

## Chapter 76

# Turning Competitions into Global Collaboration through Educational Robotics: Case of RoboCupJunior

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### ABSTRACT

*The chapter introduces a case of an educational robotics competition promoting global collaboration among participating students. Educational robotics is a learning tool that promotes the skills for collaboration and teamwork among students (Eguchi, 2007a, 2007b; Miller, Nourbakhsh, & Sigwart, 2008) through hands-on learning. When RoboCupJunior, an educational robotics competition, noticed some students becoming aggressively competitive at its annual World Championship, the organizers of the event decided to take measures to restructure its competition scheme in order to promote global collaboration among participating students. The chapter provides detailed information about the competition and its efforts to promote global collaboration among participating teams. In addition, although it is still in the early stages, the chapter shares anecdotal accounts of both participating students and organizers that confirm the positive impact the new approaches to competition has already had on encouraging collaboration among participating students.*

### INTRODUCTION

The world is changing rapidly. Friedman stated in 2005 that the world has been flattened (Friedman, 2005). He describes that it is because of Globalization 3.0 (Pink, 2005). During Globalization 2.0, as characterized by the dramatic globalization of companies, the world became *medium to small* in

size. In Globalization 3.0, starting around 2000, the world began to shrink even more from small to tiny. Friedman explains, “There’s a difference between being able to make long distance phone calls cheaper on the Internet and walking around Riyadh with a PDA where you can have all of Google in your pocket. It’s a difference in degree that’s so enormous it becomes a difference in

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kind” (Pink, 2005, para. 9). The driving force behind Globalization 3.0 is the *new found power* for *individuals* to collaborate and compete globally. Friedman describes this phenomenon as the *flat-world platform* which is:

*the product of a convergence of the personal computer (which allowed every individual suddenly to become the author of his or her own content in digital form) with fiber-optic cable (which suddenly allowed all those individuals to access more and more digital content around the world for next to nothing) with the rise of work flow software (which enabled individuals over the world to collaborate on that same digital content from anywhere, regardless of the distances between them). (Friedman, 2007, p.10-11)*

Friedman emphasizes that Globalization 3.0 is different from the previous eras because of not only how it is shrinking and flattening the world, but also how it is empowering each one of us. He also points out how Globalization 3.0 is geared up by group of diverse individuals from around the world, not just western and/or white people, but also people from various parts of the *flat* world, involving “every color of [the] human rainbow” (Friedman, 2007, p.11).

Friedman came to realize his conclusion that the world has become flat after a conversation with an Indian CEO who told him, “the playing field is being leveled” (Friedman, 2007, p.7). The phrase rang in his ear and he kept chewing on it for until he realized what it truly meant. What this story is telling us is the importance of the dispositions for global engagement that one should possess to be successful in the 21<sup>st</sup> century. As an American in a country that was considered to be lesser developed than the United States, Friedman could have easily dismissed the phrase used by the Indian CEO and continued to think of the United States as the leading country for innovation and new development. His *respect* to people from other culture, *vulnerability (openness)* to accepting an

opinion of people from other culture, and *agility* when revising his own notions of one’s belief/understanding are important dispositions for global engagement, which are necessary for successful global workforces and innovators.

Especially in recent years, global collaborations have become a necessity in any field for its advancement and innovation. This is especially true in the fields of technology, specifically robotics. For example, the French company Aldebaran Robotics developed NAO, a small-size autonomous and programmable humanoid robot, in collaboration with researchers from around the world. NAO’s development began in 2004. In 2007, Aldebaran and RoboCup, a robotics initiative promoting robotics and AI research through publicly appealing and formidable challenges, started their collaboration in order to further advance the development of NAO. NAO has been used since 2007 by various research institutions from around the world in RoboCup’s Standard Platform League (a robotics soccer league using the same robot – standard platform). Aldebaran Robotics has worked collaboratively with Robocup researchers from around the world to improve the performances of their robot. As a result, NAO has become one of the first autonomous and programmable humanoid robots made publicly available. Since 2011, NAO has been sold to higher education institutions, laboratories and schools worldwide.

DARPA Robotics Challenge (DRC), funded by the Defense Advanced Research Project Agency, was launched in October 2012, with three landmark challenges in June and December 2013, and the final challenge in December 2014. The DRC is “a competition of robot systems and software teams vying to develop robots capable of assisting humans in responding to natural and man-made disasters” (Defense Advanced Research Project Agency, n.a.). The goal of the DRC is to generate research and development in both hardware and software that will enable the development of robots that can assist humans in disaster situations where humans cannot safely operate, thereby

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