Community Engagement through Robotics – Building an International Network without Traveling

Tanja Karp
Dept. of Electrical and Computer Engineering
Texas Tech University
Lubbock, TX
tanja.karp@ttu.edu

Patricia M Gouws
School of Computing
University of South Africa (UNISA)
gouwspm@unisa.ac.za

Ute Ihme
Dept. of Computer Science
University of Applied Sciences
Mannheim, Germany
u.ihme@hs-mannheim.de

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Introduction

- Robotics has been identified as a tool to excite students about STE(A)M careers
- Significant interest in the community
- Existence of a vast variety of robotics challenges
- Most challenges require physical presence
- International participation is only possible for best teams

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Virtual Get Excited About Robotics (GEAR) Competition

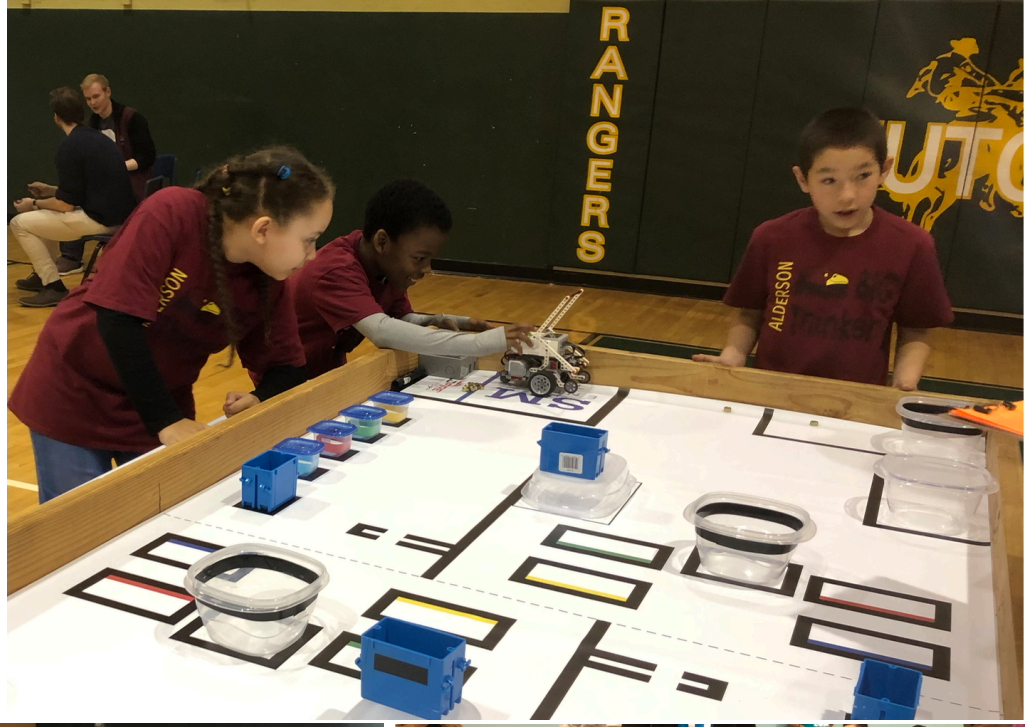
TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

GEAR Challenge

- 8 week LEGO Robotics Challenge
- 2 minute matches
- List of tasks that the robot needs to accomplish autonomously to score points



TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Purpose and Program Growth

- Broaden participation in GEAR (Get Excited About Robotics)
- Offer low cost competition suitable for beginners
- No travel required, all products are submitted online

Number of teams	2017	2018	2019
USA	1 (TX)	8 (TX & AZ)	13 (AZ & TX)
Germany	3	3	7
South Africa	12	33	49
Namibia		4	6
Costa Rica			5

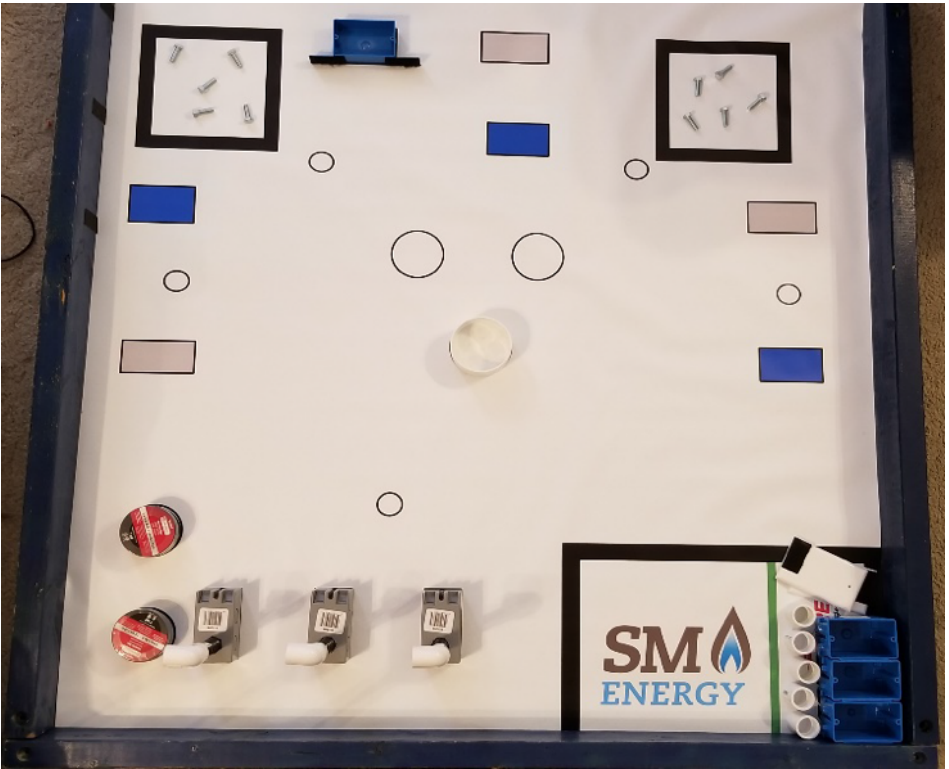
Competition Schedule

Time	Task
January 31	Register online
February 1	Game field and game element information is sent out to registered teams
February 14	Upload Team Introduction Video and share link with organizers
February 15	Game rules and all Team Information Videos are sent out to all team coaches
March 31	Upload Trial Run Video – Teams receive scores and feedback
April 30	Upload Engineering Design Videos
May 7-19	Game Day
May 31	Announcement of Awards

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering
UNISA university of south africa
hochschule mannheim

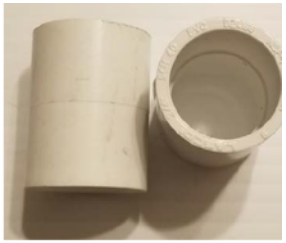
Game Instructions (February 1)

- Teams receive drawing of game field and need to build their own (print, tape, etc.)
- Teams receive information about game elements and need to purchase/build their own (supermarket, hardware store, 3D printing)



Animal Waste

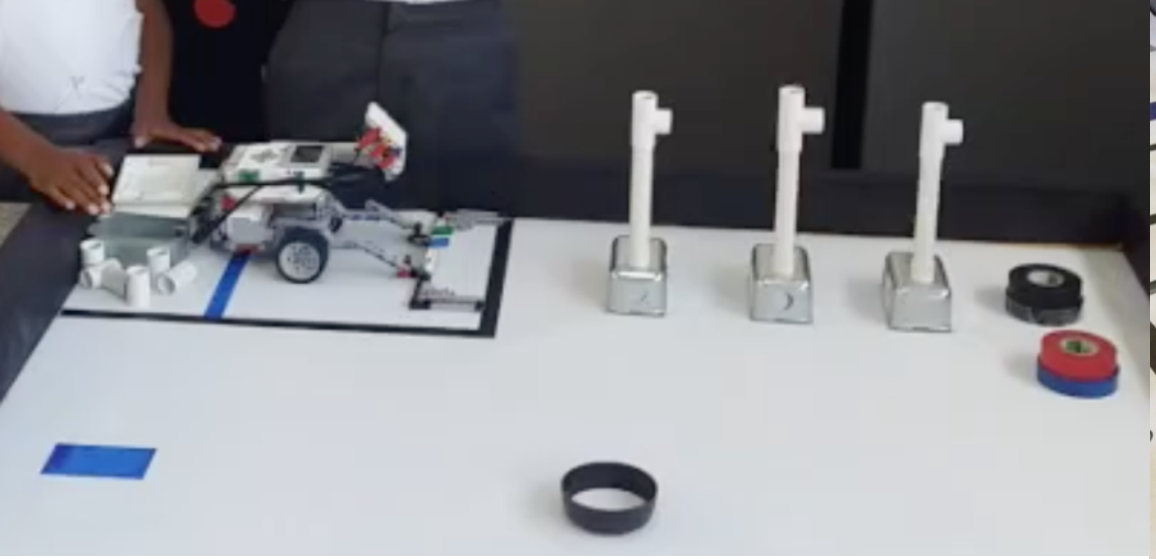
Fence Panels

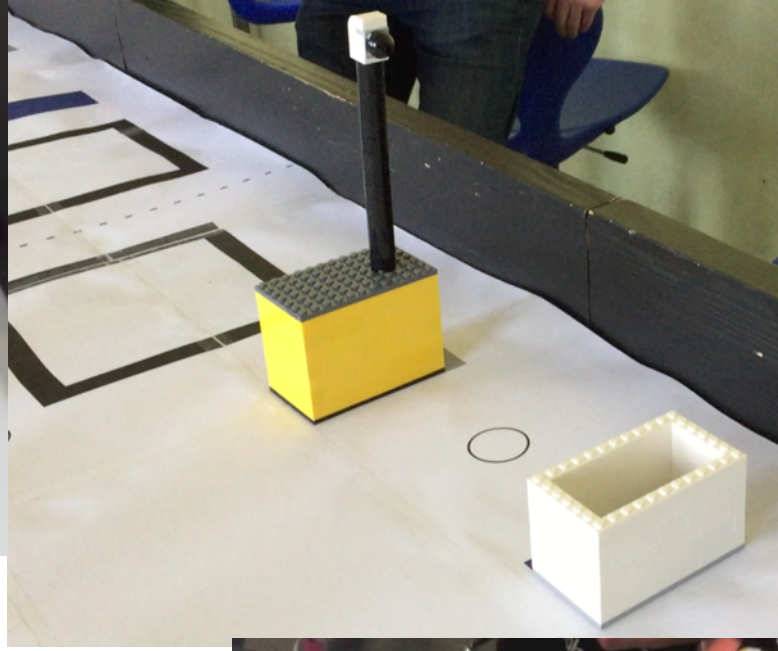

Trees

Hay Bales

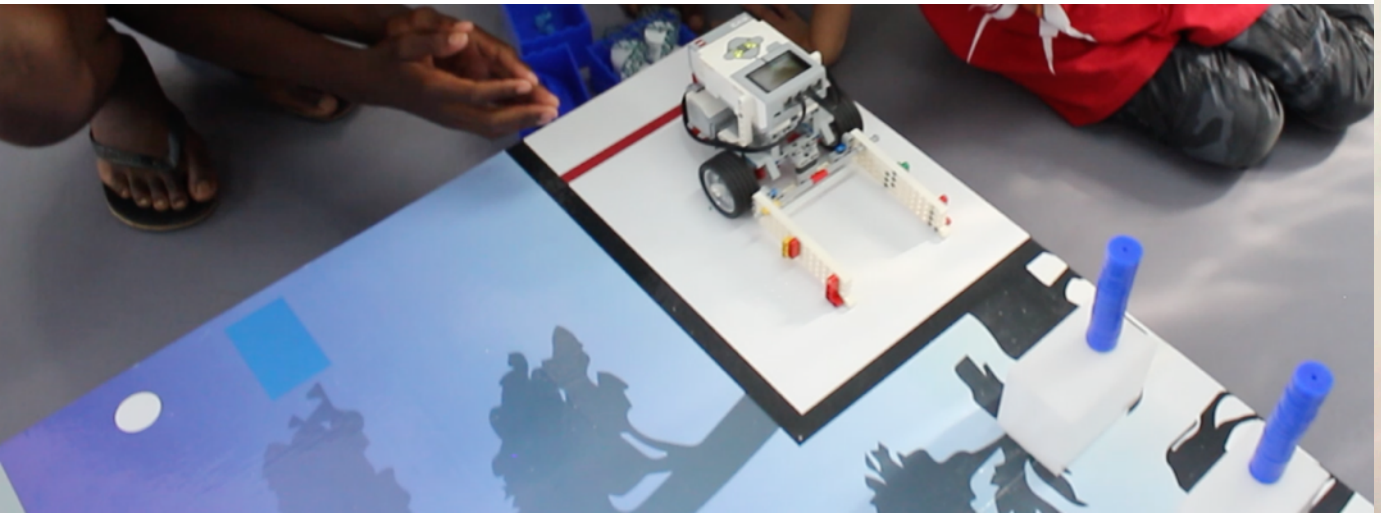
Stock Tanks

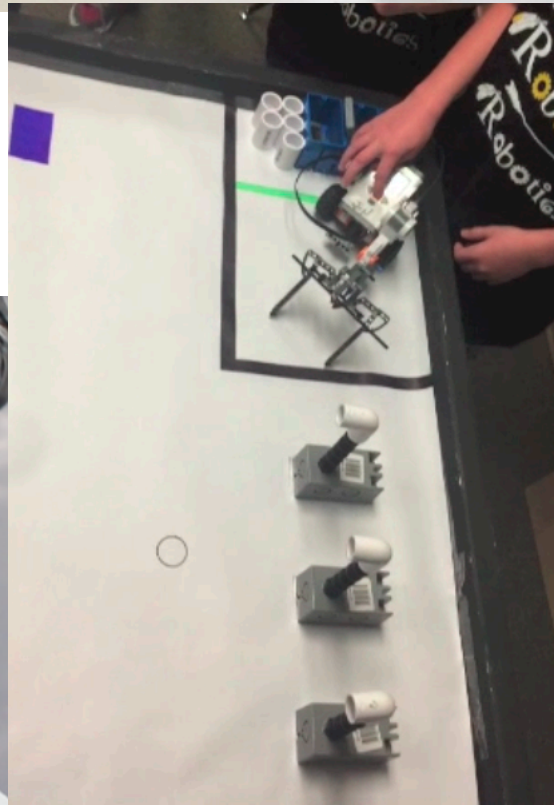
Security Cameras





Since everyone keeps playing on their own game field, game elements can look slightly different





Team Introduction Video (February 14)

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

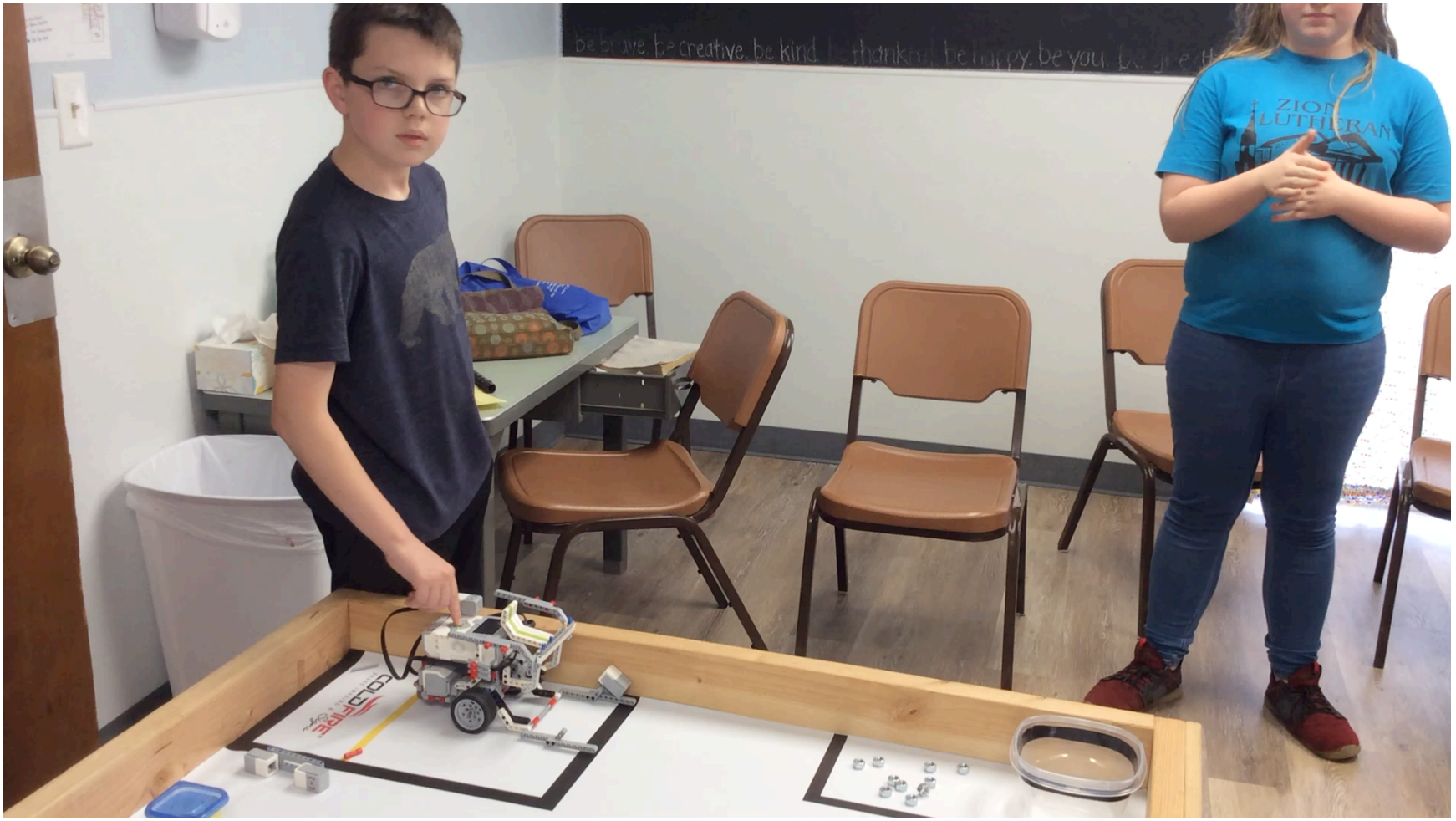
hochschule mannheim

Release of Game Rules (February 15)

- Annually changing challenge
- Description of tasks
- Scoring during 2 minute match
- 16 page document

General competition rules were sent out with game element list

Trial Run Video (March 31)



hochschule mannheim

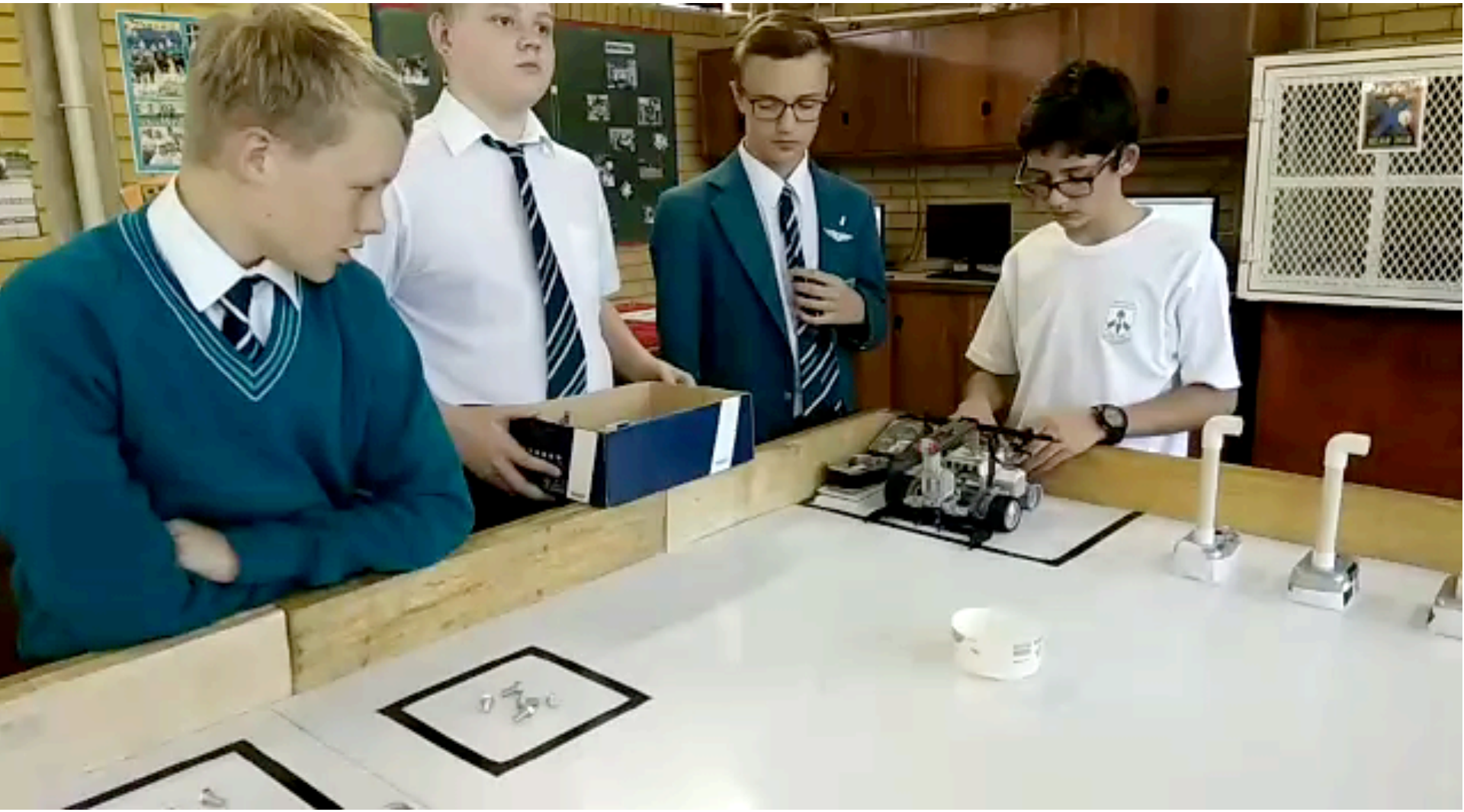
TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

Engineering Design Video (April 30)

Game Day (May 7-19)

- Team coaches schedule game day with local organizer, who will attend either via video conference or in person
- Opportunity for teams living in same area to meet and hold competition at of of their locations
- Robot performance is video taped to share with other teams
- Video is scored



TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Awards (End of May)

- Teams receive all scoring information and certificate

Certificate of Award

First Place Award

Virtual GEAR Robotics Competition 2018
First Timer Category

This certificate recognizes **That's not a Robot** from **Garsfontein High School** for outstanding achievement as the First Place Award winner in the 2018 Virtual GEAR robotics competition.

Witnessed May, 2018

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College *of* Engineering

Dr. Tanja Karp
Associate Professor
Electrical and Computer Engineering

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College *of* Engineering

UNISA university of south africa

hochschule mannheim

Building an International Community

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr.
College *of* Engineering

UNISA | university of south africa

hochschule mannheim

Key Component - Communication

Local facilitators:

- promote program and STE(A)M careers
- make arrangements for in-country participants
- host events and mini-competitions
- provide training opportunities
- secure local funding
- have crucial local expertise

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Key Component - Communication

Coaches & Teachers:

- communicate with program providers
- recruit participants and schedule robotics meetings
- share videos from other teams to build a community
- build a network to support each other

TEXAS TECH UNIVERSITY
Edward E. Whitacre Jr. College of Engineering

UNISA university of south africa

hochschule mannheim

Key Component - Communication

Social Media:

- choose App that already has the greatest penetration among participants
- enables group communications and ease of use
- is cell phone based and inexpensive
- can be used for all official communication
- allows to connect participants
- is scalable

Thank You!

Q&A