Multicultural student group work in an international classroom: An explorative study of students' experiences at TU/e

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Table of Contents

1. Introduction

Future engineers will work in multidisciplinary and international teams on open-ended engineering challenges (Crawley, Malmqvist, Östlund, Brodeur, & Edström, 2007). Eindhoven University of Technology's current educational strategy emphasizes "challenge based learning", which allows and stimulates students working in multidisciplinary teams to learn by solving real-life challenges/problems (TU/e Strategy 2030, 2018). In line with this, this strategy includes many statements with respect to internationalization, such as *students with diverse backgrounds in terms of age, culture, social background, gender and level of training* and *working in diverse teams and aiming for 1/3 of the student population is international* (TU/e Strategy 2030, 2018, p. 28, p. 33, p. 59). To achieve internationalization as stated in the TU/e strategy 2030, some initiatives towards an inclusive community have already been taken, for example having an English language policy, organizing diverse community events, and offering intercultural training. However, a clear integral policy on the international classroom is still lacking. For this reason, a specific policy for the establishment of the international classroom at the TU/e was recently defined (TU/e Policy International Classroom, 2019). The ambition for internationalization is that over 20% of the incoming bachelor students and over 35% of the incoming master students come from outside of the Netherlands. Besides, more than 90% of all TU/e students should have substantial international experience (exchange semester or internships) during their studies. The policy defines "international classroom" as *a learning space of a group of students in which*

- *different nationalities with different cultures are represented,*
- *the common instruction language is English, which is not the first language of most students present,*
- *students and staff engage in and appreciate diverse teams, and*
- *the diverse learning environment is (created) such that it enables students to gain international and multicultural experience and enhances the education quality* (TU/e Policy International Classroom, 2019, p. 10).

A preliminary study showed that a positive mindset towards international classroom is found among staff and students at the university, however, awareness, attitudes, knowledge, and intercultural competencies appear limited (Taconis, Sewnarain Sukul, Kleingeld, & Rispens, 2020). Specifically, the TU/e is facing an unbalanced division of the number of international students across institutes and programs, i.e., the percentage of international students in BSc and MSc programs varies greatly from about 10 to about 70% (TU/e Policy International Classroom, 2019). Besides, the awareness of seeing cultural diversity as valuable and enriching among staff and students seems limited. Therefore, an effort is still needed to convince all staff and students of value and benefits of internationalization and prepare teachers to use the international classroom as a tool for educational enrichment. In addition, the integration between domestic and international students deserves attention and improvement.

To meet the challenges such as the ones above, multicultural student group work is generally used in the international classroom in higher education to enhance intercultural awareness and to facilitate intercultural learning (Crose, 2011). However, simply arranging students into a multicultural group does not automatically lead to intercultural learning. The lack of interaction between domestic and international students has become a common concern, particularly in most English-speaking countries, such as the US, UK, Australia and New Zealand (Arkoudis et al., 2013; Strauss, U, & Young, 2011). The challenges of working in the multicultural group have often been reported to consist of language barriers, academic culture differences, and a negative experience with and/or a stereotype view of international students (Safipour, Wenneberg, & Hadziabdic, 2017). At the same time, the benefits of working in a multicultural group have often been reported as personal self-awareness and growth, exposure to new ideas, and the development of skills for intercultural interaction (Spencer-Oatey & Dauber, 2017).

Research in the field of management and organization has shown that there is no consistent finding of the diversity effect on either group performance or group cohesion (Webber & Donahue, 2001). Mixed-culture group members, compared with homogeneous group, often meet more challenges in group-process due to misunderstandings and coordination difficulties when working together (Popov et al., 2019). There are various perspectives and theoretical models to explore and explain the collaborative learning in a group. Marks, Mathieu, and Zaccaro (2001) provided an integrated framework using an input-process-output (IPO) model. Input variables include group task, group composition, and technological environment. Process variables include interaction and intermediate outcomes. Outcome variables consist of learning effectiveness and efficiency, satisfaction, and cohesion. By adopting this integrated framework (IPO) to explore student' multicultural group work experiences at TU/e, we could get an overview of the variables or processes embedded in a multicultural student group work.

In conclusion, the majority of studies on multicultural student group work in higher education have been conducted in English-speaking countries and are often focused on Asian students who study in western countries, since they are the largest population of international students (Safipour et al., 2017; Wu, Garza, & Guzman, 2015). A preliminary study (Taconis, et al., 2020) showed that the international students at the TU/e roughly consisted of 2/3 EEA (European Economic Area) students and 1/3 non-EEA students. In contrast, multicultural student group work at the TU/e consisted of Dutch and international students who neither speak English as their first language (international students from English-speaking countries account for a very small percentage at the university). Furthermore, the majority of studies focusing on multicultural student group work in higher education were conducted in business and marketing contexts (Mittelmeier, Rienties, Tempelaar, & Whitelock, 2018; Summers & Volet, 2008; Sweeney, Weaven, & Herington, 2008; Volet & Ang, 2012), whereas

TU/e is a STEM-focused university. Universities may differ in their organizational cultures, including their values, strategies, structures, and operations (Dauber, Fink, & Yolles, 2012), and as a result, students' perceptions about their multicultural group work experiences could differ significantly across universities. Given the above differences, gaining an understanding of students' challenges and gains in multicultural group work at the TU/e will raise teachers' intercultural awareness and help teachers to organize culturally heterogeneous groups in the international classroom effectively in the future.

Except for the challenges and gains in multicultural student group work, it is necessary to gain an understanding of the variables or processes included in students' multicultural group work, before looking for strategies to enhance the multicultural group work effectiveness. Given the above, this study has two aims: 1) to explore the challenges and gains of multicultural group work for both domestic and international students in the international classroom at TU/e and 2) to identify the variables or processes that facilitate/hinder students' multicultural group work in international classroom at TU/e.

2. Literature review

2.1 Multicultural student group work in higher education: challenges and gains

The terms of "teams" and "groups" are generally used in the literature of work organization (Delarue, Van Hootegem, Procter, & Burridge, 2008). Some researchers such as Offermann and Spiros (2001) stated that the key difference between "teams" and "groups" is the interdependent nature, namely groups tend to have looser task connections though team members may have common goals (as teams do). Other researchers such as van Knippenberg and Mell (2016) and Kozlowski and Bell (2001) have used "teams" and "groups" interchangeably in their studies. In agreement with the latter, we did not differentiate them in our study, but we paid attention to "multicultural student group work". We used the definition of Popov et al. (2012, p. 303), who defined "multicultural student group work" in higher education as "*a collaboration of two or more individuals from different national cultural backgrounds, who have been assigned a shared task and are jointly responsible for the final results, who see themselves and are seen by others as a collective unit embedded in an academic environment and who manage their relationships within a certain educational institution*".

Three main categories of challenges that students have repeatedly report regarding their experiences of working in multicultural groups are "language and communication", "attitudes and engagement", and "issues associated with the composition of the group (Spencer-Oatey & Dauber, 2017). These challenges are not exclusively related to cultural differences but are attributed to them. The English language issues, varying from a different level of English proficiency to different accents, are perceived as the major barrier to group interaction and effectiveness in English-speaking countries

(Summers & Volet, 2008; Volet & Ang, 2012). Except for the language proficiency issues, cultural differences also influence the group dynamics or cause the misunderstanding. For example, Yates and Trang (2012) found that Vietnamese students' less active participation in group discussions in an Australian university was influenced by their cultural values. In the Vietnamese culture, talking in class is discouraged and it is seen as a testament of ability instead of an important part of learning process.

Another category of challenges refers to the "attitudes and engagement". The engagement-challenge includes free riding and unequal commitment to the group (Popov et al., 2012), and the attitudes-challenge includes students' stereotyped perceptions. For example, Turner (2009) found that domestic and international students had preconceived and stereotyped perceptions of each other. Specifically, she found that domestic students in the U.K. hold a negative attitude towards international students concerning their general competence and ability to function in groups. On the other hand, international students perceived U.K. students as intolerant, aggressively individualistic, and unwilling to move out of comfortable ways of working.

The last category of challenges refers to "the issues of group member composition". Volet and Ang (2012) found that cultural-emotional connectedness impedes multicultural student group formation. In their study, both domestic and international students showed their preference for interacting and working with peers from the same cultural background, because they felt more comfortable and they worked better with minimal conflicts and misunderstanding. In a group this could mean that subgroups will form. Another study (Cotton, George, & Joyner, 2013), found that international students were less likely to participate when mixed with a dominant (domestic student) group. Specifically, in a culturally mixed group, the UK students (particularly males) dominated discussions, with limited input from international students; in a group consisting solely of international students, the interactions were much more equal.

In addition to these challenges, studies also show the values that students perceive in multicultural student group work, ranging from personal self-awareness and growth to exposure to new ideas and the development of skills for intercultural interaction (Spencer-Oatey & Dauber, 2017). Denson and Zhang (2010) found that both Australian and international students valued their multicultural group learning experiences on developing teamwork, problem-solving skills, and appreciation of and respect for diversity. Similarly, a study from Sweeney et al. (2008) showed positive changes in students' attitudes and on their personal growth. Besides, empirical evidence has shown that a multicultural student group performance was more effective in identifying problem perspectives and generating solution alternatives than non-mixed cultural groups (Watson, Kumar, & Michaelson, 1993). More broadly, studies focusing on intercultural learning gains from study abroad experiences have shown

the learning gains of knowledge/awareness of other cultures, self-confidence, and flexibility and adaptability/open-mindedness (Killick, 2017, p. 109).

2.2 An integrated model of group learning: Input-process-output (I-P-O)

We adopted the model of input-process-output (I-P-O) to identify the variables or processes that are embedded in students' multicultural group work. In this model, *inputs* refer to the composition of the team including individual characteristics and resources at multiple levels. Inputs include antecedent factors that enable and constrain members' interactions. For example, the individual team member characteristic includes competency and personality; the team-level factors include task structure and external leader influences; the contextual factors include organizational design and environment complexity (Mathieu, Maynard, Rapp, & Gilson, 2008). *Processes* refer to activities that team members engage in, combining their resources to resolve task demands. Marks, Mathieu, and Zaccaro (2001) developed a taxonomy of processes that included three superordinate categories: transition, action, and interpersonal (see Table 1 for the process dimensions and definitions).

Table 1 Taxonomy of team processes

Process dimensions	Definition
Transition processes	
Mission analysis formulation and planning	Interpretation and evaluation of the team's mission, including identification of its main tasks as well as operative environmental conditions and team resources available for mission execution
Goal specification	Identification and prioritization of goals and subgoals for mission accomplishment
Strategy formulation	Development of alternative courses of action for mission accomplishment
Action processes	
Monitoring progress toward goals	Tracking task and progress towards mission accomplishment, interpreting system information in terms of what needs to be accomplished for goal attainment, and transmitting progress to team members
Team monitoring and backup behaviour	Assisting team members to perform their tasks. Assistance may occur by 1) providing a teammate verbal feedback or coaching, 2) helping a teammate behaviorally in carrying out actions, or 3) assuming and completing a task for a teammate
Coordination	Orchestrating the sequence and timing of interdependent actions
Interpersonal processes	
Conflict management	Preemptive conflict management involves establishing conditions to prevent, control, or guide them to the conflict before it occurs. Reactive conflict management involves working through the task and interpersonal disagreements among team members

Motivation and confidence building	Generating and preserving a sense of collective confidence, motivation, and task-based cohesion with regard to mission accomplishment
Affect management	Regulating members emotions during mission accomplishment, including (but not limited to) social cohesion, frustration, and excitement

Note: Reprinted from "A temporally based framework and taxonomy of team processes" by Marks, Mathieu, & Zaccaro (2001). *Academy of Management Review, 26*(3), p. 363.

As shown in Table 1, during the *transition phase*, team members focus on activities such as mission analysis, planning and goal specification, and formulating strategies. Later during the *action phase*, members concentrate on task accomplishments, monitoring progress and systems, coordinating team members' efforts, as well as monitoring and backing up behaviour their fellow team members. Last, the *interpersonal category* includes conflict management, motivation and confidence building, and affect management. Processes are important because they describe how team inputs are transformed into outcomes. *Output* typically has three dimensions: a) performance judged by relevant others external to the team, b) meeting of team-member needs, and c) viability or the willingness of members to remain in the team. Given that we focused on multicultural student group work in higher education, increased learning can be seen as an additional dimension of the meeting of team-member needs, with regard to student teams. Besides, the viability or the willingness of members to remain in the team seems less relevant in this study, although given the opportunity, they may decide to again work as a team on other assignments.

2.3 Research questions

The general research question of this study aims to answer how students perceive their multicultural group work in an international classroom at the TU/e. Specifically, this study will answer the following two sub-questions:

1). What challenges and gains do domestic and international students perceive from their multicultural group work experiences at the TU/e?

2) What variables or processes that facilitate/hinder multicultural group work can be found from students' experiences at the TU/e?

3. Research method

3.1 Participants

Ten master students participated in this interview study. In a preliminary study (Sukul, Taconis, Kleingeld, & Rispens, 2020), a number of courses with the corresponding teachers' contact emails were inventoried that consisted of a substantial number of group work elements and had a relatively large number of international students. Based on the inventory, there are more master programs with a relatively high number of international students than bachelor programs. In master programs,

international exchange students are excluded from this study. A big difference was found between international students who come TU/e for a full study program and exchange students who are here for a short time. Generally, exchange international students are less motivated to pass all the courses, because they do not need the credits at TU/e to finish their study programs at their home country.

In total, seven of the ten master students were recruited with the help of their teachers. Due to the limited international students in this group (two of the seven students), a flyer with a detailed description of the study aim and recruit information was sent to relevant international student associations at TU/e. This resulted in three international master students who had multicultural group work experiences agreeing to participate.

Table 2 displayed the general characteristics of the ten master students. Nine of them were the second-year master students and there was only one first-year master student. Three of the five Dutch students had completed their bachelor study at TU/e, and three followed a double master degree programs. Two of the five international students had done their bachelor study in the Netherlands and the remaining three had completed their bachelor study at home country. One international student had working experiences before starting the master study.

Table 2 Characteristics of the ten master students

Interviewee	Gender	Ethnicity	Program	Department	Year	Bachelor at TU/e
#1	Male	Pakistani	Science and Technology of Nuclear Fusion	Applied Physics	Year 2	No but bachelor in the Netherlands
#2	Male	Dutch	Science and Technology of Nuclear Fusion & Mechanical Engineering	Applied Physics & Mechanical Engineering	Year 2	Yes
#3	Female	Dutch	Science and Technology of Nuclear Fusion & Mechanical Engineering	Applied Physics & Mechanical Engineering	Year 2	No
#4	Male	Dutch	Science and Technology of Nuclear Fusion & Systems Control	Applied Physics & Mechanical Engineering	Year 2	Yes
#5	Female	Portuguese	Science and Technology of Nuclear Fusion	Applied Physics	Year 2	No (home country)
#6	Male	Dutch	Operations Management and Logistics	Industrial Engineering and Innovation science	Year 2	Yes
#7	Female	Dutch	Operations Management and Logistics	Industrial Engineering and Innovation science	Year 2	No
#8	Female	Chinese	Construction Management and Engineering	Built Environment	Year 1	No (home country)

| #9 | Male | Chinese | Unclear | Electrical Engineering | Year 2 | No but bachelor in the Netherlands |
| #10 | Male | Chinese | Unclear | Industrial Engineering and Innovation Science | Year 2 | No (home country) |

Ten students have done group work quite often during their master studies, such as almost every course and at least once per quarter. Two of the five Dutch students mentioned that they had done group work with international students in almost half of their total group work experiences. The other three Dutch students had only experienced group work with international students once or twice. Three of the five international students had done group work mainly with Dutch students and the remaining two did not mention this.

3.2 Data collection

After receiving approval from the Ethical review board at TU/e, the data collection started with semi-structured interviews with the participants through Skype. All participants gave their informed consent before the interview and the participants received 10 Euro in return for their time being interviewed. Ten individual Skype interviews were conducted from February to April 2020; the interviews lasted between 34 minutes to 60 minutes with an average of 52 minutes.

A semi-structured interview was constructed including three main sections (see Appendix A for the interview protocol). The first section of the interview consisted of questions about participants' background, for example, their nationality and the frequency of their multicultural group work experiences. The second section included questions particularly about their multicultural group work experiences. In this section, we first asked students to pick up one successful example of their multicultural group work with international students and explain the reason for this success. After that, we structured questions based on the team effectiveness framework, input-process-output (IPO) to elicit the factors/processes influencing each part of the group work. For example, we asked students *how do they form their group*, *how do they divide the workload*, and *how do they share information*. The third section included questions about how they perceive the challenges and gains from their multicultural group work experiences. A try-out interview was conducted to verify whether the interview questions were understandable and would result in elaborate answers, and to test the duration of the interview. This resulted in minor reformulations of the wording of the questions and the attention to the follow-up questions.

The ten interviews were conducted in English, which has been the official working language used for teaching and academic activities at this University since the start of 2020. There is one exception of

one interview where some explanations were communicated in Mandarin between the researcher and one Chinese master student for clarification.

3.3 Data analysis

Interviews were transcribed and analyzed using open coding (Blair, 2015), namely emergent codes through the data with the aid of Atlas.ti software. The data collection and the data analysis were conducted in parallel.

The data analysis consisted of the three steps described below.

Step 1: starting open coding the first three interview transcriptions

We open coded the transcription based on reading it line by line. A code was assigned to a sentence, which represents its meaning. A list of codes was generated, and similar codes were combined by comparing their meanings, to decrease the number of the codes. For example, one student answered the question of how he/she formed a group as "*I usually just look around and team up with those who are sitting nearby.*" We assigned a code "physical proximity" to the above data.

Step 2: checking the accuracy of the initial codes

After initially analyzing the data, a report consisting of the data analysis procedures and the codes with representative quotations was sent to the other two researchers for checking. This led to some renaming of the codes that caused misunderstanding or confusion.

Step 3: applying the current codes to the new data & combining codes into categories

The current codes were used as a priori coding list to apply to the new data (the remaining transcriptions). This step resulted in a few new codes. After this, all the codes with similar meaning were combined into categories. For example, five codes were found under the group composition, namely "*group member familiarity*", "*getting to know people*", "*physical proximity*", "*task motivation*", and "*group members' commitment*". They were combined into one category named as "similarity", which represents that students voluntarily form a group based on similar attributes. This step was closely discussed with the other two researchers. Figure 1 displayed our final code list of students' perceptions of their multicultural group work experiences.
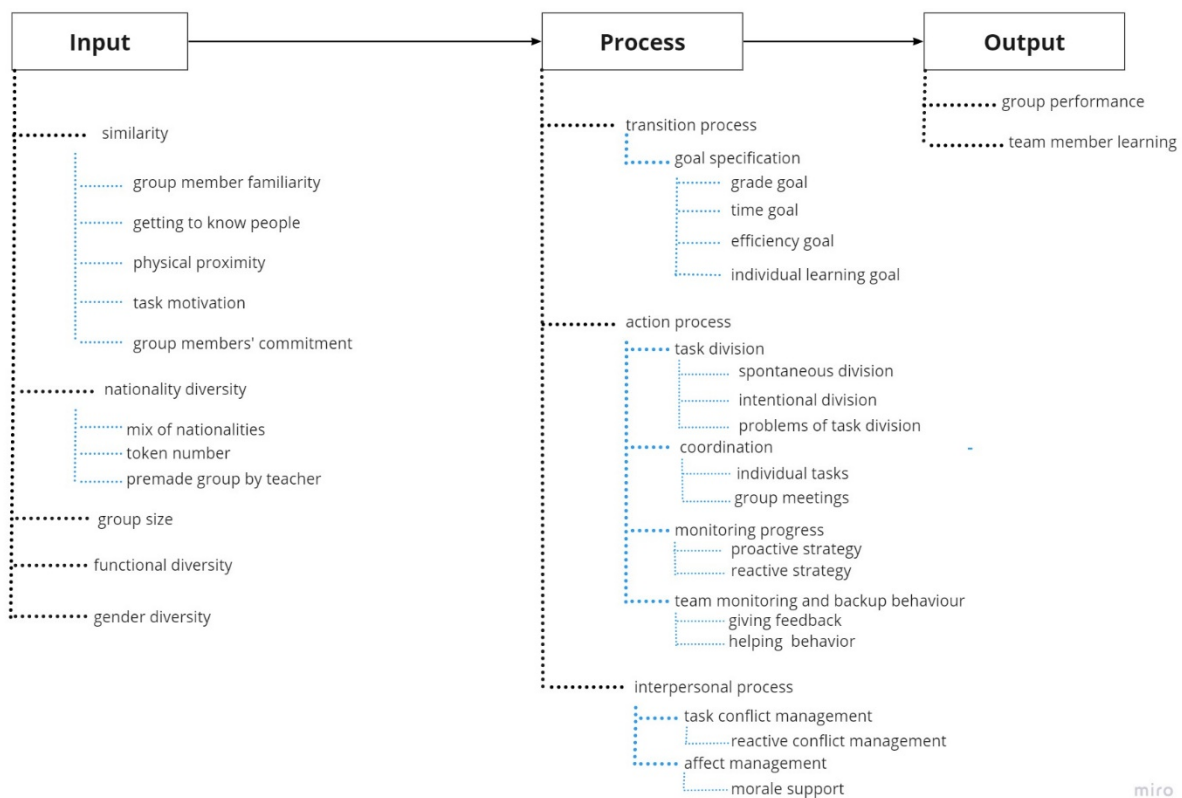
Figure 1 Final code lists of students' perceptions of multicultural group work experiences[1]

4. Research results

4.1 Challenges and gains of multicultural student group work

Overall, students mentioned both challenges and gains from their multicultural group work experiences (see Table 3 for an overview). We explained these challenges and gains perceived by Dutch and international students illustrated with quotations below. Symbols of "D" and "I" were respectively used to represent Dutch students and international students.

Table 3 Students' perceptions of challenges and gains of multicultural student group work

	Dutch students (n = 5)	International students (n = 5)
Challenges	**Total**	**Total**
Language barrier	3	2
Token member	0	3
Culturally different ways of interacting	1	2
Extra efforts to collaborate due to different backgrounds	3	1
Free-riding	0	1

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[1] The codes regarding to students' perceived challenges and gains from multicultural group work were not displayed in this figure. These will be displayed separately in Section 4.1.

	Dutch students (n = 5)	International students (n = 5)
Feeling distanced	0	1
Gains	**Total**	**Total**
Diversity leads to positive learning experiences	2	2
Bringing different perspectives	4	1
Value of Dutch students	0	2
Culture related gains	2	1
Friendship	0	2
Higher motivation	1	0

Six categories of students' perceived challenges were found: "language barrier", "token member", "culturally different ways of interacting", "extra efforts to collaborate due to different backgrounds", "free-riding", and "feeling distanced".

The most-often mentioned challenge to multicultural group work is "language barrier", perceived by both Dutch and international students. However, Dutch students mentioned this challenge slightly more often than international students did. It refers to the different levels of English proficiency, which makes communication difficult and impedes the group work progress. It is worthwhile to notice that some Dutch students perceived that using the English language is not only difficult for international students but also counts for them. Nevertheless, some Dutch students perceived the English language mainly as the challenge to international students.

"Some students are not fluent in English. It can always be hard for them to express their ideas using a second language than using mother tongue. This barrier is also for some Dutch students. [D]"

"If an international student is not fluent in English, then communication becomes harder. [D]"

"Some Dutch students are not very good at English, which makes communication hard. [I]"

The "extra efforts to collaborate due to different backgrounds" was the second most-often mentioned challenge perceived by more Dutch students than international students. It refers to the issue that more efforts are needed when working with an international student as a group because of the background difference. International students come from a different bachelor study program at their home country, and they may have different knowledge systems and different learning styles, which cause more time spent on communicating and collaborating, compared with working with domestic students.

"For Dutch students, we all know the way of making agenda and the way of working according to TU/e style. But for the international student, if they never did that before, of course, they don't know. For example, I had a classmate from Spain. We are required to write an essay. In the end, she just wrote a summary, so she failed in that course. She never wrote an essay in her bachelor study, so she had no idea

about what an essay was. [D]"

"You have to take extra time thinking about how to work with one another because they [international students] are so different in their backgrounds. If we work with all Dutch students, we came from a similar bachelor, so it is always clear that we had the same level of knowledge. But for international students, most of the time, they had completely different bachelor study background from their home country. [D]"

"For example, students from Eastern European, they do not often put references when they write a report. [I]"

The third most-often mentioned challenge was "culturally different ways of interacting", perceived by more international students than Dutch students. It particularly refers to the challenge caused by cultural differences.

"It is quite annoying. For every group project, we would form a Whatsapp group. When I send a message to ask something or to just check on the progress, it is common that they [Dutch students] read the message but they do not reply you. It happened every time actually, but I think it is common in their culture. There is another example. If Dutch students are not so positive about what you refer to, they would directly say no. Sometimes for me [a Chinese student], I do not perceive that as polite. [I]"

"If I work with Dutch students, we pay more attention to the learning process, the cooperation, the group work. You have to communicate with your group members frequently. Then the outcome becomes not that important. But if I work with my friends, the Chinese students, we normally pay more attention to the outcomes. We do not care about how you solve the problems, or how you finally choose and make the decision. In the end, we often have a good outcome. [I]"

"There are some cultural differences when working with international students. For instance, like us [Dutch students], we communicate a lot about what we are doing and how far we are, what works and what does not work during the group work. However, international students do not often communicate these details; instead, they only say 'I finish this and that.' It makes Dutch students feel uncomfortable because as a group, we want consistently to be in a loop and we want to know how everybody is doing and how far we are. [D]"

Mentioned as often as the previous challenge was "token member", only perceived by international students. It refers to the situation in which there is only one international student present in a Dutch-student group.

"There were at least two group projects in which I was the only one international student working together with all Dutch students. When we were discussing what we should do, we used English. However, as long as I was working, e.g., writing down something, they would communicate in Dutch immediately. I had no idea about what they were talking about. It was weird to me. [I]"

"If you only have Dutch students in your group, then they would start speaking Dutch. And that is the biggest struggle for me because you really have no idea about what they are talking about. [I]"

14

The fourth most-often mentioned challenge was "free-riding", only mentioned by one international student. It refers to the situation in which some students in a group do not contribute to the group work to their full potential or undermine the group working process (c.f. Popov et al., 2012).

> "I once worked in a four-person group with two Brazilian students. However, those two students did not do anything. Another student and I try to push them to do something, but the deadline was arriving. So we just did it for them. [I]"

The last challenge was "feeling distanced", only mentioned by one international student. It refers to the feeling of less related to and separated with others, i.e., the domestic students. Although only one international student mentioned this kind of feeling, the difficulty of developing learning and friendship relations with domestic students has been documented in other research (Rienties, Héliot, & Jindal-Snape, 2013).

> "The biggest challenge for me is that I do not feel close with them, and I feel distanced with them [Dutch students]. Doing group work with Dutch students, it is just like we were there only for finishing the work together, nothing else would happen. I feel very frustrated. [I]"

Six categories of gains from multicultural group work were found: "diversity leads to positive learning experiences", "bringing different perspectives", "value of Dutch students", "culture related gains", "friendship", and "higher motivation".

"Bringing different perspectives" refers to valuing the different perspectives that international students bring to the group work. This is more mentioned by Dutch students than by international students. It indicates that the majority of Dutch students, interviewed, have the awareness of seeing the value of working with international students as a group.

> "International students have different views and they look at problems from a different perspective. That is very inspiring. If we work with all Dutch students, we have a similar background, similar thinking style, which is not good for opening our perspectives. [D]"

> "Working with international students, you can learn from them how they tackle the problems, how they do the assignments. Sometimes, it can be very different than we [Dutch students] used to do. [D]"

> "The best group work I can remember is consisting of me from Pakistan, a girl from the US, and a guy from Italy, and a Dutch guy. In that group work, we really brought our different ideas into the group work and it was a good collaboration. [I]"

"Diversity leads to positive learning experiences" refers to students' perceptions of the positive or satisfied group learning experience of their culturally mixed group composition.

> "I had a very successful example. In that group, I had the background of physics, the other two from Dutch and Germany had the background of engineering. So, I picked up my expertise, they picked up their

expertise, and we were doing together and making a very good comprehensive report. That is a good collaboration. [I]"

"There is an example in which we were two Dutch students together with one international student in my second-year master class. We had a good collaboration with each other in the group. In the end, we got a 9.5 as the final grade [10 as the highest grade]. That was quite well. [D]"

"Culture related gains" refers to students' perceptions of their learning gains from multicultural group work particularly related with culture, like open-mindedness, awareness of other culture, and ability to work in a multicultural environment.

"In general, I learned collaboration skills and being open to other people. [D]"

"I learn about different cultures from working with international students. [I]"

"Working with international students as a group prepares me to be familiar with working in a multicultural team. I think after graduation, I will work in a multidisciplinary in a company, consisting of multicultural cultural values. [D]"

"Value of Dutch students" refers to international students' perceptions of the value of working with Dutch students as a group. It is only mentioned by two international students. It is normal for international students to team up with Dutch students because the ratio of international students ranged greatly in different departments at TU/e, which most programs having a majority of Dutch students.

"Working with Dutch students as a group brings some certain value. They [Dutch students] know their system. They know the proper way of communicating with teachers, and they talk to teachers more often than us [international students]. [I]"

"I feel more reliable in working with Dutch students. They [Dutch students] usually have a grasp of the knowledge. For example, if both of us have taken the pre-course together before the advanced course we are working for. They [Dutch students] would probably remember the knowledge more than me. So they have a deep understanding of the knowledge. [I]"

Similarly, "friendship", mentioned by two international students, refers to building friendship relations with group members after the group work.

"I often worked with Dutch students, and usually they were already my friends after it. [I]"

"If it is a very good team, when you finished the group work, you can make friends with each other. It is a good way to learn each other's culture. [I]"

"Higher motivation" mentioned by one Dutch student, refers to student's perception of international student's higher study motivation, which influenced him.

"I often see that German students really want to have a high grade, and they are very motivated. If your

group members are motivated, then you become motivated as well. [D]"

In summary, international students mentioned more challenges than Dutch students in the multicultural student group work. The biggest challenge for international students appears to be the situation of "token member", while "language barrier" and "extra efforts to collaborate due to different backgrounds" appears to be the biggest challenges for Dutch students. Similarly, international students mentioned more gains than Dutch students in the multicultural student group work, and these gains are more equally mentioned. It is very clear that "bring different perspectives" is perceived by the majority of Dutch students as the value of working with international students as a group.

4.2 Students' perceptions of factors/processes influencing their multicultural group work experiences at TU/e

This section is divided into five sub-sections, according to the I-P-O framework and processes identified by Marks, et al., (2001). These sub-sections include: 1) input - group composition, 2) transition process, 3) action process, 4) interpersonal process, and 5) output – group performance. In each sub-section, a table consisting of main categories, subcategories, and the number of students who mentioned them is presented, followed by explanations illustrated by quotations from students.

4.2.1 Input – group composition factors/processes

"Group composition" is the input of the group work, namely the group member composition. As shown in Table 4, five categories were found as the factors influencing students' group member composition.

Table 4 Group composition categories

Main category	Subcategory	Number of students
Similarity (23)	Group member familiarity	6
	Getting to know people	3
	Physical proximity	6
	Task motivation	3
	Group member commitment	5
Nationality diversity (14)	Mix of nationalities	5
	Token member	3
	Premade group by the teacher	6
Group size (5)	-	5
Functional diversity (4)	-	4
Gender diversity (1)	-	1

The main category of "similarity" refers to students' perceptions of preferring to work with similar others. Five subcategories were found under this main category. "Group member familiarity" refers to that students tend to find someone that they are familiar with to form a group. The familiarity can include a strong relationship such as being friends and a weak relationship like having something in

common. For example, one student mentioned how he formed a group with other four group members through his friend network. "*I was with a friend together on the same course. I knew him since high school, so I knew him very well. There was a girl also from my high school and I met her at TU/e. She brought her two friends. This is how we five form a group.*" Another example is to illustrate a weak relationship, "*It is easier working with Dutch students. You do have the same culture and the same language. Everybody is, of course, proficient in that language, and you can always switch to Dutch even though the class is in English and you have to write in English. You can communicate with your group members in Dutch, much easier than communicating in English.*"

"Physical proximity" refers to that students tend to work with those who are closer to them in geographic location than those who are distant. The majority (six of ten) students mentioned that they often form a group with someone who was sitting nearby when they did not know anyone in the classroom. This, to some degree, helps to explain the lack of mix of Dutch and international students. "*I often team up with the person who is next to me, two or three people, but they are all Dutch. Usually, Dutch students tend to sit next to each other, and international students tend to sit next to each other. When you team up, you just team up with the person next to you.*"

"Group member commitment" refers to students' willingness of taking responsibilities for the group work, which is seen as an important factor by half of the students. Students mentioned that having similar characteristics among group members would decrease group conflicts. "*I don't have any critical criteria to find group members. The most important thing is that people want to take their responsibilities and just do their parts of the group work. So there won't be any delay with the group work.*"

"Task motivation" refers to another similar characteristic among group members, the ambition to gain something from the group work. "*When I worked together with my friend, we were basically at the same level as the educational background and motivation. We always want to have the highest grade as possible, and we even do not need to discuss it (the grade).*"

"Getting to know people" refers to that students tend to look for similarity before forming a group with someone they are not familiar with. For example, one student would post a message on Canvas to find group members to join. "*Usually I would post a message on Canvas. Like 'I am in Group A, and my background is …. You can join me if you want.' Then students may react on my message.*"

The main category of "nationality diversity" refers to students' perceptions of working in a mixed nationality group. Half students mentioned that they would like to work in a mixed nationality group. If the mix of nationality is not in a balance (i.e. approximately 50:50), then it would appear the token member situation, in which only one international student present in a dominant Dutch group. In that situation, Dutch students tend to form a community where they start speaking Dutch. It makes the only

one international student feel distanced and isolated from the group. The "token member" is often mentioned as a challenge for international students working in a culturally mixed group. Both the Dutch and international students notice the above situation, but it seems that they want someone else to take responsibility for it, like the role of teacher. Dutch students have difficulty to reject their friends and international students feel uncomfortable to ask unknown students. For example, one Dutch student mentioned that she preferred to have the groups pre-made. "*I didn't do my bachelor in TU/e and I even felt many times that I didn't know everybody and how could I find a group member. I could understand it is even harder especially for international students. For me, at least I speak the language.*"

The main category of "group size" refers to the number of students in a group. Students mentioned that group size influences the group discussions and group morale, so the proper number is around four to five persons. If it is more than that number, the discussions and exchanges of information are difficult to control, and if it is only two people, then it may be good for building the interpersonal relationship but not good for the information elaboration. "*I think three or four is a good number. Four students is a good number for sharing knowledge. Three makes you take the responsibility to participate because you cannot delay. If someone is not doing his/her part, then one-third of the assignments would be missing, and then you could not pass.*"

The main category of "functional diversity" refers to different educational backgrounds, i.e., their bachelor subject backgrounds. Four of ten students mentioned that when students come from different subject bachelor programs, they often consider these subject differences when they divide the assignment, and in this way, they could learn from each other's expertise.

The main category of "gender diversity" was mentioned by one student. That student explained that she believed that girls are better at communication than boys, and she would like to work in a group with another girl present.

In summary, both Dutch and international students prefer to work with someone based on "similarity". International students tend to mention "mix of nationalities" and "token member" more often than Dutch students do/did. Dutch students tend to mention "functional diversity" more often than international students do/did.

4.2.2 Transition process – goal specification

"Goal specification" belongs to the transition process, namely the preparation and planning activities to guide the accomplishment of a team goal. As Table 5 shown, four main categories of (group) goals were found.

Table 5 Goal specification

Main categories	Number of students
Grade goal	4
Time goal	4
Efficiency goal	2
Individual learning goal	1

The "grade goal" refers to the group grade that individual group members expect to achieve at the end of the group work. It is often discussed by students at the beginning of their group work. For example, one student explained to us "*We would like to talk about the grade at the start of the group assignment. If one person wants to get 9, and the other one wants to get 6. And if you (as a group) don't talk about it, it can lead to frustration later on.*" The "time goal" refers to time management and planning activities, such as setting deadlines and scheduling group meetings with each other. As one student mentioned "*I think most often we would plan when and where we are going to sit together. We would talk about each other's schedules and figure out when people have time.*"

The "efficiency goal" refers to the balance between time and effectiveness. It was mentioned by two students. For example, "*We always first discuss the goals, because they (goals) give us directions about what we are going to do within the time. Like if we have one-week time, we can search for everything we could find from literature, or we can also do a simulation. That depends on the goal we set. It is important to agree on a goal, and then we could have some kind of main questions. In this way, it makes the group work more effectively.*' The "individual learning goal" refers to an individual student's expectation of learning gains from the group work. It was only mentioned by one student, namely "*At the start of the group project, we would like to get to know what everyone wants to get from the course. So I usually said that I want to learn something from this course, and I want to do that extra bit.*"

In summary, not many students clearly have the process of goal setting at the start of their group work. When students talk about the group goals, they tend to talk about the "grade goal" and "time goal". One difference of "grade goal" was found between Dutch and international students, namely only Dutch students mentioned it.

4.2.3 Action processes

After the goal specification process, four processes were found in the task action process.

Table 6 Group processes and their main categories and subcategories

Processes	Main category	Subcategory	Number of students
Task division	Spontaneous division	Task uncertainty	6
		Voluntary division	5

	Intentional division	Continuous division	5
		Expertise	3
		Student motivation	2
		Equality	1
	Problems of group task division	Efficiency VS learning	2
Coordination	Individual tasks	-	7
	Group meetings	Disagreement & questions	7
		Checking something	9
		Sharing progress	5
Monitoring progress	Proactive strategy	Regular meetings	5
		Different deadlines	1
	Reactive strategy	Student leadership	4
		Teacher facilitation	5
Team monitoring and backup behaviour	Giving feedback	Peer review	8
	Helping behaviour	Work as a team	8
		Switch the workload	2

TASK DIVISION

As shown in Table 6, the action process starts with the "task division", namely dividing the group workload into individual group member tasks. Three main categories were found in students' task division. "Spontaneous division" refers to students dividing the group task in a random way without adequate consideration. Usually, students spontaneously divide the group tasks because of the "task uncertainty", namely they do not have an overview of the group task difficulty. For example, one student told us "*At the beginning of the group work, it is very hard to predict the difficulty level of the workload. My experience is that when I look at the group tasks, I pick up one task that I thought it would be easier, but at the end, it turns out to be a very difficult one.* " "Voluntary division" refers to that students voluntarily selected one part of the group task. For example, one student mentioned: "*It [task division] is like we sit together on the first day of our group work. Someone says 'I do this, what about you?' And another student would say 'ok I will pick up that one, it might be an interesting task for me.' Sometimes, some students do not say anything and then they get whatever left.*" "Voluntary division" is often combined with "continuous division", dividing the workload several times to compensate for the unequal workload division. One student mentioned: "*Since it [workload] is quite randomly divided, it can turn out to be one's part is very big and the other's part is really small. In that situation, we change the workload around a bit, because it is not fair to have one student doing a lot of work.*" It seems that students do not spend much time on analyzing the task at the beginning, and it leads them to divide the group task in a voluntary way to allay the ambiguity. Because of the voluntary division, it leads students to continue dividing the unequal workload.

"Intentional division" refers to that students divide the group task based on group members' willingness. The first consideration is their own "expertise". For example, one student mentioned "*I once worked with two guys. We three had quite a different background, so mine was quite technical, another guy was really technical, and the last one was more academic oriented. We picked up each other's skills that were best suited for a certain element. So we distributed the workload based on our skills and we also mingle to ensure everyone has to work on other aspects.*" The second consideration is own "motivation", the expectation of the learning gains from group work. One student explained that the workload division would not be equally divided, "*Because in every group work, there would be someone more proactive than others, and he/she is more willing to take more workload.*" The third consideration is "equality", namely the similar amount of workload distribution among group members, as mentioned by only one student: "*Each time, we try to divide the group task and distribute an equal workload to every student. Sometimes students have more time than other others, then they take a little bit more work on it. So in general, we try to be fair each time.*"

"Problems of group work division" refers to the issues after group task division. Although two students mentioned "efficiency vs learning" as a challenge of task division, it deserves attention from the perspective of designing of the group task. One student told us that it was a bad group work experience, in which seven students worked together as one group and they had to hand in assignments every two weeks. The group needed to work on an assignment by using SPSS. "*I didn't have that experience [SPSS] before but the other guy was really good at it. I try to learn from his expertise, but he was just too quickly to solve everything. He finished the task in one hour where maybe I would put five hours into it. I guess it was nice for the whole group because he could tackle a difficult task very easily. I want to learn it [SPSS] at that time, but he was just too quick to solve it, and there was a lot of time pressure. So I also let it go. But now in my thesis, I have to use SPSS to solve some problems, but then the chance of learning it at that moment just leave away from me.*" In another student's group work experience, it seems normal for her to divide the group workload into individual workloads and there is less time for team interaction. She explained that her group assignment was often every week, and it was an efficient way to divide the group workload into individuals to maximize group members' expertise and to get a better group grade. Both of these examples involve the time constraints doing the group task, and it influences them to divide the group workload efficiently and leave little time for them to learn and interact with each other.

COORDINATION

"Coordination" refers to the arrangement of sequences and timing of the interdependent actions. After the process of task division, students often combine doing individual tasks for which they are responsible and having group meetings to complete a group task. Two main categories were found in the coordination process.

"Individual tasks" refers to the low interaction between group members, namely they do their own tasks, such as reading literature and writing reports. For example, students mentioned "*Usually, we need to submit a group report. Every group member is responsible for one chapter and we just write our own pieces of the reports.*" "*We often do separately after the task division. I like doing it on my own such as doing my own literature research. In this way, I feel more effective.*"

"Group meetings" refers to the high interaction between group members, where they exchange information, solve problems, and combine individual tasks to arrange the new tasks. Students have group meetings, particularly in three situations. The first situation is when students disagree or when they have questions or difficulties to be continued. For example, students mentioned, "*When there are problems that we could not find the answer, we normally meet and brainstorm about how we could come up with a solution.*" "*When there is no clear agreement and when we have confusion about something, we often meet together.*"

The second situation is when students need to rely on each other, for instance checking each other's written report. It is relevant to mention that checking reports is not often organized in a group meeting. Nevertheless, it indicates a high interaction with group members, and therefore we decided to put it under the main category "group meetings". For example, one student mentioned that all group members would read and check each other's part to know other's result and to keep the cohesion of the final group report before submission. "*When every group member finished the individual part, we often combined different parts into one group report. After that, we would check the report several times. Maybe one student firstly looked through the whole report and improved some parts. Next time, the other student would go through it again and correct something. And the next student would do it again until we agreed to submit.*"

The third situation is when students share their progress. For instance, one student mentioned "*In the group meetings, we would discuss the progress or the task you have already finished. Then we would discuss the deadline and also how much left we are going to finish.*"

MONITORING PROGRESS

"Monitoring progress" refers to the tracking task and progresses towards goal accomplishment. Two main categories were found of the strategies that students used to monitor the group work progress.

"Proactive strategy" refers to students who take actions to manage the group work to accomplish the goal, such as time management. One example is about using different deadlines to ensure group task completion. "*We always set two deadlines, a hard deadline and a soft deadline. If the delay happens within the soft deadline, we still have time to catch up on the progress. So it has never happened to me that the hard deadline was late.*" The other example is about keeping regular meetings to prevent

progress delay. "*We usually have a group meeting once per week or two times per week. In each group meeting, we will discuss the progress or the task we have already finished. Then we will discuss how much left we are going to finish and plan a new meeting.*"

"Reactive strategy" refers to students who take actions in response to progress delay. One example is about students taking the leadership role to solve the issues that impede the task completion. "*Once we had a leader in our team when someone's task is too much or too difficult, he [the student leader] takes charge of re-dividing the task to everyone appropriately and makes new deadlines.*" Another example is about the involvement of teachers. When students are stuck and they could not move on, they often ask help from the teacher. "*I have been a lot in this situation [we could not move on]. Then we just ask the teacher. The teacher sometimes gives an answer or a hint, so that we could go on and try to find the solution.*"

TEAM MONITORING & BACKUP BEHAVIOR

"Team monitoring and backup behaviour" refers to the assisting team members to perform their tasks. Two main categories of backup behavior were found.

"Giving feedback" refers to helping group members correct mistakes and give comments on the report content that they have made. For example, one student mentioned: "*I think during the first week, all the feedback is about the report content after reading each other's pieces. Like is there anything missing or is it logic? During the second week, we check more on the coherence of the pieces, like the academic style and references. We also did peer review, like review each other's pieces and give feedback.*"

"Helping behaviour" refers to offering help to group members who meet difficulties in his/her task, like working on it together as a group and switch the workload. For example, students mentioned that they often offer help when someone meets difficulties. "*When someone meets difficulty, we often offer help and work together on it as a group.*" Students may also swap the tasks to complete the task for a group member. "*Sometimes when one group member meets difficulty and could not continue, we switch the tasks to see if it could be solved by another group member.*"

In summary, after forming a group, students usually spontaneously divide the tasks. The high interaction between group members happens in two processes, namely having group meetings and helping behaviour (working together on a tough question as a group).

4.2.4 Interpersonal process
Two processes were found relating to the interpersonal process.

Table 7 Interpersonal processes and their main categories and subcategories

Processes	Main categories	Subcategories	Number of students
Task conflict management	Reactive conflict management	Discussion until consensus	8
		Teacher facilitation	4
Affect management	Morale support	Limited pressure sharing	2
		Peer encouragement	3

As shown in Table 7, the process "task conflict management" refers to task focused disagreements among group members. This happened a lot in student group work, namely having different ideas or opinions about the task. One main category "reactive conflict management", namely working through task disagreements among group members was found. Working on the task disagreement includes "discussion until consensus" and "teacher facilitation". The "discussion until consensus" is often mentioned by students as a common approach to manage task disagreements. For example, "*I came to this [disagreement among group members] a lot. Often we would propose our arguments to each other. Then we try to find the flaws in other's opinions. Then it is possible that we come to a natural understanding with each other.*" If there is still not clear agreement after the discussion, then students often ask advice from teachers, namely "teacher facilitation". For example, "*If we still disagree with each other, then we would go to ask the teacher. Just telling the teacher, we are doing this part of the assignment, she thinks it should be done on that way, and I think it should be done on this way. Could you help to figure out which way is a better option?*"

The process "affect management" refers to regulating group members' emotions during task accomplishment, such as frustration. One main category "morale support" was found, namely, students would offer mental support when someone shares his/her pressure or frustration within the group. "Pressure sharing" is limited, and students tend not to talk about their struggles or pressures within the group. It could be that students do not experience much pressure. It could also be that students are reluctant to share their emotions with group members. For example, one international student explained to us he always felt very stressful because of the financial pressure and because he had another part-time job besides the master study. He hardly shared his pressure within the group, because he thought it was irrelevant to the group work. "*Every time, if you work with new people, they don't have sympathy for you anyway. If you are doing one master, you have seven or eight courses. And you do the tasks with different people. So in three months, you only meet them a couple of hours a day, and then you only talk about the work. It is hard to develop that kind of feeling like caring and sympathy.*" If someone shares his/her pressure in the group, then the rest group members would offer "peer encouragement". For instance, one student mentioned "*I met that situation in which someone is demotivated to continue. We try to encourage him to not give up and keep going. However, we also*

respect his decision when he says 'I am quitting'. Then I think it is quite good for the morale for the rest of the group members."

In summary, students mentioned "task conflict management" more often than "affect management". Relationship conflict, namely the disagreement due to the different cultural values or interpersonal styles was not found in this study. With respect to reactive conflict management, Dutch students tend to use "discussion until consensus", and international students tend to use "ask advice from the teacher" to solve the conflict. For morale support, only two international students mentioned that they had pressure but felt reluctant to share with group members.

4.2.5 Output – group performance

As shown in Table 8, two main categories were found as the output of the group work in students' perceptions.

Table 8 Group output

Main category	Number of students
Group performance	3
Team member learning	7

"Group performance" refers to the performance judged by relevant others external to the group, namely the group grade judged by the teacher. Students mentioned that group work is often assessed by the teacher based on the final submitted group report. "*Teachers often just assess the final report and give a group grade. So as long as we submit the report, it is fine.*"

"Team member learning" refers to students' subjective perceptions of the increased learning through working together with peer students. For example, students repeatedly mentioned, "*I like the exchange of ideas and we can talk about the content instead of I am just looking at some papers by myself.*" "*It is valuable to learn from other's opinions. Like if I get a subject, I don't understand it. My group members will explain it to me. That is very valuable.*"

In summary, the group output consists of teacher's grading based on group report and students' perceptions of gained learning by working with peers as a group. Dutch students tend to mention "group performance", and international students tend to mention "team member learning" more often.

5. Discussion

5.1 Discussion the main research findings

Multicultural student group work in the international classroom has often been documented as leading to disappointing (intercultural) learning, due to the lack of interaction between domestic and international students. This study aimed at finding challenges and gains of multicultural group work

for both Dutch and international students in the international classroom at TU/e. By using the integrated framework of input-process-output (I-P-O), we also aimed to identify the variables or processes that facilitate/hinder students' multicultural group work in international classroom at the TU/e. Through semi-structured interviews, this study attempted to formulate recommendations for lecturers who use group work in the international classroom at TU/e.

A main research finding is that Dutch and international students perceived different challenges and gains of working in a multicultural group. The most obvious challenge for international students is the group composition situation of being a token member, namely a single international student present in an otherwise Dutch student group. In such skewed group composition, Dutch students are often tend to switch to speaking Dutch and "ignore" the token international student. Similarly, in another study conducted in the context of a UK university, Cotton, et al. (2013), found that international students are less likely to participate when mixed with a dominant domestic student group. The most distinct challenge for Dutch students is the "extra efforts to collaborate due to different backgrounds". International students, usually due to their transfer to a new academic environment, do not understand the learning and teaching culture of host country. This often requires Dutch students to take extra efforts (not only time but also willingness to adapt to a new difference) to communicate and collaborate, compared with working with Dutch students as a group. This seems to indicate that Dutch students have an assimilation view of seeing international students, namely international students are expected to behave as domestic students do (according to the strategies that teachers used in international classroom by Dalglish, 2006). In addition, Dutch students slightly mentioned language barrier as a challenge in a multicultural group more often than international students did.

In addition, Dutch and international students mentioned language barrier as a shared challenge of working in a multicultural group (three Dutch and two international students mentioned it). English-language "deficits" seems to be a stereotyped label on international students; however, it could also be a reflection of communication and attitudinal deficits among the dominant student population (Killick, 2017, p.114). In our study, two Dutch students perceived the English language skills as a challenge for themselves, and they were aware of the difficulty of using the English language to explain ideas than using mother tongue in the group. Such self-awareness is a good sign because it could make Dutch students more patient when they communicate with international students in the group.

With regard to the gains, two Dutch and international students, respectively, perceived "diversity leads to positive learning experience". It means that they have experienced satisfactory group work with a mix of nationalities present, which leads to a good collaboration and good group output. The majority (four of five) of Dutch students perceived "bring different perspectives" as the gain from their multicultural group work. This is in line with a previous research finding, namely bringing new insights and different perspectives were mentioned as the benefit of mixed national group work by

students (Spencer-Oatey & Dauber, 2017). The different perspectives that international students bring to the group work are seen as a value by Dutch students; at the same time, the different backgrounds that international students bring to the group work is also seen as a challenge by Dutch students. Challenges and gains could be seen as not necessarily contradictory but rather as potentially interconnected. Two international students perceived "friendship", namely being friends with Dutch or other international students after the group work, as the gain from their multicultural group work. Studies on international and domestic students' friendship relations, on the one hand, show that most students prefer to develop friendship relations with students from similar cultural backgrounds (Volet & Ang, 2012). On the other hand, there are studies shown that international students build a friendship and learning relations by actively interacting with each other, irrespective of cultural backgrounds (Montgomery & Liz McDowell, 2009). In our study, it seems that international students have a stronger intention to build "friendships" and learning relations with Dutch students. This, to some degree, is understandable, as Dutch students typically already have well-established friendship networks, and therefore feel not necessary to build "friendships" and learning relations with international students.

A second main research finding is that the variables or processes embedded in students' multicultural group work cover a wide range of main categories and subcategories. Concerning the input processes, students prefer to form a group with similar others. This is in line with the principle of homophily from organizational theory, namely a contact between similar people occurs at a higher rate than among dissimilar people (Miller, Lynn, & James, 2001). The study conducted in Australia (Volet & Ang, 2012) shows similar research finding, namely both Australian and international students preferred to work with peers from similar cultural background, and both groups of students believed that similar cultural background enabled a group to work better together, with minimal conflicts and misunderstanding. Strauss, U, and Young (2011) found that it is the uncertainty that induces students' cognitive and affective anxiety when students work with someone they are not familiar with in groups for assessed projects. Another input variable, national diversity, is perceived as more favorably by international students than by Dutch students. This is also found in another study (Summers & Volet, 2008), namely local students tend to have more negative perceptions of joining a culturally mixed group than international students do. "Token membership" is exclusively mentioned by international students, as discussed as an important challenge of working in a multicultural group work. It, thus, seems to indicate that culturally composition of a group is an important factor, which, to a large degree, influences the group process and group output for Dutch and international students.

Concerning the group process, the action processes have been mentioned more often by students than the transition and interpersonal processes. In the transition process, it is clearly found that the process of task analysis and planning is missing in our interview study, compared with team processes

developed by Marks and his colleagues (2001). Although we found the process of goal specification, these goals are often concerned about the grade and arrangement of time schedules; not so much about the formulating goals or sub goals for task accomplishment. In the action process, students usually started with the process of task division more in a spontaneous way, due to the miss of the process of assignment analysis. After the task division, group members do their individual tasks and then use group meetings to share progress, elaborate information, or discuss difficulties met in their own parts of the task. In the interpersonal process, we found the task related disagreements rather than the interpersonal disagreements among the group members. Facing these task related disagreements, group members often take reactive conflict management strategies to cope with. For example, group members discussed the disagreement until the consensus was reached or they would approach teacher for help. Concerning the process of affect management, regulating members' emotions during the task accomplishment such as frustration seems rather limited in our study. It remains unclear whether it is because students do not have much pressure or frustration, or it is because they feel reluctant to share with group members. Only one international student mentioned that he had pressure or frustration with accomplishment of the group task, however, he did not want to share with group members. This was due to the short period of one group assignment, usually covering a few weeks, and the amount of the group assignments, i.e., students often have more than one group assignment in one quarter. Besides, it is a large chance that students form a group with different peers whom they are not familiar in different courses. Students may feel uncomfortable to share pressure or frustration with someone they do not know very well. Concerning the final output process, students in our study mentioned more about their increased learning through working together with peer students rather than the group grade evaluated by the teacher. This to some degree indicates that students value the opportunity of learning from each other when doing a group assignment.

5.2 Limitation and future research

There are some limitations to this study. First, although this study offers an understanding of challenges and gains as well as processes in multicultural group work based on students' experiences in international classroom at TU/e, it is solely based on students' self-reported data. A study with a participatory perspective would give more insights into the real-time interactions between students when they are doing group work.

Second, we have tried different ways to get in contact with international master students, however, only five international students agreed to participate in this interview study. Four of them all come from Asian countries and only one international student comes from another European country. A study by Rienties and Tempelaar (2013) showed difference in forming learning and friendship relations between European and Asian international students at a UK university. It is a pity that we could not interview more European international students and then make a comparison of their

perceived challenges and gains among domestic, European, and non-European students. Although the main categories of challenges and gains as well as the processes in student multicultural group work have been repeatedly found based on ten students' experiences, generation of these results to a large amount of students in master programs at TU/e should be careful.

Third, out study provides insights into the processes of group composition (Input), group collaboration (Process), and group performance (Output), the connections between these processes (I-P-O) are not explored. For example, how different multicultural group composition influences group collaboration and further influences the group performance could be explored in future research.

5.3 Conclusion and implication

TU/e Policy International Classroom (2019) aims at enhancing the intercultural interactions and intercultural learning between domestic and international students by, but not limited to, multicultural group work among Dutch and international students.

Our research results have shown that international students tend to mention more challenges than domestic students did. The most frequently mentioned challenge by international students was the group composition of being a token member, followed by language barrier and culturally different ways of interacting. Dutch students' perceived challenges of working with international students as a group centered in language barriers and extra efforts to collaborate due to different backgrounds. With these challenges in mind, teachers could facilitate multicultural groups in at least two ways. One way is that teachers can from the groups for students and try to cross students' diversity attributes as much as possible. The other way is that teachers could raise students' awareness of the value of working in a mixed culturally group, for instance by putting intercultural interaction and learning into one of the goals of group assignment. In this way, although not the ideal way to motivate students to work in a multicultural group, it gives students external motivations. The language barrier seems to be encountered by both domestic and international students in a culturally mixed group. Since the start of the 2020, the university (TU/e) launched its English language policy, it provides a foundation for mixed cultural communication, however, it also poses challenge for both teachers and students. The university (TU/e) could offer teachers and students some intercultural communication training to give practical tips.

Based on the processes we identified in students' multicultural group work, it has clearly shown that the social-emotional interaction, such as getting to know each other and developing trust and belonging is missing in such multicultural group work. For instance, students often start their group work by briefly talking about their time schedules and dividing group task in a random way. Another clear indication is the missing role of teachers in facilitating student group-work process. For example, it seems that teachers give the group assignment and then grade it based on the group report that

students handed in. Teachers could facilitate students to better socially collaborate with each other and play an important role in facilitating students' collaborative processes in multicultural group. An intervention study (Rispens & Arteaga, 2018) provides some practical tips for teachers, such as using self-discourse with their students in their first meeting and creating a safety environment for students to work together, to facilitate student multidisciplinary teams.

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Appendix A Interview protocol

Dimensions	Questions
Background	- Which country are you from? - Which year are you in your master program? - How many times, in general, have you experienced student group learning in your master programs? How about group learning with international students? - To what degree would you consider your group assignment to be challenge-based? Please explain briefly. (Central to challenge-based learning is that students acquire knowledge by engaging in real-life challenges: seeking out and applying knowledge individually or in groups. In this process, the professor is a coach for finding the right knowledge (TU/e Strategy 2030)).
As I asked you before, there is a group task in TU/e classrooms. Now I would like to ask you to reflect on your group work experiences. Please think of a group work that you work with international students and that group learning went very well. Could you please briefly talk about that group learning experience? And why do you think it went very well?	
Starting the group task	- How do you form your groups? Are there any criteria (based on what)? - After finding your group members, what will you usually do?
Transition	Goal specification - Do you define goals at the beginning of the group project? / Usually who define the goals? - Are the goals clear to every group member? - How group members are committed to that goal? Division of labour (planning) - Can you tell me in general, how do you determine who does what task? / Who made this decision? - How much time is spent on this? - How explicitly is it? Is it clear for everybody in the group what he/she has to contribute? - How does this link with the goals you set?
Action	Monitoring progress - Can you tell me how do you perform the tasks? (e.g., Separately or working together?) - What will you do, when some certain knowledge is lacking for doing the task? / How about when all the group members lack the knowledge or expertise? / - In practice, we notice that group learning is not always in a linear way. Sometimes, you could not meet the goals as you planned, so what will you do to manage that to working towards the final deadline? - In this kind of situation, will there be somebody who can offer some support? /Who? Workload sharing - How do you assign the task among the group members? - Is it equally divided? Why? Information elaboration

	- How do you gather the information from each member to the group as a whole? / How do you share the information with each other? - How often do you share with each other? - Are that information equally valuable/useful?
Interpersonal process	Conflict management - How do you agree to handle difficult situations? - How open do you feel your team members are willing to accept different opinions? Motivating/confidence building - How do you encourage team members to perform better or to maintain high levels of performances? / In which way? - How much efforts do you do for supporting each other? - What will you do if it does not work? - How confident do you feel as a group? Affect management - Imagine that if one group member feels very stressful and frustrated, how will you manage this? Psychology safety - Did you feel free to express yourself within the group? - How comfortable do you feel when you express your ideas in the group?
Finishing the group task	- How do you usually combine the individual reports into one final group report? - How do you feel the group learning process? - Which aspect do you care or value the most in assessing your group task? (performance or learning based?)
Perceptions of international students	- What do you learn from working with international students as a group? - What challenges do you meet when working with international students? - What is the biggest difference, in your opinion between working with domestic students and working with international students? - Would you like to try to work with international students in a group next time? - What will you pay more attention to when you work with international students as a group next time?
General	- Any comment you would like to mention on this topic.