

# **Expanding Educational Horizons: High School Students Creating Innovative Designs for Safer Pedestrian Level Crossings in the TrackSAFE Education STEM Competition**

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## **Abstract**

In 2017 the TrackSAFE Foundation (TrackSAFE) issued a challenge to young people to use design thinking to create an innovative solution to make pedestrian level crossings safer using science, technology, engineering and mathematics (STEM) principles. Year 7 to 10 students (aged 12 to 16) from across Australia entered the inaugural TrackSAFE Education Rail Safety Competition for High Schools. This was an opportunity for students to expand their horizons through developing their research skills, and designing an original mechanical or electronic device with the potential to make a real difference to people's safety, for a genuine purpose beyond their classroom walls.

### **The challenge**

According to the Australian Institute of Health and Wellbeing, young people aged 0 to 14 represent eight percent of pedestrian serious injuries at level crossings in Australia (Henley & Harrison, 2009). For the 15 to 24 years cohort, this figure jumps to thirty one percent (Henley & Harrison, 2009). TrackSAFE, a not for profit organisation aiming to reduce near collisions, injuries and fatalities on the rail network, asked young Australians themselves to help reduce these statistics through a meaningful, authentic STEM task.

Students investigated a pedestrian level crossing safety issue in their community and, working in small groups of two to four, applied 'design thinking' (Empathise/Define/Ideate/Prototype/Test) to create an innovation to address this issue. They then created a video pitch to describe why their chosen safety issue is important; explain how they used design thinking to create their idea; and justify why they think their idea will help improve safety. The competition aligned with the Australian Government's National Innovation and Science Agenda to improve student participation in STEM (Department of Education and Training, n.d.).

### **Promotion and registration**

The competition ran between March and July and was promoted via Facebook advertising (reach of 33,649/480 link clicks); website (1051 unique pageviews); general social media posts; and through TrackSAFE Education's Reference Group member network. Fifty seven teachers registered for a digital competition pack. These teachers indicated between 1000 and 1250 students would participate.

### **Results**

All entrants chose distraction or inattention as their safety issue. Their innovative design solutions included a series of obstacle course gates to walk through; poles with flags which swing open to smack the pedestrian in the face if they are looking at their mobile device; and a reflective junction which reflects light into the pedestrian's eyes, forcing them to look up and concentrate on crossing.

Five entries in the Year 7/8 category and one in the Year 9/10 category progressed to the expert judging panel. The panel comprised of three judges from engineering, human factors and safety standards backgrounds from TrackSAFE's rail industry partners. The public voted on their favourite innovation in the People's Choice Awards during Rail Safety Week (14-20 August 2017). Prizes

with a total value of \$5000 were awarded to the winning students, schools and teachers. The winning entries and teams will be showcased during the conference session.

### **Key learnings**

Registered teachers whose students did not enter were asked to provide feedback for insight into why they registered but did not enter the competition. Key themes from the feedback included changes to priority, and limited class time, including a request for advertising a term in advance. Some teachers facilitated the lessons with their students but did not enter due to poor quality entries, or asked their students submit their own entries, however they were not received. Many teachers praised the competition concept and high quality of the accompanying materials. The website and social media analytics; and future strategies to improve engagement based on teacher feedback, will be discussed during the conference session.

### **References**

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