

STUDENTS' PERCEPTIONS OF MULTICULTURAL GROUP WORK IN INTERNATIONAL ENGINEERING CLASSROOM

Cui Ping¹, Ad Kleingeld², Sonja Rispens², Ruurd Taconis¹

¹Eindhoven School of Education (ESoE), Eindhoven University of Technology

²Department of Industrial Engineering & Innovation Sciences (IE&IS), Eindhoven University of Technology

ABSTRACT

The rapid internationalization of engineering leads universities to change their education in ways that meet diverse students' learning needs. The ambition behind the internationalization policy at Eindhoven University of Technology (TU/e) is that the multicultural experiences will improve the quality of educational experiences for all students. In a small-scale interview study, we explored how domestic and international students perceived the challenges and gains in their multicultural student group work experiences in master programs at TU/e. In addition, the factors that influence multicultural group work were explored based on students' experiences. Key challenges that were identified are different communication styles and language issues, whereas key gains are mainly related to complementary knowledge and skills for domestic and international group members. In the group process, factors in which they were similar were found, for example both domestic and international students preferred to work with someone they already know. Difference in students' perceptions of group work behaviors, such as division of task and disagreement solution were found between domestic and international interviewees. The factor of culture seems to play a role in interpreting the above differences. Based on the results, we concluded that the vision of an international classroom has not yet been achieved. The results suggest that inclusion at the university still needs to be taken a step further, and this paper provides a basis for discussion on how to move the vision forward.

KEYWORDS

Diversity, Cross-cultural collaboration, Multicultural student group, Standards: 2, 3, 7, 8.

INTRODUCTION

Eindhoven University of Technology has been striving for internationalization as part of the 2030 education strategy (TU/e, 2018). To achieve internationalization, "international classroom" was recently defined as a learning space of a group of students in which: 1) different nationalities with different cultures are present, 2) the common instruction language is English, 3) students and staff engage in and appreciate multicultural teams, and 4) the diverse learning environment is (created) such that it enables students to gain multicultural experiences and enhances the education quality. The above definition clearly indicated two main goals behind the establishment of the international classroom at the university.

A first goal is to enable students to engage in multicultural teams and gain multicultural experiences. There are currently a lot of courses that involve different types of group

assignments and projects at the university. All these group assignments indeed create opportunities for students to work in multicultural groups. The lack of interaction between domestic and international students in a group project has become a common concern in most English-speaking countries, such as the US and UK (Arkoudis et al., 2013). In response to this, there has been good initiatives to facilitate multicultural interactions, such as the examples that have been presented at CDIO conferences: improved introductions to Master programs for international students (Knutson Wedel & Persson, 2010), intercultural training for students (Josefsson, 2010), cross-cultural training for teachers (Van Puffelen & Van Oppen, 2020), well-organized intercultural social activity for students (Gourvès-Hayward et al., 2013), and integrated group work (Bergman et al., 2017). Challenges of working in a multicultural student group have been reported to comprise language barriers, academic culture differences, and a negative experience with and/or a stereotype view of international students (Safipour et al., 2017). In the Netherlands, this could be even more complex since English is not the native language for both Dutch and (most) international students. Thus, it is worthwhile to explore the challenges and gains that Dutch and international students perceive in their multicultural group work experiences, to create a better diverse learning environment at the university.

A second goal of the international classroom is to enhance the quality of education. It means that all students are expected to gain positive outcomes from their multicultural group work experiences. Both domestic and international students need and learn skills of diverse teamwork and intercultural communication (see CDIO syllabus items 2.4.2, 2.5.2, 2.5.5, 3.1.1, 3.2.2, 3.2.10, and 4.1.6). Research showed no consistent finding of the diversity effect on either group performance or group cohesion (Webber & Donahue, 2001). Members of multicultural groups, compared with homogeneous group members, are found to encounter more challenges in the group process due to misunderstandings and coordination difficulties when working together (Popov et al., 2019). In the education context, multicultural student groups can have very promising as well as very disappointing education outcomes. Thus, it is the question of what factors facilitate or hinder the multicultural student group work in the international classroom at TU/e.

THEORETICAL FRAMEWORK

Marks et al. (2001) provided an integrated model of input-process-output (I-P-O), which helps to understand the key variables or processes that are embedded in team collaborative learning. Their argument is that team outcome is not only influenced by the team input, such as team members' talents, but also (and perhaps more importantly) by the processes team members use to collaborate with each other to accomplish the work.

The *input* refers to the composition of a team, including individual characteristics such as competency and personality, and team level attributes such as task structure and external leader influences (the role of the teacher) (Mathieu et al., 2008).

The *process* refers to the activities that team members engage in to resolve the task demands and learning. These activities were further distinguished into transition process, action process, and interpersonal process. The transition process refers to group planning activities, including task analysis and planning, goal specification, and strategy formulation. The action process refers to group collaboration activities, including monitoring progress towards goal accomplishment, team monitoring and backup behaviour, and coordination of the interdependent tasks. The interpersonal process refers to group regulation activities, including

conflict management, motivation and confidence building, and affect management such as emotion regulation.

The *output* refers to: 1) performance judged by relevant others external to the team (e.g., teacher), b) meeting of team-member needs, and 3) willingness of members to remain in the team.

RESEARCH QUESTIONS

This study is a small-scale explorative study aimed at describing students' perceptions of their multicultural student group work experiences in the current international classroom at the university. Given the above research aim, three research questions were formulated:

- 1) What challenges and gains do domestic and international students perceive from their multicultural student group work?
- 2) What cultural differences do domestic and international students perceive from their multicultural group work?
- 3) What factors that influence multicultural group work can be found from students' experiences?

RESEARCH METHOD

This study was approved by the Ethical Review Board of the university <ERB2020ESEO5>. Ten individual Skype interviews were conducted, in English, between February and April 2020. The interviews lasted between 34 to 60 minutes with an average of 52.

Currently, about 21% of the master students at the university are international students, comprising students from European countries (EER) (roughly 2/3) and non-European countries (non-EER) (roughly 1/3) (Taconis et al., 2020). Ten master students from different programs that consisted of a substantial number of group work elements and had a relatively high number of international students participated. The interviewees included five Dutch students and five internationals (one Portuguese, one Pakistani, and three Chinese). Nine of the interviewees were second-year master students and one was a first-year master student. All ten interviewees had experienced group work quite often, such as almost every course or at least once per quarter.

A semi-structured interview was constructed including three main sections. The first section consisted of questions about participants' backgrounds such as their nationality and frequency of their multicultural group work experiences. The second section included questions about their recent multicultural group work experiences. In this section, we asked interviewees to pick up one successful example from their multicultural group work experiences and explained the reason for success. After that, we structured questions based on the input-process-output (IPO) model to elicit the variables/processes influencing their group work. For example, we asked interviewees *how do they form their group, how do they divide the workload, and how do they share information*. The third section included questions about students' perceptions of challenges and gains from working in multicultural student groups.

A try-out interview was conducted to verify whether the interview questions were understandable and would result in rich answers, and to test the duration of the interview. This

resulted in minor reformulations of the wording of the questions and the formulation of suitable follow-up questions.

Interviews were transcribed and analysed using open coding (Blair, 2015) with the aid of Atlas.ti program. The data collection and data analysis were conducted in parallel, and the data analysis consisted of the following three steps. Firstly, we open coded the transcription based on reading it line by line. A code was assigned to a text fragment, 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 interviewee 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 sentence. Secondly, after initially analysing the data, a report consisting of the data analysis procedures and the codes with representative quotations was sent to two other researchers for verification. This led to some renaming of the codes that caused misunderstanding or confusion. Thirdly, 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 meanings were combined into categories. For example, codes of *"group member familiarity"*, *"getting to know people"*, *"physical proximity"*, *"task motivation"*, and *"group members' commitment"* were combined into one category – "similarity", which represents that students voluntarily form a group based on similar attributes. This step was closely discussed with two other researchers.

RESEARCH RESULTS

Challenges and gains of multicultural student group work

Challenges and gains that students mentioned from their multicultural group work experiences. The challenge of "communication style" refers to the differences in how to communicate due to culture differences. Both domestic and international interviewees mentioned this challenge. Due to the lack of understanding of different cultural communication styles, it sometimes leads to misunderstanding and even a negative view about each other. One domestic interviewee mentioned: "So, like Dutch students, we communicate a lot about what we are doing and how far we are. But I heard stories about internationals who don't do that often, and they only say I finished this. I would like to say it makes us [Dutch students] uncomfortable." (Interviewee, #2). Similarly, one international interviewee mentioned: "Another big challenge for me was Dutch students' directness. For example, if they are not positive about what you refer to, then they would say it directly. Sometimes, I don't perceive it as polite" (# 10).

The challenge of "language issue" refers to either the English proficiency or speaking Dutch, which hinders the group communication. Domestic interviewees often mentioned poor English: "So, you have a little struggle with language when working with international students. Not every international student can speak good English" (# 4). International interviewees often mentioned the issue of domestic students speaking Dutch: "If all other students in a group are Dutch students, then the biggest struggle for me is language, because they will start speaking Dutch" (# 1).

The challenge of "extra efforts to collaborate" refers to extra efforts to work with international students because of their different backgrounds, only mentioned by domestic interviewees. "I think it is just because international students are so different in their background. So, when we work with them, we really have to take extra time thinking and learning how to work with one another" (#7).

The challenge of “feeling distanced” refers to the feeling of being separated from the group only mentioned by international interviewees. “The major challenge I can think now is that I do not feel close to them [Dutch students], or sometimes I can feel distanced. As I said, we were just there to finish the work together, so nothing else would happen. Sometimes, it can make me feel quiet frustrated” (#10).

Interviewees also mentioned gains or valuable aspects of working in a multicultural student group. They agreed that a multicultural group can bring different views to the group task, i.e., “different value”. For example, one domestic interviewee mentioned: “people from other countries have different views, and they look at problems completely different, so that is very good” (#3). One international interviewee mentioned: “People with diverse background have different ideas and different study experiences, that gives many innovative ideas to group project. It is also a good way to learn from each other’s culture” (#8). Two domestic students mentioned that they have learned collaboration skills and improved their English skills in multicultural group work.

International interviewees seem to be very certain about the value of having Dutch students in their group. “They [Dutch students] know their education system better, and they know professors and hence they know the proper way of talking with professors” (#1). “Some assignments require us to read some local materials or to understand some local backgrounds, so we need domestic students in a group” (#8).

Cultural differences of multicultural student group work

We asked students’ perceptions about cultural influence when they work in multicultural group, and only two international interviewees (Chinese) gave examples.

One Chinese interviewee appeared to mention the difference in learning orientation between Dutch and Chinese students. “I once had a course called Sims Design. We had a group of seven people: four Dutch students, two Chinese students, and one international student. For the Dutch students, they emphasized more on the learning process, like learning how to design the multi-structures with peers. However, for us, Chinese students, we emphasized on the learning outcomes” (#9). According to Vermunt & Vermetten (2004), the concept of learning orientation consists of five categories: personally interested, certificate oriented, self-test oriented, vocation oriented, and ambivalent oriented. This Chinese interviewee seemed to express that Chinese students are more outcome or certificate oriented, such as striving to obtain a good learning results and/or credit points; Dutch students are more personally interested such as studying for interest in course subjects. Another Chinese interviewee addressed a difference in cultural communication styles. “I experienced cultural differences. For example, in the Netherlands, if someone is not involved in the group work, then other Dutch students will just kick him/her out directly. But this seems really rare in China” (#8). According to Gesteland (2012), cultural influences bring difference in how to communicate, and one of the communication styles is directness. As this Chinese interviewee mentioned, Dutch students are more direct in communication: people should be honest and direct – tell it as it is; Chinese students are less direct: it is best to talk carefully with people when you are unsure about their feelings, and most of the time, you want to preserve relationships.

Although a domestic interviewee did not personally experience cultural differences, he heard about cultural difference and this also affected his participation in multicultural group work. “I did hear stories from people who have worked with international students, for example Chinese

students. So, their way of collaboration is different than ours. And that reminds you to probably avoid working with them [Chinese students], if it is your first group work. Because at the end, I would like to work as close to my normal working style as possible" (#2).

Two other interviewees mentioned that similar subject backgrounds will reduce the obstacles caused by culture differences in multicultural student group: "I feel like people I have worked with are mostly the same as me, because we are all doing physics. That kind of overcomes cultural differences" (#5).

Factors that influence multicultural student group work

In this section, the findings are presented in line with the input-process-output model.

Input – group composition processes

"Group composition" is an input attribute, and four factors (main categories) were found: similarity, difference, and group size, and separate community.

The main category "similarity" refers to interviewees' perceptions of preferring to work with similar others. Four subcategories were found under this main category. The "familiarity" refers to interviewees often choose who they are acquainted with to do group work together. Dutch interviewees often mentioned they tend to work with friends: "If we know we can pick up ourselves, we usually get a text message from friends. 'Hey, do you want to be in a group with me?' That is usually how it goes. That makes kind hard for international students to join. Because usually we have already decided on the groups before the start of the course" (#3). International interviewees often mentioned they tend to work with someone they know: "So in my case, I don't know everybody very well at the first phase. As long as the teacher said that [form a group with three people], I would approach to the people I already knew before" (#10).

"Physical proximity" refers to that interviewees tend to work with those who are closer to them in geographic location than those who are distant, when they hardly know anyone in the classroom. "In Fusion, it is such a small class, usually, you just ask the person who is sitting next to you or sitting in front of you to form a group" (#2).

"Commitment" refers to that interviewees prefer to work with those who take responsibilities for doing the group tasks: "The most important thing is that people want to take their responsibilities and just do their parts as they promised" (#7). "Task motivation" refers to interviewees prefer to work with those who are interested in subjects and are motivated to do the group work, only mentioned by domestic interviewees. "I had an experience of working with international student in Portage. That went well, because if you looked at the people with right skills and if they are motivated, then it is not a problem working with them" (#6). "Gender" is only mentioned by one international interviewee: "It would be better if a group has a girl member, and then the communication would become better" (#8).

The main category "difference" refers to interviewees' perceptions of working with peers with different nationalities, i.e., mix of nationalities, only mentioned by international interviewees. If the mix of nationality within a group is not roughly "in balance" (i.e., approximately 50:50), then the "token member" situation can occur. In that situation, Dutch students were reported to start talking Dutch amongst each other. This is not in line with the university international classroom and makes the only one international student feel distanced and isolated from the group.

The main category “group size” refers to interviewees’ perceptions of the proper number of students in a group. Interviewees mentioned that group size influences the group discussions and group morale, and 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.

The main category “separate community” refers to the “loosely coupled” parallel communities between domestic and international students. “Dutch people don't go to the internationals to say, ‘do you want to join my group?’ The international students also don't go to the Dutch people to say, ‘may I join the group?’ It is both ways” (#6). An international interviewee mentioned that “there is like only one or two international students in my department. Dutch students would have their own WhatsApp group, and they know each other. They would make a group. So, I don't have the chance to do that” (#8).

When we asked interviewees how to facilitate a good mix of Dutch and international students, they refer to the role of teacher. A Dutch interviewee mentioned: “I think it would be some more mix between international and Dutch students. I always prefer to have groups already pre-made. Because I didn't do my bachelor at the university but in Enschede [other university nearby] and even I felt a lot of times like ‘I don't know everybody, how do I find a group member or do I just do it alone.’ I know especially for international students, that is even harder, because at least I speak the language” (#3). An international interviewee mentioned that “As an international student, I feel more comfortable when the professor made the group, so they [professor] decided. Because I don't know so many people in the class. It is hard to just approach random person and try to ask them ‘can I join you?’ (#5).

Transition process

The group transition process includes the preparation and planning activities towards task accomplishment. According to the interviewees’ statements, once the group is formed, group members will clarify the requirements, specify the goals of the group work, divide the work, and set deadlines for next group meetings. Therefore, specification of group goals and division of group work are often linked together.

“Goal specification” refers to some goals that students set or try to achieve based on the requirements of the group work, for the purpose of completion of the group work. Four subcategories of goal specification were found. “Grade” means the grade an individual group member aspire/expect to achieve at the end of the group work. This was only mentioned by domestic interviewees: “We go through the group grade [ambition] and the assignment” (#6). “Time schedule” refers to the time management activity such as scheduling group meetings. “I think at the beginning it is mostly like when and where we are going to sit. Because of the different schedules, it is mostly about practical things” (#3). Only one domestic interviewee clearly mentioned a personal learning goal: “For me, it always has been we get to know what everyone wants to get from the course at the start of the project. So, I usually said that I want to learn some from this course, and I want to do that extra bit” (#7). Similarly, one domestic interviewee mentioned the task goal: “I believe we always first discuss the goals, so what do we want to do in this week (#4).

The main category “division of labour” refers to interviewees’ perceptions of the division approach of the group assignment into individual tasks. “Voluntary” is the most often mentioned task division method. “Mostly it is like we sit together on the first day, and we say ‘I do this,

what about you?’ And somebody says ‘ok, that might be an interesting task for me and then just pick it up.’ Sometimes, there are people who do not say anything and then they get whatever is left” (#1). The reason for the voluntary division is probably due to the lack of comprehensive analysis of the task requirements/deliverables. “Expertise” refers to that interviewees make a connection between the tasks and their subject backgrounds. “So, we did pick each other’s skills that were best suited for certain element. And then we do want to learn from each other. We distributed the workload even based on the skills of each group member, but we did mingle, and everyone has to work on every aspect of the work” (#7).

The main category “challenge” refers to the issue caused by division of the labor mentioned by two interviewees, i.e., the conflict between efficiency and learning. One domestic interviewee mentioned: “I once had a course where we have to work with a software [program]. I didn’t experience that [software] before but one guy in my group was really good at it. I want to learn from his expertise, but he was just too quick to solve it. Actually, it is a really big workload, but he can solve it very quickly, which was nice for the group, I guess. But now I meet the problem that in my thesis I have to use that software. I really want to learn it at that time, but he was just too quick and there was a lot of time pressure, so I just let it go” (#7). One international interviewee mentioned: “I think it is the result of division of labor. The division of labor is for efficiency, so it is good for everyone to do what they are good at. For example, if you are good at writing, then you are responsible for writing introduction, which requires the ability of generalization. I once had a very difficult assignment, and most of us don’t know how to do. We just let those who can do the hard part do it, and for those who can’t, we may fill in other parts” (#8). Both domestic and international interviewees mentioned the conflict between efficiency and learning. However, the domestic interviewee perceived that group work experience as really bad experience and it was a pity that she failed to achieve her learning goal. The international interviewee seemed to perceive it as reasonable and the aim of division of labor is achieving efficiency and getting a good grade.

Action processes

After the preliminary formulation of the plan and division of the group work, it enters the action process, including group cooperation activities. Among the group cooperation activities, we have selected two key events that contains conflicts: disagreement and lagging behaviors. We also pay attention to interviewees’ perceptions on the group atmosphere, such as whether they feel free and comfortable to express their ideas in a group. We illustrate the differences between the perceptions of domestic and international students on these topics.

“Disagreement” refers to the situation in which group members have different opinions on the assignment. Interviewees mentioned two approaches they used to solve these disagreements: “explanation until agreement” and “compromise”. Students often use explanation until agreement method. For example, one domestic interviewee mentioned: “Most of the time, the reason people have a different opinion is because it is not all clear. We usually sat together, and try to write down what was really happening on paper. Then we had a discussion, and the third guy gave opinion on the disagreement” (#4). An international interviewee mentioned: “Normally it takes a long time. For example, if the group meeting lasts one hour and we will spend 40 minutes to discuss the disagreements” (#9). Solving disagreement seems difficult in project work in many cases and interviewees further mentioned that they would consult teachers if an agreement cannot be reached.

The other approach, “compromise”, namely a way of reaching agreement in which each person or group gives up something that was wanted in order to end an argument or dispute. The approach of “compromise” is often found under the specific condition of a group member

insisting and pushing his/her opinions. One domestic interviewee mentioned compromise because of *conflict-avoiding*. "It was an open assignment, and there were many ways to solve that. There were two girls in my group who really wanted to do things in their way. They always say 'you should do in another way, and you should do like this'. At the end, we did as they wanted just to get rid from them. But it turned out their way is not very good. We had another chance to improve our grade. This time, we did that part in the way we wanted, and it turned out to be better. It is always difficult to have a good discussion about how you want to do something especially in a team where people really want to push their opinion" (#6). One international interviewee mentioned compromise because he perceived it is *not worthy*: "Sometimes, you have disagreements, and it depends on the person how you will handle it. It takes me a lot of efforts to argue with them and show them that I was right. Then I just listen to them. Some people are very evident that they need to prove they are right, but sometimes I feel it is not worthy. For me, I am always like if I am stressed, I am just going to do what they say and then it is done. Because I don't really care and don't want to get into it" (#1). Another international interviewee mentioned compromise because of *helplessness*, because she just came to the Netherlands for the master program and was not confident in speaking English. "There were three people in my group, including me. Two of them have been arguing. But I really can't understand why they are always quarrelling, because in my eyes, this task is very simple. Every group meeting, they would discuss about their opinions for 2 to 4 hours, and it really made me uncomfortable. That group work was really terrible and painful, so I even wanted to quit from that group" (#8).

"Lagging behind" refers to the progress of group work has been lagging. To catch up, domestic and international interviewees mentioned different ways to do this. Domestic interviewees often mentioned "direct remind" to cope with the lagging behaviour: "Usually he/she gets the stress from the group. We spoke to him/her 'hey, you are not doing the work and please do it now.' If it really gets bad like he/she really doesn't put anything in the work, then we normally either told teacher or left his/her name out of the report. That was the worst thing you can do probably. But it often doesn't come to that bad" (#2).

International interviewees mentioned more diverse approaches to cope with the lagging behaviour than domestic interviewees did. One international interviewee mentioned "accept", i.e., if a member is lagging behind, then other members in a group would do his/her assignment for him to catch up. "While I had a group where two people didn't almost do anything. We were four, so me and the other person try to push them to do something, but then the deadline came, and they weren't doing anything. So, we just did it for them" (#5). Another international interviewee mentioned "offering help" to deal with the lagging behaviour: "We are going to share progress with each other in each meeting. If we see someone is lagging behind, we are going to help. Normally we don't blame someone, probably they have some personal issues. We just try to help and solve together" (#9). One international interviewee mentioned "self-study" to deal with the lagging behind, because he perceived himself as the one who caused lagging behaviour in the group. "In my experience, I am the one left behind most of the time. But I still have to solve it myself and nobody is asking it". When we further asked him if he would communicate with group members about like what and where made him stuck and unable to continue. He replied: "In the group discussion, I would not propose this. It feels kind of embarrassed to me. I would take extra time and extra efforts to understand it. Till the next meeting I would ask them questions from my own research. Then I would ask them to explain to me" (#10).

"Group atmosphere" refers to the group dynamics that makes the group members feel free and comfortable to express their opinions. Domestic and international interviewees expressed different perceptions about the group atmosphere (here we refer to general perceptions of

group atmosphere instead of specifying working in a mixed nationality group). Domestic interviewees mentioned they are free to express their opinion in a group: “I always feel free to express. I never feel that I should keep my mouth shut or people don’t appreciate my opinion. I feel comfortable to say what I want to say” (#2). Other domestic interviewees mentioned get-to-know before they feel comfortable to express opinions: “In the beginning I often wait a bit, because I need to get to know people, know how they will react and how they work. After a while, I would like to just express myself and be clear about my opinions” (#3).

International interviewees seemed to be more hesitant to express their opinion in a group compared with domestic interviewees. International interviewees mentioned they only do this when they are certain about their idea: “sometimes, I feel maybe this idea is not mature enough to propose in the group, then I just keep it to myself” (#10). One international interviewee mentioned that it also depends on the group relationship: “If the group has a very close relationship among group members. I can share my opinion and ask what they think about. But if the group relationship is much further and people are separated, then I will weigh my words a bit” (#8). The above difference in perceptions of group atmosphere between domestic and international interviewees may be related with cultural communication style – expressive (Dutch) vs. reserved (Chinese) (Gesteland, 2012).

CONCLUSION

The TU/e International Classroom aims at creating a diverse learning environment where both domestic and international students engage in and appreciate multicultural teams. There are currently many types of group assignments that indeed offers students opportunities to experience that at the university. This study aimed at getting an understanding of domestic and international students’ perceptions about their multicultural student group work experiences in the current international classroom at the university.

To answer our first research question, both domestic and international interviewees mentioned their appreciation of different values that international (domestic) students bring to the group, so they did not show a strong tendency to refuse to work with each other as a group. Meanwhile, they reported certain challenges such as different communication styles and language barriers when working in a multicultural group. To answer our second research question, not so many interviewees (only two international) can sense and tell the cultural influence on their group collaboration behaviours. On the one hand, it may mean that students have an open and tolerant attitude towards different cultures, so they do not feel that cultural differences influence their group work. On the other hand, it may also mean that students are likely to be unaware of cultural differences and even the multicultural learning. To answer our third research question, we found similar factor that influences students (domestic and international) joining in a multicultural group. For example, both domestic and international interviewees preferred to work with someone they already know. However, we also found different factors perceived by domestic and international interviewees that influence their group work behaviours. For example, domestic interviewees tended to mention “task motivation” and international interviewees tended to mention “mix of nationalities” as factors to consider before joining a multicultural group. Difference in students’ perceptions of how to do the group work, such as division of task and disagreement solution between domestic and international interviewees were found. The factor of culture seems to play a role in interpreting the above differences.

Based on the results, we concluded that the vision of an international classroom has not yet been achieved. It provides a basis for discussion on how to move the vision forward. Next steps would focus on comparing group collaboration behaviors and performances with

members of varying nationalities (balancing groups and random formation) to see the diversity effects. Future research could empirically test the factors that have an influence on input-process-outcome of multicultural student group work by means of a questionnaire.

REFERENCES

- Arkoudis, S., Watty, K., Baik, C., Yu, X., Borland, H., Chang, S., Lang, I., Lang, J., & Pearce, A. (2013). Finding common ground: enhancing interaction between domestic and international students in higher education. *Teaching in Higher Education*, 18(3), 222–235.
- Bergman, B., Normann, A., Carlsson, C. J., Nåfors, D., & Skoogh, A. (2017). Forming effective culturally diverse work teams in project course. *13th International CDIO Conference*.
- Blair, E. (2015). A reflexive exploration of two qualitative data coding techniques. *Journal of Methods and Measurement in the Social Sciences*, 6(1), 14–29.
- Gesteland, R.R. (2012). *Cross-cultural business behavior: Marketing, negotiating, sourcing and managing across cultures*. 5th edition, Copenhagen Business School Press.
- Gourvès-Hayward, A., Morace, C., & Rouvrais, S. (2013). the Global Village: a Student-Led Initiative for Intercultural Skills. *9th International CDIO Conference, June*.
- Josefsson, T. (2010). Intercultural Competence in Engineering. *7th International CDIO Conference*.
- Knutson Wedel, M., & Persson, H. (2010). a New Introduction To a Master Programme in Materials Science , Turning Student Diversity Into an Advantage. *7th International CDIO Conference*.
- Marks, M. A. , Mathieu, J. E., & Zaccaro, S. J. (2001). A Temporally Based Framework and Taxonomy of Team Processes. *Academy of Management Review*, 26(3), 356–376.
- Mathieu, J., Maynard, T. M., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997-2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34(3), 410–476.
- Popov, V., Biemans, H. J. A., Fortuin, K. P. J., van Vliet, A. J. H., Erkens, G., Mulder, M., Jaspers, J., & Li, Y. (2019). Effects of an interculturally enriched collaboration script on student attitudes, behavior, and learning performance in a CSCL environment. *Learning, Culture and Social Interaction*, 21(February), 100–123.
- Safipour, J., Wenneberg, S., & Hadziabdic, E. (2017). Experience of education in the international classroom-a systematic literature review. *Journal of International Students*, 7(3), 806–824.
- Taconis, R., Sewnarain Sukul, I., Kleingeld, A., & Rispens, S. (2020). International classroom at Eindhoven University of Technology. *IEEE Global Engineering Education Conf*, 1764–1769.
- TU/e. (2018). *TU/e Strategy 2030: Drives of change*, Eindhoven University of Technology.
- Van Puffelen, E., & Van Oppen, M. (2020). Supporting cross-cultural university education. *The 16th International CDIO Conference*.
- Vermunt, J. D., & Vermetten, Y. J. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational Psychology Review*, 16(4), 359–384.
- Webber, S. S., & Donahue, L. M. (2001). Impact of highly and less job-related diversity on work group cohesion and performance: A meta-analysis. *Journal of Management*, 27(2), 141–162.

BIOGRAPHICAL INFORMATION

Cui Ping is currently a post-doctoral fellow at Eindhoven School of Education (ESoE) at Eindhoven University of Technology (TU/e). She received her Ph.D. degree from the same institute with a topic on teacher educators' professional learning. She is currently conducting a research project about effective learning and group collaboration in the international classroom at TU/e.

Ad Kleingeld is an assistant professor in the Human Performance Management (HPM) group at the faculty of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology (TU/e). His research focuses on work motivation, especially goal-setting and feedback interventions to enhance performance of individuals and teams. His recent research focuses on identifying student-related predictors of academic success in STEM university programs.

Sonja Rispens is an assistant professor in the Human Performance Management (HPM) group at the faculty of Industrial Engineering & Innovation Sciences at Eindhoven University of Technology (TU/e). Her research focuses on organizational culture and behaviour, social and organizational psychology, leadership and teamwork. She is currently studying the changing nature of collaboration due to technological developments on the one hand and complex societal challenges on the other hand.

Ruurd Taconis is associate professor and director of education at Eindhoven School of Education (ESoE) at Eindhoven University of Technology (TU/e). His research focuses on ICT in education and teacher professionalization, cognitive development in STEM and science identity and accessibility of STEM education. He is also the chair of the STEM section of VOR, uniting Dutch and Flemish educational researchers focusing on those topics.

Corresponding author

Cui Ping
Eindhoven University of Technology
Eindhoven School of Education
Postbus 513
5600 MB Eindhoven
C.Ping@tue.nl



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).