

PISH COUNTRY STUDIES

(Finland)

PISH PROJECT



Erasmus+

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Contents

Section 1: Introduction 2

Section 2: State of the art on HEI STEM in Finland 3

 Section 2.1 Profile of STEM students in Finland 3

 Section 2.2: State of the art on STEM education in Finland 5

Section 3: Intercultural Communication Challenges faced by STEM students..... 8

 Section 3.1 Intercultural challenges encountered by Students within the classroom 8

 Section 3.2: Intercultural communication challenges encountered outside the classroom..... 11

Section 4: Challenges encountered by HEI Teachers in solving the identified challenges. 12

Section 5: Initiatives adopted by HEI teachers to solve the problem 13

Section 6: Recommendations from students and Teachers on how to solve the challenges. 14

References 16

List of Figures

Figure 1 Students' favourite teaching methods..... 10

Figure 2 How to improve group work experience? 14



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Section 1: Introduction

- Subsection 1: **Aim of the report (Will be developed by AAU and added to all reports).**
- Subsection 2: Profile of the respondents of the report.

Table 1: Profile of respondents to the country report.

Profile of the respondents	
● Number of teachers who filled in the survey	6
● Number of experts who discussed the report's recommendations	1 teacher, 2 HR professionals, 1 student, 1 intercultural communication expert
● Number of students who filled in the survey	30 (3 foreign students, 3 local students)
● Names of HEI represented in the Interview	Most responses from UEF and Tampere University. Also represented: Haaga Helia, Oulu University, Karelia University of Applied Sciences
● Countries of origin of foreign teacher(s) interviewed (if the teacher is a foreigner).	4 teachers have lived or worked abroad for at least 3 months. We did not ask where these experiences took place.
● STEM courses taught by the teachers interviewed	Data science, biology, engineering, special education, study advisor
● Country of origin of students interviewed	3 international students, 10 students have studied or plan to study abroad. 17 students have no experience of international education



<ul style="list-style-type: none"> • STEM discipline or field of study of the student 	All STEM fields were represented, from natural sciences to data science and STEM pedagogy. In addition: business studies, cultural studies and humanities, pedagogical studies
<ul style="list-style-type: none"> • Gender of teachers interviewed 	n/a
<ul style="list-style-type: none"> • Gender of students interviewed 	n/a

Note on methodology.

The Finnish case study was carried out using a modified methodological framework. Instead of individual interviews, we prepared a survey that was sent to HEI across Finland. The reason for this change was the low level of engagement from the participants. Despite interview requests disseminated in an attractive graphic form online and on campus, too few participants signed up for interviews. Focusing on surveys allowed us to collect responses from more students than originally planned (30 instead of 6). Although survey data is not as rich in nuances as interview data, the survey offers the participant more anonymity so it can be easier to address difficult or taboo topics through this mode. Indeed, qualitative responses show that many responded found the survey to be a safe space to confide their opinions in.

Section 2: State of the art on HEI STEM in Finland

Section 2.1 Profile of STEM students in Finland

Table 2: Profile of HEI STEM students in Finland

Indicators	
<ul style="list-style-type: none"> • Number of HEIs in the country. 	13 universities and 22 universities of applied sciences (previously known as polytechnics)
<ul style="list-style-type: none"> • Number of STEM students in each HEI. 	Total number of STEM student in 2018 was 51,000, 30% were women. This number varies between disciplines. Women made up 69% of biology students but only 26% of physics students and 14% of electric engineering students (Naukkarinen & Bairoh 2020)
<ul style="list-style-type: none"> • Number of international students at HEIs 	Since 2012, there have been about 20,000 international students in Finnish HEIs. The number of university students slightly exceeds the number of those who study at

	universities of applied sciences. For more detailed information, see Table 1 below
<ul style="list-style-type: none"> • Average number of student per class. 	Data is not available
<ul style="list-style-type: none"> • Average age range of STEM students (Optional) 	The average age of first-year students (irrespective of the program) is 24 years old. 43% of students complete the program ‘on time. Women are more likely to graduate within the default duration of the program. (OECD 2019)
<ul style="list-style-type: none"> • Average number of foreign students per class 	8% of total student population (OECD average is 6%). (OECD 2019). Please see Table 1 below for more detailed information
<ul style="list-style-type: none"> • Percentage of students from EU 	30% (OECD 2019)
<ul style="list-style-type: none"> • Percentage of from Non-EU countries 	39% from Asia (more than in other Nordic countries), 10% from Russia (OECD 2019)

Data concerning the average number of students per class in HEI is not available. Only data concerning compulsory education levels is available.

Please note students from outside of EU/EEA must pay tuition fees. Students from EU/EEU are admitted on the same rules as domestic students.

Table 1 International students per subject field and degree program type, source Ministry of Education

	Universities of Applied Sciences		Master’s Degree at universities		Doctoral Schools	
	% of international students at UAS	% of students in that field	% of international master students	% of students in that field	% of international PhD students	% of students in that field
Natural sciences	0%	7%	10%	15%	16%	31%
Data science and Computer science	19%	13%	23%	26%	13%	39%
Engineering	19%	5%	20%	16%	22%	27%
Total	38%		53%		51%	



Section 2.2: State of the art on STEM education in Finland

National attitude/policies and initiatives towards promoting STEM education in country x.

Finland may have a small population and be in the peripheries of Europe, but its education system is famous internationally. Its education system has been nicknamed the best in the world. Finnish students' test scores in PISA tests are often cited in connection with the above statement. PISA stands for OECD's Programme for International Student Assessment for students at the age of 15. The education system's success dates to the 1970s education policy reform that limited the number of standardized tests and gave education institutions more independence. Since then, PISA test scores have served as a key proof that the reforms have been successful. However, the performance of Finnish students in PISA tests has been declining since 2006 (Niinimäki 2020). All subjects' areas are affected: reading, mathematics, and science. However, science and mathematics show quicker decline in test scores.

The promotion of STEM education, as well as the promotion of problem-based methods, was part of the 1970s education reform. The activities are especially visible at the basic education level. There are organization that specializes in STEM education for children. For example, STEM School Finland is a chain of 40 schools that specialize in STEM pedagogy and training for teachers. Another company, Pilke Päiväkodit, operates in early childhood education, offering specialized daycare cares. Each day care has its own specialization, from science, through language learning and sports, to arts and music. Even so, STEM education is promoted at all levels of compulsory education, from early childhood education to secondary education and adult education.

As a country that markets itself as a facilitator of technological innovation, Finland is certainly interested in developing STEM education. The institution that promotes "technical science" education is the LUMA Centre Finland established in 2013 (earlier functioning as the LUMA project). LUMA is a Finnish language acronym that stands for natural sciences (FI *luonnontieteet*) and Mathematics (FI *matematiikka*). Even though this acronym has a narrower meaning than STEM, in Finnish language publications it is often used to refer to the same set of subjects.

The LUMA Centre is a union of university-based organizations. Despite the high level of STEM education in Finland (see PISA test scores), few students are interested in a career in STEM, which poses a serious challenge. By targeting a comprehensive set of stakeholders, the Centre's mission is to address this challenge.

As Finland is a small country in the periphery of Europe, it also recognizes the need for international collaboration. For example, in 2013 Finland and the United States announced a joint project to promote and develop STEM education at elementary and high school levels. The project, names Science Across Virtual Institutes (SAVI) involved academic and business institutions from both countries and had a joint budget of USD 4 million.



Despite the active promotion of STEM, researchers appeal for bolder and more comprehensive activities. Naukkarinen and Bairon (2020) observe, for instance, that motivating girls to study STEM subjects is not enough to ensure that more women pursue careers in STEM fields. Indeed, gender gap in STEM education is given a lot of attention in Finland, as it unmasks the elusive nature of gender equality in this country.

Initiatives towards promoting STEM education in country x

Also, the approach to STEM education is evolving. The STEAM acronym illustrates this change – the addition of the letter A symbolizes the introduction of Arts to STEM education. However, transdisciplinary education is promoted at earlier education stages. Such activities are less visible at higher education stages. Even so, students have the possibility to participate in project that direct their attention towards global challenges.

STEM students at HEIs in Finland have opportunities to complete problem- or project-based projects at numerous hackathon events. Hackathon is a blend of two words *hack* and *marathon*. The participating teams are given a task which must be solved within a specific time frame. The default target group are students but there are no formal age restrictions. Usually hackathons have a specific thematic focus but there are sub-categories that open up possibilities for participants with different educational background.

The events are organized by independent entities, but the students may still be awarded credit points for participation, which surely works as an encouragement. Example hackathons include DHH20, Ultrahack, DASH, Junction and Epic Challenge. The information about these events is published in English and international students (and non-students) can also participate. The organizers often create teams where members have diverse ethnic backgrounds. Although these events have a strong focus on STEM skills, many promote the participation of students from other programs. Tasks range from designing an engineering solution (e.g. building a greenhouse on Mars in Epic Challenge) to a social innovation (e.g. solutions for successful migrant integration).

The general situation of international students

The excellent reputation of the Finnish education system encourages international students to apply to Finnish universities. Interestingly, international students care more for the general reputation of the Finnish system than the reputation of individual study programs. Employment prospects after graduation are another pull factor. Among the international community in Finland, a degree in an ICT field is believed to offer good employment prospects. Technological sector is experiencing a boom and a shortage of skilled workforce. This means that employers are more flexible concerning language requirements, and advanced Finnish skills may not be necessary.

Mathies and Karhunen (2019) observe that international graduates from STEM fields are more likely to stay in the country than graduates from other fields (except medical fields). Also, students from outside of EU/EEA are more likely to stay in Finland than their European colleagues.

Most analyses of STEM education in Finland concentrate on compulsory schooling stages. As far as higher education is concerned, important indicators include graduates' employability (Melin, Zijdan & Good et al. 2015). Ministerial funding is linked to this indicator so HEIs. If graduates of a certain program are unable to find work, the funding for that program may be stopped. International students who graduate from universities have a better chance of finding work within a year (about 50%) than those with diplomas from universities of applied sciences (about 40%) (Mathies and Karhunen 2019).

On average, international students with engineering degrees earn €600 less than their Finnish peers. They are also less likely to find in the private sector and get a permanent contract (Piri & Tomperi 2020). These inequalities are a well-known problem in Finland but the scope of this report does not allow for their analysis.

Table 3: Overview of class setting for HEI STEM students in country x

General Respondent Indicators	
<ul style="list-style-type: none"> Average number of students in the respondent students' classes. 	The survey did not include this question.
<ul style="list-style-type: none"> The profile of groups taught by the teacher respondents 	Five of the teachers taught at least 31 students per semester. One of the teachers taught a small group of 1-15 students. International students are a minority in the classroom.
<ul style="list-style-type: none"> Teaching methods used by teachers (in the order of popularity) 	<ol style="list-style-type: none"> lectures individual activities group discussions group projects other
<ul style="list-style-type: none"> Teaching methods preferred by students (in the order of popularity) 	<ol style="list-style-type: none"> individual activities lectures group discussions field trips group projects other



● Mode of student interaction within the class	group work, mutual evaluation, group projects, seminars, break out rooms during classes
● Language of instruction	21 students study in English and Finnish. 6 students study only in English. 3 study only in Finnish. 2 students used other languages.
● Student's company	

Section 3: Intercultural Communication Challenges faced by STEM students

Three international students filled in the survey. Among Finnish students, 10 had the experience of studying abroad or planned studies abroad. However, 17 students were not interested in an education experience abroad. More than half of student respondents believe that a multicultural environment has a positive impact on their studies. This group also rated their intercultural communication skills as good or excellent. About a third think that it has no significant influence on their studies. Four students responded that being part of a multicultural classroom hurts their studies. These students were not happy with the level of cooperation between domestic and international students. In addition, most of them did not enjoy group work activities at all.

The students were asked about their usual company at the university. The responses reveal that the division between domestic and international students is rather strong. Fourteen responded said that they spend time with other Finnish students. Five students responded that they have friends in both groups. There was also a group of eight students who do not know anyone at their HEI. This observation will be analyzed in more detail later.

Section 3.1 Intercultural challenges encountered by Students within the classroom

1. **Intercultural communication challenges as experienced by students (both foreign and local) in the classroom – in the order of how frequently the students experience them.**
 - a. loneliness
 - b. unclear expectations
 - c. overwhelming stress or depression
 - d. language barrier



- e. A small minority of respondents have often experienced hostility in the classroom. A vast majority, however, has never had such experiences.

2. Challenges as observed by the teachers in the classroom - in the order of how frequently the teachers observed them.

- a. unclear expectations
- b. language barrier
- c. cultural misunderstandings
- d. overwhelming stress of depression
- e. hostility

Students' feedback paints a complex picture of challenges faced during group work activities at Finnish HEIs. These challenges can be categorized into two groups: a) conflicts with other students, b) teaching method or the teacher's attitude.

- a) conflicts with other students, b) teaching method or the teacher's attitude, c) structural problems.

Although some respondents made generalizations about cultural differences, very often these generalizations can be traced to particular interpersonal conflicts. Typically, conflicts concern students' priorities or organizational skills. Some respondents were frustrated that group work activities had to be finished at the last minute because other group members did not seem involved enough. One student reported that their prior negative experiences make them avoid any group work with international students. Although this comment stood out from other responses, it is important to address it here to illustrate that failed cooperation can have a lasting effect on attitudes, and deepen biases.

There are also additional challenges. Eight of our student respondents report that they do not know any of their peers at the university. At the same time, the majority of respondents answer that they have experienced loneliness, either frequently (33%) or sometimes (43%). While the Covid19 pandemic complicates social contacts between students, most of our respondents have already completed the 3rd year of studies, and many were 2nd or 3rd year students. This means that the observed social isolation is a deeper problem that cannot be explained just by the pandemic-related restrictions.

- b) teaching method or the teacher's attitude

Few students offered detailed feedback on their teachers' skills when answering open questions. Relations between other students were a more popular topic.

This said, students prefer teaching methods that require little interaction or cooperation with other students. Figure 1 below represents these findings. A group project (marked in green) was the students' least favorite method. The students found individual assignments (red) and lectures (blue) more appealing. Groups discussions (orange) are the most popular 'social' method. However, class discussions require less cooperation and planning than projects, which explains the difference in attitudes.

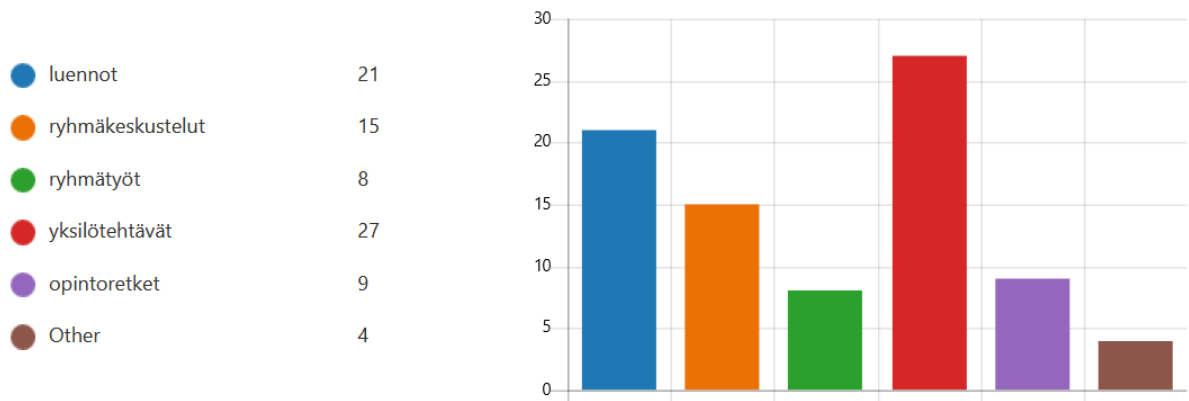


Figure 1 Students' favourite teaching methods

Although group work was not their favorite type of assignment, on average students rated it at 3 out of 5, which can be understood as 'good enough'. This said, there is clearly room for improvement. No one selected a five-star rating, but one person chose the lowest score (1 star). The teachers, on the other hand, put more trust in group work methods. While these attitudes are not easily comparable, it is important to note that it is the teachers who decide what the method will be used, and students have to adapt.

As far as more specific problems with teachers are concerned, students rated their professors' pedagogical skills. These comments include remark about communication and organizational skills. For instance, one international student noted that:

I have felt like the teachers didn't have an interest in improving their communication skills, being frustrated when some students couldn't understand while their enigmistica skills are appalling.

The lack of understanding that local teachers had for their needs was noted. However, another international student had no such complaints. This said, the international students who participated in the survey also report that they have often experienced hostility. This is an alarming observation, even though the small scope of this survey does not let us explore this problem further. The classroom environment may not always be an 'easy space', but above all it should be a safe space.



Another problem with group work activities was their organization. Activities are arranged in a way that interferes with students' study-life balance. Complaints about workload were common. In light of these challenges, the labor-intensive group work activities can seem daunting.

Students can also struggle with the learning curve required to meet course demands. While challenging oneself and facing obstacles are a normal part of the learning process, it is certainly important to prepare students for these difficulties. One student was also critical about the selection of teaching methods for activities.

Group work often seems like a burden. Not all activities are best done in a group. For example, it makes more sense to complete a short writing assignment individually, and then go through feedback in a group.

A problem that links conflicts between students and criticism towards teachers concerns the organization and management of group work. Students concentrate on the result of group work but they struggle with the process of achieving these results. A student comments that even though students are required to work together, project management skills are not taught at all. This brings about conflicts that arise because the division of tasks is a problem, or the project itself is overwhelming. A lack of leadership skills (or the will to be the leader) among students deepens this problem. This student also believes that work should be distributed equally but very often one person must oversee each step, whereas others barely do the minimum amount of work. It is worth noting that this challenge is not unique to a multicultural setting but might arrive anywhere.

There were also respondents who described classroom challenges as a normal part of university life. Learning about expectations is a good example. Two students noted that beginnings are always marked with some uncertainty because teachers have different requirements. Initially, this uncertainty can cause stress. While uncertainty can never be fully eliminated, clear communication about requirements can minimize the stress and ease the adaptation process.

Section 3.2: Intercultural communication challenges encountered outside the classroom

In Finland, the discussion about intercultural communication challenges encountered outside the classroom concentrates on international students' employment prospects after graduation. The data cited in Section 2.2 illustrates that international students often struggle with finding employment that matches their education or interests. Numerous initiatives are being started to eliminate inequalities between local and international students' work-related opportunities. Many schools have their own programs or projects that helps students build professional networks and improve their job search skills. Example projects include SIMHE at the Karelia University of Applied Sciences (<http://simhe.karelia.fi/en/>) and Hanken International Talent at Hanken School of Economics. In



addition, there are different organizations whose mission concentrates on enhancing the values of diversity and inclusion in the Finnish society. Examples include a diversity promoting non-profit Inklusiiv (<https://www.inklusiiv.org/>), a software house Integrify that offers coding courses for international talent (<https://www.integrify.io/en/>) and a recruitment firm Pointer Potential (<https://pointerpotential.fi/>).

The survey concentrated on intercultural challenges inside the classroom. There was one general question about the student's self-assessed intercultural communication skills. The student was supposed to evaluate them on the scale of 1 to 5 stars, where 1 meant "poor" and 5 meant "excellent". The average rating was 3.57 stars, that places students' skills between adequate and good. Students selected "excellent" more often than "poor" (only 1 response, 3 respondents selected a 2-star rating).

A follow-up question asked about possibilities to develop the student's communication skills further. Although students concentrated on the classroom context, many response's suggested that travelling or more interpersonal contacts could help them develop their intercultural competence. This idea was expressed by both international and domestic students.

Section 4: Challenges encountered by HEI Teachers in solving the identified challenges.

Challenges observed by the teachers

1. **Unclear expectations**
2. **Language barrier**
3. **Cultural misunderstanding**
4. **Overwhelming stress**

For four teacher respondents, language barrier was the most serious obstacle. They note that this challenge concerns both teachers and students. Language difficulties affect the quality of teaching and learning. Many students who study in English-language programs experience difficulties. This observation also concerns Finnish students in English-language programs. Among international students, the teacher identifies specific groups of students who struggle the most with the language barrier. The groups are based on the students' ethnicities. The teacher also brought up the notion of cultural distance when commenting on cultural misunderstandings, suggesting that these problems are more likely to emerge in contact with students from outside of Europe.

Teachers' opinions were divided when assessing the level of cooperation between Finnish and international students. None of our respondents thought that cooperation was exceptional. As far as



intercultural communication skills are concerned, our respondents generally described their skills as good, though one person described them as poor. The teacher's self-assessment overlaps to a degree with their opinion on student cooperation. However, a teacher who described their IC skills as good also rated their students cooperation as merely adequate. While IC training could improve the classroom experience, a more comprehensive approach should be utilized.

Two teachers answer that having to teach in a multicultural classroom affects their work negatively. Although the four other teachers do not share this opinion, the needs of these teachers should be addressed. Based on other responses, one of these teachers seems to have faces a lot of difficulties in the classroom. For example, they are not satisfied with the level of cooperation with the students and they often deal with misunderstandings. This explains their attitude. The other teacher seems to have faced fewer challenges. Unfortunately, this study cannot explore this discrepancy further.

In addition to the teacher survey, we have talked with professionals from recruitment, teacher training and intercultural communication. The recruitment professional pointed out that STEM graduates have a good chance of finding work in Finland without the knowledge of the Finnish language. English is the working language of most tech companies in Finland. At the same time, socializing often takes place in Finnish, and international team members can be left out from social groups if they cannot participate in informal conversations. For this reason, companies' value multilingual workers. Another challenge listed by the recruitment professional concerned trust. Projects can fail when news about problems or hurdles is not addressed early enough. The expert mentioned that cultural factors can complicate a discussion about problems. Sometimes, it may be too risky to speak about encountered difficulties openly. This is one area where cooperation needs to be strengthened.

An expert in intercultural communication noted that 'intercultural communication' is often treated as a simple and self-evident notion. Although, a teacher expert mentioned that intercultural communication module is a useful module to prepare students for teamwork, the question remains how to teach this skill in the 21st century. Professor Fred Dervin has written numerous critical articles on the subject of interculturality at Finnish universities.

To conclude, it is important to note that this study concentrated on group work challenges. Our survey shows that students' and teachers' experiences vary. We will address some good practices in the final section of this report.

Section 5: Initiatives requested by HEI teachers to solve the problem

1. **teacher training**
2. **teaching resources**

When asked about the support needed to improve their pedagogical skills, most teachers selected ‘teacher training’. Two teachers could also benefit from ready-made teaching resources. Most teachers did not find institutional-level support useful for them. Institutional-level support means for example, an official strategy or a national-level expert organization.

Section 6: Recommendations from students and teachers on how to solve the challenges.

After the initial survey results were analyzed, the below diagram (Figure 2) was developed in cooperation with experts who participated in the discussion part of our research.



Figure 2 How to improve group work experience?

The collected feedback shows that three areas can be tied to the reluctance towards group activities. The first area concerns teachers. While group work has proven pedagogical benefits, it is not always clear for students how they can benefit from doing tasks together. On the other hand, there may be cases when group work is not the best method. The important thing is that aims, and objectives are carefully planned. As group work can be challenging for students, teachers must be able to respond to difficulties. It is therefore important to plan how much support a teacher can offer to those who struggle with the task. Finally yet importantly, the evaluation criteria inform students about the work that is expected of them. Students mentioned the final result as the most important part of group work, ignoring the process that leads to it. This approach makes students perceive group work as a risky environment. This approach also makes it easy for conflicts to erupt because students must work in perfect harmony to achieve this perfect result. If teachers were able to see the process



behind the product, they would have a better understanding of the challenges that students had to solve on the way. Learning to document the process without overburdening the team with extra tasks could help students come to terms with the difficulties and disagreements that are a natural part of teamwork.

The second area concerns team building. In group projects, students are likely to work with randomly chosen partners whom they do not know. Having to accomplish things together with someone who does not share our dedication or ideas can be challenging. Our expert suggested that students should start from drafting a contract. At this stage, they can address the motivation and expectations of different team members before disagreements turn into conflicts.

As trust is an important element of teamwork, students should be encouraged to socialize and get to know each other before any serious work starts. The survey shows that some students are not part of any social group. Social activities help achieve a sense of belonging, which is necessary for successful teams. Socializing activities should concentrate on building sympathy for other team members. Here it is also important to note that we usually do not like people whom we do not know very well. At the same time, we are more likely to work through problems with people whom we like. Learning about others' interests and life goals is also a good idea. Connections forged during studies can bring further networking benefits later in life.

In addition, students could benefit from learning conflict management tools. Tools based on Positive Psychology and Non-Violent Communication help address a crisis in a constructive way. An added benefit of introducing these methods is promoting honesty and respect in problem situations. It is important to choose conflict management tools wisely to avoid problems of mobbing or groupthink.

Team building activities should also include elements of intercultural communication. While several participants had the desire to 'learn about other cultures', it is important to consider also the critical approaches to intercultural communication training. This training should help students address their biases and misconceptions and prepare them to work in conditions of uncertainty.

Finally, an expert who works with teams noted that feedback sessions are important. Often the process can be challenging for team members. Reflection helps cope with the encountered difficulties and draw conclusions for the future.

Finally, students could benefit from implementing project management tools. Our students expected that every team member should have the same level of enthusiasm and the same workload. Learning about leadership could help students divide tasks. If the students were able to 'own' individual elements of their work, this could motivate them to try their best. This idea could also make it easier for the teacher to see how the work was accomplished. Students who had more interest in the task could be rewarded for their efforts. Students who chose the path of least resistance would also get a grade that matched their contribution. Importantly, students who helped with 'invisible' task, like administration or management would also be recognized for this extra effort.

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