

# STUDENTS' PERSPECTIVE ON THE IMPACT OF CULTURAL AND ETHNIC DIVERSITY IN STEM EDUCATION

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## Abstract

The awareness of European students towards cultural and ethnic diversity matters is increasing. During BEST Symposia on Education, while working in focus groups, students proposed solutions in order to better support inclusion. The students observed the tendency of segregation among their foreign colleagues, caused by factors such as language barriers, cultural and ethnic stereotypes, social or academic context, which leads to negative effects on their academic performance and mental state.

From the input gathered, it is clear that not all students and teaching staff have a clear understanding of the effects of diversity on STEM education, whether it be the students' academic success or mental state. Several points were raised, the most common ones being related to the inclusion of foreign students in a new environment, providing appropriate programs for integration into new educational systems and professional help when mental health concerns appear.

Keywords: diversity integration, improvement, STEM, students perspective, Symposia.

## 1 INTRODUCTION

Diversity is taking STEM education by storm. Every day, more students travel abroad to either enrich their student experience or to continue their studies. With this in mind, every student is required to have knowledge about the effects that diversity has on their studies and everyday life. This paper focuses on real-life contexts and experiences, informing both students and educators of their responsibilities towards diverse environments inside universities and gives a summary of the students' perspective regarding diversity in education. Board of European Students of Technology (BEST) gathers input from European students through its BEST Symposia on Education (BSE), in the form of focus groups and disseminates the output to relevant bodies throughout Europe.

## 2 METHODOLOGY

BEST Symposia on Education (BSE) are events made to involve students in the process of educational improvement and to raise their awareness about the possibility of students being involved in their education. A variety of different session formats were used during the BSE to gather input, ideas, and opinions from the participants (currently pursuing various studies in different universities around Europe), regardless of their origin, age, or gender. Furthermore, a survey was launched to gather data used for the content of the BSE events, in order to identify what are the students' main concerns about diversity. During both BSE Athens, hosted by National Technical University of Athens and BSE Skopje, hosted by University Ss. Cyril and Methodius, 41 participants were involved in these sessions. BSE reports ([2],[3]) are written and disseminated throughout Europe.

### 3 DIVERSITY AND ITS TYPES

Diversity is the existence of variations of different characteristics in a group of people. These characteristics represent something unique such as cognitive skills and personality traits, but they also describe the shape of an identity of an individual (such as race, age, gender, religion, sexual orientation, cultural background and much more). Diversity as a concept has spread across the world and many countries have added the empowerment of diversity to their constitutional laws. The process and pace of its adoption varies from entity to entity, which leads to inequality. According to the participants, diversity is required and essential, as different backgrounds, attributes, or perspectives will offer creativeness, healthy conflict with innovation, and progress.

Diversity could be divided into several types, which are theoretically infinite. When it comes to education, diversity is mainly experienced by students. Hence, for a deeper analysis, BSE Report Athens, identifies 9 types of diversity: racial and ethnical, age and generation, gender and gender identity, sexual orientation, religious and spiritual belief, disability and ability, socio-economic status, thinking style and personality & personal life experience.

According to the BSE participants, personal life experience, age and generation, social-economic status, and disability and ability are the most undervalued types of diversity. For the participants, the most important type of diversity in education are socio-economic status and thinking style and personality. Based on their opinion, there is a certain gap when it comes to the attention given to some types of diversity.

### 4 CULTURAL DIVERSITY

At present, culture and ethnicity are hot topics regarding diversity in education. According to the BSE participants, most universities welcome foreign students to attend the same lectures as local students but, at the same time, they only provide study programs in English for a few fields. There is some lack of information regarding the tuition fees for international students and there are only few ethnically diverse professors. The most important aspect of diversity in education is studying in a foreign language with the aim to improve the students' language and communication skills and to become more independent. This will help individuals to self-improve, to gain the ability to adapt to a different environment and to possess a flexible mindset.

Cultural diversity means defending the idea that, despite differences, every person can make a unique and positive contribution to a large society. [1]

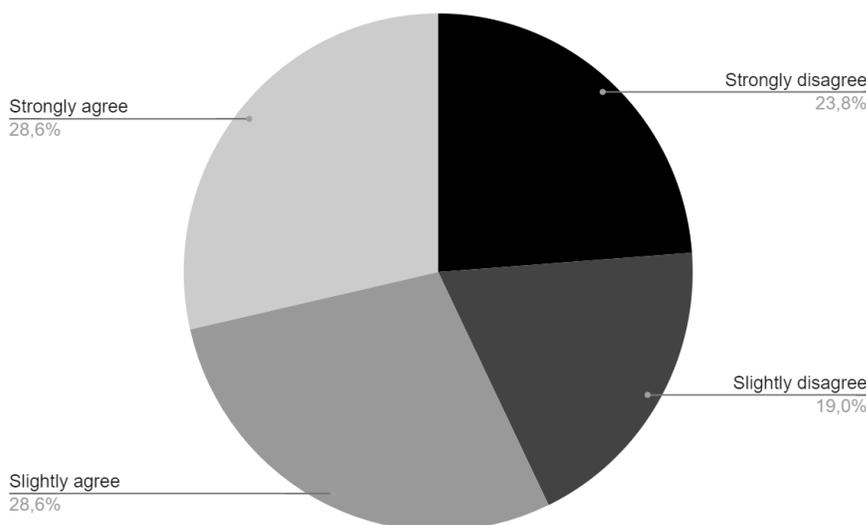


Figure 1: The proportion of opinions of BSE participants when asked to give an opinion on the statement "In my university we can experience different cultures"

In the current European context, cultural diversity is present in every aspect of our lives. In Figure 1, the differences between the European universities is visible, in terms of cultural diverse environments.

## **5 ATTITUDE OF UNIVERSITY, STUDENTS, AND EDUCATORS TOWARDS DIVERSITY**

In the following 3 subsections, the opinions expressed by the BSE student participants regarding attitude of important figures in education are mentioned and possible solutions are proposed.

### **5.1 University**

Usually every university has a student council or faculty student representatives that are elected by the students. According to the participants, there is a lack of involvement of these representatives towards cultural diversity and lack of visibility of the associations. The solutions proposed by the participants are:

(1) Improving transparency of all NGOs or associations in the university involved in issues surrounding cultural diversity by sending monthly reports via email to all students. This could be achieved by publishing and advertising cultural events in both the local language and English, promoting with the cooperation of other associations and developing sharing programmes.

(2) Establishing a more active role of the student representatives, for example by creating a new position which will be focused towards the international students and students from different cultures in the local areas.

### **5.2 Students**

Aside from the university, the attitude of students plays a significant role in supporting the cultural diversity. The BSE participants stated that they had experienced events where people with different cultural background were ridiculed during lectures without any indication of empathy. Local and international students do not tend to merge during the lectures which leads to more compressive problems. Group projects do not seem to help diversity because of the language barrier, gender, background or stereotypes. Students often care about their grades and efficiency to succeed rather than about exploring diversity. Students lack interest in being involved with something outside of their comfort zone which leads to lack of integration. Diversity, for them, could increase the workload, emerge the need to invest more time and create a slow development process.

### **5.3 Educators**

A major drawback to integration and a possible source of discrimination could be the educators. This behaviour could depend on the country, the age of educators, their personalities and possibly other factors. This could occur because of intolerant backgrounds or just lack of knowledge. Many educators are passionate about their subject and teaching but not about actually reaching their students. On average, the effort of the educators is not oriented towards engagement with their students.

Their role in integration can be impactful but usually they do not use it as a tool to promote inclusiveness. According to the BSE participants, most of the inclusive teaching methods are practical sessions, laboratories and projects. A system of feedback between students and educators should be implemented. To further promote integration, more projects with diverse working groups, lessons and materials in English and interactive breaks should be created; awareness should be increased, kind and just treatment towards the international students should be promoted, educators should be aware of the needs of the students.

## **6 DIVERSITY AT THE WORKPLACE**

Cultural diversity exists in every aspect of our lives. One of the most important areas is the workplace. There are many benefits and challenges of cultural diversity at the workplace[5].

### **6.1 Benefits**

(1) Diversity at work improves productivity. The nature of having different perspectives compensates for the decline in productivity, even if colleagues find themselves uncomfortable at work due to different environments. Teams with racial diversity are 35% more productive than teams that stick to the same skin color. According to MIT[6], a successful team in each sector has three elements: (a) sensitivity to each

other's needs, (b) each person in the team gives roughly equal time to talk to everyone and (c) teams involve more women when possible.

(2) Diversity in the workplace helps companies to grow. Two-thirds of hiring managers say that a diversity initiative helps companies grow and creates new positions and opportunities for local employees. Almost 90% of recruitment managers believe that cross-border communication will increase market share and revenue over time [6].

(3) Task assignments have fewer variables. When diverse teams are present in the workplace, individual workers can receive specific assignments based on their strengths and experience.

## 6.2 Obstacles

(1) May cause initial fluctuation in resignations. Working in a different environment could be uncomfortable. While one might call such an act “prejudice”, “racism”, or something worse, businesses will have to deal with the cost of training for new changes for these workers. You get an improvement in the workplace because prejudice is no longer allowed, but there is a price to do the right thing.

(2) There may be communication barriers that make productivity more difficult. People of different origins and ethnic backgrounds can speak the same language, but the words they use may have very different meanings.

(3) Discussions can speed up or slow down projects. Having a wide range of views and perspectives makes it possible to find better solutions. There are times when perspectives are very diverse, but it becomes more difficult to choose. People who do not consistently approve their proposals will start to get angry with their situation. They can stop entries altogether, which means you've missed a potential opportunity, even with a different team.

## 7 BENEFITS AND OBSTACLES OF ETHNIC AND RACIAL DIVERSITY IN EDUCATION

Increasing ethnic and racial diversity will make society more aware and can lead to a decrease of inequalities. Diversity gives different perspectives and it always has benefits and obstacles when it comes to its inclusion in education, which can be observed in Table 1.

Benefits	Obstacles
<ul style="list-style-type: none"> <li>➤ Self-improvement in actions and mentality</li> <li>➤ Being prepared to work in a multicultural environment</li> <li>➤ Getting to see more diverse perspectives that can be mind-opening</li> <li>➤ Richer and more impactful experience, both in a social and academic context</li> <li>➤ Better adaptive skills/flexibility</li> <li>➤ Increased critical thinking and increased social capability</li> <li>➤ Students develop an increased level of tolerance in the workplace</li> <li>➤ It may make finding a job in a foreign country much easier, as students will already have built connections with foreign students</li> </ul>	<ul style="list-style-type: none"> <li>➤ Students base their judgement on stereotypes without meeting foreign colleagues</li> <li>➤ Not good enough knowledge of English to communicate, in other words, the language barrier for both students and professors which sometimes can lead to miscommunication</li> <li>➤ In some universities there are no classes taught in English</li> <li>➤ Students don't have the mentality to interact with foreign students</li> <li>➤ Foreign students form groups and they don't interact with local students</li> <li>➤ Local students don't approach foreign students or are not willing to work with them and there is a lack of curiosity and interest from students</li> <li>➤ No equal evaluation for students: foreign students pass easier or get special treatment</li> <li>➤ Sometimes both local and international students can get demotivated when not working with people from the same culture because of working methods differences</li> </ul>

Table 1: Benefits and obstacles of ethnic and racial diversity in education

Diversity can help develop better critical thinking which is important for the youth. Discovering new cultures can increase tolerance. Self-improvement is the benefit that is the most convincing on why ethnic and racial diversity is important for students. Other students' opinions about diversity should be encouraged to be

shared, in order to better understand the problems and their roots, henceforth this knowledge can help the students find the solutions to further empower diversity and overcome the obstacles.

## 8 PROPOSED SOLUTIONS FOR IMPROVEMENT IN INTEGRATION

During BSE Athens 2019, students were asked about how diversity was integrated at their universities. On the question, “*How do the professors behave with and around foreign students in your university?*” the answers of the participants were diverse: from professors not knowing English to no classes in English, but giving the opportunity to foreign students to learn native language of the country and offer them materials in English or even extra classes taught by the professors.

To better understand the current process of integration, we asked, “*How do students behave with and around foreign students in your university?*”. The answers were that the local students don't have the mentality to interact with foreign students or that they have problems with putting in extra work for a university with foreign students because of the language barrier or the other way around. During classes, they work all together with no problems, but outside classes, they don't interact as much. An non-exhaustive set of actions that could be done in some European universities in order to help better integration of foreign students is: extra classes offered by professors, lectures in English, materials and tools in English, native language lessons for free with certification, cultural classes and social activities, angel system: a local that helps the foreign student, an organisation that helps foreign students integrate.

The participants agreed on segregation, equal evaluation, language barriers, and curiosity as the main issues of this type of integration. They proposed the following potential solutions:

- (1) *Segregation* - Angel system and culturally diverse teams for projects
- (2) *Equal evaluation* - Standardised and impartial evaluation, with 2 or more professors for all oral exams and to use a computer for randomising the subjects for written and oral exams.
- (3) *Language barrier* - Free English courses for the staff and local language courses from the university, events in English, and better promotion on the benefits of learning English
- (4) *Curiosity* - Increasing the transparency and promotion of international opportunities like available scholarships, internships, programmes, students' organisations, etc. This will increase the curiosity of students towards cultural diversity.

Extra-curricular activities help to develop students in areas that the normal education per se does not allow. The ability that such activities have of integrating foreign students was assessed, as well as understanding the kind of activities universities currently are offering. The main outcomes were:

- (1) These activities may both integrate and/or segregate foreign students depending on activity.
- (2) Universities tend to not support organisations associated with these activities, at least financially.
- (3) There is a need for a place within the university where you can get information about the clubs and organisations that are associated with the university.
- (4) There are activities but students do not participate, it mostly happens because either they are not the target group for that specific activity, big fees are in order to participate, or because they do not have time (academic schedule is overloaded).
- (5) The reason behind the lack of more activities is the lack of initiative/proactivity both from universities and students.

At BSE Skopje 2019, participants came to the conclusion that the lack of interest results in further lack of integration. Participants further agreed that in sports, integration seems more natural, since the teams unite people. On the other hand, participants noted that there is some reluctance from minorities to join associations, but there are also ethnic associations that can be helpful in the integration process. Participants also agreed that there is little interaction between different ethnic groups. They said that students usually look for people with similar cultures and merging is not common. While analyzing the causes, they concluded that people don't want to leave their comfort zone, they feel threatened by the language barrier or they don't want to invest in, what is assumed to be, a short-term friendship.

Participants gave some ideas how to improve integration and said that they could take actions to help students of different races and ethnicities like speaking up against discrimination, help them to adapt to the new environment or just be friendly and empathetic. Finally, participants suggested that the teachers could help a lot in this topic as well, by making diverse working groups, but they also agreed that they could step up and make those diverse groups on their own.

Table 2 contains the results of discussions and evaluations between participants about the possible techniques to better include them in society.

	Less Effort	More Effort
High Impact	<ul style="list-style-type: none"> <li>- Spend time with international students and people of other ethnicities</li> <li>- Share actions and activities in the social media</li> <li>- Sponsor integration activities</li> <li>- Organize social events, like tandem meetings or international meals</li> <li>- Being open minded</li> <li>- Mixed accommodation</li> <li>- Guidance programs for international students</li> <li>- Make group projects with international students</li> </ul>	<ul style="list-style-type: none"> <li>- Implement new laws/regulations</li> <li>- Generalized use of English</li> <li>- Sponsor NGOs</li> <li>- European Programme</li> <li>- Meetings with alumni</li> <li>- Research about the lack of diversity</li> <li>- Ease the process for foreigners to come to a new country</li> <li>- Internationally involved teachers</li> <li>- International internship program</li> <li>- Cultural trips</li> </ul>
Low Impact	<ul style="list-style-type: none"> <li>- Guest lectures in English</li> <li>- Actions for religious groups</li> <li>- Hiring international students</li> </ul>	<ul style="list-style-type: none"> <li>- Changing teaching methods</li> </ul>

Table 2: Impact-Effort matrix of participants' ideas about integration techniques

In addition, participants gave their ideas to promote integration: more projects with diverse working groups (including international students or minorities), have lessons and materials in English, make interactive breaks, raise awareness among the teaching staff about the challenges that international students face, start the lessons welcoming international students, implement a feedback system so that teachers are aware of the needs of the students.

## 9 CONCLUSION

Based on the input given by BSE participants, the awareness of European students towards cultural and ethnic diversity matters is increasing. Cultural diversity is present in every aspect of our lives, and in Europe, the university plays an important role. In addition to the benefits of cultural diversity, there are also some problems. In universities, some methods can be applied to minimize these problems, and students who have to face difficult situations due to cultural diversity can be highly beneficial. Ethnic and racial diversity in education is very important from many points of view, but still there are discussions when it comes to empowering this type of diversity.

For improving integration of ethnic and racial diversity in education, participants of BSE Athens and BSE Skopje have pointed out many problems, but they also suggested practical and constructive solutions. One of the problems was that the lack of curiosity of local students results in lack of integration of foreign students. As solutions participants suggested buddy programs, free courses of English and local language, extra-curricular activities, sports, speaking up against discrimination and many more.

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