

Institute of Physics Public Engagement Grant Scheme Report

Summary

A redevelopment of an existing science show on the physics of music technology was delivered to Rotary clubs in Norfolk.

A feedback questionnaire showed high levels of enjoyment and all participants thought that they had learned something new. The talk was valued highly and there was demand for more talks in the future.

Background

"Music to your ears" is a demonstration lecture on the physics of sound and music technology. The show was the IOP schools' lecture in 2002 and still entertains and educates thousands of students each year through *science made simple's* schools programme.

The project involved replicating the props and adapting "Music to your ears" for presentation to adult audiences in Norfolk. Focusing on the use of technology to produce, alter and record sounds, the show aimed to introduce a new audience to the physics behind music reproduction. The target audience was Rotary clubs in Norfolk, their membership includes community stakeholders such as school governors, business leaders, lawyers and other professionals who, whilst interested in science and technology, are unlikely to engage in science communication activities.

There were three principal objectives:

- 1 To reproduce the "music to your ears" materials and adapt the show to a new audience
- 2 To present the physics of music technology to an audience of interested adults who are otherwise unlikely to participate in science communication activity
- 3 To exploit the networking opportunities that arise from meeting community stakeholders.

Project development

There were two main aspects of the show which needed to be altered to suit the new audience. The length needed to be reduced from 50 mins to half an hour to suit the time allowed by clubs. The content needed to be less focused on National Curriculum links, and more on the novel technologies and processes involved in the study of sound and music.

The adaptation of the show took place during August and involved producing a new PowerPoint slide show, new demonstrations connected with audio compression and a revised script. The new show retained elements which work well with younger audiences such as the use of props and

demonstrations as well as audience participation. It was hoped that these would be similarly effective with adult groups.

Following the first performance on 16th September the show was slightly revised in response to initial feedback.

The final presentation lasted 30 minutes and covered 3 areas where technology has impacted on music.

- Recording music

This section looks at differences between digital and analogue recording, including demonstrations of compression and discussion of sampling.

- Changing music

This shorter section uses Audacity software and a ukulele to demonstrate how easy it is to manipulate recorded sounds and produce new effects.

- Producing music

The final section examines the difficulties faced by technology in trying to synthesise new sounds and imitating musical instruments. The show closes with demonstrations of voice synthesis and speculation on future developments in this exciting field.

Recruitment and delivery

Rotary clubs were contacted through their secretaries and offered the show between September and November 2008. The target was to recruit five clubs around the county. Nine clubs were approached and from these the five were signed up by mid September.

Club	Venue	Date	No. members present
Dereham	Dereham Conservative club	16/9/08	19
Wymondham	The Feathers Wymondham	22/9/08	22
Wroxham Bure Valley	Hotel Wroxham	29/9/08	21
Great Yarmouth Haven	Britannia Hotel, Gt Yarmouth	30/9/08	25
Thetford	Thomas Paine Hotel	11/11/08	20

The target was to reach 150 people. The final total was: 97. Although groups had an average membership of 30 the number attending each meeting was generally lower, especially for those clubs who met during the daytime.

Evaluation

A short questionnaire was used to canvas the opinions of the audiences immediately after the show. These were completed and returned to the presenter. Out of a total audience of 97 rotarians, 90 completed forms, were returned, though not all questions were answered on every form. A copy of the form and full results is supplied.

The analysis of the forms showed high levels of satisfaction with the talk in terms of educational and entertainment measure

- 98.9% of respondents rated the show excellent or good
- 97.78% rated the entertainment value of the show excellent or good
- 92.22% rated the educational content excellent or good

All of the respondents reported that they had learned something new from the show. An open question asked which areas in particular were new to them. Responses were grouped into 8 areas plus “all” or “none”

The top areas of “new” information were:

Compression 34.88%

Synthesisers 11.63%

Recording techniques 11.63%

Many of the audience reported informally that they found the use of digital technologies of particular interest. This can probably be attributed to the age of the audience, many over 50, for whom the technology is new and unfamiliar.

Asked which areas they liked most or least, the majority answered all or none. Interestingly the parts on synthesis split opinion, recording highest for both most and least interesting or useful.

- 6.26% of respondents recorded sound and voice synthesis as least interesting/useful
- 85.94% reported “none” as least interesting/useful
- 22.36 % reported sound and voice synthesis as most interesting/useful

- 46.05 % reported “most or all” as most interesting/useful

Comments on the show and ideas for future topics were invited. There was a clear demand for more content to the existing show and general interest in other science topics. A full transcript of comments is supplied, typical of the responses were:

- Good form and content
- More please
- Enables education in an up to date manner
- Need a longer session
- All put in easy to understand form that I could cope with
- Too fast, don't rush the presentation

Overall the comments on the show reflected the high levels of satisfaction recorded. The only negative comments concerned the length of the show. During recruitment phase the club secretaries were asked about the length and were in agreement that 30 minutes was about right, it may be possible to extend the duration now that clubs know more about what to expect.

Conclusion

Overall the project met its aims well. The show was adapted to suit the new audience, and continued to evolve during the project. More time was spent on digital compression and recording following feedback from the first club. The show was well received by a new audience who were largely male and aged over 50. This demographic tends not to engage in traditional, family based science communication projects. The groups showed high levels of interest in science more generally and would be willing to hear talks on other topics. In conversation about current activity in physics, and *science made simple's* other projects, members expressed an interest in hearing more about the Large Hadron Collider, the Herschel Space Telescope and the Bloodhound supersonic car.

The networking opportunities were not as successful as hoped, the majority of the members were retired and, although active in their communities, were not necessarily the most appropriate in terms of improving awareness of *science made simple's* activities in the county. However School governors and head teachers were amongst those present and these were useful contacts.

There was demand from the audiences for more shows at other clubs and adult groups. Informal invites were offered to an adult computer studies class, a U3A group and 4 other Rotary clubs. These groups can only be

engaged if further funding can be found to visit them as all are very unlikely to have funds to pay for a speaker.

As a pilot project the scheme proved that the material works well with adult audiences and that their response was similar to that of school pupils. There is demand for further interaction with adult groups and this is an area that science made simple would be keen to explore if funding can be found.

Audience comments

On the show:

good form and content

excellent

well explained

a great insight into recording

excellent personal presentation

very clear

more please

enables education in an up to date manner

fascinating presentation aimed at increasing scientific knowledge.

very good

Music to new ears report

The best I have heard for a long time
projections very helpful
need a longer session
very professional
very good
flowed well with logical order
very good, worth listening to
all very well done and interesting
marvellous
very professional with light humour
very good
too fast, don't rush the presentation
excellent
good idea and presentation
excellent, come again
excellent an innovative approach to complex subject
well presented in an enlightening, original and humorous manner
a first class presentation. I could have listened to it for 2 hours
all put in easy to understand form that I could cope with
excellent presentation and a nice fellow
very entertaining and informative excellent speaker
we could have had a longer presentation-so interesting.

Other topics of interest:

Herschel telescope
harmony/singing
more explanation of software
speech machines
best practice and tips on how to deliver this kind of show
vision
green issues
link between $E=mc^2$ and quantum theory
conversation generation and voice sampling
other fields would be interesting
taped music
basic computer explanation