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The challenge of assigning groups

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Abstract: Group work is increasingly used in higher education and is associated with several benefits, both for the students and the teacher. How groups are assigned is of significance for the success of group work. This study aspires to explore the ways in which teachers can assign groups in order to enable successful group work. The findings indicate that heterogeneous groups that consist of students with complementary abilities are the most favourable for successful group work. Furthermore, three different methods for assigning groups were identified via interviews with teachers in higher education: 1) groups intentionally assigned by teacher, 2) randomly assigned by teacher, and 3) groups decided by students. Each method is however associated with both advantages and disadvantages, and it appears challenging for teachers to assign groups in an optimal manner.

Key words: group work; group formation; assigning groups

Introduction

Assigning group work is a well-known method at all educational levels and very common in higher education (Johnson et al., 2000). Group work involves students working together toward a shared common goal (Topping, 2005). There are many benefits of group work - both for the students and the teacher. For the students, group work is an opportunity for turning theory into practice and for increasing their depth of understanding. Group work motivates the student to exert more effort, to learn more, and to build more complete and complex conceptual structures as well as establishing positive and supportive relationships (Johnson & Johnson, 1999). The advantages of group works are even more diverse as the students often also benefit from peer-to-peer instruction, the reduced workload, the increasing interdependence and the better understanding of concepts as well as the ability to overcome conflicts (Young & Henquinet, 2000; Brame & Biel, 2015). For the teacher, group work allows harnessing critical perspectives and promotes deep learning through interaction among students (Millis, 2014). Group work can also ease the workload of the teacher as it is less difficult and time-consuming to manage large classes in groups than individually.

Although group work is generally assumed to be positive, it also has drawbacks. For example, poorly designed group tasks and dysfunctional groups can demotivate and frustrate the students, which implies that the learning outcome will be considerably smaller (Oakley et al., 2004). For teachers, group work can be challenging in terms of time and workload, especially if groups are dysfunctional. Conflicts within groups are common and the teacher may have to engage in a lot of conflict handling. The ways in which groups are assigned is important in this aspect, as the group functionality is decisive for reaping the advantages of group work. Assigning groups is thus an important tool for increasing the success of group work (Burke, 2011).

There is vast literature which addresses the importance of group work, the design of group projects and the management of groups and group conflicts, both in the professional environment (e.g. Young & Henquinet, 2000; Mannix & Neale, 2005; Caruso & Woolley, 2008) and in the educational field (e.g. Oakley et al., 2004, Payne et al., 2005, Borg et al., 2011). Specific literature on assigning groups is limited but there is some research discussing factors to consider when forming groups. The aim of this report is to, based on available literature, empirically investigate ***how a teacher can assign groups to enable successful group work.***

First, we introduce relevant literature that can guide our study. This is followed by a short overview about our methodology before we present our findings from the conducted interviews with teachers in higher education. Lastly, we discuss our results and summarize them in the conclusions.

Theoretical background

Approaches to learning

Approaches to learning refer to how students undertake their academic tasks and how that translate into learning outcomes (Chin & Brown, 2000). Thereby the learning approach of students determines not only their study technique but also the level of their understanding. Higher education literature distinguishes between two approaches to learning: deep learning and surface learning (Elmgren & Henriksson, 2018). The difference between the two lies in the quality of the knowledge (Beccaria et al., 2014). Deep learning occurs when students seek to understand the underlying implications and meanings of the subject whereas surface learning takes place when students focus on memorizing facts and figures only (Hall et al., 2004; Wilson & Fowler, 2005). In that regard, a deep learning approach relates to an intrinsic motivation of the student whereas a surface learning approach is coupled with extrinsic motivation (Beccaria

et al., 2014). A deep learning approach will likely generate an improved ability to retain and transfer knowledge as well as critical thinking. In contrast, a surface learning approach will likely result in fragmented and temporary learning and lack of commitment to the subject (Chin & Brown, 2000; Hall et al., 2004). The approach to learning is not static within students but varies over time and context. Research suggests that a student's approach to learning is a consequence of the context, meaning that variables such as the level of workload and deadline influence the approach (Chin & Brown, 2000; Dolmans et al., 2010). In the instance of a heavy workload or a short deadline, a student is thus more likely to have a surface learning approach towards the task at hand (Elmgren & Henriksson, 2018). Therefore, it should be in the interest of teachers to design the group work so as to facilitate a process that fosters deep learning (Beccaria et al., 2014).

The context variables are noteworthy in group work. Jointly coordinating the workload within the time limit is at the core of a collaboration process. This is referred to as coordination costs, i.e. the time and effort that the group members spend on planning, communicating, decision making, managing the time, etc. (Carnegie Mellon University, n.d.). Other stressors can be ascribed to coping with the logistical challenges of group work in an online learning environment and the increasing heterogeneity of the student population (Beccaria et al., 2014). Correspondingly, research have highlighted how time consuming activities, such as communication, attendance at meetings (Hassanien, 2006), overcoming internal differences in motivation and commitment, fragmented comprehension due to the division of work (Shea, 2018) and unequal workload (Bennett, 2015), occupy a majority of the time that students put into group work. Thus, the time allowance is a decisive variable for the learning approach of students in group work. More precisely, the risk of the students assuming a surface approach to learning increases in parallel to the intensity of the (time) constraints.

Beccaria et al. (2014) indicate that the group composition constitutes a determining factor for the learning approach. For instance, having a group solely consisting of surface learning students would only aggravate the challenges of the group work. However, there is also contradictory evidence suggesting that a heterogeneous group will result in a negative outcome (Beccaria et al., 2014).

The zone of proximal development

The zone of proximal development (ZPD) is a theory established by Vygotsky stating that students can reach a higher level of individual development through joint efforts or with help (Shabani et al., 2010). The ZPD itself is defined as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). The ZPD is reached by giving students a problem that they would be unable to solve individually (Roosevelt, 2008). Finding a solution requires the students to collaborate or receive input from someone more experienced. The theory of ZPD states that through such tasks, individuals can extend their skills to the extent that when encountered with a similar problem in the future they can solve it themselves. This implies that the ZPD has decreased in size and that the student must be faced with a more difficult task to shrink the ZPD even further.

Hence, group work collaborations can be useful for increasing students' level of development. Vygotsky's definition of ZPD, which ends with “more capable peers”, suggests that a group must consist of individuals with asymmetrical skills and levels of development. Other researchers however, have stated that learning also occurs in a group where the students are at the same level of development (Fernández et al., 2002). Nyikos and Hashimoto (1997) extended

the ZPD to not only consider individual learning but to account for groups. The concept of ZPD implies that in each group there is a potential for individual learning. However, Nyikos and Hashimoto (1997) argued that this potential is dependent on group characteristics. A group ZPD is subsequently the potential growth for the group as a whole where each individual learns from collaborative interaction. In Nyikos and Hashimoto's study (1997), they showed that social interaction within groups is necessary for reaching the ZPD. If all group members work independently, there will be no exchange of thoughts and peers will not learn from each other. Other prerequisites for collaborative learning are that all group members engage in critical thinking, and that they arrive at a mutual understanding of the subject (Nyikos & Hashimoto, 1997). This also implies that language, as a tool for exchanging views and ideas, has a decisive role.

Group formation

Assigning students to groups is according to Burke (2011) essential to the success of the group. A common problem related to group work is the failure of the group to work effectively together, and a possible solution to this problem is to carefully construct the groups (Huxham & Land, 2000). Seethamraju and Borman (2009) reviewed literature on group characteristics that have been claimed to positively influence the performance and found the following: commitment to a common purpose, performance goals and approach; combination of academic ability; high levels of domain knowledge and technical ability; heterogeneity (varied expertise and backgrounds allow for widest perspective to problem solving and approach selection); and complementary skill sets. However, despite that higher education is increasingly using group work, there is little guidance on how to allocate students to groups in an optimal manner (Huxham & Land, 2000).

There are generally three methods of assigning students to groups described in the literature: 1) allowing the students to choose their groups; 2) allocating students to groups randomly; 3) attempting to 'engineer' the groups according to personal characteristics e.g. personality, past achievements, gender, race or relevant skills. According to Huxham and Land (2000) the third method is most recommended, while method one and two appears to be the most commonly used. In line with this, Oakley et al. (2004) argue that teachers should form the teams, rather than letting the students select their groups. One mentioned reason for this is that strong students tend to seek each other out when allowed, leading to some groups with strong students and others with weak, which does not benefit either.

Seethamraju and Borman (2009) identified four different factors that influence the formation of groups: convenience, social cohesion, task management and technical skills/knowledge. The convenience factor concerns forming groups based on convenience aspects such as sitting close to other members in class, studying the same degree or being asked to join a group. The second factor, task management, implies forming groups on the basis of ensuring that the members have the necessary ability and skills to manage the group working process. The social cohesion factor entails forming groups based on ensuring that members of the group are socially and personally compatible. Lastly, technical skills/knowledge concerns forming groups on the basis of members complementing each other in terms of technical skills (that are required to solve the task). The study showed that students who consider the factors skills and knowledge, task management and social cohesion of the group members are likely to perform better as a group. While convenience was an identified factor that influences the formation of groups, it had no significant effect on the group's academic performance.

Students consider a range of factors when forming groups themselves. The factors which they consider are in line with those that research has identified as leading to high performances. The

conclusion that follows is that since students have more insight into the characteristics of potential group members, they might be best placed to form the groups themselves. (Seethamraju & Borman, 2009)

Group size

The size of a group has been found to be important. There are several aspects to consider such as cohesion in groups, ease of planning and management, ease of collective decision making, and possibilities of all group members' active contribution (Burke, 2011). Two people are generally not considered a group but a dyad and they have more limited possibilities of coming up with new ideas and being creative (Csernica et al., 2002). A group thus consists of three or more people. The suggested optimal group size is between three to five members (Davis, 1993; Csernica et al., 2002; Mellor, 2012). A group that consists of more than five members increases the risk of a decline in the active participation of the members. Therefore, group size should be adapted to the group task. Smaller groups are generally better for smaller and shorter tasks.

Methodology

We conducted a smaller interview study among teachers at Lund University to further understand their procedures and opinions on group work in general and on assigning groups in particular. We chose to carry out an interview study as it provides the researcher with a rich perspective of the phenomena being investigated, and an explanation of the lived experience from the interviewees (Legard et al., 2003). To acquire an overview of the topic, we first conducted a literature review. We performed an internet search for articles, web sites, and books with keywords such as group learning, group assignment, group formation, and deep learning. The review sharpened the focus of the study and also helped to inform the interview guide.

We conducted one interview each, which thus amounted to a total five interviews. The respondents were selected through our professional contact networks within Lund University. Purposive sampling was consciously done to target persons with vast teaching experience and elicit information of multiple experiences of group assignment tasks. Our selection criteria included having a PhD and teaching courses at master level where a large proportion of the studies consist of group work. With the guidance of literature, we constructed a semi-structured interview guide (see Appendix 1). The interviews lasted from 30-45 minutes in total. We informed the respondent about the objective of the study before commencing the interview. The interviews were either recorded or notes were taken during the interview. The respondents have been anonymized and we refer to them as respondent 1, 2, 3, 4, and 5.

We analyzed the respondents' answers using an Excel spreadsheet where the interview guide provided the structure to extract relevant information from each interview. Based on this, we identified and constructed three different themes deemed most relevant for further analysis and discussion. The literature was equally utilized to inform and strengthen the discussion section.

The study is limited in its sample size and thus does not provide an exhaustive list of ways to assign groups. Nonetheless, it provides an in-depth source of information concerning experiences of assigning groups. Ethical considerations were observed throughout the study and includes prior consent before recording and anonymizing names.

Findings

The interviews revealed that all respondents strive to support the development of the students' intellectual and cognitive skills by integrating group work as part of their teaching concept, and the findings are presented under three subsections: 1) Advantages and disadvantages of group

work, 2) Preconditions, factors, goals and rationale for assigning groups, and 3) Methods for assigning groups.

1. Advantages and disadvantages of group work

The advantages and disadvantages of group work were pointed out manifold. Our respondents mentioned that group work would emulate “real life” and improve the cooperation skills of the students. In group work, students must interact and can thereby learn from each other. Furthermore, articulating their ideas and testing their knowledge and preconceptions can support their learning. One respondent believed that group work can lead to more and improved learning due to the higher level of discussions and dialogues that occur within groups, which is different from how a student would approach a task individually. Moreover, the workload can be distributed, which allows for taking on larger and more complex tasks, whilst also deepening the understanding in ways that are not viable for students who work individually. From the teacher’s perspective, the advantage of group work can be a reduced workload and the pragmatic means of using available resources, and the possibility to work with a larger quantity of students.

A disadvantage for both, the student and (even more) for the teacher are the difficulties (and sometimes the impossibility) to assess individual efforts. Also, there can be perceptions of unfairness as students have different abilities, experiences and ambitions. In general however, most of the respondents believed that the benefits of doing group work outweighs the disadvantages.

2. Factors that influence assigning groups

Context and group size

Several of the respondents mentioned the importance of context when assigning groups. These included the duration and complexity of the task, the desired outcome, and the size of the class. Respondent 5 argued that if a group project will extend over long periods of time i.e. across one or several semesters, the group composition is of higher importance compared to group projects with shorter duration. In accordance with respondent 5, respondent 1 claimed that with larger group tasks, it becomes more important to have a well-working group. Respondent 3 mentioned that the class size is a decisive precondition for having group projects. S/he stated that the groups are necessary to handle the huge number of students in his classes (approximately 120 students).

The respondents also had different opinions on desirable group sizes within the class. This was partly dependent on the class size since smaller groups imply a heavier workload for the teacher, as there are more groups to manage. Most of the respondents agreed that four people is the optimal number since it creates a good group dynamic. Some leaned more towards three to four people per group whereas others preferred four to five. Respondent 4 stated that when a group is larger than 4 it usually becomes difficult to find a role for everyone, which increases the risk of unequal workload and free-riding. In contrast, respondent 1 often chooses to have five people in a group even though he argued that four is optimal. It is a precaution as students sometimes quit the course and he does not want groups of three people, as it highly increases their workload.

Group heterogeneity

Although the methods of assigning group work differ among the respondents, a large majority was in favor of high degree of heterogeneity when assigning groups. These included equal numbers in terms of gender and mixing participants according to national background or academic background. Respondents 3 and 4 considered heterogeneity in groups to be an asset

as the students will complement each other's abilities and create a holistic understanding of the topic by merging their different perspectives. The goal of the group constellations is therefore to bring as many perspectives to the table as possible. Respondent 3 and 4 also shared the belief that heterogeneous groups will foster skills of collaboration that transcend national and cultural boundaries. Respondent 2 also believed in mixing groups based on gender, skills and cultural background but for a different reason. According to respondent 2, heterogeneous groups are a matter of ethics. By mixing the groups the teacher can avoid risks of groupism and negative emotions due to some students feeling excluded. Respondent 2 also noted that mixing groups prevents too much group consensus and lack of debate. Some of the respondents expressed challenges with assigning groups and accounting for national and educational background. According to respondent 4, this requires thorough background knowledge, which can be difficult to acquire in university courses where the classes tend to be large and the interaction between teachers and students is limited.

Respondent 1 on the other hand, believed that some homogeneity in group constellations is necessary to succeed. S/he argued that all group members should share the same ambition in terms of grade, a willingness to put equal amounts of time into the group work and have similar levels of competences. For example, sharing the same language skills is vital. Students that have difficulties communicating in English often grow and learn more by working with students on their own level. If put in high performing groups, these students are often bypassed by the others who give them secondary tasks, which ultimately may lead to involuntary free-riding. In contrast, other respondents argued for mixing students with different learning abilities (strong and weak skills). Respondent 5 in particular believed in mixing strong and weak students in the same group, as this will improve the learning for everyone. Weak students will receive additional support and strong students will improve their understanding when they explain the topic for the others.

3. Methods for assigning groups

The respondents mentioned a set of different methods that they are using, or have been using for assigning students to groups. These have been summarized under the following three categories: intentionally assigned by teacher; randomly assigned by teacher; decided by students. Three of the interviewed teachers alternate between different methods (respondent 2, 5 and 4) while two of them always turn to the same method (respondent 1 and 3).

Intentionally assigned by teacher

Three of the respondents used the method of intentionally assigning students to groups, i.e. taking certain factors into consideration when forming groups. Respondent 5 had experience from using this method with two different approaches. In the first approach, he had prior knowledge about the students from another course, and the students were assigned to groups based on this. The goal was to form diverse groups consisting of students that complement each other in terms of educational level (i.e. stronger and weaker). In the second approach, the students got to fill out surveys about themselves (e.g. about their interests, strengths, and personality type) and diverse groups could be created based on that information. Respondent 2 turned to this method when he perceived a risk of dominance of one member, by placing the dominant member in a group with other dominant members, and also to avoid unequal balance e.g. in terms of gender or ethnic background. Respondent 4 used this method with the aim to create new constellations of students, since one of the overarching goals with the program at her institute is to have all students collaborating with everyone in their class at least once during the two years. The groups are therefore normally put together according to a running schedule,

where also other factors (gender, nationality, education) are taken into consideration to maximize the heterogeneity of the groups.

However, neither of the three respondents are using this method for every group assignment. One reason is that a certain level of prior knowledge and understanding of the students is needed, and it requires more effort from the teacher compared to other methods. Respondent 5 argues that it can be worthwhile to use this method to form mixed groups - but mainly for larger group assignments. Respondent 4 expressed a wish to form groups in a more intentional manner, but argued that this would require more background knowledge of the student than she usually has. Also respondent 3 stated that he would assign students based on gender, motivation and nationality, if he knew the students better.

Randomly assigned by teacher

Three of the respondents used the method of randomly assigning students to groups (but alternating with assigning groups intentionally). This can be done in different ways e.g. through the use of educational tools (e.g. online learning platforms) or a class list by students' names. This is the preferred method by respondent 5 when it comes to minor courses, since it offers an efficient way to create mixed groups. Furthermore, respondent 4 used a method where the groups are formed based on the students' topic of choice. This approach could be seen as a hybrid between randomly assigning students and giving them the freedom to decide themselves, i.e. not the freedom to choose whom to work with but *what* to work with.

Decided by students

The method of allowing students to choose their groups themselves was the preferred method of respondent 1 and 3. According to the experience of respondent 1, this method has generated the best results. However, he strongly encourages students to work with people of different backgrounds, knowledge, and perspectives. This is encouraged through a “mingle” in the beginning of the course where he randomly divides students into groups of four, and meta discussions are held where the students discuss topics, such as “what is important when working as a group” and “what are the challenges of working as a group”. This always results in some new group constellations, however some students choose to remain in the usual groupings. Respondent 3 always uses this method with the main reason being that the groups have to be assigned very early in the course and he does not know the students well enough at that point. Furthermore, respondent 3 also prefers this method in order to avoid the responsibility and the risk of becoming involved in potential conflicts over unfair group constellations. Respondents 2, 4 and 5 avoid or never use this method, since they perceive a set of associated disadvantages, such as students working with the same peers (i.e. choosing their friends or students they have worked with before) which they believe decreases the level of exposure to different perspectives, experiences and educational levels. Also, they do not want situations where some students are left without collaboration partners, which according to respondent 2 can lead to groupism and negative feelings.

Discussion

1. Advantages and disadvantages of group work

According to our respondents, one advantage in doing group work is the improvement of the collaboration skills of the students. That is in line with findings from Johnson & Johnson (1999), who assert that group work supports the establishment of positive and supportive relationships. Also the ability to overcome conflicts and to work cooperatively “*to be more competitive on the global marketplace*” (Young & Henquinet, 2000) plays in there. To build transferable skills can also be an outcome from using the cooperative learning approach, which

aims to promote students working together to maximize their own and each other's learning (Brame & Biel, 2015; Johnson et al., 2008). The theory of the deep learning approach states that deep learning occurs *when students seek to understand the underlying implications and meanings of the subject* (Hall et al., 2004; Wilson & Fowler, 2005). This can be achieved by working together and explaining thoughts and argumentation to others. Another advantage is the possibility to distribute the work amongst the group members, and consequently be able to solve more complex problems than they would have been capable of doing individually. This approach is based on the proximal zone theory by Vygotsky (1978). By working together with *"more capable peers"* the student learns how to solve more complex tasks and thereby also widening their proximal zone. Another important advantage for the teacher is the possibility to manage large and heterogeneous classes. By dividing students into small groups, they can reach a higher level of knowledge compared to large groups, which also allows *"the teacher to reduce evaluation time and to provide feedback in a timely manner"* (Young & Henquinet, 2000).

The disadvantages of group work are hardly discussed in literature. According to our respondents, the preparation time that assigning group work requires of them can play a decisive role which is in accordance with a statement from the Carnegie Mellon University (n.d.): Besides the preparation time for adequate tasks and the design of groups, it often needs time during the project term to meet and monitor student groups. Also, the occurrence of potential conflicts in groups can diminish the utility of group work for teachers (Borg et al., 2011) as it implies a heavier workload. Another disadvantage concerns the assessment of the individual work, which is practically impossible and remains unfair in parts, according to some of the respondents. On the other hand, there are some approaches existing on how to assess individual work even in group work, e.g. peer rating systems and feedback sessions (Young & Henquinet, 2000, Oakley et al., 2004).

2. Factors that influence assigning groups

Our respondents experienced that assigning groups is context dependent. This resonates with research in that smaller groups are better for performing smaller and shorter tasks whereas larger groups are necessary to solve more complex issues. In terms of group sizes, our respondents were unanimous with research in that three to five people is the optimal group size. They also mentioned similar disadvantages with having too large groups, which is a possible cause of free-riding. However, due to resources constraints and the considerable size of some classes, some respondents felt compelled to compromise and assign groups of more than five students.

As stated in the conceptual framework, Beccaria et al. (2014) indicate that the group composition constitutes a determining factor for the learning approach of the students, albeit with weak support from research (Seethamraju & Borman, 2009). However, there appears to be no consensus on what constitutes the best group composition (Fernández et al., 2002; Beccaria et al., 2014). There are both proponents and opponents of heterogeneous groups Vis á Vis homogenous groups. This lack of consensus appears to be reflected among our respondents' rationale behind group formation, as they all had different ways of creating groups.

Our respondents identified and considered a number of student related factors when constructing groups: academic background, cultural background, nationality, gender, skills, and level of development. Four out of five respondents believed that creating mixed groups based on these factors are beneficial for the learning, as it will: 1) enhance the understanding of both weak and strong students, 2) create positive skill synergies, 3) improve the students' skills of collaboration, and 4) prevent group conformation and lack of debate. Both Vygotsky (1978)

and Beccaria et al. (2014) support that heterogeneous groups, where students are at different levels of development, learn more. The rationale to construct groups based on this factor is thus justified. Somewhat contradictory however, other research have stated that learning also occurs in a group where students are at the same level of development (Fernández et al., 2002) and that mixing could actually lead to negative outcomes (Beccaria et al., 2014), a belief that respondent 1 adheres to.

Research further supports the notion that a group will benefit from having members with complementary skills (Seethamraju & Borman, 2009), which justifies the rationale of creating positive skills synergies. Respondent 3 and 4 believe that dividing the students according to nationality will improve the students' collaboration skills. Although not in conflict with any evidence, this division may also pose challenges. Nyikos and Hashimoto (1997) identify that language plays a vital role in exchanging views and ideas. As such, language may also constitute a barrier for learning, especially if the students must communicate in a language other than their mother tongue. Groups with members with varying language abilities put additional stress on the work (Beccaria et al., 2014) which may result in surface learning (Bennett, 2015). This evidence contradicts our respondents' rationale that groups of students of mixed nationalities always are beneficial for learning. A reasonable conclusion is that mixed groups both have benefits and disadvantages.

As noted by respondent 4, teachers in higher education rarely know the students well enough to be able to divide them according to the aforementioned factors, in particular their skills and level of development. Seethamraju and Borman (2009) note that students commonly have better insight into these matters, which suggest that the students are possibly better suited to form well-working groups themselves. However, only two of our respondents adhere to this logic. This is an interesting finding as there appears to reside an inherent conflict between creating novel constellations and well-working groups. On the one hand teachers want well-working groups to promote deep learning, but on the other hand they also want their students to be exposed to new impressions. According to this study, with additional support by Oakley et al. (2004), the latter seem to overrule the prior as three out of five respondents prefer to assign the groups to prevent the students from working with people they already know. However, this trade-off also suggests that novel constellations have a priority over already well-established group formations, which ultimately may hinder deep learning.

3. Methods for assigning

The interview findings show that a variety of three different methods are being used by the teachers. Two of the respondents prefer to let the students decide themselves, while three find it important to control the formation - more or less consciously. Advantages and disadvantages of both approaches are described from the teachers' perspectives.

By consciously assigning the students to groups, the teacher can ensure that heterogeneous groups are formed, based on whatever factors that the teacher considers important and feasible. Creating groups with students that are on different educational levels was mentioned as a motive to this approach, which is in line with the recommendations of Oakley et al. (2004), i.e. in diverse teams, both weak and strong students are of use to each other. However, there is an agreement that this method requires more from the teacher compared to the other alternatives. In particular, a certain level of background knowledge about the students is required, which is not always available to the teacher when the groups are to be formed. Burke (2011) correspondingly argues that this method can be used for small sized classes where the teacher is familiar with most of the students. Regarding the method of randomly assigning students to groups, the advantage of efficiency was highlighted. This is consistent with the key benefits

mentioned by Burke (2011): an effective means to create heterogeneous groups in large classrooms. However disadvantages of this method are also mentioned in the literature e.g. that achieving the aspired balance is left to chance (Baepler et al., 2016). The respondents who preferred to control the formation appear to keep in mind the heterogeneity of the group and to create an active and a positive learning environment. Such a rationale makes sense given that research shows that even though the conformity of homogenous groups may prevent conflicts, it may not necessarily result in critical skill development.

Allowing the students to decide themselves saves time and effort of the teacher, but may also decrease the likelihood of heterogeneous groups being formed, as friends tend to choose each other. Also, this method is associated with the risk that students feel left out. These findings are well in line with the disadvantages mentioned by Burke (2011), i.e. that the tendency of friends selecting each other may lead to segregation and too much time spent on socializing. On the other hand, Seethamraju and Borman (2009) found that students actually do take into account factors that have a positive effect on the groups' academic performance, which is why they actually might be well placed to form the groups themselves.

Conclusion

The objective of this paper was to investigate how teachers can assign groups in order to enable successful group work. The findings show that group work is associated with several benefits, but despite its importance there appears to be a lack of understanding and consensus on how to best form groups. As stated by respondent 1: *"It is very easy to simplify this question. There are large consequences of dysfunctional groups. The question of assigning groups deserves attention and discussion."* For the most part, the findings point toward heterogeneous groups being most promising to foster good collaboration skills and learning among the students. However, there are several different factors to take into consideration, and while there is consensus that heterogeneity is preferred for certain factors (e.g. gender), there are different opinions regarding other factors (e.g. development level), rendering it questionable to generalize whether heterogeneous groups always are superior to achieve good collaboration and deep learning.

Three general methods for assigning students to groups were identified, which are all associated with both advantages and disadvantages. It appears challenging for teachers to ensure the formation of successful groups. Resource constraints force them to occasionally compromise and assign groups in ways that are not the most beneficial for the students' learning. Furthermore, forming successful groups requires prior knowledge about the students, which is not always accessible for teachers in higher education.

To conclude, the findings of this paper suggest that more research is needed, in order to provide teachers with clear guidance on how to best assign groups, which is in line previous findings, e.g. *"There is very little empirical research, however, on which method best promotes student learning or enhances the learning experience."* (Baepler et al., 2016).

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Appendix 1: Interview guide

1. What is your opinion of group work in education?
2. What are the objectives of the group work projects in your courses?
3. In your opinion, what makes a successful group?
4. How do you usually assign groups for group projects?
 - a) Can the students decide for themselves or do you assign groups? If you vary between the two - why (e.g. depending on task?)
 - b) What group sizes do you use?
 - c) What factors do you consider when assigning groups? E.g. background/knowledge/ambition
5. What is the intent behind your assigning of groups? And how can it help achieve your mentioned objectives?
6. Does assigning groups affect the outcome of your course?
7. What are the consequences of unsuccessfully assigned groups?
 - a) For the teacher
 - b) For the students
8. Have you tried other ways of assigning groups previously? Experiences?
9. Is there anything related to assigning groups you would like to add? (e.g something that you find extra important or challenging?)