Contribution ID: **19** Type: **Workshop**

Good Vibrations: Sound Physics in Science Centres

Monday, 1 October 2018 11:30 (1h 30m)

This workshop explores effective physics teaching by evaluating an aspect of the work done by interactive science centres in South Africa. The focus of the study was grade 9 students from three different school groups: urban, township and rural visiting the Unizulu Science Centre (in Richards Bay, South Africa) and attending a science show "Good Vibrations" which presents concepts in sound and waves through the medium of musical instruments. The principal author's long experience at Unizulu Science Centre has indicated that the three groups above have very different experiences during a visit which relate to their prior experience and educational opportunities. The different groups were compared and contrasted in terms of: General attitude; conceptual and visual difficulties with respect to sound; and prior knowledge and learning during the show. The implications of this study for the design and presentation of science shows (and for Physics teaching in general) were then considered in the light of these findings.

The initial study of the show (conducted towards a Masters' degree) used a combination of qualitative and quantitative probes to measure learning and other outcomes. Valuable lessons were learnt about how well these probes performed in the evaluation of a science show, which will be extremely valuable to practitioners. The probes showed encouraging evidence of significant learning taking place during the show, and significant knowledge gains with two of the three groups doubling their pre-test score in the post-test. We found that the show worked well for urban and township students, but not very well for rural students, due to issues of language, cultural background and prior knowledge.

Design Based Research (DBR) claims to provide solutions to real educational challenges by refining both the interventions offered by communicators and the instruments used to test their effectiveness. As an extension to the study mentioned above (conducted towards a doctoral degree) the author used the data from the initial study to refine the show and to attempt to boost learning achieved by the students – especially in the weaker rural group. The survey instruments used were simultaneously refined to try to avoid ambiguity and misunderstanding of the questions. Students were presented with the "new improved" show and then tested using the refined instruments. Learning was contrasted with that previously achieved and significant gains were noted. While performed in the context of science shows in science centres, this study nevertheless has relevance to all Physics teaching. It offers a feedback instrument (using DBR) to assist teachers in refining their message (and the instruments used to evaluate it) to suit the different groups they present to.

In this interactive workshop session: some aspects of the show will be performed, data and conclusions from the two studies will be presented and discussed, and participants will be guided through the effective creation, evaluation and improvement of a Physics show (or lesson).

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