

Bridging values: The inclusion of young generations in computing

Serena Versino
University of Pisa
Pisa, Italy
serena.versino@phd.unipi.it

Anna Szlavi
Norwegian University of Science and
Technology
Trondheim, Norway
anna.szlavi@ntnu.no

Irene Zanardi
Università della Svizzera Italiana
Lugano, Switzerland
irene.zanardi@usi.ch

Karolina Bolesta
Warsaw School of Economics
Warsaw, Poland
kboles@sggw.waw.pl

Letizia Jaccheri
Norwegian University of Science and
Technology
Trondheim, Norway
letizia.jaccheri@ntnu.no

ABSTRACT

Technology has become so widespread nowadays that it penetrates people's daily lives. This, on the one hand, results in a constantly growing need for skilled professionals in the computing field¹. According to the 2022 Digital Economy and Society Index, 55% of companies have problems filling their tech positions [7]. On the other hand, due to technology's ubiquitous role, it is essential to create software which is useful and usable for a wide range of people. This requires diverse development teams so team members can check each other's blind spots and avoid bias [19]. Studies show that diversity also leads to greater creativity and success [6]. Despite this, computing is a homogeneous field: the workforce predominantly constitutes white, cis-gendered, heterosexual, Global Northern, young, middle-class men [14]. Women constitute only 19% of the computing job market within Europe [3]. Even though the awareness about Diversity, Equity, and Inclusion (DEI) in computing is continually being raised, interventions that focus on inclusiveness are still necessary. In order to tackle the growing demand for computing professionals and to achieve DEI, we need to reach young people - for instance, GenZ, born between the mid-1990s and the 2010s [5] - to join computing majors. To achieve DEI goals in computing, in 2020 Horizon Europe sponsored EUGAIN², a 4-year COST Action, whose goal is to improve gender balance in the field of computing through creating and strengthening a multi-cultural European community of academics. By doing so, it

aims to use the tools of role models, networking, and mentoring, as described in the previous section, to enhance DEI. EUGAIN wishes not only to map and invigorate the different areas of computing education, it also wishes to connect the findings to the industry, as well as to design interventions for inclusion.

Inclusiveness necessitates the acknowledgement that gender is only one dimension of an individual's identity, and as such, exclusion and bias cannot be eradicated with a single focus on binary gender. The combination of factors such as gender, sexuality, socio-economic status, ethnicity, religion, nationality, dis/ability, and education, can account for the individual's unique disadvantages and challenges[4]; thus, inclusiveness can only be achieved with a shift in approach. In fact, the need for more workforce and more DEI in computing underscores the urgency of finding better ways to attract young people to the computing field. GenZ, also called as digital natives [15], has a pronouncedly different view on the digital world, as well as on social values, than previous generations [8]. Due to their early exposure to the internet and digital technologies, they are much more aware of social issues and global problems than other generations [10], appreciating and expecting the values of DEI from their work environments [12]. They cherish career paths that allow them to realize themselves and meaningfully contribute to social issues according to their values [1].

The Project GenZ carried out by early career researchers within EUGAIN³ has the aim to design an intervention that attracts and includes young people in the field. Acknowledging the importance of role models for thriving in computing[13, 17, 18], we wanted to reach out to GenZ by creating short visual content: interviews about primarily young role models and mentor figures. Over 30 testimonials were collected from diverse stakeholders from the field, both from industry and academia, all over Europe. We designed a library of brief videos, shortening each of the testimonials, in order to share them on social media, such as YouTube and TikTok, the main channels for GenZ[16]. By this, the project had the intention of boosting both the visibility of the field for younger people, portraying it as an inclusive field. One of the videos featuring specifically GenZ stakeholders (master students of CS), reached over 300 views over a weekend. Due to the popularity of the intervention, the authors saw an opportunity in analyzing the testimonials and their potential to motivate young generations in choosing computing.

¹The word computing refers to a goal-oriented activity requiring, benefiting from, or associated with the creation and use of computers. (...) computing includes a variety of interpretations such as designing and constructing hardware and software systems for a wide range of purposes: processing, structuring, and managing various kinds of information; problem solving by finding solutions to problems or by proving a solution does not exist; making computer systems behave intelligently; creating and using communications and entertainment media; and finding and gathering information relevant to any particular purpose[2]

²The fifth author is the Chair of the present Action.

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³The first four authors consisted of this team.

Methodology. According to research, GenZ is concerned with social values and making a significant contribution to society[11], specifically DEI, as part of their profession. In order to identify and classify the main characteristics that best describe experiences in the sector, we created a data collection of testimonies during the Project GenZ (between October and December 2022). Stakeholders were asked to describe their professional path and what role DEI play in their perception of it in brief, 1-2 minute videos. The participants work in the computing field, both in academia and industry, and they cover a variety of positions such as professors, researchers, students, managers, UX professionals, and so on. The data collection includes diverse profiles in gender, job position, country, and specialization. We asked them to share valuable information that high school students can use to make an informed decision when choosing their educational path.

Discussion. For the analysis of transcripts, we applied text mining approaches that enables to analyze textual data for the extraction of meaningful information and patterns present in natural language text originally organized as unstructured data[9]. We extracted 31 keywords and grouped them in five macro themes: *Computing, Academia, Skills, Society and Gender*. Then, we checked the robustness of our findings with different methods. We confirmed the presence of social aspects in the lived experiences of CS professionals. Findings showed that professionals in the field recognize computing’s social embeddedness, which aligns with younger students’ values and expectations and confirms that computing is a valid choice to achieve their goals of making a positive change in society.

Conclusion. Nowadays, despite efforts to ensure inclusiveness, only a tiny portion of students select computing. The misalignment between GenZ and the values associated with computing is one potential factor[11]. In order for them to see computing as a viable career option, it is essential to demonstrate how it can help them realize their goal of having a positive impact on the environment and society through their work. The propose of our examination, which marries data mining and feature extraction methods, is to see how much the perception of computing and the interest of GenZ are consistent with each other. Our goal is to contribute to a better understanding of how to design interventions that target younger generations, with the purpose of achieving DEI in computing. According to the findings of this study, while GenZ perceives computing as a career that is misaligned with their values, professionals in the field recognize the social embeddedness of their work contributions. As a result, in order to diversify the field by engaging and attracting younger people to computing, we should continue to promote and share the positive impact of the field on society.

This study is part of a larger effort proposed and realized by EUGAIN, a Horizon Europe-sponsored COST Action, whose purpose is to create a European network that enhances gender balance and diversity in the field of computing.

CCS CONCEPTS

• **Social and professional topics** → **Computing profession; Gender; Age**; • **General and reference** → **Design; Surveys and overviews.**

KEYWORDS

gender balance, DEI, computing, intervention, generation Z

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