

# **DIVERSITY IN STEM EDUCATION**

## **BEST Position Paper**

**Prepared by**



## 1. Introduction

The Board of European Students of Technology (BEST) is a constantly growing non-representative, non-political, and non-profit voluntary student organisation whose vision is to empower diversity. Since the foundation of BEST in 1989, several activities have been developed with the aim of developing students such as BEST Courses, European BEST Engineering Competition (EBEC), BEST Career Centre (BCC), and the BEST Symposia on Education (BSE) [1].

Through its Educational Involvement Department, BEST strives to raise students' awareness about educational issues and to gather their ideas on what can be changed in their universities, study programs, and curricula. BEST is eager to be in close collaboration with the stakeholders of higher education, contributing to the discussions with innovative solutions coming directly from the recipients of education - the students. BEST is co-funded by the Erasmus+ Programme of the European Union and cooperates with a number of corporate and university partners, as well as other NGOs, to provide its services.

Under the theme of "*Diversity in STEM Education*", four BSEs were organised during the summer of 2019 in Brno (Czech Republic), Skopje (North Macedonia), Athens (Greece), and Aveiro (Portugal). The positions and recommendations presented in this Position Paper are based on the reports from these events. In addition, two surveys were conducted to gather further insights from STEM students and support the conclusions of the Position Paper.

Based on this research and following approval from the Local BEST Groups, BEST has four main **recommendations** for the stakeholders:

1. Using English in STEM Education;
2. Empowering cultural and ethnic diversity;
3. Achieve gender balance and fight gender bias;
4. Provide equal opportunities for students with disabilities.

## 2. Organisational Stance

### 2.1 Using English in STEM Education

According to data collected from students from ten European countries, one of the biggest problems caused by diversity in STEM education is that not all students can speak a common language [2].

Two-thirds of Europeans (67%) think that English is one of the two most useful languages. In addition, English is the most widely spoken foreign language in the EU (38%); and at a national level English is the most widely spoken foreign language in 19

of the 25 Member States where it is not an official language [3]. English is the most prevalent news and information language in the world used both in the business and the scientific worlds [4].

For these reasons, BEST proposes that English should be used in STEM education in parallel with local languages to allow for effective communication between the stakeholders of Education from all over Europe.

#### **For students:**

» Student organisations should strive to work in English instead of only in their local language(s) to allow for migrant/international students to integrate.

» In a group where not every person is capable of communicating in the local language, students should aim to speak in English, even if not talking directly to the foreign person(s).

#### **For educators:**

» Educators whose mother tongue is not English should have at least a B2 (Upper Intermediate) level in English to communicate effectively with foreign students.

#### **For universities:**

» Whenever possible, Master's degrees at universities should be available in English.

» Universities should support students' communities and activities that strive to help students improve their English skills.

» Universities should provide educators who are not native English speakers with opportunities to improve their language level.

## 2.2 Empowering cultural and ethnic diversity

160 distinct cultural groups and societies call Europe their home [5]. Every day their members commute to work, study for exams, and live a life seemingly indifferent from each other. Yet, contemporary studies confirm that cultural differences continue to be an obstacle in cooperating in diverse environments. Students, who are one of the social groups with the highest exposure to multiculturalism, understand that addressing this issue is crucial for the companies and universities of tomorrow - a

statement backed by many peer-reviewed papers, outlining advantages of creating diverse work and research environments [6].

Students from 13 European countries discussed the situation of cross-cultural relations at their universities. They identified problems that occur in those relations as well as possible actions that may contribute to solving those issues [7].

### For students:

» Students should participate in mentor programmes to help foreign students settle in a new country.

» Students should organise and participate in multicultural events and initiatives where people can present their culture and perspectives.

### For educators:

» Educators should encourage project groups to have mixed cultural backgrounds (e.g. avoid having all the Erasmus students in the same group).

» Educators should create and maintain materials in English in order to increase their accessibility to foreign students.

### For universities:

» Universities should build, support and promote exchange programmes, which help build cooperation networks between educational institutions.

» Universities should support students' and academics' cultural initiatives and projects, making sure all students are receiving the necessary aid, no matter their country of origin.

## 2.3 Achieving gender balance and fighting gender bias

Even though women make up for 51% of the European Union population, 41% of all the European scientists and engineers are women [8], 36% of managerial positions in the EU are filled by women [9], and they earn on average 14% less than men [10]. Studies have shown that working environments which include women benefit from, for example, increased productivity and improved communication [11], yet discrimination in the workplace remains to be an unsolved issue in European society.

Students, who are often the first to be exposed to this problem while taking the first steps of their careers, are not only concerned about issues of discrimination but also willing to expose and fight them. This is why, during the BEST Symposium on Education in Aveiro, students from all over Europe discussed what can be done to empower all members of the community, no matter their gender, with the same opportunities to contribute to Europe's and the world's progress and to develop themselves as STEM professionals [12].

### For students:

» Students should create opportunities to discuss gender imbalance and gender bias by organising community events (e.g. discussion panels or symposia).

» Students should participate in mixed-gender activities such as sports events and class projects.

### For educators:

» Educators should learn about conscious and unconscious gender bias and other discrimination-related issues.

» Educators should follow a zero-tolerance discrimination policy based on gender.

### For universities:

» Universities should introduce mechanisms to report and prevent gender discrimination: safe and anonymous communication channels, counselling, and mentoring systems.

» Universities should work with the alumni network to introduce and promote role models for all genders.

## 2.4 Providing equal opportunities for students with disabilities

About 15% of the world's population lives with some form of disability [13]. The Convention on the Rights of Persons with Disabilities (CRPD) guarantees the fundamental rights and freedoms of people with disabilities [14]. For this reason, as in all areas of society, people with disabilities should be rightfully integrated into STEM education and considered as a key element of diversity.

According to data from 16 universities in 11 European countries, some of the problems that disabled students experience in universities are related to their academic environment, financial situation, career opportunities, mental health, accessibility, and social interactions [15].

Students with disabilities experience these problems at their universities often. Therefore BEST proposes a set of actions that can be done to combat those issues.

### For students:

» Student organisations should ensure that their activities can be equally accessed by students with disabilities, whenever possible.

### For educators:

» Educators should provide examples and success stories to raise awareness about people with disabilities in STEM fields, to ensure that all students have the necessary sensitivity in this regard.

### For universities:

» A university-company cooperation platform should be created for career opportunities that are inclusive for students with disabilities.

» Universities should ensure that students with mobility problems have adequate access to all the relevant infrastructures to fully participate in all academic activities.

### 3. Final Remarks

This paper addresses the three main stakeholders of Education - students, educators and universities - and aims to inspire change and direct action towards a more diverse and inclusive environment in all European STEM Higher Education institutions. We want to give a direction for student and university leaders to guide their organisations in promoting a more equitable setting for everyone.

Even though individual change plays an important role, BEST believes that actions must also come from the institutions, by

implementing changes at the leadership and management levels. By rethinking beliefs, adjusting attitudes, and practising empathy, we are able to promote diversity and combat conscious and unconscious biases.

We ask the reader, on behalf of BEST, to be an active agent of change, to implement some of these actions in their own activity and to make these words reach their institution, their collaborators and other stakeholders.



**Together,  
we are  
empowering  
diversity!**



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### Prepared by:

João Moita (BEST Lisbon, Portugal)  
Franciszek Gorczyca (BEST AGH Kraków, Poland)  
Irem Sipahi (BEST Izmir, Turkey)

### Designed by:

Iulia Mihaiu (BEST Brasov, Romania)

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