



2018 NATIONAL ROBOTICS COMPETITION

More Than Robots ...

JUBILEE CENTER FOR
EXCELLENCE IN EDUCATION
King Hussein Foundation
www.jcee.edu.jo

Introduction

The Arab world has witnessed a remarkable interest in educational robotics and artificial intelligence during the past 10 years. This interest is best illustrated in the implementation of educational programs in a number of public and private schools in some Arab countries. Also, many initiatives have been taken to encourage students and teachers alike to adapt to the educational robot system through competitions, student activities and curricula. Jordan was one of the first countries that showed interest in this subject through the Jubilee Center for Excellence in Education.

The world's interest in using robotics in education and learning has been growing steadily worldwide. Realizing this fact, as well as, being aware of the importance of keeping pace with technological progress and innovations, in general, and in education in particular; The Jubilee Center for Excellence in Education holds an annual competition for students for the purpose of encouraging and motivating them to improve their knowledge and skills in robotics and artificial intelligence.

In order to collect as much information as possible about robotics and artificial intelligence in Jordan and the Arab world, the Jubilee Center for Excellence in Education prepared and conducted a survey. This survey consisted of three questionnaires. The first questionnaire was designed for students, the second for supervisors and the last one for the judging committee. The purpose of this survey was to identify the problems facing the application of robotics in education in Jordan and the Arab world, and collecting the different points of view on how to deal with this problem. Information collected will also be useful for designing future competitions.

THE SURVEY WAS CONDUCTED ON 10-11/3/2018 AND WAS SUPERVISED BY THE TESTING AND EVALUATION UNIT AT THE JUBILEE CENTER FOR EXCELLENCE IN EDUCATION, THE SINGLE AND EXCLUSIVE AGENT FOR ORGANIZING THE COMPETITION IN JORDAN SINCE 2005.

The Jubilee Center for Excellence in Education (JCEE)

The Jubilee Center for Excellence in Education (JCEE) was founded by King Hussein Foundation in 1998 to fulfill the vision of His late Majesty King Hussein. This vision reflected his belief in the importance of education to achieve social justice and economic development.

Since its foundation, The Jubilee Center for Excellence in Education has been endeavoring to develop its technical programs to achieve this vision by providing distinguished services through its various departments. The activities of these departments are being developed all the time to meet the increasing needs of local and Arab educational communities. The main purpose of this development is to be able to develop educational models that meet and respond to the needs of talented students and their support staff. Also, The Center has dedicated its efforts to excellence and innovation in the field of education by launching original initiatives in the fields of science and technology around the world.

To keep pace with world progress in technology, in general, and education in particular; the Jubilee center was aware of the importance of making best use of the latest innovations in robotics and artificial intelligence. As a sign of this awareness

the Jubilee Center for Excellence in Education has been holding annual robotics and artificial intelligence competition, for students, since 2005.

National Robotics Competition

The Jubilee Center is the exclusive and single representative of FIRST Foundation robotics competition “FIRST is a global organization based in the United States of America”. The main focus of activity of FIRST is robot competition, as it encourages creativity and innovation in this field. FIRST organizes a series of scientific competitions in the field of robotics and artificial intelligence, most notably it organized the FIRST LEGO League competition “FLL” (for ages 10-16), in cooperation with the Arab Robotics Society. A number of other robotics and artificial intelligence competitions have been added to the national competition to cover all ages and suit the needs of all students.

THE CHALLENGE OF 2017 - 2018

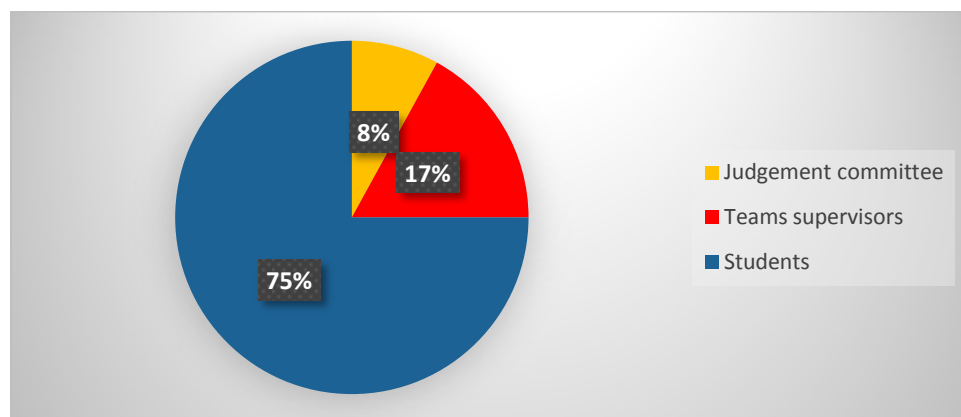
Each year, the title of the competition is launched by the World Committee, where the annual competition challenge addresses a global problem of interest to students and the community. Students are involved in researching this problem, inventing innovative solutions and presenting a proposed project (problem - creative idea of solution - presentation) Over the years, a range of global problems have been presented.

This year's challenge was the theme of "Water Dynamics", one of the most important topics in Jordan, where we suffer from a shortage of water resources. We asked our students to participate in finding solutions to this problem through research, inquiry, thinking and participation which is related to the transfer, use and reuse of water.



The results of the study were divided into three groups: the first group targeted the students, the second group targeted the teams' supervisors, and the third group targeted the judges committee. 382 students participated in this study out of 463 students who participated in the competition. 85 supervisors participated in the study out of 126 supervisors participated in the competition and 38 judges participated in the study out of 49 judges participated in the competition. The total number of participants in the study is 505 divided as shown in chart (1).

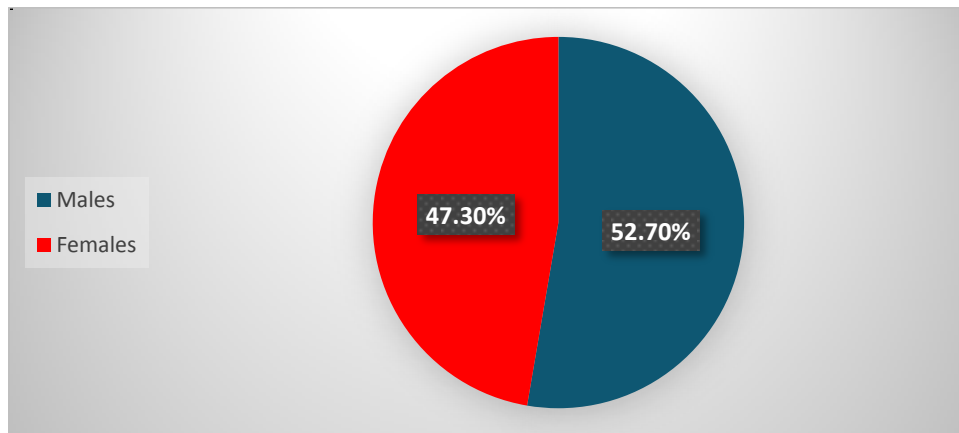
Chart (1)



GENDER INCLUSION

Attention to gender is particularly significant in view of JCEE, as one of its main goals is to achieve gender equality and women empowerment. Young women and girls were encouraged to participate in the fields of science, technology, engineering and math. Almost 50% of the participants in the competitions were females as shown in chart (2).

Chart (2)



Males accounted 50.5% of the number of participating students, 48.2% of supervisors and 76.3% of the judges committee, while females accounted 49.5% of the number of participating students, 48.2% of supervisors and 23.7% of judges committee.

Areej Al-Otaibi, one of the significant examples of a successful women in JCEE community. Areej studied Mechatronics engineering at the University of Jordan, she has a talent and passion for robotics since she was a schoolgirl. She participated twice in the competition, and came back and participated as a member of the judges

Areej: *"One of the most beautiful periods of my life was when I participated in the robot competition; it made me feel different from my classmates and influenced my personality even when I entered the university."*

committee.

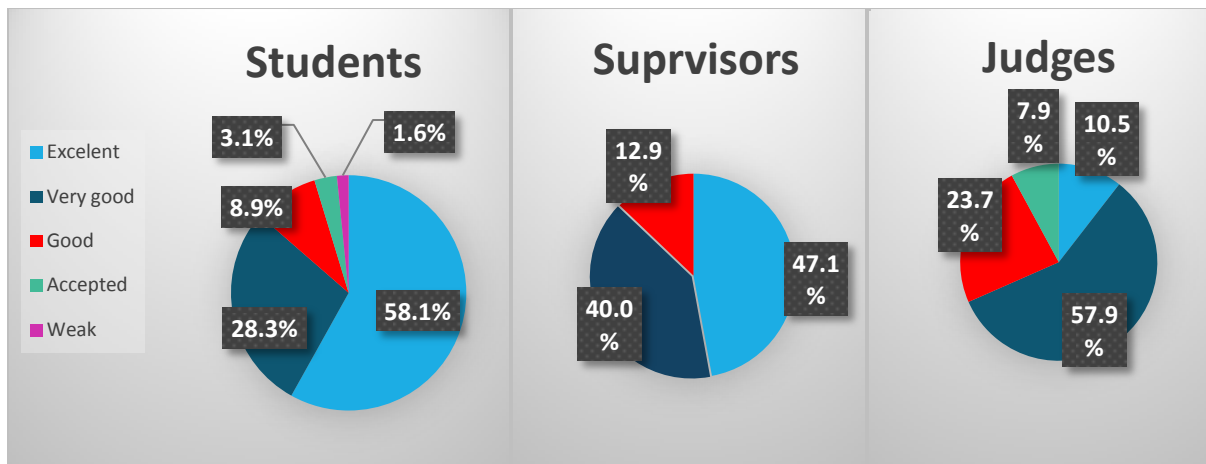


MAJOR FINDINGS

Importance and Evaluation

The competition evaluation results were very good. The vast majority of the respondents rated the competition as either excellent or very good. Students' evaluations were 58.1% excellent, 28.3% very good. Supervisors' evaluations were 47.1% Excellent, 40% Very good. Judges' evaluations were 10.5% excellent and 57.9% very good as shown on chart (3).

Chart (3)



The opinion of the Judges Committee regarding the level of science provided in the competition was evaluated: 39.5% excellent, 39.5% very good, 15.8% good and 5.2% acceptable.

About the importance of the robot and artificial intelligence 97.6% of the supervisors, 100% of the judges and 93.5% of the students assured that there was a positive impact of the robot on the quality of education in Jordan. 98.2% of the students, 100% of the supervisors, and the judges agreed that there is a benefit of learning robot in students' lives. 90.1% of the students, 97.6% of the supervisors and 100% of the judges agreed that there will be a benefit of learning robot in the future of students.

97.4% of the students, 98.8% of the supervisors and 100% of the judges supported holding the competition annually. 90.3% of students, 96.5% of supervisors, and 94.7% of judges supported inclusion robotics in school curricula.

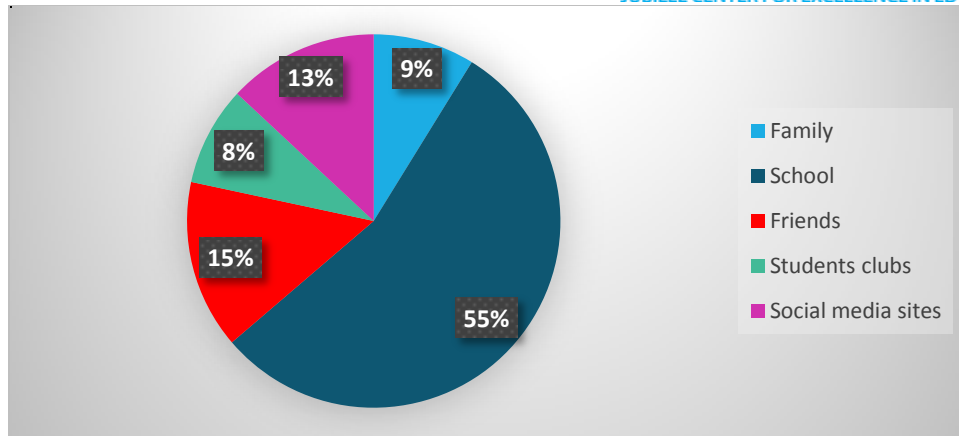
Motivations

- Students' motivations to participate in the competition: 91.6% said that they wanted to learn technology and robotics while 12.3% said that their motivation was their family desire.
- Supervisors' motivations to participate in the competition: 85.9% of respondents said that their motivation to participate was the importance of the subject of robot, 42.4% by virtue of their specialization and 2.4% to improve their financial condition. Some added that they liked working in teams, and expressed their desire to transfer their experience to others.
- Judges' motivations to participate in the competition: 65.8% said that their motivation was their great interest in robotics, 52.6% the importance of the subject and 57.9% by virtue of their specialization. They added the desire to gain experience and to participate in the development of the competition.

More than Robots ...

- The problems encountered by students while learning and applying robot and artificial intelligence: 18.5% said that the robot laboratories were not properly prepared, 16.2% reported that they did not have suitable training, 63.9% reported that the preparation time was short, while 34.6% reported that financial cost was their biggest problem.
- The skills acquired by students in robot learning included 55.2% of students learned science, engineering, mathematics and technology, 48.2% time management, 78% learned group work and 44.2% learned communication skills. They added that they also learned how to work under pressure, emotion control skills, Problem-solving skills, self-confidence, and self-control and student empowerment.
- 67.3% of the students said they received support from the school, 52.9% from parents, 39% from friends and 22.3% from the students club.
- 55% of the students reported that they learned about the competition through the school, 15% learned from friends, 13% learned from social media sites, 9% learned from their family, 8% learned from student clubs as shown on chart (4).

Chart (4)



Inspiration

Some of our main goals are to spread the word about the importance of robot and artificial science, give a hand to all those who have the passion and potential to learn and achieve. We aim to inspire the new generation to walk the new path of technology and artificial science.

Three inspirational talented young men left the robot competition as school students and returned as judges, after they had finished their university studies, or attended various engineering courses after being inspired by the competition which increased their passion for technology. They returned to play an active role in inspiring a new generation of students.

Zaid Al-Tubasi studied computer engineering, Hamzah Fakhri studied mechanical engineering, and Rizq Abu Al-Homs, studied electronics engineering, all of them attributed a great deal to the robot competition to study engineering and



Zaid: *The robot competition brought me into the programming world, changed my orientations and made me love computer engineering.*

described their feelings of happiness to participate as judges.

“Hello Robot” is an inspirational team, it is composed of a group of young people with special needs, who are talented and passionate about robot. Despite the difficulties they faced, they did not give up and were able to work hard and give all their energy and abilities to become a big examples of hope and challenge. The Jubilee Center gave them the opportunity to participate twice in the competition, they won third place in the last year and second place in this year.

The aim of Hello Robot initiative is to provide an opportunity to people with special needs to discover their talents and enhance their skills with support of the Jubilee Center for Excellence in Education.



Hello Robot: "We won third place in our first participation last year and second place in the second participation this year but we will definitely win first place next year."

RECOMMENDATIONS

The study concluded with a set of recommendations aimed at developing robot learning and education in Jordan and the Arab region.

Recommendations included:

- Supporting students and encouraging them to work and develop their projects. 90% of students expressed their desire and intention to develop and commercialize their projects.
- Educating the community and students' families about the robot and the importance of robot learning and artificial intelligence.
- Including robot in the curriculum where 90% of the students and 96% of the supervisors stressed the importance of introducing the robot within the curriculum. 93% of the students and 97% of the supervisors confirmed the positive impact of the robot on teaching and learning.
- The need to continue organizing the competition on annual basis and expand the scope of work to include more age groups and cover all regions of the Kingdom.