Explore Land, Sea and Air

Aberystwyth bandstand evaluation report

1 Introduction

Explore Land, Sea and Air is a collaboration between the University of Wales, Aberystwyth, the Open University and the University of the West of England. The activity aims to bring together robots, roboticists and members of the public using the theme of 'exploration'. A suite of activities have been developed around robots that operate in different environments.

In support of the Microtransat autonomous boat trials that took place in Aberystwyth harbour on 3 September 2007, the first event showcasing the robots was held at the Aberystwyth bandstand, a public venue on the sea front. Hands-on robotics activities and demonstrations included tele-operated LEGO rovers and representatives from Scisys showing off the Beagle 2 model. Now that the activity has been developed, the plan is to repeat it at different venues throughout the course of the WWR programme.

The TAROS-07 conference was being held in Aberystwyth at the time which meant that a number of roboticists were able to help with demonstrations on the day.

2 Evaluation methodology

As the first event in a series, the team were keen to gather feedback on the way in which activities were delivered, as well as their potential impacts. So the evaluation considered the opinions of visitors and the roboticists and science communicators that delivered the event.

An important element of the evaluation was observation. I observed the way visitors approached the event and moved around the space, and how they interacted with the robots and the roboticists.

Audience opinions were canvassed using a simple questionnaire. Adults self-completed the form and it was used as a structured interview schedule for young children that may not have possessed the reading or writing skills to fill it in. I also conducted a number of less structured interviews to gather additional information on audience opinions that weren't covered in the questionnaire.

A debrief after the event provided a useful way to gauge how the deliverers felt the event had gone. I was able to share some of my observations and feedback from audiences and we discussed recommendations for future events, which have informed the recommendations at the end of this report.

3 Findings

3.1 Event metrics

The event ran from 10am to 3pm on **Monday 3rd September 2007**. This was the last day of the school holidays in Aberystwyth and several visitors commented that it was a good day to hold an activity for this reason.

Eight 'stands' were set up inside the bandstand, each with a different robot or activity. Some were staffed by University of Wales, Aberystwyth roboticists and robotics (or related course) students. One of the activities was run by a roboticists / communicator from the Open University, and one was run by the University of the West of England. Representatives from Scisys brought the Mars Rover.

Visitors to the event were given a sticker with the *Walking with Robots* logo and website. 425 stickers were given out throughout the day. A considerable number of people didn't want stickers (especially adults), so a conservative **estimate of actual audience numbers is 450**.

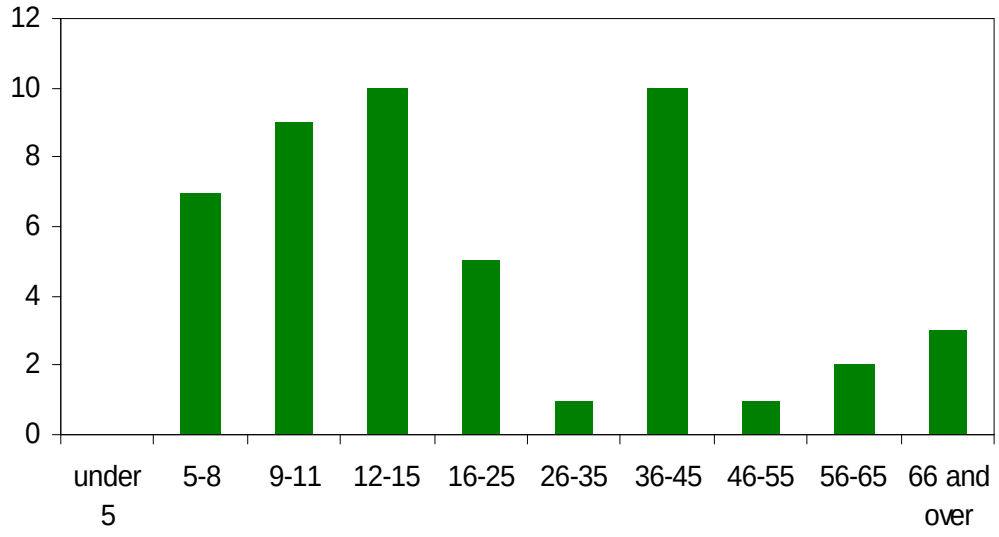
3.2 Audience feedback

Questionnaire sample

51 questionnaires were returned throughout the day, which represents a sample of over 10%. I spoke to a further 12 visitors informally. I also asked many of the questionnaire respondents where they had heard about the event. This wasn't in the questionnaire but was of interest to the project team for this event.

The gender balance for respondents was 56% male, 44% female. From observation, there appeared to be more male young people at the event. The age range for questionnaire respondents is given below.

Visitor age ranges



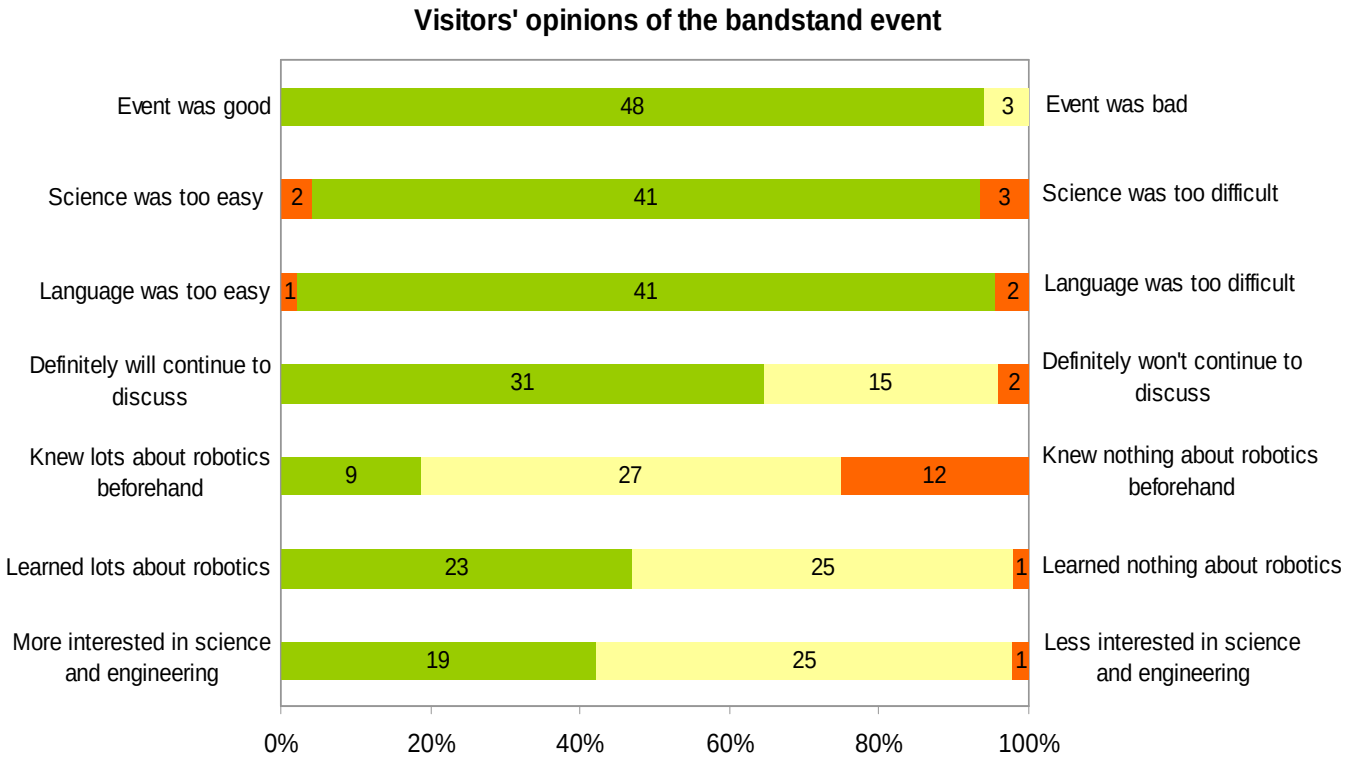
Opinions about the event

Questionnaire respondents were asked to respond to a number of questions using a three-point smiley face scale. Written descriptions for what each end of the scale represented were also included, for example:

2. Please circle the face that describes what you thought of the event:

Event was ***good***	☺	😐	☹	Event was ***bad***
Science was ***too easy***	☹	☺	☹	Science was ***too hard***
Language was ***too easy***	☹	☺	☹	Language was ***too hard***

The results from these questions are presented in the graph below:



Green bars represent the 'smile' responses, cream bars represent 'indifferent' responses and orange bars represent 'frown' responses.

Most respondents (94%) said the event was **good**. The questionnaire also asked visitors to write down three words that described how they felt about the event. The most popular words were **fun** and **interesting**. Some respondents also said it was **informative**. Others said it was cool, amazing or exciting.

Generally, respondents felt that the **level** of the science and the language was about right (89% and 93% respectively). This is an impressive achievement considering the wide age range of audience members. From the unstructured interviews, it appeared a success factor here was the face-to-face interaction with roboticists who could tailor their explanations to individual visitors. This was especially important to some teenagers I spoke to, who would have been immediately turned off had they felt patronised in any way. Some respondents described the event as **friendly** or **welcoming** which also reflects well on the deliverers. One described them as **nice people**.

Respondents had various levels of **prior knowledge** about robotics. Some visitors were in Aberystwyth for the TAROS conference so clearly knew lots about the subject! Others felt they had no prior knowledge whatsoever. Most respondents felt they had **learned about robotics** at the event. Only one visitor felt he hadn't learned anything about robotics from the activity; 47% said they had 'learned lots' and 51% rated their learning as somewhere between 'lots' and 'nothing'.

Respondents were asked to list **something they had learned**. Specific learning points included those related to sensors, infra-red and solar powered robots. Several related to how robots can be used in space, and some people said they had learned more about Aberystwyth's role in robotics programmes. Comments included:

> *"Light sensory robots - how they work*" (16-25 female)
>
> *"How much robots are used in space especially on the moon"* (13 year-old male)
>
> *"How varied robots are"* (36-45 female)
>
> *"That it's even possible for the ignorant to understand!"* (66+ male)
>
> *"You can use robots for most things" (*13 year-old male)
>
> *"Robotics can be studied at university"* (46-55 female)
>
> *"How to build a robot"* (7 year-old male)
>
> *"That Aberystwyth was involved with the Mars lander"* (16-25 female)
>
> *"That robots can be solar powered"* (13 year-old female)

42% of visitors said that the event had made them **more interested in science and engineering**. Half (50%) reported no change. Many said that this was because they were already interested. Two-thirds (66%) said they would **continue to discuss** robotics after the event. The questionnaire also asked whether the event had changed how visitors **felt about robotics**. Around half the respondents said that the event had changed how they felt to a greater or lesser extent. Responses included:

> *"I didn't really like it before - it was too complicated - but I learned about it so it's better"* (12 year-olds female)
>
> *"Thought they were cool before but now they're even better"* (12 year-old male)

"I used to think it was made up now I think they are real" (10 year-old male)

"How helpful they are for us" (13 year-old male)

"I feel that robots are much more advanced than I thought" (13 year-old male)

"Has made it more relevant" (66+ male)

"Not scared of them anymore" (7 year-old female)

"I would like to be involved in robotics when I am older" (10 year-old male)

The responses here were very interesting. Many respondents said the event had made robotics more interesting, exciting or relevant. A few indicated that they had some anxieties about robots prior to the event. One elderly couple I spoke to informally described robots as 'eerie' and felt they were going to 'take over the world'. They felt that technology was out of the control of scientists and that politicians were responsible.

The last item in the questionnaire asked for further comments or suggestions for improvement. The most common suggestion for improvement was to **expand the event** in various ways:

"More robots" (9 year-old male)

"More interactive activities" (66+ male)

"Maybe a bigger venue next time, such as the Morlan" (16-25 female)

"Over 2 days rather than 1?" (36-45 male)

"More stuff to make and play with" (11 year-old male)

These suggestions indicate that the activities were well-received and that the event left visitors wanting more! Some respondents felt the event could have been **better publicised**, although around half of the people I spoke to informally had heard about the event before they came. An article in the Cambrian News and an item on the BBC lunchtime news on the day of the event helped attract visitors.

"Perhaps greater publicity" (56-65 male)

"They should put a robot outside to attract crowds" (15 year-old female)

A few comments highlighted the difference in **public perceptions** of robots based on TV programmes such as *Robot Wars* and the reality of robotics research:

"Would like to have seen more action with larger robots like robot wars etc" (36-45 female)

"More big robots outside moving around having fights" (12 year-old male)

3.3 Feedback from observations and delivery team

After the event the team held a debrief session. We discussed each of the activity stalls individually then moved on the talk about the event as a whole. Overall the team were pleased with how the event had run and with the high visitor numbers. The main points from the discussion are summarised here:

Paddling pool stand

- The stand consisted of robot boats in a paddling pool that were guided by sonar and a compass and powered by two fans.
- The activity was developed for the Aberystwyth summer University.
- The paddling pool was **eye-catching** and attracted people to the stand.
- It was easy to start talking about the robots, but was more difficult to explain why the activity was important. This was because the demonstration was a **teaching aid rather than a research tool**.
- Some **more poster boards** that gave a bit of context would have been helpful.

Autonomous boats

- The stand included information and live GPS tracking of the autonomous boat trials in Aberystwyth harbour.
- This activity **worked really well**, especially when the boats were nearby in the harbour. There was lots of interest from visitors and the autonomous boats drew a small crowd when they passed.
- It was very dependent on a **facilitator**. I observed several people walking up to the stand then walking away when it was unmanned.
- The posters were not easily visible (they were too high up) which meant people were less sure what the stand was about. **More posters** that were better placed would have improved the activity.
- Some **videos** of the boats would have been a useful addition, especially when the boats weren't nearby on the harbour. This would also allow this stand to work without an accompanying boat trial.

Light sensing robots

- Visitors could interact with light-sensing robots using torches at this stand. The demonstration was funded by WWR.
- The activity was something that visitors could do **on their own**.
- The stand was **simple** to set up and run.
- The robotics was **easy to explain**; an analogy comparing LDRs to eyes worked particularly well. This was reflected in the evaluation data: many respondents cited sensors as a key learning point.

- The idea was that the boats in the paddling pool and these robots would tie in together although in the end the **link wasn't very clear**.
- Like some of the others, the stand was in need of a **poster** or similar to provide visitors with information.
- A bigger pen with bigger sides and more torches would also have improved the activity.

Bugbot build

- Visitors built a small robot that used pressure sensors.
- The **explanation** tied in well with the light-sensing robots. It was possible to compare 'repelled by pressure' to 'attracted by light'. This reinforced the message about sensors.
- The activity was very **popular** and visitors spent a relatively long time at the stand, which was crowded throughout the day. Some younger visitors found the activity challenging as it was a bit fiddly.
- Fewer visitors asked to **keep the robots** after they had made them than when the activity has been used in other venues.
- One suggestion was to produce a **handout** that described what you would need to build a robot at home.
- A 'disassembly engineer' to help take apart the robots and more kit would have improved the activity.

Kite robot

- The kite robot was displayed and researchers were able to explain its purpose to visitors.
- Unfortunately it was not possible to **suspend** the kite so it was less obvious that it was designed to be airborne. Visitors didn't really grasp what it was unless it was explained to them.
- This exhibit worked well for visitors who **were interested in research at the higher level**. It was possible to link with some of the other exhibits to explain, for example, how the kite could be launched from the rover to explore the air.

Mars rover and lander

- The Mars rover and a model of the lander were displayed near the centre of the bandstand. They were **large and eye-catching** and the researchers were able to explain their functions and purpose to visitors.
- From observation and the experiences of the roboticists, it appeared that these (and the kite) were of more interest to **older** audience members.

- While the children were building robots, parents and older visitors had the opportunity to **discuss real research** with roboticists. This meant there was '**something for everyone'**.
- Another positive impact for the representatives from Scisys (who have contributed to the development of the Rover) was the interest from visitors who were part of other centres at the university. **Useful contacts** were made that could lead to new collaborations.

Open University

- The Open University stand allowed visitors to build and operate LEGO robots.
- The stand was **busy** throughout the day and young visitors especially were very interested in the activities.
- A good number were able to **successfully use the robot** to pick up a tyre, which indicated that the level for the activity was about right.

University of Wales, Aberystwyth stand

- The University of Wales, Aberystwyth had a stand that provided information for people interested in studying robotics and related course. A member of staff was on hand to talk about entry requirements and related details.
- Some visitors took **prospectuses** and there were at least 2 serious potential students.
- It was useful to talk to young people on the day to help them think about the route into a potential career in robotics, and to **raise the profile** of the subject.

4 Conclusions

Drawing on the above observations, several general conclusions about the way the event ran were drawn:

- Some visitors appeared initially unsure of **what the event was about**. Although signs were displayed on the outside of the bandstand they were on white walls which were difficult to look at in the bright sun. A sandwich board may have helped. It would have been useful to have someone walking around outside explaining the event to passers by (including that it is free of charge) and inviting them into the bandstand.
- The **timing** of the event was a success factor. The last day of the holidays meant that while there were plenty of family visitors there were few tourists, which led to a sense of the event being held 'for the town'. The roboticists had positive feedback on this from visitors, who said '*we see the Uni but don't hear about what's going on*'.

- The bandstand **venue** was very good. There was lots of traffic throughout the day and it was accessible to visitors from all walks of life.
- One point mentioned by a family I interviewed was their **perceived gender bias** of the event. All of the robots involved were gender-neutral and there was a balance of male and female roboticists running the event; however it appeared that more males were interested in getting involved than females. The team were aware of this issue but did not want to introduce female-gendered robots for fear of deterring male visitors.
- The **publicity** for the event was excellent. There was an article in the local paper, the Cambrian News, and the event was featured on the radio and TV. This helped attract visitors and share the event's messages with a wider audience.
- There were pros and cons to organising the event to **coincide with the TAROS conference**. On the plus side, the roboticists could participate in the event while at the conference. However it meant there was a lot to organise at the same time. Some of the demonstrators at the event had very little sleep the previous night!
- Many of the stands would have benefited from some extra information in the form of **posters**. The success of the activities would then not be so dependent on the facilitators. There were around 10 roboticists running the event at a given time. It would also provide a greater background and context for more visitors.
- Various **linkages** between the stands were established, e.g. linking the sensors from the boats and LDRs to the pressure sensors in the bugbots, and linking the kite with the rover and the lander. These came through as some of the key learning points visitors had taken away from the event: the role of sensors and robots in space. The striking purple University of Aberystwyth **tablecloths** helped the exhibits seem part of a single event.
- Despite this, it was felt that there was not much opportunity to bring in the whole **theme** of the event: that robots are not humanoid and can be used to explore land, sea and air. More could be done to tie all of the robots in together. Clearer signage at the entrance, more posters and someone in a meet and greet role could help address this. A meeting beforehand to discuss how each stand contributes to the messages would have been ideal.
- Although areas for improvement have been identified, the team were very pleased with this first event. It took a large amount of time and effort to set the activity up for the first time, and they acknowledged that subsequent events would be considerably easier.

5 Recommendations

Several recommendations are made for future events:

1. The **concept of the event worked well** and all of the exhibits were engaging to visitors. The overall theme and message of the project could be reinforced through prior discussion (this has taken place in the form of the debrief), posters and a demonstrator introducing visitors to the event.
2. The **timing and venue** for the event combined to successfully engage the local community, whether they had a previous interest in robotics or not. The local knowledge of the team at Aberystwyth was invaluable here; similar local knowledge should be used when selecting times and venues for future events.
3. Many of the stands could have been improved by offering **more information**. This would be easiest to provide in the form of posters. There was also suggestions for handouts or flyers, maybe for each stand, or a 'collector's card' where people that visit each stand collect stamps or similar to exchange for a prize. Some videos of the autonomous boats would be a useful addition too.
4. All the activities and robots should **remain gender neutral**. However including an activity such as the robot garden that is likely to appeal to females should be considered.
5. The **balance between activities that were of interest to older and younger visitors** worked well and meant there was something for everyone. This balance should be retained for future events.
6. While the **effort and commitment** of the team in putting the event together was admirable, organising such activities should not cause extreme stress or lack of sleep. In future, consider scaling down an activity if it appears this will be the case – visitors would still have enjoyed the day even if there were fewer stands.
7. As well as providing an enjoyable experience for visitors, there were **positive impacts for the deliverers**. These included attracting potential students and making useful contacts with potential research funders or collaborators. The profile of the research group was also raised through the media coverage gained. These impacts should be shared with others in the Walking with Robots network to highlight some benefits of public engagement work.