students than the subject. The OL and LIC each answers the questions in Dimensions 2 and 3 consistently. Figure 5.4 illustrates the difference between the LIC and MAT students.

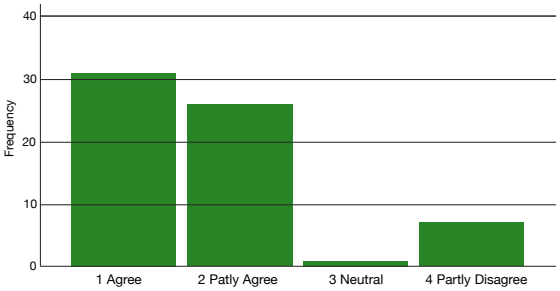
In line with the answers in Dimension 2, MAT students appeared to choose group members due to relational factors. Thus OL, LIC and MAT students, respectively, each group answer consistently in Dimensions 2 and 3. OL and LIC appear to have a subject focus, while MAT has a relational focus.

When we analysed the interviews for the MAT students, however, we saw a more balanced picture. It seems that they were guided by both issues, subject and relationships. For instance, one student said:

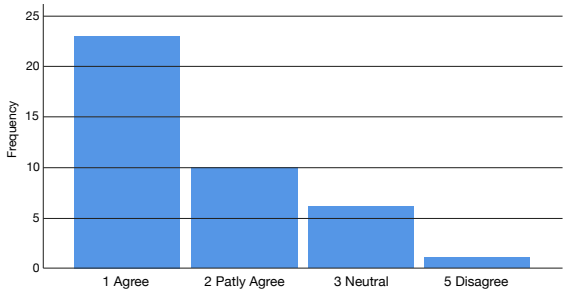
> Leslie (MAT): We used the freshman-trip to talk about who we would like to work with and if there was someone, I would rather work with than others … it was less 'I can't be bothered to write with you' and more 'I would like to write about this topic'.

However, later in the interview, it was clear that subject played a major role:

Considerations about personal chemistry played a major role for my choice of group

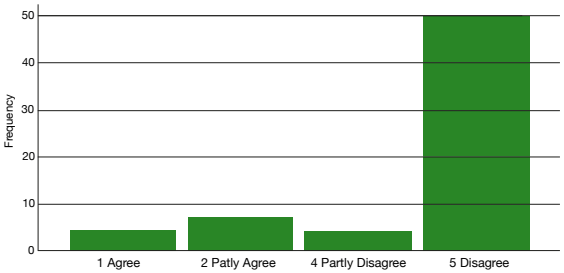


LIC: (M = 1.75, SD = .936)

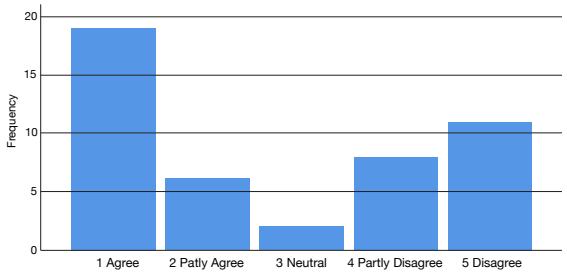


MAT: (M = 1.65, SD = .921)

Some time before the group formation, I had agreed with some other students that we would form a group

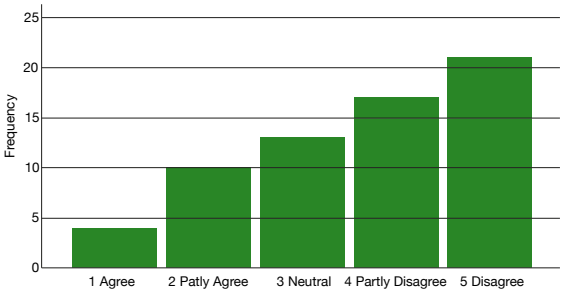


LIC: (M = 4.37, SD = 1.282)

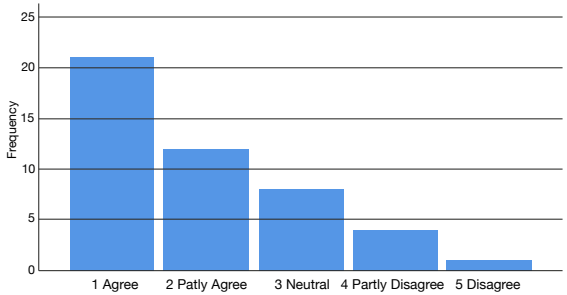


MAT: (M = 2.70, SD = 1.698)

I was more concerned about who I would work with than the subject



LIC: (M = 3.63, SD = 1.257)



MAT: (M = 1.96, SD = 1.095)

Figure 5.4: The three questions. For OL (not in Figure) the numbers are: Top: (OL: M = 1.95, SD = .973), Middle: (OL: M = 3.43, SD = 1.568), Bottom: (OL: M = 3.48, SD = 1.209)

Leslie (MAT): The social aspect plays a minor role ... it is nice that we can have a good time in the group, but …

Sally (MAT): You are there to work.

These students thus had a clear focus on the subject, contrary to the overall picture seen in the questionnaire. They are there to work. However, Leslie and Sally were not alike. When asked which elements particularly determined the final choice of groups:

Leslie (MAT): To me it was 100% … I read about this at home [the project catalogue is available in advance of the group formation day], and this is what I want to write about, it was this, I found to be most interesting …

Sally (MAT): To me it was a bit like 50/50.

Leslie at one point mentioned something that suggests a more balanced view:

Leslie (MAT): So, the subject clearly played a more important role than the social aspects. … Also, because the social aspects already worked.

Given that the social aspects already appeared to work well, the subject became the most important element within this framework. One may argue that in cases less characterised by social Darwinism, the focus on the subject is higher.

Dimension 4: Physical frames

The LIC, OL, and MAT students answer the question about whether the rooms were used in a suitable manner in a similar way, although the three groups had a very different style of group formation – and room locations.[7] They answered differently to the question about whether it was possible that the process could have taken place in any type of room.[8] MAT and OL seemed to believe that the type of room did not matter, while the LIC students had more diverse opinions, with a tendency to disagree. The different answers to this question are not surprising since the group formation process for MAT was very short, and in fact needed only a blackboard on which to write names, whereas the process was much longer for LIC.

Dimension 5: Coordinator involvement

MAT students overwhelmingly agreed that the coordinator/supervisor was only involved when asked[9] and also overwhelmingly disagreed that the coordinator/supervisor played a vital role

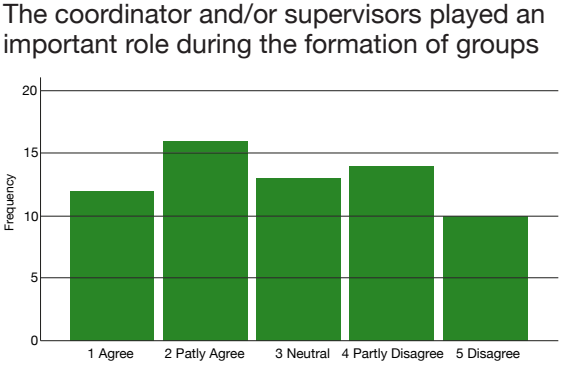
7 (LIC: M = 2.51, SD = 1.416) (MAT: M = 1.85, SD = 1.032) (OL: M = 2.10, SD = 1.179).

8 (LIC: M = 3.25, SD = 1.601) (MAT: M = 1.89, SD = 1.059) (OL: M = 2.14, SD = 1.236).

9 (MAT: M = 1.33, SD = .598)

during the process[10]. They appeared happy with this, as the majority agreed that it is important that students have time alone to form groups[11].

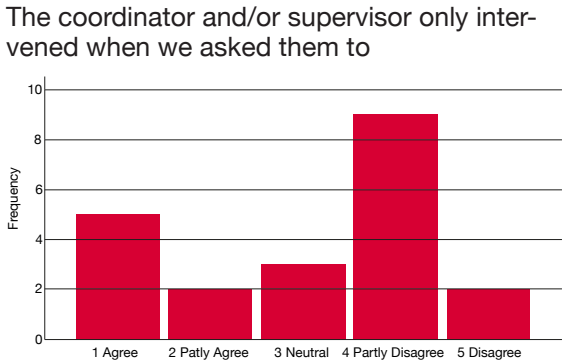
LIC students were quite similar to the MAT students as regards the first and third question,[12] however, in terms of the question about whether the supervisor played a vital role, the answers were very diverse (Figure 5.5):



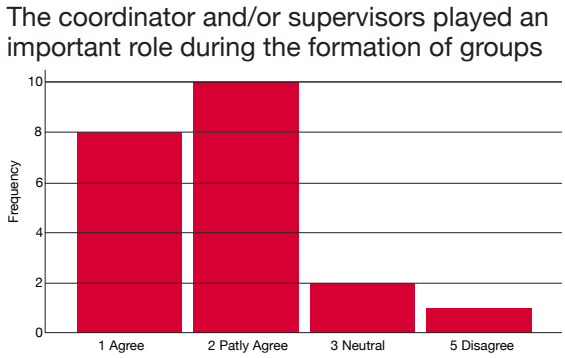
LIC: (M = 2.91, SD = 1.355).

Figure 5.5: LIC students.

OL students, on the other hand, said that their coordinator or supervisor only intervened when asked (Figure 5.6, top), but also that they played an important role (Figure 5.6, bottom).



OL: (M = 3.05, SD = 1.396)



OL: (M = 1.86, SD = .964)

Figure 5.6: OL students.

The coordinators or supervisors thus intervened without being invited to, but the students appreciated that. On the other hand, they also indicated that they need time alone, although much less than the MAT and LIC students.[13]

10 (MAT: M = 4.37, SD = .951)

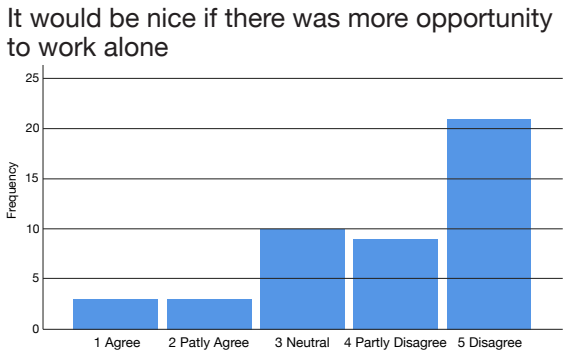
11 (MAT: M = 1.78, SD = .941)

12 (LIC: first question: M = 1.69, SD = 1.089, third question: M = 1.80, SD = 1.003)

13 (OL: M = 2.24, SD = 1.179)

Dimension 6: Size of group

The most interesting question in this dimension involved being allowed to work alone on a project. Almost all student groups disagreed with this (Figure 5.7).[14]



MAT: (M = 3.91, SD = 1.244)

Figure 5.7: MAT students.

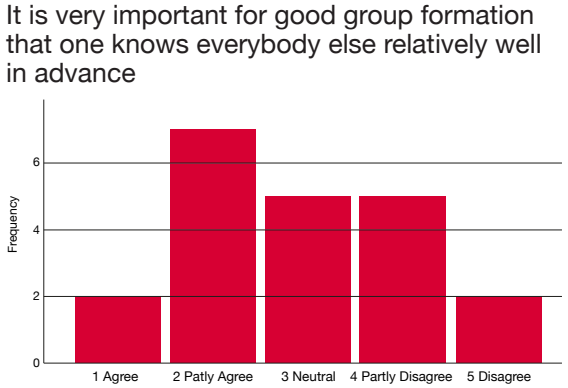
Dimension 7: Standardised model

The students' answers reveal that they were all moderately satisfied with how the style of group formation fitted their study,[15] and that their coordinators had good experience with this type of group formation,[16] however, MAT seems more neutral in the question regarding their coordinators' experience.

Taking Dimensions 1 and 7 together, it clearly appears that the students are satisfied with the group formation process and the time put aside for doing it.

Dimension 8: Number of students

OL and MAT students mostly agreed that it is an advantage to know the other students quite well before group formation (Figure 5.8), whereas LIC appear more neutral.[17]



OL: (M = 2.90, SD = 1.179)

Figure 5.8: OL students.

OL were mostly neutral regarding the question of whether many students in the cohort are helpful, because there are many to choose between,

14 (LFP: M = 3.75, SD = 1.490) (MAT: M = 3.91, SD = 1.244) (OL: M = 4.10, SD = 1.338).

15 (LIC: M = 1.78, SD = .976) (MAT: M = 2.24, SD = .923) (OL: M = 2.29, SD = 1.146).

16 (LIC: M = 1.78, SD = 1.053) (MAT: M = 2.96, SD = 1.010) (OL: M = 2.33, SD = 1.017).

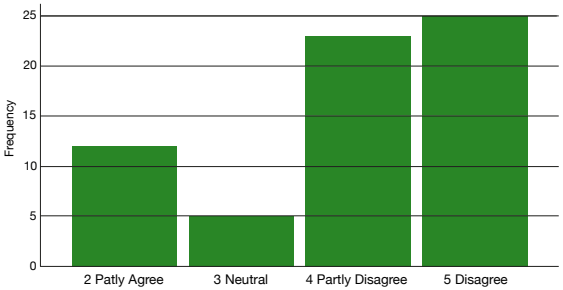
17 (LIC: M = 3.05, SD = 1.255) (MAT: M = 2.37, SD = 1.199) (OL: M = 2.90, SD = 1.179).

whereas LIC and MAT students tended to agree with this statement.[18]

Dimension 9: Diversity of students

LIC students clearly disagreed about being at a similar stage in life as their fellow students (Figure 5.9, left), and clearly disagreed about having similar education backgrounds (Figure 5.9, top right), but their answers were more evenly spread about whether they ended up in a group with students with different backgrounds (Figure 5.9, bottom right). It thus seems that although the student cohort clearly consisted of students at various stages in life, the groups formed were relatively homogeneous.

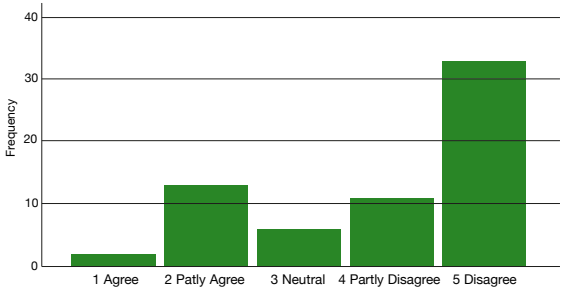
My fellow students and I are at a relatively similar stage in life



LIC: (M = 3.94, SD = 1.102)

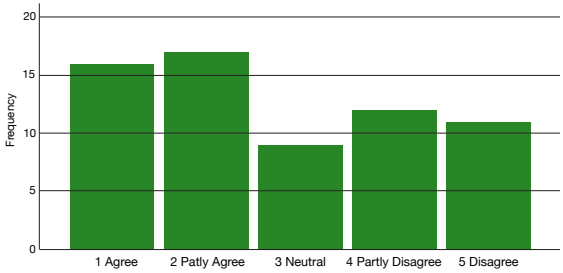
Figure 5.9: LIC students.

My fellow students have more or less the same educational background as me



LIC: (M = 3.92, SD = 1.303)

The group formation meant that I am in a group with some people who have a different starting point to mine for work in PBL.



LIC: (M = 2.77, SD = 1.444).

Figure 5.9 *continued*: LIC students.

MAT students agreed that most of the other students were at a similar stage in life[19] and had a similar educational background.[20] They were

18 (LIC: M = 2.92, SD = 1.163) (MAT: M = 2.41, SD = .956) (OL: M = 2.86, SD = 1.014).

19 (MAT: M = 2.50, SD = 1.070)

20 (MAT: M = 2.33, SD = 1.097)

neutral on the question[21] of whether their final group consisted of students with a different background. OL students also mainly agreed that they were at similar stages in life[22] and had a similar education background[23] but disagreed with the question about the final group.[24]

The administrative model

In addition to the nine dimensions, we also asked the students whether they would have preferred to have administratively formed groups for this project. MAT and OL students had experienced administrative groups during the first three to four weeks in their first semester, when they worked in the P0-groups (a small project of a few weeks duration at the start of the first semester). Overwhelmingly, most students (84.4 - 86.2%) preferred to not have administrative groups (Figure 5.10).

It is important to note that the question asked specifically about this project, not about administratively formed groups in general, or later in the semester. There might be a bias here if the students who answered the questionnaire shortly after the group formation actually found that the groups they formed were relatively good. In this case, they might have unconsciously compared this group to an unknown potential

21 (MAT: M = 3.17, SD = 1.102)

22 (OL: M = 2.76, SD = 1.044)

23 (OL: M = 2.62, SD = 1.071)

24 (OL: M = 3.90, SD = .944)

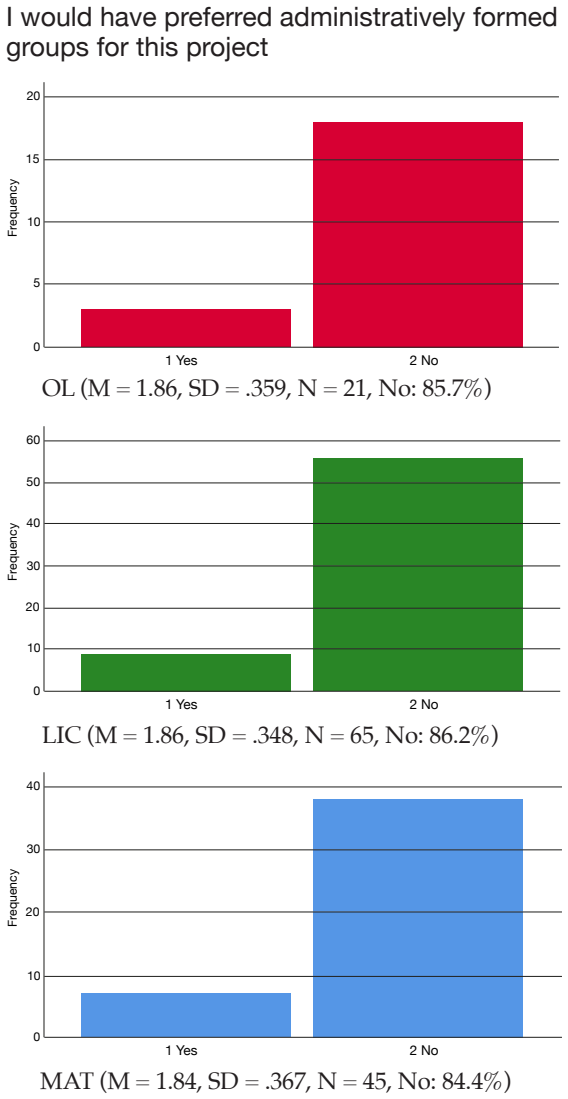


Figure 5.10

group formed administratively, thus being more negative about administratively formed groups. On the other hand, had the students ended up less satisfied with their groups, any other group might seem more appealing, thus answering this question more positively. In any case, the answers were relatively negative regarding administratively formed groups.

Interestingly, perhaps, the students we interviewed were much more positive about administrative groups. This could be because the students who had volunteered for the interviews were somehow less satisfied with the situation and saw the interview as an opportunity to talk about their experience.

Some of the statements of the students signalled this dilemma. For instance, in the MAT interview, when asked about how they would feel about administratively formed groups, and a student here explains the dilemma:

Leslie (MAT): P0 was administratively formed, and if P1 [the larger project at first semester, directly after the first project P0] is also administratively formed, where you shake the bag again … then no one is nervous before the group formation … we do not yet know each other so well, so it can be difficult to form groups, but one is allowed to choose a group according to subject, whereas in the other way [administratively formed group] one needs to compromise about the topic.

When asked about the learning that takes place as part of forming groups, Leslie says: "This would then have to be postponed to later … where one also has a little more experience and where one might also be more self-confident".

The OL students explained that particularly at the beginning of an education programme, administratively formed groups could be an advantage (the quotes below are not in any particular order):

Simon (OL): It is too much to put upon us, which topic, which group…

Elisabeth (OL): I imagine that it would have been different, if we had done this in the third semester … as by that time you have more experience about who you work well with in groups. I would have told myself to choose based on topic but you cannot avoid some people, and perhaps also myself, who think: ah, I do not think it is a good idea that I am in group with him or her.

Simon (OL): If we look at the groups formed after the first test, where some students had formed groups in advance, then one can see that those who socialise together also have a tendency to form groups together.

The social factors of forming social communities and being included appear to play a significant role, as does insecurity:

Simon (OL): I could see that the topic was actually good for me, but there is still reflection about whether I did it for the topic or due to feeling safe with them … there is still this element of insecurity. Perhaps one could also ask oneself if it would be good to have predetermined groups again.

Elisabeth agrees and Simon continues to argue, in line with the MAT students, that later, one would have more experience in forming groups, and he suggests the second semester as the time to start forming groups, which Elisabeth does not agree with.

Elisabeth (OL): As a cohort we had to figure out how to solve this task [form groups], and it was not the responsibility of any teacher to make sure everybody was happy. It was our responsibility, and we had to be fellow students to each other and make sure that everyone ended up in a group … and we need to compromise even if we perhaps thought I do not want to work with him or with her. … It is a good exercise for team spirit since we are only 30 students.

Helen from LIC said that she could see both pros and cons with administratively formed groups:

Helen (LIC): I can see the point of it … in relation to practice collaboration … this is what we are supposed to do afterwards, but at the same time it can also be a little difficult … it would take longer to decide on what to write about … when I came I did not really care about whether the project went one way or another … so in that sense I could have been in an administratively formed group, but if you were really into organisation or really into learning, then would be a little annoying to be in a group where the three others are the opposite … I think that the longer you are in the education, the more influence you should have on which direction it should take.

The issues here involve how advanced in their education the students are, the extent to which they should be allowed to choose the focus of their projects, and how to deal with nervous students. The latter is discussed further below, but in terms of the opportunity to choose the focus of the project, PBL to a large extent stipulates that it is the students who set the goals of their projects. This focus is not chosen randomly and is in a specific framework, but the students are still supposed to have determined their specific

focus. There may be a potential misalignment between the principles of PBL and practical issues of student fears and insecurities.

Nervous students

We asked the students if they had been nervous before the group formation. Overall, the students tended to be relatively nervous, however a little less for MAT (Figure 5.11).

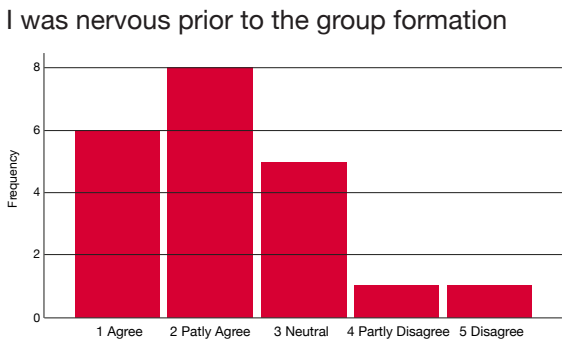
When MAT students were asked if students had been nervous during the group formation, Sally explained:

> Sally (MAT): It seemed as if some were nervous about whether they would find a group … whether anyone wanted to write with them.

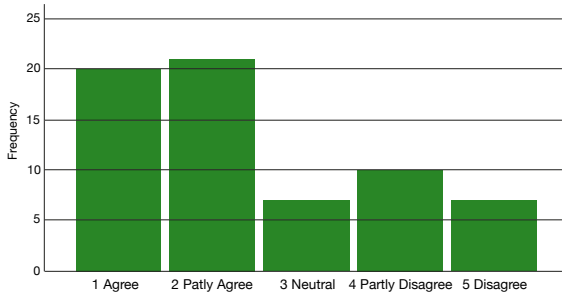
Leslie continued to explain two different situations:

> Leslie (MAT): The ones who had sat by themselves and did not talk a lot with other people, or get to know them, on the freshman trip, and there were also some who were nervous about how it worked.

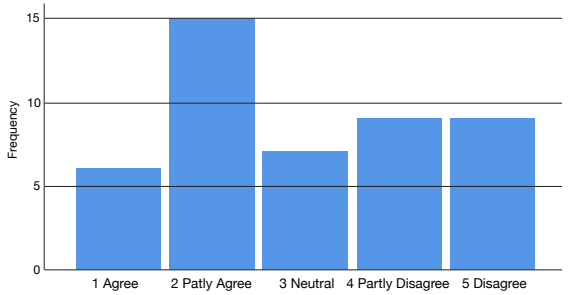
When asked what could be done to help the nervous students, Leslie suggested that the tutors could talk about it, and make the process less mysterious since they have used it before, instead of telling horror stories about someone stating to cry. The OL students both indicated



OL (M = 2.19, SD = 1.078).



LIC (M = 2.43, SD = 1.357).



MAT (M = 3.00, SD = 1.366).

Figure 5.11.

that they had been nervous, Elisabeth actually said "super nervous". She explained:

Elisabeth (OL): It is a little intimidating – one is being judged … one has to find out how to fit in somewhere … how is this going to work? What are the others like?

Elisabeth also explained that she could sense that others were also very nervous and stressed about the group formation. She explained that they had been "shaky-like" since it was so unknown, which made Simon (who had not been particularly nervous) feel very bad and say that it made his heart hurt. The LIC student explained that she had not been as affected by the whole process as previously. She said that she had spoken with some of her nervous fellow students and they had talked about how "there is not anyone here who is not able to write a project" to make them feel better.

Conclusions and Recommendations

6

Our findings demonstrate that it is very important to be aware of how troublesome some aspects of group formation processes can be for students. Even though there are different traditions regarding how this process is carried out in different educational cultures, there must be considerations of how the process affects the students when group formation is taking place, but also how this process may affect the work of the resultant groups. In this chapter we will discuss and draw conclusions about the different aspects of group formation which have been discussed and analysed in the chapters above. Finally, we will offer some considerations for PBL coordinators who are faced with the task of organising group formation processes to be aware of, and a list of questions to be considered for reflection.

The aim of this booklet was four-fold. It was first to discuss the challenges related to group formation in PBL in the light of existing research. In Chapter 2 we explained that group formation is by no means an easy endeavour and concepts such as social Darwinism were introduced. As learning involves participation in a learning community, issues of social inclusion and exclusion are vital. Group formation is the first step of the group collaboration and is thus essential for setting the scene for the work – and hence the learning.

Secondly and thirdly, we aimed to present various models of group formation practices and develop a didactical-conceptual vocabulary about models of group formation – all based on examples from AAU. In Chapters 3 and 4 we presented four models for group formation: self-organising, subject-centred, a relations-based model and the administrative model, as well as nine dimensions through which to describe central aspect of any group formation. These nine dimensions were duration, subject focus, relational focus, physical frames, coordinator involvement, group size, standardised model, number of students, and the diversity of the students.

The dimensions within the control of the coordinators

As described above, coordinators would often have control of the time allocation for group formation, the proposed focus – subject or relational – the physical frames, and, naturally

how far the coordinators decided to be directly involved.

The allocated time sends a signal to students, but there is no such thing as best practice here – all students in the three different programmes investigated were happy, even though the time allocated was very different. The choice of time, however, needs to be made considering the other elements of group formation, for instance the composition and number of students, and how experienced the educators are with facilitating a group formation, or the extent to which the group formation follows a traditional procedure (which everyone knows very well) or whether the coordinators wish to make changes to the previous procedure. More time than the three hours used in the self-organising model will probably be needed where there are large numbers of students, a heterogeneity of students (or if they do not know each other very well), or if a new procedure is being tried out.

The focus on subject or relationships is to some extent dependent on each other. If the milieu in the student cohort is characterised by being heterogeneous or with tendencies to social exclusion, then relational focus may be more beneficial, as students do not dare to form groups with the "wrong" people. On the other hand, a more socially inclusive milieu, not characterised by social Darwinism but welcoming differences, may make it more possible for students to choose groups based on subject interests. It is thus important that the coordinators "know" the student cohort, either through own experience, discussion with the group of students themselves or through asking colleagues closer to these students.

Administrative groups should probably be avoided except for short introductory project periods early on in semesters where students do not know each other yet. Most students prefer to decide on groups themselves, as clearly indicated in our study, and they should also be allowed to form groups based on their specific interests in the topic – and with peers with the same level of ambition.

Most students are nervous – some very much so! It is strongly advised that tutors avoid stories about tearful students, which can make group formation even more tense to begin with. Social exclusion can perhaps be avoided if students are taught that in fact, the best groups consist of students who are different.

In general, the rule that no one is in a group before everyone is in a group could perhaps be relaxed if it causes stress, however, this also needs to be balanced with the fact that learning to work in teams is an essential competence in almost all professions, and often such team-work competencies are listed as learning objectives in the curricula, and so cannot be neglected.

Dimensions beyond the control of the coordinators

Coordinators do not usually have control over rules about group size, formal rules or tradi-

tions about the model of group formation, or the number or diversity of students. The key thing here is how to navigate within these boundaries and optimise the situation. Even though there are boundaries, there might still be room for flexibility. For instance, the number of groups and group size are in fact two sides of the same coin. Taking into consideration the diversity of the students, another given, a coordinator can choose to allow one group to be smaller than the others, for instance, while the other groups have the maximum number of students. If group formation becomes difficult owing to "too" many students wanting to work together, a coordinator can suggest that they form two groups more or less at random and the two groups collaborate closely on, for example, data collection. A coordinator cannot change the diversity of students, but it is possible to change the way that students perceive each other, and it is possible to work on the didactical framework to lead the interaction of the students in a specific direction. Although some group formation processes are stated in formal rules, it is also always possible to challenge these rules in study boards, if/when a coordinator has experienced a type of process working less well.

Recommendations

Our fourth intention in our research was to develop and communicate useful recommendations for coordinators and supervisors in higher education PBL programmes, regarding how to conduct group formation. The rest of this chapter will be devoted to this.

Below we list several considerations that we find essential for coordinators prior to choosing any of the models. These considerations are based on the results of our questionnaire and interviews with the students, as seen in Chapter 5. We do not recommend any of the models as such, but for any model, certain things need to be considered in advance. (Table 6.1, next page).

Reflection questions for coordinators

The questions below can be seen as a kind of check-list for things to consider prior to planning the group formation. In addition to these questions, a coordinator also needs to become familiar with any rules or regulations concerning group formation. Advice from previous coordinators can be very valuable, as can previous semester evaluations. Study secretaries are usually a fountain of knowledge. (Table 6.2, next page).

Considerations to be taken before choosing the self-organising model

It is very important for a coordinator choosing this model to know the level of maturity and social atmosphere in the student cohort (whether they seem to accept each other, including students who appear "different" in some way), and how well the students know each other. If these parameters are low, it is likely that the process will be unpleasant for many students. If some students are a lot more ambitious than others, it can be an advantage to give them an opportunity to form groups themselves. Stage in education is also a factor: in later semesters, students can be expected to be able to handle this. When the coordinator is not present, it is important that they are easily accessible, and that the students know this. At the same time, it will be necessary for students to learn about the criteria for forming groups, and what a good group actually is, in advance. Leaving this to the tutors or other older students alone is neglectful.

Considerations before choosing the subject-centred model

This model removes the focus on who likes and dislikes each other, and towards the subject content. The coordinator needs to consider the extent to which the interests of the students are diverse, whether it matters if their project is on the exact topic or whether they will miss something, or whether there are relational factors among the students that need to be addressed. The coordinator also needs to know that it is necessary to be very rigorous in maintaining the subject approach to ensure that the whole cohort of students is focused on this.

Considerations before choosing the relation-based model

This model is time consuming, which requires didactical consideration from the coordinator. In this case, the coordinator included the steps in the preparation of the group formation in their ordinary lessons, but this might only be possible in specific education programmes that are interested in, for example, identity and relational work. The coordinator also needs to consider whether there are formal requirements about specific topics that need to be included in the projects. The coordinator also needs to be trained in process-facilitation to avoid becoming the one making the decisions for the groups. The level of student maturity and the importance of students learning to handle conflicts and group processes on their own also needs to be considered.

Considerations before choosing the administrative model

The size of the student cohort can have an effect on how well the students get to know each other and fragmented student cohorts (either due to high diversity or different types of tensions) can also make the group formation process difficult. In a smaller group, students get to know each other faster and are often able to form groups themselves more quickly.

In the case of a student cohort where a larger group knows each other from the past while the rest do not know each other – e.g. in the seventh semester where students come in from outside the university, administrative group formation can help break down clique formations. Conversely, students who are completely new to AAU's group work may enjoy having a semester to create their own experiences with project work before mixing with the more experienced students.

It is a clear advantage for the students that they can direct their educational profile themselves and the discussion of topics and problems quickly plays a bigger role in self-selected groups. In a semester with a fairly fixed project, however, the students will not receive this benefit anyway.

Table 6.1: Considerations for each of the four models.

Dimensions of Group Formation	Reflection questions for coordinators
1. Duration	How much time is available? Is this negotiable? Who knows? What do I need to know about the students and their prerequisites – who should I ask? Should the group formation take place during one session or be interrupted by breaks – and if so how long should the breaks be?
2. Subject focus	How do I incorporate the theme of the project or semester? Are there any requirements in the curriculum about this? How detailed should the project catalogue be? Should there be a project catalogue? How different should the project ideas be / how much freedom is acceptable within the frames of curriculum and supervisor experience?
3. Relational focus	Should the students take a competence/learning style/personality test prior to, or during group formation? Which test(s)? Should this be mandatory? How should such tests be used, by whom? Can I use tutors/older students to offer good advice?
4. Physical frames	Which room(s) would work best? Do I have a free choice of room(s)? For how long should I remain in the room with the students? For how long should I leave the room (yo-yo)? Do I give the students my phone number or should they come in person?
5. Coordinator involvement	How much pressure can/should the coordinator use? Is there a point where the coordinator steps in uninvited? How much facilitation can/should I do? Am I trained for this? Who should I involve beside myself?
6. Group size	How big are the groups allowed to be? How many supervisors are available and how many groups can each take? Is it permissible to work alone (when?)
7. Standardised model	What is the previous experience in my education programme about the model for group formation? How/where can I change things, if I want to?
8. Number of students	How many students are in the cohort? How diverse is the cohort in terms of age, level, gender, language etc.
9. Diversity of students	Are there students with special needs (Asperger's, blindness, deafness, physical disabilities etc.)? How do I deal with this? Who can I contact? Older (second degree) students, language issues, previous work experience etc.

Table 6.2: Reflection questions for coordinators.

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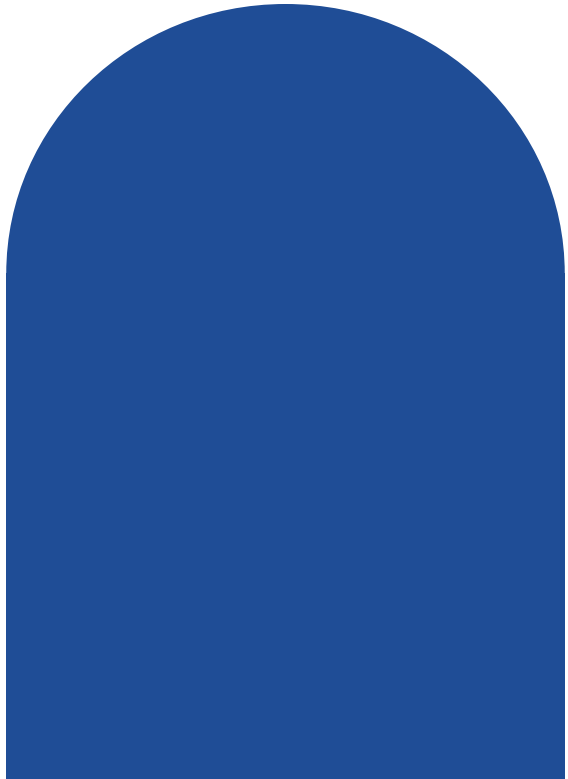

Appendices

Appendix A: Interview Guide

The guide has been translated into English for the use of this booklet.

In general

- When is the best time for the group formation? Very early, at any time, or…?
- How much structure is needed for a good group formation process?
- What does the optimal group formation model look like?

The most recent group formation process

- What was the worst part of the most recent group formation?
- What was the best part of the most recent group formation?
- Which suggestions do you have for future group formations this semester?
- What was the most essential learning experience of this group formation?

The other students

- What elements of your fellow students do you pay particular attention to during group formation?
- Is the academic level of your fellow students important during group formation?
- What characterises the group you ended up in? Which elements were particularly important in your final choice?
- Many students indicated in the questionnaire that they had been nervous. How did you experience this yourself, and among fellow students? What can be done to avoid this?
- Some noted in the comments in the questionnaire that it was difficult to say no to people you know you will not be able to work well with. Can you elaborate on this?

The role of the educator

- How much should the educator steer the process? What are the pros and cons?
- How did it work to have a mentor (OL) or multiple supervisors participating in the process?
- How do you perceive the distribution of responsibility between educators and students when forming groups?
- What do you think about administratively formed groups?

Appendix B: Questions in the questionnaire about the nine dimensions

Below are listed the three questions (opinion statements) for each of the nine dimensions. First in Danish (as given in the questionnaire), then translated into English for this booklet.

1: Duration	Der var afsat passende tid til gruppedannelsen/There was an appropriate amount of time for the group formation
	Tiden det tog at danne grupper kunne med fordel forkortes/The time allocated for group formation should be made shorter
	Jeg oplevede gruppedannelsen som forjaget/I experienced the group formation as rushed
2: Subject focus	Jeg valgte gruppe primært ud fra hvilket emne, der interesserede mig/I chose a group mainly based on which topics were interesting
	De projekter vi havde mulighed for at lave var alle rimelig ens/The projects we were able to choose between were all fairly similar
	Det emne jeg skal skrive projekt om, er meget interessant/The subject for my project is very interesting
3: Relational focus	Overvejelser omkring personlig kemi spillede en væsentlig rolle for min gruppedannelse/Considerations about personal chemistry played a major role for my choice of group
	Jeg havde nogen tid inden gruppedannelsen aftalt med nogle medstuderende, at vi skulle danne gruppe sammen/Some time before the group formation, I had agreed with some other students that we would form a group
	Jeg tænkte mere på, hvem jeg ville arbejde sammen med, end hvilket emne jeg ville skrive om/I was more concerned about who I would work with than the subject

4: Physical frames	Lokalerne, der blev brugt til gruppedannelsen, var udmærkede til formålet/The rooms that were used for the group formation were fine for this purpose
	Underviserne brugte aktivt lokalerne undervejs gennem gruppedannelsen til at styrke gruppedannelsesprocessen/The teachers actively used the rooms during the group formation to strengthen the process
	Vores gruppedannelsesproces kunne foregå i stort set hvilket som helst type lokale/Our group formation could have taken place in almost any type of room
5: Coordinator involvement	Koordinator og/eller vejleder blandede sig kun når vi bad dem om det/The coordinator and/or supervisor only intervened when we asked them to
	Koordinator og/eller vejledere havde en vigtig rolle under selve dannelsen af grupper/The coordinator and/or supervisors played an important role during the formation of groups
	Det er vigtigt, at de studerende får tid alene for at danne gode grupper/It is important that students have time by themselves to form good groups
6: Group size	Vi måtte selv bestemme, hvor mange der skulle være i gruppen/We could decide how many should be in the groups ourselves
	Det ville være dejligt, hvis der var større mulighed for at arbejde alene/It would be nice if there was more opportunity to work alone
	Der var et krav om, at alle skulle være i gruppe/It was necessary that all students were part of a group

7: Standardised model	Mit indtryk var, at koordinatorerne havde gode erfaringer med netop denne type gruppedannelsesproces for studerende som os/My impression was that the coordinators were well experienced with this type of group formation process
	Det var mit indtryk, at der var en traditionsbestemt procedure for, hvordan gruppedannelser skal køres/It was my impression that the procedure for group formation is a long tradition
	Jeg synes, formen på gruppedannelsesforløbet passer fint ind på mit studium/I think the procedure for group formation was suitable for my education
8: Number of students	Det er meget vigtigt for en god gruppedannelse, at man kender alle ret godt forinden/It is very important for good group formation that everyone knows everybody else relatively well in advance
	Det føltes uoverskueligt med så mange på holdet, der skulle danne gruppe/It was confusing with so many students in the cohort when we formed groups
	Det er godt med store hold, da man har flere at vælge imellem til at danne den bedst mulige gruppe/A big cohort is good, as there are more people to choose between to form the best possible group
9: Diversity of students	Mine medstuderende har nogenlunde samme uddannelsesbaggrund som mig/My fellow students have more or less the same educational background as me
	Mine medstuderende og jeg er på nogenlunde samme stadie i livet/My fellow students and I are at a relatively similar stage in life
	Gruppedannelsen endte med, at jeg har dannet gruppe med nogle, som har et andet udgangspunkt end mig for at arbejde med PBL/The group formation meant that I am in a group with some people who have a different starting point to mine for work in PBL

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7 Stine Bylin Bundgaard, Bettina Dahl, Lone Krogh, Ole Ravn Exploring PBL Group Formation Processes

Group formation is an essential practice in many Higher Education institutions where students work collaboratively in groups, solving different kinds of tasks and problems. The process of group formation is sometimes a more critical part of the collaborative work where processes of exclusion may be seen.

This booklet discusses and investigates various models for the process of forming student groups, specifically in relation to Problem-Based Learning in Higher Education settings. In the last part of the booklet, the authors provide various recommendations and questions for reflection for teachers and coordinators about the group formation process. Further, the authors suggests that it is a process where teachers and coordinators get involved.