Upgrade Your Robot Competition, Make a Festival!

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In 1992, Jean-Daniel Nicoud started the first edition of an internal robotics contest at the École Polytechnique Fédérale de Lausanne, Switzerland. In 2008, Francesco Mondada opened it up to the broader public and launched the robotics festival, which comprised workshops, exhibitions, and events in addition to the competition (Figure 1). Today, the robotics festival is one of the largest events in Europe, attracting 17,000 visitors on a single day. The goal of the robotics festival is to foster a better understanding of technology and robotics in our society and to do this in an open way. In this article, we outline why we think the image given by robotics competitions is restrictive and what people's motivations are to attend these events, particularly girls and women, who are clearly underrepresented. We conclude with suggestions for designing and advertising such activities in the future.

Robotics is playing an increasingly important role in our daily lives, but most people are not educated in how to deal with this kind of autonomous technology. This can lead to strong negative or positive overreactions. For instance, a large-scale survey in Europe [1] revealed that, despite a generally positive view on robots, the majority of European citizens (60%) felt that robots "should be banned" from tasks such as helping disabled people or caring for elderly and children, which contrasts with the trend in research to improve quality of life with assistive robotics.

This lack of education on robotics also generates inequalities and gaps between subgroups in society. For instance, women, who are clearly underrepresented in technology-related fields, tend to have a worse image of robotics than men [1]. This gender imbalance is detrimental to the field, as studies have shown that collective intelligence depends on the proportion of females in the group [2].

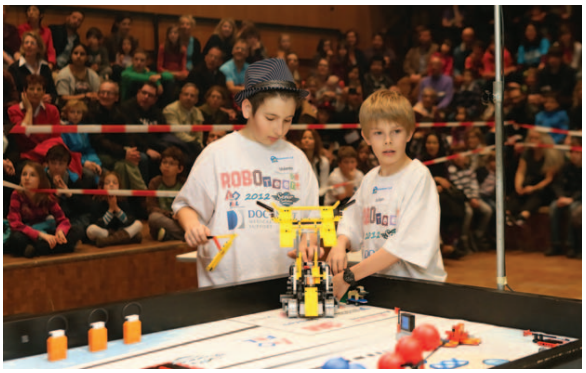

Figure 1. The robot competitions are a core event of the robotics festival, held 20 April 2013.

The gender imbalance is reflected in robotics competitions. In Switzerland, one of the most popular robotics competitions is the First Lego League. Among its 660 participants in 2012, only 20% were girls. The EuroBot contest, the largest contest for technical schools, scored worse, with young women representing less than 5% of the nearly 100 participants. The Swiss

Figure 2. The 57 robot exhibitions, including the one shown here of a flying robot in action, were very attractive and generated many exchanges between public and specialists.

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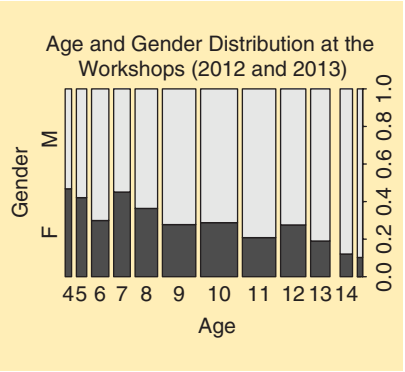

Figure 3. The proportion of gender by age of the 1,755 participants in the workshops of the last two editions of the festival, illustrating the increasing proportion of males in respect to their age. The width of the bars is proportional to the number of individuals in each category.

national Bug and Play contest reached 30% females among the 259 participants. This contest revolves around technology but mainly promotes its artistic and creative side.

With our festival, our aim was to promote related activities in a nondiscriminatory manner (Figure 2). In 2013, we had an average of 27% female participation among the 2,300 participants in workshops. Some activities even reached a proportion of 67% girls. Several surveys conducted during the festival helped us understand where these participation differences come from.

The first clear aspect we could observe is that the proportion of girls and boys differs by their age group (Figure 3). Both in 2012 and 2013, the mean age of boys taking part in the workshop was significantly higher than that of girls. Concretely, we observed that, at a young age, the number of girls and boys is comparable, but for older children, the proportion of boys increases. These observations are coherent with some sociological assumptions stating that interest in scientific fields or professions at the age of the construction of sexual identity is driven by the image that these fields or professions diffuse [3]. For instance, boys would turn to sciences and technology because many men are already involved in this field, whereas girls would show interest in humanities because in that field women outnumber men.

In the robotics festival, differences in motivations between genders were discovered through two surveys carried out among more than 1,300 participants over two years. Whereas most men and boys stated that they joined the event because they are interested in technology (65%), only 40% of women and girls attended because of their interest in technology, 25% joined out of interest in the social event and 22% because of the interest in technology of the men in their family. Despite a less personal initial reason to attend the festival, girls and women participated in the workshops and events and appreciated them, showing that they are not reluctant to participate in these types of activities (Figure 4).

The angle from which activities are advertised could be a determinant, as hinted at by the success of the Bug and Play contest, which promotes its creative side. However, we could not make a clear link between the workshop topics and their female attendance. What we did observe is that some workshop descriptions that were written by men and included masculine terminology [3] attracted very few girls. We also noted that the workshops with the highest female attendance were often organized by women.

In 2012, we sought to highlight the effect of activity advertisement by distributing 1,500 free robotics kits associated with a choice. The basic kit, which comprised a set of parts to build a robot figurine, was the same for everyone, but two possible activities were suggested: a collaborative, creative one or a competitive, game-oriented one. The participants would choose one activity and then receive the corresponding accessories. We recorded the gender and the choice of activity of 1,428 participants. This choice does not seem to be influenced by gender, as the proportion of females was similar in both categories (38 and 35%). However, even for males, collaboration is the preferred option, as two thirds of all participants opted for this one.

In conclusion, the image of robotics competitions seems to be attractive only to a specific segment of the public, leaving aside an important part of the audience. This is especially obvious with women and girls. Thus, although competitions are a precious tool to educate people, they are not sufficient. Our experience shows that having a variety of activities and promoting their different aspects, be it creative, fun, or social, gives a wider impact to the venture, reaching not only more girls but also boys who appreciate the noncompetitive side of robotics. We should also keep in mind that the older the girls are, the more difficult it is to reach them. Finally, the communication of the event is primordial: involving females in the organization and the advertisement of the event is likely to broaden its scope and give a more open image to the audience.

Figure 4. In one of the 2,250 festival workshops, participants could assemble, solder, or program robots.

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