Inspiration, Engagement and Learning

The Value of Science & Discovery Centres in the UK
Working towards a Benchmarking Framework

ecsite uk
European Network of Science Centres and Museums

Ecsite-uk

The UK Network of Science & Discovery Centres and Museums

Ecsite-uk encourages excellence and innovation in informal science learning by serving and linking its member centres and advancing their common goals. Ecsite-uk supports effective communication and promotes best practices within the Science & Discovery Centre field, strengthens the position of Science & Discovery Centres within the community at large, and fosters the creation of successful partnerships and collaborations in their widest sense.

Ecsite-uk is a non-profit membership organisation and is affiliated to ECSITE (The European Collaborative of Science, Industry and Technology Exhibitions).

Ecsite-uk believes the UK's Science & Discovery Centres and Museums represent an extraordinary opportunity for the future of science in this country. As a network with a physical infrastructure and 19.5 million visitors a year, we are uniquely positioned to foster scientific entrepreneurship and a genuine and long-lasting sense of excitement and adventure in science with people of all ages in all parts of the UK.

Contents

Preface: The science centre enrichment activities project

In November 2006, Ecsite-uk was awarded £750,000 by DIUS and DCSF to demonstrate the impact of Science & Discovery Centres, to encourage their effective collaboration and maximize their future viability.

The details of how this might be achieved were outlined by Ecsite-uk in their proposal of October 2006. In summary, this proposed that the most direct mechanism to improve the financial sustainability of the UK's Science & Discovery Centres with the £750,000 available was for centres to form small consortia through which to deliver innovative projects. The aim was to encourage effective collaboration and sharing of ideas, knowledge and best practice between partner centres whilst developing new skills and resources, and building relationships with new audiences.

As part of this model, consortia included large and small centres as well as DCMS-funded museums, Science Learning Centres and SETpoints to ensure best practices were shared widely within the STEM community as well as between geographically distant centres.

Thus, 93.3% of the total project funding, approximately £700,000 of the £750,000, was allocated to five consortia projects (and their administration). The remaining approximately £50,000 was allocated to surveying the field and working towards a benchmarking framework for the sector as outlined in the original proposal.

> This report, the 2007 data collection, the creation of the on-line benchmarking tool and the review of studies into the impact of science centres constitutes 6.7% of the total value of the project

These five projects are now complete and were delivered on time, on budget and with excellent feedback working with hard-to-reach audiences across the UK, including in the most remote school in England. In total the consortia reached 26,678 students in 347 schools from Land's End to the North Yorkshire Moors and across to North Wales. The full project reports have been submitted to the DIUS and DCSF and can be found on the Ecsite-uk website.

The resultant benchmarking framework has been designed to help support Science & Discovery Centres, by providing them with a tool with which to collect quantitative and qualitative data in relation to key outputs and thus measure their individual performance and development year on year.

A number of factors have informed its development, 1) the increasing use of benchmarking frameworks in the public and private sectors as planning tools and 2) the lack of consistent data capture that has thus far prevented a comprehensive picture of impact across the sector.

Through the use of a benchmarking framework it is hoped that Science & Discovery Centres may be able to access the benefits identified by other businesses[1] and that those outside the Science & Discovery Centre sector will more clearly understand the impacts and outputs delivered by the sector as a whole. Like other benchmarking tools, the on-line service currently being piloted by Ecsite-uk will be secure and confidential, respecting the needs of its independent member organisations to keep aspects of their business performance confidential. The benchmarking framework does not, at this early stage, provide an in-depth comparison of centres' relative market position, but it will help encourage Science & Discovery Centres to assess their own business performance in relation to key outputs and may (if funding is secured and subject to consultation with Science & Discovery Centres) be developed in the future to enable centres to compare individual outputs with overall trends.

As part of this review, Ecsite-uk did not commit to looking at how Science & Discovery Centres could become self-sustaining or self-financing and whilst this report contains some evidence about the issues facing Science & Discovery Centres in relation to funding, long-term recommendations about their financial viability are outside the scope of this report.

1 See http://www.benchmarkindex.com/bi/sb-fs.html

Executive summary

Ecsite-uk believes that the UK's Science & Discovery Centres and Museums represent an extraordinary opportunity for the future of science and scientific innovation in this country. As a network with an infrastructure of over 50 vibrant venues attracting over 19.5 million visitors a year, they are uniquely positioned to engage and enthuse people with science throughout the UK.

With their expertise in hands-on learning, exploration and emphasis on dialogue, the UK's Science & Discovery Centres are well placed to foster scientific entrepreneurship and a genuine and long-lasting sense of excitement and adventure in science with people of all ages in all parts of the UK.

Ecsite-uk, with funding from DIUS and DCSF, has worked to create a framework that will help all science centres in the UK to demonstrate the impact of the work they do in a consistent manner.

This particular report is concerned with the benchmarking element of the Science Centre Enrichment Activities Project and along with the Review of Science Centre Impact Studies and the on-line benchmarking tool, constitutes 6.7% of the overall value of the project. The main part of the grant was awarded to consortia of science centres. All reports and the resultant on-line tool are publically accessible via the Ecsite-uk website.

For the purposes of this report the term Science & Discovery Centres will generally include science centres, science museums, zoos and aquaria, since the common aim of these centres is to engage and inspire people with the wonders of science and the world around them. There are of course a number of issues around this terminology which will be reserved for a later date.

This report is divided into three parts:

Part 1: A survey of the UK's Science & Discovery Centres

A survey of the Ecsite-uk membership commissioned early in 2007, supplemented by additional research in early 2008, has supplied evidence for a set of key findings outlined in the report.

The results show that in 2005-6, 19,503,000 people visited the UK's Science & Discovery Centres and 15,606,618 of these were to centres in England. This is more than the number of adults who visited an exhibition of art, photography or sculpture[1] in England (8.6 million adults) or who went to see a play or drama[2] in the same period (8.9 million adults). This puts science centres and museums firmly on the cultural map.

In 2005-6, 11.8 million people visited the STEM-related DCMS-funded national and regional museums, and 7.7 million people visited other Science & Discovery Centres. This is a considerable number of visitors to a network of charitable organisations promoting STEM to school students and the wider public.

Evidence from the survey also revealed that on average 56% of visitors to the Ecsite-uk Science & Discovery Centres were female and that almost every centre is a registered educational charity. Evidence also supports the fact that throughout the UK teachers use Science & Discovery Centres as a valuable resource to support science teaching and learning.

The survey gathered specific evidence to show that Science & Discovery Centres support dialogue and debate between scientists, schools and the public and that each week science centres and science museums across the UK engage and inspire the public with over 1,000 individual science events.[3] There was also considerable evidence that Science & Discovery Centres often act as regional hubs for science engagement activities.

Finally, although Science & Discovery Centres are not referred to in the Government's STEM programme[4], this report gives clear evidence that they are in fact

1 DCMS Taking Part Survey 05-06, 8.6 million adults visited an exhibition of art, photography or sculpture
2 DCMS Taking Part Survey 05-06, 8.9 million adults went to see a play or drama
3 Includes evidence from just half the centres, the actual figure is likely to be nearer 2,000 events per week
4 Science, Technology, Engineering and Mathematics (STEM) Programme Report DfES, DTI, 2006


Glasgow Science Centre ©

important contributors to STEM engagement and enrichment activities across the UK.

Part 2: The next steps

The aim of this research was to provide a mechanism to begin to evidence and benchmark the work of the UK's Science & Discovery Centres.

Considerable research by Ecsite-uk, in collaboration with many partners in early 2008 revealed the multiplicity of data collection and impact evaluation approaches being employed across the country. The key aim was to provide a new, single system for collecting consistent and unified data, with common definitions, which would include the key outputs Science & Discovery Centres have been analysing, or would want to analyse. The system needed to dovetail with existing national and international frameworks and address the many issues raised by the Science & Discovery Centres in previous surveys. The result is an adaptable on-line system that will be piloted with centres in the first half of 2008.

To achieve a simple, effective and workable measurement of impact throughout the Science & Discovery Centre sector, Ecsite-uk is making the following recommendations, which are described in full in part 2 of this report. These represent the first steps along the road to achieving a comprehensive picture of the impact of Science & Discovery Centres.

Ecsite-uk recommends that:

1. All UK Science & Discovery Centres commit to taking part in the annual on-line survey giving information on a set of key performance indicators such as visitor numbers, education visits, partnerships, content areas and other details as agreed during the pilot. Privacy and data protection levels will be agreed in advance.
2. All UK Science & Discovery Centres sign up to the DCSF-backed Learning Outside the Classroom. This quality badging scheme will be low-cost and instantly recognisable by teachers as a kite mark of quality for school visits. It is being developed by PriceWaterhouseCooper in collaboration with stakeholders (including Ecsite-uk) and will set a benchmark for the quality of the learning experience science centres offer, as well as setting a benchmark for the safety of the experience.
3. All UK Science & Discovery Centres join the Visitor Attraction Quality Assurance Service. Many of our members are already part of this service, which benchmarks the quality of the visitor experience.
4. All UK Science & Discovery Centres undertake their evaluation of learning and impact using the DCMS-backed Inspiring Learning for All Framework (Generic Learning Outcomes) which are already being used by many Science & Discovery Centres, in order that there is a standardised framework to assess visitors' learning across the sector.

Part 3: Sharing best practice

The final section of this report shares ideas, knowledge and best practice by those who have found ways to improve their financial sustainability. Written by senior staff from Science & Discovery Centres around the UK, they include case studies ranging from innovative revenue streams created through property investments, rock concerts and product launches to making the most of gift aid, advertising and partnership opportunities.

Part 1
A survey of the UK's Science & Discovery Centres

A survey of the UK's Science & Discovery Centres

This report describes the key impacts that Science & Discovery Centres and Museums make. It takes evidence from science centres, science museums, zoos and aquaria, all of which are represented by Ecsite-uk.

Together their common aim is to provide publicly accessible venues and learning programmes, where the public can be engaged and inspired by science.

This report makes recommendations about how we can progress the measurement of impact of Science & Discovery Centres and Museums by recording key benchmarks through which improvements can be measured year on year.

What is a Science & Discovery Centre?

The UK's Science & Discovery Centres and Museums have at their core interactive exhibitions and programmes inviting visitors to explore, experiment, test, predict and discover science and the world around them. Laboratories, workshops, planetaria and interactive shows take the initial hands-on engagement a level further, encouraging active personal exploration and enquiry.

The exhibitions and learning programmes offered by Science & Discovery Centres are designed for wide-ranging audiences including young children, primary and secondary school pupils, teachers, students, families, adult learners and senior citizens. They engage people with science from under-represented groups, for example, people with disabilities, parents from minority ethnic communities and teenagers at risk of social exclusion.

The majority of Science & Discovery Centres provide some form of outreach services to schools and to the wider community, extending their reach still further both geographically and to people from a range of backgrounds.

Science & Discovery Centres and Museums are the **only** publicly accessible venues providing science learning opportunities for all, in a network that extends across the UK

This report includes evidence taken from a survey of all Ecsite-uk members in 2007 (by Gammon and Harris for the financial year 2005–6) and submissions to the House of Commons Science and Technology Committee inquiry into the funding of science centres in October 2007. It also includes additional data relating to visitor numbers gathered by Ecsite-uk in early 2008. The methodology can be found in Appendix 1.

> "It encouraged the rest of the staff at my school to regard science investigations as fun and not something to be nervous about"
>
> *KS2 teacher from Richmond, North Yorkshire*

> "It changed how I feel about science because I never knew you could have fun as well as learn that much in one lesson"
>
> *Student, Astronomy show*

> "The children have come back full of all they have learnt"
>
> *Year 3/4 teacher from Selby*

The UK's network of Science & Discovery Centres

Members of Ecsite-uk in 2007

A rich diversity of members

For the purposes of this report, the term 'Science & Discovery Centre' is used to describe science centres, science museums, zoos and aquaria. The common aim of these centres is to engage and inspire people with the wonders of science and the world around them. Some Science & Discovery Centres have collections of historic objects, animals or plants (museums, zoos, aquaria and botanic gardens) and others provide interactive exhibits and planetaria. Some focus on specific areas of science, for example, chemistry at Catalyst and sustainability at The Living Rainforest. Some - such as the Science Museum and the Natural History Museum in London - were established by the Victorians, whilst others were built to celebrate the new Millennium.

There is clearly a need for greater clarity between data from DCMS-funded museums and other Science & Discovery Centres. The funding arrangements are complex, particularly in devolved nations, and something we aim to look into in future surveys.

In 2007, at the time of the survey, 52 UK Science & Discovery Centres and Museums were members of Ecsite-uk. This report takes evidence from the membership of Ecsite-uk which includes science museums.

In England alone, Ecsite-uk has 35 member centres, of which 26 are Science & Discovery Centres and nine are DCMS-funded museums

Most Science & Discovery Centres are charities

The vast majority of Science & Discovery Centres are charities[1]. They are not-for-profit organisations which exist to discharge their charitable aims relating to science engagement and education. Their income differs widely in scale and source. Some (for example DCMS-sponsored museums or members of the Renaissance in the Regions programme) receive DCMS funding, some receive funding from the devolved administrations, some receive local authority funding and some receive no public funding at all.

Funding of the UK's Science & Discovery Centres

Science & Discovery Centres across the UK operate under varying financial conditions, both in terms of income and expenditure, making overall comparisons between centres difficult. However due to the lack of available funding streams most Science & Discovery Centres have had to become effective and innovative income-generators in order to continue operating year-on-year.

Of the Science & Discovery Centres sampled in the Ecsite-uk survey the majority received less than 5% of their overall income from Government sources in 2005-6. Of those that received over 76% of their income from Government sources, most were national or DCMS-sponsored museums[2].

The map shows which of the English members of Ecsite-uk receive DCMS funding (either as DCMS-sponsored museums or through the Renaissance in the Regions programme).

A wealth of learning experiences

The differing size, scale and focus of UK Science & Discovery Centres means that the range of visitor experiences provided is vast. Visitors can explore the night sky in Glasgow, tour a tropical rainforest in Cornwall, lift a car in Leicestershire and explore the world's oceans in Hull. As the Government's Learning Outside the Classroom Manifesto states, experiencing a world beyond the classroom is an essential part of learning and personal development. Through their exhibitions, collections and programmes Science & Discovery Centres can provide powerful and memorable science learning experiences for all.

No two Science & Discovery Centres are alike, but they are united by a common mission to inspire and engage school pupils, families and the public with the wonders of science

1 Only one of the 44 centres providing evidence to the House of Commons Science and Technology Committee inquiry is run by a commercial operator (Spaceport)

2 Figures are correct for the period 2005-6. Grant settlements may have changed since then. 21 centres provided information on their finances

Ecsite-uk centres in England in receipt of DCMS funding

(National museums and some science centres in Scotland, Northern Ireland and Wales are funded through their devolved administrations)

The survey: key findings

1: Science & Discovery Centres attract large public audiences

19,503,000
Total annual number of visitors to the UK's Science & Discovery Centres[3]

11,816,000
Total annual number of visitors to UK's DCMS-funded science museums

7,687,000
Total annual number of visitors to the UK's Science & Discovery Centres excluding DCMS-funded science museums

All figures relate to Ecsite-uk members

It is estimated that 50% of visitors to Science & Discovery Centres are children[3b]

This equates to nearly 10 million children visiting each year

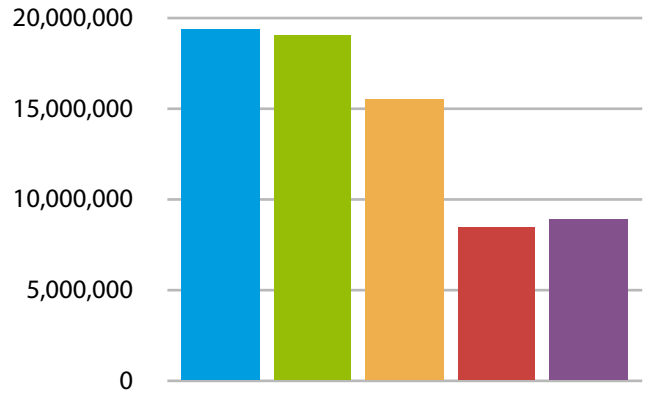
Definitions and data collection methods currently vary across the field and we aim to explore and improve these methods in the coming year

A fifth of the population said they have visited a science museum or science centre in the 12 months prior to the survey and a quarter had visited a zoo[3c]

The number of visitors to all DCMS-sponsored museums in the same period was **34,000,000**[4].

19,503,000 people visited a UK Science & Discovery Centre. This is more than the number of adults who visited a library[5]. **15,606,618** of these visitors were to centres in England. This is more than the number of adults who visited an exhibition of art, photography or sculpture[6] in England and more than the number of adults who went to see a play or drama[7] in England. **11.8 million** members of the public went to Ecsite-uk centres that were DCMS-funded science museums and **7.7 million** went to Science & Discovery Centres. These figures show that Science & Discovery Centres with or without historic collections are attracting large numbers of the public and playing an important role in the cultural activity of the nation.

Annual visitor numbers to a range of cultural attractions



- **19.503 million** visited a Science & Discovery Centre in the UK
- **19.1 million** adults in England Visited a Library
- **15.607 million** visited a Science & Discovery Centre in England
- **8.6 million** adults visited an exhibition of art, photography or sculpture[6] in England
- **8.9 million** adults went to see a play or drama

3 This data is from all 52 Ecsite-uk members. It includes data from 25 members collected in the Gammon and Harris Survey of 2005–6 data, and is supplemented by data collected by Ecsite-uk telephone, email and personal contact in Jan – March 2008. The data has been corrected to include only those of the museums that are STEM-related from the Nationals, for example Liverpool Museums includes eight museums of which only three are STEM-related and included here. The data does not include any STEM-related museums or centres within the UK that are not members of Ecsite-uk

3b This figure is an estimation, in the survey on average 31-40% of visitors to Science and Discovery Centres were children not in school groups. 5-60% of visitors were in school groups. Adding these numbers together gives an overall child visitor percentage of approximately 50%. Ecsite-uk intends to collect more precise data in the future.

3c RCUK and DIUS Public Attitudes to Science 2008 A Survey

4 Some of these visits were to science museums and are therefore included in those listed as Science & Discovery Centre visitors

5 DCMS Taking Part Survey 05-06, 19.1 million adults visited a library (in England)

6 DCMS Taking Part Survey 05-06, 8.6 million adults visited an exhibition of art, photography or sculpture

7 DCMS Taking Part Survey 05-06, 8.9 million adults went to see a play or drama

The future

With our members' consent, in the future Ecsite-uk would like to tabulate the data for individual Science & Discovery Centres in the UK[8]. We would also wish to achieve greater clarity between DCMS-funded museums, centres funded in one way or another by devolved Governments, Ecsite-uk Science & Discovery Centres and other centres that provide STEM but are not yet members of Ecsite-uk.

Science & Discovery Centres attract a high proportion of females

The 2007 survey revealed that on average 56% of visitors to the Ecsite-uk Science & Discovery Centres were female. Female visitors out-numbered male visitors in 10 of the 14 organisations who responded to this question. The highest reported percentage of female visitors was 68% (Horniman Museum). There was a 50-50% male-female split at Inspire Discovery Centre, while male visitors slightly outnumbered females at The National Space Centre (51%) and the Science Museum (50.5%).

The DCMS survey of museums and galleries for the same period shows that overall 54% of visitors to museums and galleries were female[9]. It appears that marginally more females visit Science & Discovery Centres than museums and galleries overall[10].

Science & Discovery Centres have made great efforts to engage women and young girls in science and engineering which might have had an impact. In addition, this effect may be due to the family-friendly nature of Science & Discovery Centres which have high levels of interactivity and often appeal to families with young children. As family-friendly venues that already engage a higher percentage of females than other exhibitions, Science & Discovery Centres are positioned to play an important role in engaging more females with science.

56% of visitors to Ecsite-uk Science & Discovery Centres were female

54% of visitors to museums and galleries were female

8 Ecsite-uk plans to consult with its members and seek advice regarding data protection issues in 2008
9 For the UK population as a whole in 2005 51% of the population was female (Office of National Statistics, Social Trends 2007)
10 Ecsite-uk aims to obtain further data on the gender of visitors in 2008 and beyond, although currently many centres do not record this information

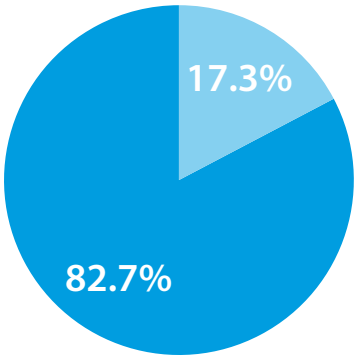
The survey: key findings

2: Science & Discovery Centres are widely used by teachers to support science curriculum teaching and learning

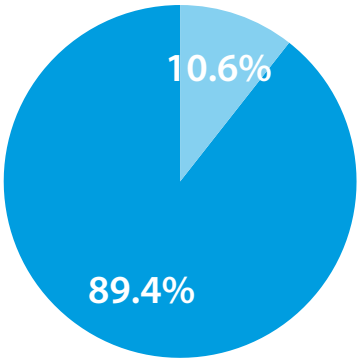
Science & Discovery Centres attract large numbers of school visits.

1,534,350 school children visited a sample of a half of the UK's Science & Discovery Centres and museums in 2005-6 and 943,439 took part in on-site educational activities during the period April 2005 to March 2006[11].

Schools visitors (formal education groups) as a percentage of total visitors



Millennium Science Centres 17.3%
average for nine Ecsite-uk members who took part in the survey



DCSM-funded National Museums 10.6%
average for six Ecsite-uk members who took part in the survey

Over 1.5 million school children visit the UK's Science & Discovery Centres annually.

Nearly 1 million pupils took part in curriculum-linked science workshops and activities in 2005-6

The majority of Science & Discovery Centres and Museums attracted between 11% and 30% school children as part of their overall visitor total. This survey reveals the percentages of school visits to Science & Discovery Centres are significantly higher than to national museums.

Every single submission from Science & Discovery Centres (44 in total) to the Science and Technology Committee inquiry drew attention to the important role Science & Discovery Centres play in supporting schools and the science curriculum. They do this through their exhibitions, their learning programmes, printed and on-line resources, teacher training programmes (CPD) and outreach services. In the 2005-6 Ecsite-uk survey respondents developed 155 new on-line and printed educational resources for pupils and teachers ranging from whole websites[12] to resources to support a multi-venue travelling exhibition.

Teachers use Science & Discovery Centres as a valuable resource to support science teaching and learning

Evidence submitted to the Science and Technology Committee inquiry from a number of centres (MOSI, W5, National Space Centre) shows that these Science & Discovery Centres have had a positive impact on science learning and attitudes towards science. These individual studies show that students who have been involved in science centre educational programmes performed better than those who were

11 In the sample of 25 Ecsite-uk survey organisations

12 Over 27 million visits were made to 17 Ecsite-uk member websites during 2005-6. A 'visit' was defined as "a new incoming visitor viewing a page who was not connected to the site during the last 30 minutes". Measurement of 'visits' were used as they offer a more accurate indication of the amount of traffic going to a website than the number of 'hits'

At-Bristol © Paul Box

not involved[12b]. Government figures show that there has been a decline in the numbers of pupils choosing STEM subjects, the contributory factors being identified as a shortage of specialist teachers, the image of science and scientists and a feeling amongst some pupils that school science is not relevant to contemporary life.

Case Study: W5, Belfast

At W5 in Belfast, qualitative evaluation with teachers showed that 82% felt that the pupils' experience at W5 had made the science curriculum more relevant, 85% said it made the science curriculum more enjoyable, 75% said it helped to reinforce topics taught in class, 79% said it increased knowledge and understanding and 82% said it provided opportunities that were not available at school. In the case of W5, this evidence suggests strongly that it is directly addressing factors that lie behind the decline in the take up of STEM subjects in schools.

Penetration of education markets

Science & Discovery Centres connect with many schools in their localities and regions and the value placed on Science & Discovery Centres by teachers is substantiated by the high levels of penetration of educational markets achieved. Over 50% of all schools in Scotland worked with Glasgow Science Centre in 2005–6, 70% of all schools in Northern Ireland have visited W5 in the last six years and over 70% of schools in Birmingham have participated in Thinktank's educational programmes since opening. In addition to their on-site activities many centres are running active outreach programmes, taking their educational programmes and services (for instance science shows or mobile exhibits) out into schools and community venues. A total of 2,241 off-site outreach events were run during 2005–6[13].

> "Gets pupils thinking about science as part of the world around them and not as a subject just taken to pass exams"
>
> *Holy Cross College on participating in W5's education programmes*

Science & Discovery Centres employ trained and skilled science communicators and scientists

Many school teachers are not science specialists and Science & Discovery Centres help train and equip non-specialists to teach STEM subjects well.

The Parliamentary Office for Science and Technology has stated that:

'There is a shortage of teachers with specialist qualifications in particular sciences. There is concern that non-specialists may be less likely to show the enthusiasm, flair and confidence to inspire their students to choose STEM options at school and beyond... The shortage of specialist teachers, along with curriculum pressures and health and safety fears means fewer teachers are willing or sufficiently confident to teach practical classes.'[14]

12b Pupils performed better in a number of areas including, but not limited, to science attainment. The assessment methods included teacher assessments and actual child performance. Skills, attitudes and knowledge were assessed.

13 By the sample of 25 organisations who provided data for the Ecsite-uk survey

14 Strategic Science Post Note 277 Jan 2007

Science & Discovery Centres employ trained and skilled science communicators and scientists who develop and deliver a range of science learning activities and resources. They provide non-specialist teachers with access to skilled scientists. Ecsite-uk survey data showed that during 2005-6, a sample of 17 organisations offered a total of 182 teacher-training days, which were attended by 4,203 teachers. They provide specialist facilities and resources which many teachers simply do not have access to at school.

Science centres offer hundreds of teacher training days and other CPD

Case study: At-Bristol

Of the 20 volunteers currently supporting At-Bristol's programmes with the public and schools, all either have or are studying for qualifications in STEM subjects including a PhD in Materials Engineering, five Masters qualifications in science subjects and 14 degrees reflecting a broad range of STEM subjects including Biochemistry, Chemical Physics, Environmental Science, Mathematics and Statistics, Physics, Zoology and Physiology. The core educational staff is even more highly qualified.

Science & Discovery Centres are major providers of STEM enrichment and engagement activities in the UK

Every week, in Science & Discovery Centres across the country there are hundreds of educational events taking place. The Ecsite-uk survey data shows that in 2005-6 Science & Discovery Centres delivered over 1,000 events to interpret science each week[15].

Every week science centres and science museums across the UK engage and inspire the public with over 1,000 individual science events

Type and total number of events run per week (in 25 centres)

Interpretation event	Total no run per week term-time	Total no run per week holiday time
Workshops/labs	299	312
Lectures/lessons	255	339
IMAX/Planetarium shows	228	342
Guided tours	91	65
Drama performances	27	42
Other interpretation events	114	190
Total per week	**1,014**	**1,290**

Although Science & Discovery Centres are not referred to in the Government's STEM programme[16], they are in fact important contributors to STEM engagement and enrichment activities

> "I think from the school's point of view we actually pray for things like this because it's just a different way of a child developing and learning"
>
> *Teacher, Thinktank 2007*[17]

15 Data was provided by 25 centres only, the figure for the sector as a whole will be much larger and Ecsite-uk is seeking to attain these figures in 2008

16 Science, Technology, Engineering and Mathematics (STEM) Programme Report DfES, DTI, 2006

17 Thinktank, Birmingham Science Museum, teacher consultation 2007

The survey: key findings

3: Science & Discovery Centres attract large numbers of children and young people

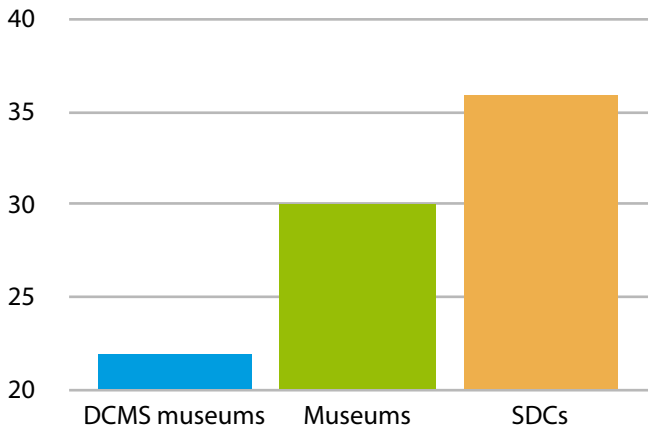
Nationally 20% of the UK population are under the age of 16[18].

Science & Discovery Centres attract a higher proportion of young people than museums and galleries in general

Of the organisations who responded to the Ecsite-uk survey, most reported that 31-40% of their visitors were under the age of 16. Science & Discovery Centres are attracting a higher proportion of young people than museums and galleries in general (according to MLA Digest of Statistics 2006) where by comparison 30% of visitors to all museums and galleries were children and 22% of DCMS-sponsored museums were children (2004-5). It follows that Science & Discovery Centres are therefore well placed to engage more young people with STEM subjects and contribute to the Government's STEM programme.

Ecsite-uk welcomes the Government's announcement of funding to support the provision of five hours of cultural activity a week for children and young people and looks forward to working with the Youth Culture Trust to ensure that many more children and young people can access the UK's Science & Discovery Centre network.

Graph to show percentage of overall visitors who are under the age of 16[18b] (not including school visits)



18 http://www.statistics.gov.uk/cci/nugget.asp?ID=6
18b Percentage for Science & Discovery Centres taken at mid-point between 31% and 40%

The survey: key findings

4: Science & Discovery Centres support dialogue and debate between scientists, schools and the public

Science & Discovery Centres work with large numbers of scientists, who are often involved in public events.

There is considerable evidence of Ecsite-uk organisations working with research scientists and engineers from academia and industry. In research conducted with 25 of the UK centres, 12 of the organisations regularly involved research scientists and engineers in the delivery of presentations, shows, and dialogue events, and eight ran 'Meet the Scientist' style events.

16 of the 25 organisations regularly consulted with research scientists and engineers, seeking advice on content for new exhibitions and live events. Four of the 25 organisations had scientists or engineers sitting on their governing boards.

Several centres also ran training for research scientists and engineers in science communication, used scientists to act as referees on funding applications, provided links on their organisation's website to material by research scientists, and hosted science and engineering ambassadors.

Many also had collaborations with professional societies such as The Institute of Physics, The Institute of Structural Engineers and the Research Councils.

Science & Discovery Centres are partners in the newly formed Beacons for Public Engagement

- Techniquest is a partner in the Wales Beacon
- MOSI is a partner in the Manchester Beacon
- The Centre for Life is a partner in the Newcastle Beacon
- Our Dynamic Earth is part of the Beltane Beacon, Edinburgh

The need to bring scientists and the public closer together has been identified as a priority by Government, as has the need to help school pupils understand more about what scientists do in order to promote STEM career choices.

The UK network of Science & Discovery Centres is unique in that it offers publicly accessible opportunities for interactions between scientists and wide-ranging public audiences on a consistent year-round basis, in locations right across the UK

Science & Discovery Centres have established partnerships and networks at national and international levels, which will help them continue to bring schools, the public and scientists together. Ecsite-uk welcomes the network of Beacons for Public Engagement that are developing around Britain and will be working together to identify partnerships between the networks.

> "My students are finding this activity quite taxing, no-one has ever asked them what their opinion is before"
>
> *KS4 Teacher, Thinktank* [19]

There is an apparent demand for more public consultation on scientific issues[19b]

19 Thinktank, Birmingham science museum teacher feedback 2006

19b RCUK and DIUS Public Attitudes to Science 2008 A Survey

Science & Discovery Centres run a range of events that engage the public with scientists and policy makers

Nearly 1,000 dialogue events each year: getting the public debating and discussing the latest issues in science

In total 952 science dialogue events were run by the 25 Ecsite-uk organisations sampled by the survey. The audience for these dialogue events covered all three of the main visitor categories: adults, families and schools. Some organisations ran events specifically for post-16 and A-level audiences, while others ran events tailored to a 14–19 year old audience.

Engaging the public in genuine dialogue about contemporary science is a key Government aim, and is outlined in the Science and Innovation Investment Framework 2004–14.

Evidence from the Ecsite-uk survey shows that Science & Discovery Centres can act as hubs for dialogue between the public, schools and policy makers

Examples of dialogue events in 2005-6 included:

- The Centre for Life who offered mini-debates to schools having participated in the Ecsite-uk's 'Doing Dialogue' project
- Inspire Discovery Centre ran a monthly science café
- The Natural History Museum's 'Nature Live' events encouraged discussion between scientists and members of the public and involved interviews, hands-on activities, demonstrations, debates, talks, discussions, and workshops
- The Science Museum's weekly programme of evening science engagement activities at the Dana Centre for adult audiences included interactive debates and presentations with leading scientists, policy makers and campaigners, object-handling sessions, live video presentations from operating theatres, forum theatre events, deliberative debates, sci-art events, and on-line discussions
- The Dundee Science Centre (Sensation) held debates in collaboration with other research and science engagement organisations such as the BA and the Medical Research Council
- Techniquest ran a Citizens' Jury which looks at aspects of genetics and also ran Science Café Wales
- Thinktank submitted evidence to the Nuffield Council for Bioethics as a result of a programme of Stem Cell Debates with 14-19 year olds, co-ordinated by Ecsite-uk with funding from the Wellcome Trust
- Since the collection of data from 2005-6 Ecsite-uk has supported the training of dozens of Science & Discovery Centre staff to deliver dialogue events

The survey: key finding

5: Science & Discovery Centres are often regional hubs for science engagement activities

Science & Discovery Centres work in partnership with many organisations and can be regional focal points for public engagement activity

The combined evidence collected in the Ecsite-uk survey and the submissions to the Science and Technology Committee inquiry shows that collectively Science & Discovery Centres are already working in partnership with all of the organisations identified as the 'Core STEM Delivery Network' in the Government's STEM programme.

As a group, Science & Discovery Centres are already working in partnership with:

- STEMNET and SETPOINTs
- National and Regional Science Learning Centres
- The Beacons for Public Engagement
- The British Association for the Advancement of Science
- Science Cities
- The Association for Science Education
- The Royal Colleges and Universities
- Teacher training organisations
- Regional Development Agencies
- Sector Skills Councils
- Education Business Partnerships

INTECH, Ironbridge Gorge Museum and Science Oxford host regional SETpoints and At-Bristol hosts the Science Learning Centre South West. As publicly accessible buildings, usually open seven days a week for most of the year and often centrally located, Science & Discovery Centres have the potential to become a focus for regional public engagement with science activity, helping to streamline, co-ordinate and promote a wide range of initiatives.

In addition most Science & Discovery Centres work in partnership with one another. The experience of Ecsite-uk shows that where funds have been made available to promote partnership working and to cover the inherent costs (as in the case of the Scottish Science Centre Network, The Science Centre Enrichment Activity Awards and Doing Dialogue project), Science & Discovery Centres work extremely effectively together and benefit enormously from sharing best practice.

In Wales, the Welsh Assembly Government's core funding of Techniquest in Cardiff has led to the establishment of local hubs throughout Wales, each operating through regional partners. The hubs, such as Techniquest@NEWI, which is hosted by the North East Wales Institute in Wrexham, make possible a network of outreach services, delivered with local knowledge to schools and community events.

Together, the UK's Network of Science & Discovery Centres works with every organisation identified in the Government's 'Core STEM Delivery Network'

As public venues, Science & Discovery Centres have the potential to act as regional hubs for science engagement bringing the public together with many providers to promote a wide range of science initiatives

6: Science & Discovery Centres promote community cohesion

Science & Discovery Centres are working inclusively and engage under-represented audiences

Ecsite-uk survey data shows that Science & Discovery Centres were delivering initiatives to engage under-represented groups.

These audiences included:

- Community groups working with refugees
- Prisoners and prison staff
- Young people at risk
- Travellers and their children
- Black and minority ethnic communities
- Adults with learning disabilities

Initiatives to target under-represented groups

Examples included:

- An exhibition and celebration day for community groups working with refugees as part of Refugee Week (The Horniman Museum)
- Free admission for carers of visitors with special needs (the Observatory Science Centre and many other centres)
- A bursary scheme to sponsor schools and community groups to visit at a subsidised rate (At-Bristol)
- Bursaries to provide access to education (in the fields of science and technology) targeting those experiencing financial and social barriers to participation (The Kalpana Chawla Foundation and the National Space Centre)

The impact of such initiatives on Science & Discovery Centre visitor profiles is inconclusive and more work is needed to assess the socio-economic status of Science & Discovery Centre visitors and the proportion of visitors who come from black or minority ethnic backgrounds.

The on-line benchmarking tool developed by Ecsite-uk, could at a later date, help to provide a standardised framework for data collection to create a clearer picture of UK Science & Discovery Centres in this regard. However many centres feel strongly that they would not wish to impose on visitors and ask such personal questions as ethnicity so it is questionable that a fully comprehensive data set could be achieved.

Evidence submitted to the Science and Technology Committee inquiry indicates clearly that whilst many Science & Discovery Centres seek to develop and continue their educational work for the widest possible audiences, without investment to support the costs of development and delivery, initiatives targeted at diverse audiences may disappear as funds are diverted to more commercially viable activities.

> Without investment and financial support, initiatives targeted at diverse audiences are likely to disappear as funds are diverted to more commercially viable activities

The survey: key findings

7: Science & Discovery Centres connect our science-based industry with schools and the public

The Government has recognised in both The Science and Innovation Investment Framework and The STEM Programme that inspiring and motivating young people to chose STEM subjects and consider STEM careers is linked to the provision of relevant and positive role models[20]. Science & Discovery Centres across the country are helping school students to work with scientists and engineers from UK industry to break down stereotypes, revealing that a career in science can be a highly creative, lively and full of teamwork and collaboration.

Many Science & Discovery Centres have formed fruitful partnerships with corporate sponsors who have provided funding, expertise and content, which has enhanced and supported exhibitions and learning programmes. In addition income is often provided through corporate hire activities. Corporate visitors[20b] made up on average 5% of overall visitors to UK Science & Discovery Centres (without historic collections)[21].

Submissions to the House of Commons Science and Technology Committee inquiry show that science-based industries are supportive of the role Science & Discovery Centres play in promoting STEM careers and scientific achievement in the UK. Indeed this is evident through the fact that they are our main corporate sponsors.

The importance of the role of a knowledge-based economy is evident in national and regional economic policy, however the mismatch between the skills required by employers and those available in the workforce in many areas is well documented.

Science & Discovery Centres can support the development of a more scientifically literate public and promote STEM careers by showcasing UK science and by providing a public platform for science-based industry.

Overall, attitudes to science are positive and insterest in science has increased since 2000[21b]

> "Everything different and visual seems to bring science alive for the children"
>
> *Teacher*

20 Such as the successful Science and Engineering Ambassadors (SEAs) scheme, which some Science and Discovery Centres are involved in either through their close links to regional SETpoints or through the participation of their staff as SEAs

20b Those who attend as part of a corporate group or function

21 No museums provided data on corporate visitors

21b RCUK and DIUS Public Attitudes to Science 2008 A Survey

The survey: key findings

8: Science & Discovery Centres reach far beyond their walls

The Ecsite-uk survey revealed that in the year 2005-6 member centres were engaged in a vast variety of outreach work, extending their sphere of engagement beyond their walls, and beyond their city and often regional boundaries. This work involved taking vibrant science shows, workshops, planetaria and even molecular biology and genetics debates to schools throughout the nation who were unable to visit the centres.

For example, Glasgow Science Centre's outreach programme reached 17,000 people, Inspire's reached 11,000, The National Space Centre 25,000 and Techniquest and Thinktank 17,000. The Oxford Trust had three times more outreach visitors than visitors to its site.

Techniquest in Wales is rapidly expanding its outreach activities to enable it to deliver quality STEM provision to pupils right across Wales and now serves an outreach population of 43,000 (2007-8).

> "You can attend many CPD courses and have people telling you what works and what doesn't. But having the science centre coming to the schools and putting things into practice and then supporting us to present the next session, that is what has made the project successful"
>
> *Teacher, Bristol*

The survey: key findings
9: Financial and staffing evidence

FTE staff employed by Science & Discovery Centres in 2005–6

The Ecsite-uk survey found that staffing levels within Science & Discovery Centres vary greatly. The Natural History Museum employs 758 FTE staff (many of whom are research scientists), the Science Museum employs 410 FTE staff and National Museums Scotland employs 450[22]. The on-line benchmarking tool launching in 2008 would aim to capture fuller datasets in coming years.

Collectively, the workforce includes many skilled scientists and science communicators (as described in the submissions to the House of Commons Science and Technology Committee inquiry) providing expertise in a wealth of scientific disciplines.

Volunteer staff in 2005-6

Approximately half the centres without collections reported no involvement of volunteers at all. Centres that did involve volunteers include The Centre for Life, Inspire, At-Bristol, The National Stone Centre, The Observatory Science Centre and The Dundee Science Centre.

Centres with collections had a far greater number of volunteer staff, for example a successful volunteer programme with 270 volunteers at the Natural History Museum, 200 volunteers at the National Museums Scotland and good numbers at Thinktank in Birmingham, The Science Museum London, World Museum, Liverpool and The Horniman Museum.

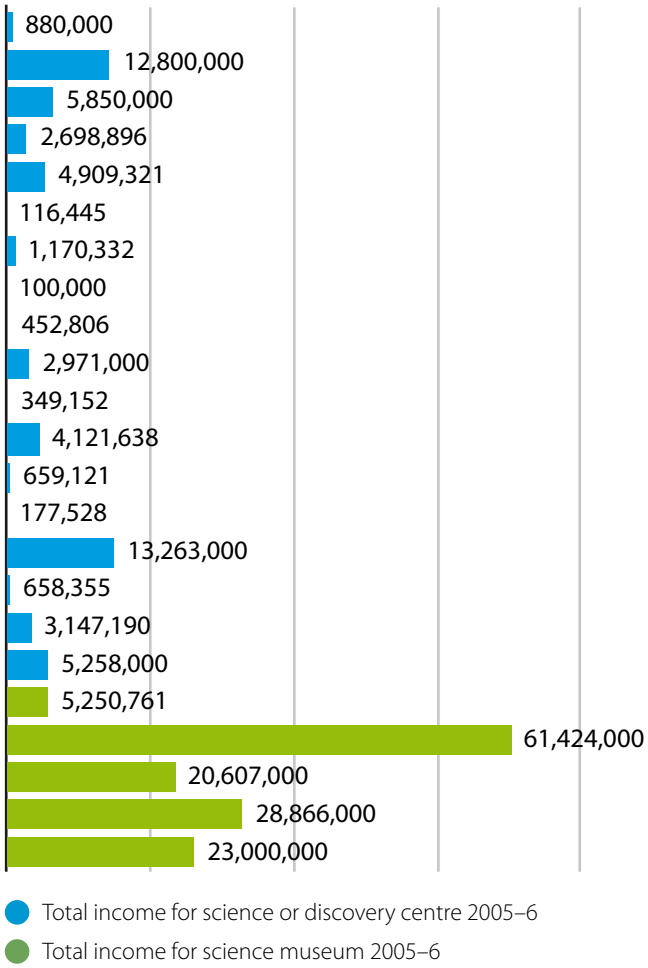
Further work is needed to assess the impact of and potential for volunteering in the Science & Discovery Centre network. There is anecdotal evidence from Science & Discovery Centres that volunteering programmes have resulted in benefits for host organisations and volunteers[22b], although this impact has yet to be assessed across the field as a whole.

There are no doubt lessons we can learn from centres that have vibrant volunteer programmes, as well as from centres in the United States where there is an energetic culture of volunteering in science centres.

Income to Science & Discovery Centre for 2005–6

Science & Discovery Centre incomes also differ widely, from £25,000 per annum for smaller science centres to in excess of £60 million per year for the National Museum of Science and Industry (NMSI). In 2005-6, the majority of Science & Discovery Centres[23] operated with annual incomes of less than £5 million.

Variance in income across UK Science & Discovery Centres and Museums in £



Note: The names of the individual centre have been removed. In the future we will consult with members more fully regarding data protection as to what should be made publicly available.

22 24 Science & Discovery Centres employed a total of 2,539 FTE (full time equivalent) staff and worked with 750 volunteers, the overall figure for the whole sector is clearly much larger and Ecsite-uk is aiming to collect data from all centres regarding staffing in 2008

22b Such as the development of new work place skills and accredited training for volunteers and a more diverse and representative workforce through Thinktank, Birmingham Science Museum's Science Career Ladder Programme

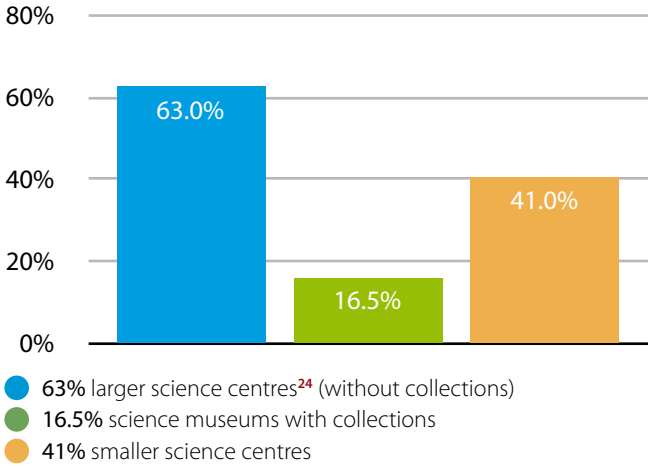
23 15 of the 24 who provided income information reported incomes of less than £5 million

Generating income

The Ecsite-uk survey showed that Science & Discovery Centres without historic collections generated more income than those with historic collections. On average larger science centres[24] without collections generated 63% of their income through commercial activities. Science museums with collections generated 16.5% of their income through commercial activities and smaller science centres generated 41% of their income[24] in this way.

It should be noted that income generation potential is partly linked to the levels of original investment, with some centres being created with assets such as car parks and corporate hire spaces specifically to provide long-term commercial revenue.

Percentage of income earned from commercial activities

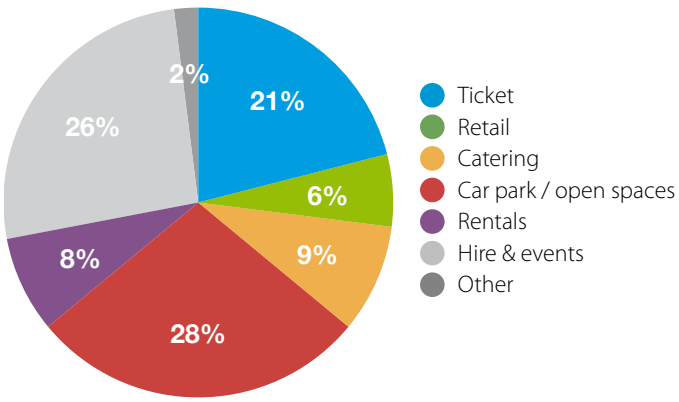


On average larger science centres[24] (without collections) generated 63% of their income through commercial activities

Most centres gained less in sponsorship and grants than they did from commercial activities and, as many pointed out in their submissions to the House of Commons Science and Technology Committee inquiry, successful fundraising itself requires investment in skilled staff time and is an increasingly competitive and costly activity.

Earned income

An example of the origin of earned income to a science centre



24 Larger science centres had incomes above £1.5 million per annum, smaller Science Centres had incomes below £1.5 million per annum

The survey: key findings

Other findings

1. Longer-term planning is hampered by short-term project funding.

This has been identified as an issue for organisations across the cultural sector in the McMaster review:

> "Risk-taking and innovation, and hence excellence, require a stable environment in which to work. The confidence that assured, long-term, sustainable funding brings can give organisations the freedom to plan beyond the immediate need to break even, open up opportunities for innovation and allow risk-taking to be planned and managed properly"
>
> *Sir Brian McMaster, January 2008*[25]

Whilst the McMaster review recommends that some cultural and arts organisations have their financial settlements extended to a period of ten years, most Science & Discovery Centres do not have financial certainty on an annual basis. In many Science & Discovery Centres the reality is that the financial environment is far from stable and this has clear consequences in terms of centres' abilities to plan for the future.

2. Funding streams are severely limited and competition is high

Capital and revenue funding for UK Science & Discovery Centres is hard to find. No centre in the world earns enough from its core activities to sustain its operations and there is no reason to expect that this will be the case in the UK. Additional funding is therefore required to invest in new exhibitions (to bring in repeat visitors and refresh content and programmes) and centres compete against each other for development funding. Funding streams that have promoted partnership working are therefore valuable.

3. Science & Discovery Centres need to re-new their exhibitions which requires investment

The average cost of building a science exhibition is £2,000–£4,000 per square metre and high quality interactive exhibitions require significant investment. Indeed the difficulties of on-going operational costs after the opening of centres were predicted prior to, for example, the Millennium centres opening (POST Note 143 July 2000).

4. Collecting data costs money

In order to collect and analyse data about impacts and outputs, centres need to invest in staff time, booking systems and often external independent evaluators. Some centres lack the funds to invest in this work.

Some Science & Discovery Centres are part of Government-funded programmes (for example DCMS-funded museums). It is a condition of their funding that certain outputs are reported regularly to Government, and that they have systems and staff in place to achieve this. Without this incentive, centres prioritise expenditure on other areas, for instance, essential maintenance or essential staff.

25 'Supporting Excellence in the Arts From Measurement to Judgement' Sir Brian McMaster, Jan 2008, DCMS

Recommendations

These recommendations are based on the results of research undertaken by Ecsite-uk between November 2007 and March 2008, in conjunction with findings from the survey.

The proposed implementation of these recommendations is described in part 2 of this report.

Ecsite-uk recommends that all UK centres should work towards a consistent approach to demonstrating the value we provide, whilst celebrating the diversity and variety within our sector.

Ecsite recommends:

1. All UK centres should begin collecting data in a consistent manner

Science & Discovery Centres should be supported to collect data in a consistent and manageable way[26] that is compatible with other international data collection[27] systems to evidence the contribution Science & Discovery Centres make to science learning and the national STEM agenda.

Ecsite-uk also recommends that there is a pilot phase for this data collection to fully understand and solve the inherent challenges of data privacy and data consistency amongst our diverse membership.

Data collection is not a cost-neutral activity. Ecsite-uk should explore ways to help Science & Discovery Centres invest in data collection, providing support for those in need of infrastructure and staffing. Modest financial support will make a significant difference to some centres' ability to collect and submit data.

To ease this process Ecsite-uk has set up a pilot on-line benchmarking tool

2. All UK centres should sign up to Learning Outside the Classroom

Ecsite-uk should encourage Science & Discovery Centres to participate in the DCSF-backed Learning Outside the Classroom initiative to emphasise the value and learning potential of the Science & Discovery Centres. This Quality Assurance Badge launches in September 2008 and will signal to teachers and education providers the quality of the learning on offer and the safety of the experience. A key to this scheme is that it will be low-cost, and the high quality in most of our centres already exceeds the requirements. It is imperative that all centres sign up to this as a benchmark of our quality

A full description of Learning Outside the Classroom and how to join is in part 2 of this report

3. All UK centres should join The Visitor Attraction Quality Assurance Service (VAQAS)

Ecsite-uk will encourage all UK Science & Discovery Centres to join the VAQAS service providing a customer-focused quality assessment benchmark based on industry visitor attraction standards. The majority of major tourist attractions in England, Scotland and Wales belong to this service (or a derivative of it) and inclusion is required by the Highways Agency for road signs and DCMS for museum accreditation.

A full description of VAQAS and how to join is in part 2 of this report

26 For instance definitions of children and senior citizens. Data affected significantly by these discrepancies has been omitted from this report

27 ECSITE in Europe and ASTC in the USA

4. All UK centres should begin using the DCMS-backed Generic Learning Outcomes (GLOs) to evaluate learning

One methodology that has proved useful for measuring impact in museums[28] is that of the Generic Learning Outcomes (GLOs) developed by the Research Centre for Museums and Galleries at Leicester University. The GLOs have been adopted by the Museum sector and some Science & Discovery Centres to determine the learning that is taking place during a range of activities and programmes.

Ecsite-uk should encourage the use of this framework by all UK Science & Discovery Centres, supported by the provision of training for staff so that evidence for learning in Science & Discovery Centres is collected and presented in the same way as that of museums, libraries and archives in order that the relative contribution of Science & Discovery Centres can be more accurately assessed.

A full description of the GLOs is in part 2 of this report

5. Funding is urgently needed for research into the long-term impact of Science & Discovery Centres

One element of research for this project was a review of all the current studies into the impact of Science & Discovery Centres (www.ecsite-uk.net).

It is clear that whilst evidence exists for museums, greater research is needed into the impact of the work of Science & Discovery Centres. Ecsite-uk fully supports work in this field including a recent proposal from the University of Leicester and Techniquest to ESRC[28b]. Ecsite-uk recommends that consideration is given as to how funding might be made available to support Science & Discovery Centres in the collection of more comprehensive (and if possible longitudinal) evidence about their impact in relation to learning.

6. Funding should be made available to allow the UK's Science & Discovery Centres opportunities to share best practice

In particular this would include regular meetings and training events supported by Ecsite-uk and hosted by the diversity of centres across the UK to share ideas, knowledge, skills and best practice. The aim would be to bring together staff at all levels and in all areas of expertise by overcoming the current impediment of travel costs and, for smaller centres, costs of staff cover.

Part 3 of this report shares ideas with cases studies from across the UK.

7. Ecsite-uk, DIUS and DCSF should recognise the contribution of Science & Discovery Centres to the STEM programme

This report has outlined the evidence that Science & Discovery Centres are an important part of the UK's STEM landscape. Ecsite-uk and DIUS and DCSF should ensure that Science & Discovery Centres' contribution to the STEM agenda is recognised and supported by the STEM programme.

To date Science & Discovery Centres have received scant mention in Government policies and plans in relation to the STEM agenda and UK science in general. Ecsite-uk welcomes the DIUS acknowledgement that Science & Discovery Centres are part of its brief, and seeks to work closely with DIUS and DCSF to ensure that Science & Discovery Centres are an integral, rather than peripheral, feature of future initiatives.

Conclusions

This report is the first part of a journey to evidence the impact of the UK's Science & Discovery Centres and the added value they deliver to public engagement with science and the National STEM Agenda.

It presents evidence to show that Science & Discovery Centres help teachers, pupils and the public to become engaged and inspired by science. It argues that Science & Discovery Centres play a pivotal role in bringing together scientists, industry and the public in its widest sense. Whilst it does not pretend to be a comprehensive study of the impact of every UK Science & Discovery Centre, it signals the way for a new concerted and consistent approach to evidence gathering within the sector.

28 And widely used as part of the DCMS Renaissance in the Regions programme for regional museums

28b Techniquest and Leicester University Research Centre for Museums and Galleries (RCMG) will submit a research proposal to the Economic and Social Research Council (ESRC), examining in a robust and academic way, the learning impact of visits to a Science Centre on school-aged pupils. This research will produce an evidence-base of learning outcomes from school visits to Science Centres that will be of value to the sector as a whole

Part 2
The next steps

Working towards a benchmarking framework

Establishing a benchmarking framework to measure, assess and quantify the success and impact of the Science & Discovery Centres is one of the holy grails of science centres across the world. The current project aimed to investigate what currently existed in terms of such a framework, and to make steps towards creating a benchmarking framework for centres across the UK.

The purpose of developing a benchmarking framework is to help support Science & Discovery Centres' business planning, by providing them with a tool with which they can collect quantitative and qualitative data in relation to key outputs and thus measure their individual performance and development year on year. Through the use of a benchmarking framework it is hoped that Science & Discovery Centres may be able to access the benefits identified by other businesses[1] which contribute to overall business viability, and that those outside the sector (including potential funders) will be able to more clearly understand the impacts and outputs delivered by the sector. Like other benchmarking tools, the on-line service which has been developed and will be piloted by Ecsite-uk, will be secure and confidential, respecting the needs of its independent member organisations to keep aspects of their business performance confidential. It would be foolish to ignore the fact that Science & Discovery Centres are independent businesses which strive to achieve a competitive edge over other attractions competing for the public's leisure time and money. The benchmarking framework, does not provide an in-depth comparison of centres' relative market position, but it will help encourage Science & Discovery Centres to assess their own business in relation to key agreed outputs and may (if funding is secured in the future) be developed to enable centres to compare individual outputs with overall trends.

Ecsite-uk has consulted worldwide as this issue is pertinent to science centres and science museums internationally. In particular we have sought advice from other networks, including the European Collaboration of Science Industry and Technology Exhibitions (ECSITE) based in Brussels and the Association of Science-Technology Centers (ASTC) in Washington DC, as well as many experts in the field.

We have also reviewed the results of the 2007 Ecsite-uk Survey (by Gammon and Harris) to explore the reasons why centres struggled to answer certain questions and how this might be mitigated in the future, and have interviewed a number of CEOs, finance directors and education managers in over 25 centres in early 2008 to better understand the difficulties individual Science & Discovery Centres had with definitions and data collection.

All these findings have been incorporated into the on-line benchmarking tool **www.ecsite-uk.net/survey2008/**

We invite your comments to help us shape it during the pilot phase

Key Performance Indicators for our sector

Clearly agreeing a set of sophisticated Key Performance Indicators (KPIs) for the UK's Science & Discovery Centres is an aim of our sector both in the UK and internationally. However, reaching agreement over even relatively simplistic KPIs that effectively reflect the work and achievements of the huge varieties of Science & Discovery Centres is difficult to achieve.

A recent study undertaken over the past six months involving interviews with CEOs from 26 centres around the world, including those in Australia, Europe, USA and Canada, has revealed that no framework of KPIs with any level of sophistication exists[2].

On 31 March 2008, The Scottish Science Centre

1 **See** www.benchmarkindex.com

2 Pers. Comm. This research has been undertaken by Paul Jennings, CEO of Dundee Science Centre (Sensation) and Satrosphere as part of his current professional doctorate thesis entitled 'How is and could government funding and performance management systems for science centres be better used to facilitate government policy on public engagement with science?' The results will be available in 2008–9.

Glasgow Science Centre © Andy Buchanan

Network submitted their proposal of 17 Key Performance Indicators to the Scottish Government as agreed between the four Scottish Science Centres. The work and discussions that have gone into creating these proposed KPIs should not be under-estimated, and it is clear that in an international sense, the Scottish Science Centre Network, in collaboration with the Scottish Government are leading the way.

All members of the Scottish Science Centre Network are members of Ecsite-uk and we will be working closely with them to explore how this might be taken forward.

The 17 KPIs include visitor numbers, education numbers, quality assurance as visitor attractions and quality assurance in terms of learning. The KPIs being proposed come after several years of partnership between the Scottish Government and the Scottish Science Centre Network and for the next three years it has been indicated that funding will be determined by share of visitors to each centre across the network. The framework developed in Scotland is largely quantitative and outputs-based. The aspiration amongst Scottish stakeholders is that the framework moves to a more outcomes-based approach as its understanding of appropriate learning and impact based models develops. A similarly dynamic approach relating to Government partnership might be appropriate for the rest of the UK.

Taking the five first steps to a benchmarking framework

Ecsite-uk has reviewed the field with the aim of simplifying the multiplicity of options on offer and providing consistency across the UK. The recommendation is, as a first step, for all Ecsite-uk member Science & Discovery Centres to sign up to five commitments which will act as benchmarks for quality in five areas. These are listed below and expanded upon in subsequent articles in part 2 of this report.

The five main recommendations for each centre are as follows:

1. **To collect consistent data across the sector**
   Ecsite-uk have created an on-line survey of UK Science & Discovery Centres containing a number of key performance indicators such as visitor numbers, numbers of education visitors and income. The questions have been developed in consultation with members and there will be a period of consultation with this on-line tool before the data collection begins. We also ask that all centres commit to offering feedback on the definition and criteria for the KPIs in the pilot phase.
2. **To join the Visitor Attraction Quality Assurance Service**
   Many of our members are already part of this or similar schemes. This acts as a benchmark of the quality of the visitor experience, and the attention paid to this.

3. **To sign up to the DCSF-backed Learning Outside the Classroom**
   This quality badge scheme will be low-cost and instantly recognisable by teachers as a kite mark of quality for school visits. It is being developed by PricewaterhouseCoopers in collaboration with stakeholders (including Ecsite-uk) to set benchmarks for the quality of learning and the safety of the experience offered by Science & Discovery Centres. It will become a standard across the UK in coming years.
4. **To undertake evaluation of learning and impact using the DCMS-backed GLOs**
   The Generic Learning Outcomes (GLOs) are already being used by museums and a number of science centres within our field. Consistency here would allow us to compare evaluation and outcomes between centres and projects across the UK.
5. **To commit to sharing ideas, knowledge and best practice with other centres**
   Ecsite-uk has begun the creation of The Science Centre PR and Marketing Forum, and will soon set up a UK-wide network of Science Centre Representatives in addition to supporting a number of other specialist forums, workshops and meetings.

The adoption of these five measures by the UK Science & Discovery Centre network will, set a consistant benchmark for the sector, ensure consistent data collection and evidence the impact of the sector

An on-line benchmarking tool

The UK's Science and Discovery Centres and Museums have enormously varied histories. Consequently they capture data about their visitors and operations in ways that suit their individual needs, rather than in a co-ordinated nationally agreed manner. The exceptions are the two networks where data collection is now part of the funding commitment (DCMS-funded museums and the Scottish Science Centre Networks).

As part of this project, Ecsite-uk has created a pilot on-line tool available to all UK Science and Discovery Centres, which asks centres for a number of Key Performance Indicators (KPIs) such as visitor numbers, education visitors and income as well as other performance data. A major part of this pilot is to achieve consensus over the way centres collect and supply data.

The KPIs and their definitions can be viewed at:

www.ecsite-uk.net/survey2008

The Challenge

Whilst this might seem like a simple task, there is huge variability in the definitions and criteria used by each centre. The 2007 Ecsite-uk survey undertaken by Gammon and Harris highlighted a host of challenges that must be resolved prior to any meaningful data collection exercise.

Who can you count as a visitor?

For example, in the 2007 survey, some centres included the following in their visitor figures, others did not:

- Corporate hire visitors
- Free visits, eg carers, pensioners, teachers, returning visitors
- Visits to the grounds (this might be 100,000 additional visitors)
- Members' visits
- Children under three years
- Some double-counted schools visitors who had taken a workshop and visited the exhibition
- Some double-counted visitors who had been to an IMAX and then visited an exhibition
- Some counted visitors who had only visited the shop, or the café but not been into the museum or centre

This made a number of independent centres feel unwilling to publish their visitor numbers alongside their incomes or outputs as it was clear that across the sector, like was not being compared with like.

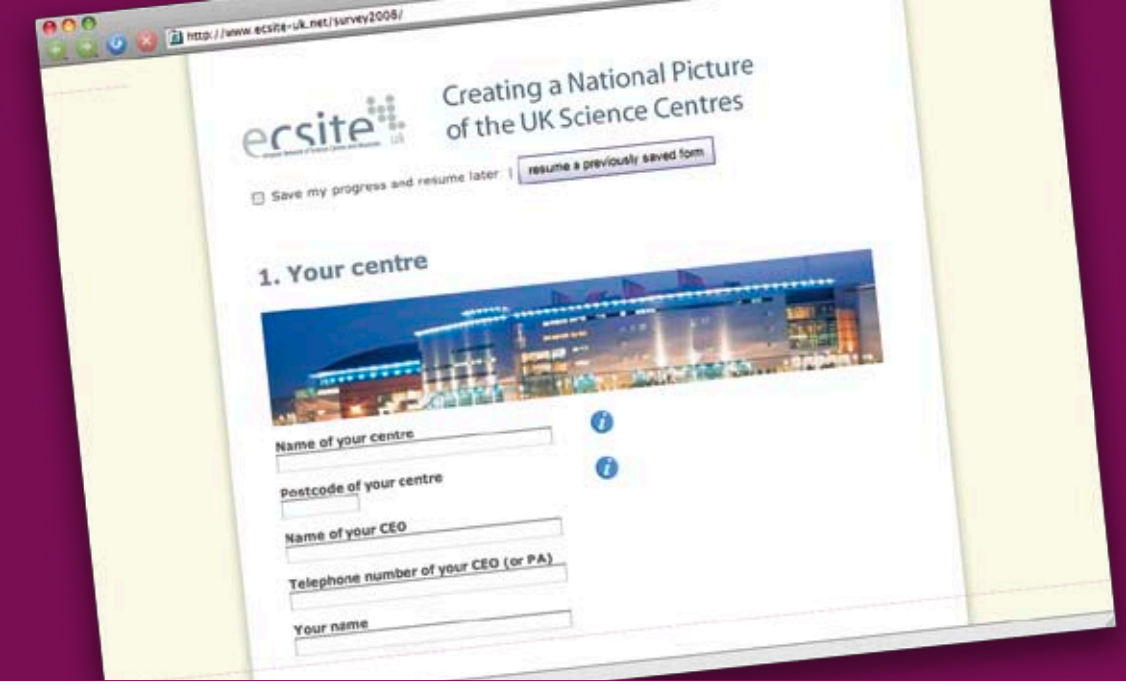
The on-line tool defines exactly who we recommend centres should include in their visitor figures to ensure consistency across the sector.

Who counts as a child visitor?

What constitutes a child in terns of visitors? Some centres don't record any child below three years, some below five years. Ecsite-uk museums tell us that DCMS have recently reclassified a child from 15 and under, to 16 and under which has utterly changed their year-on-year figures. Some centres don't count children at all (or lack electronic ticketing systems to count automatically) and can only judge by the number of formal school visits that have been booked. Centres vary as to whether under 16 visitor figures include school visitors or not.

Visitor profile

This is highly variable. Some centres collect no data on the background of visitors except within specific projects where there is funding to do so. Other centres, such as major museums might contract market research organisations to provide detailed information on their visitor profiles for DCMS funding.



Annual income

Our research indicates that the vast majority of Science & Discovery Centres are charities. Those in England and Wales report to the Charities Commission therefore structuring the financial section of future surveys in this manner is likely to make this section easier to fill in for our members in England and Wales, but poses issues for centres in Scotland and Northern Ireland.

Data protection

Most of our members are independent charities and run as extremely lean enterprises. We therefore need to respect their right to privacy and this will need to be addressed prior to the UK-wide data collection. It might be that in the first instance all centres' names will need to be removed. Equally it would be hard to split centres up into categories albeit anonymously (for example by country) as anyone with knowledge of the field would quickly identify participating centres.

The cost of collecting data

As detailed elsewhere in this report, collecting data is not a cost-neutral activity. It requires infrastructure and a time commitment. The most successful reporting of data is when it is linked to a funding stream.

> "The difference between a science museum and a science centre is like a line drawn in water"
>
> *Dr Per-Edvin Persson — Director, Heureka, The Finnish Science Centre*

The following organisations have been consulted in the creation of this benchmarking tool:

- The Association of Science-Technology Centres
- ECSITE (Europe)
- CEOs, finance, education or marketing managers in over 25 UK science centres
- Discussions with centres who did not complete last year's survey to uncover the reasons and adapted the questionnaire to address their concerns
- Dr Per-Edvin Persson, Director, Heureka, the Finnish Science Centre and a number of other experts in the field
- Paul Jennings, CEO of Dundee Science Centre (Sensation) and Satrosphere currently writing his Professional Doctorate on the subject

Ecsite-uk also reviewed the following documentation:

- Criteria used by other global science centre networks
- The Association for Leading Visitor Attractions
- A Review of the DCMS criteria
- A review of Ecsite-uk / Gammon's questionnaire and results to uncover questions with low response rates

Learning outside the classroom and the manifesto

Peter Carne — *Learning outside the classroom manifesto champion*
Department for children, schools and families

Launched in November 2006, the Learning Outside the Classroom Manifesto aims to encourage more widespread use of educational opportunities outside the classroom and to inspire schools and those organisations that support learning outside the classroom to provide high quality experiences for all young people. The Manifesto acts as a shared statement of intent for all who see the benefits to young people and want to help bring about this vision of high quality, meaningful learning experiences for all.

Learning outside the classroom manifesto

"We believe that every young person should experience the world beyond the classroom as an essential part of learning and personal development, whatever their age, ability or circumstances." (Manifesto vision statement)

These, often the most memorable learning experiences, help us to make sense of the world around us by making links between feelings and learning. They stay with us into adulthood and affect our behaviour, lifestyle and work. They influence our values and the decisions we make. They allow us to transfer learning experienced outside to the classroom and vice versa.

What is our vision for young people about?

Learning outside the classroom is about raising achievement through an organised, powerful approach to learning in which direct experience is of prime importance. This is not only about what we learn, but more importantly how and where we learn.

Ecsite-uk urges every Science & Discovery Centre and Science Museum to sign up to Learning Outside the Classroom when it launches in September 2008

What we learn

As we are all aware, education is more than the acquisition of knowledge. Improving young people's understanding, skills, values and personal development can significantly enhance learning and achievement. Learning outside the classroom is not an end in itself, rather, we see it as a vehicle to develop the capacity to learn. It provides a framework for learning that uses surroundings and communities outside the classroom. This enables young people to construct their own learning and live successfully in the world that surrounds them.

There is strong evidence that good quality learning outside the classroom adds much value to classroom learning. It can lead to a deeper understanding of the concepts that span traditional subject boundaries and which are frequently difficult to teach effectively using classroom methods alone. It provides a context for learning in many areas: general and subject based knowledge; thinking and problem-solving skills; life skills such as co-operation and interpersonal communication.

How we learn

Much has been learnt in recent years about how the brain works and the different ways in which we prefer to learn. Research suggests the need to re-engage learners with the world as they actually experience it. This is often called 'experiential' or 'authentic' learning.

In recent years teachers have been exploring 'learning how to learn' in order to raise achievement. What we see, hear, taste, touch, smell and do gives us six main 'pathways to learning'. Young people are intensely curious and should be given the opportunity to explore the world around them. The potential for learning is maximised if we use the powerful combination of physical, visual and naturalistic ways of learning as well as our linguistic and mathematical intelligence.

What are the benefits of learning outside the classroom?

Quality learning experiences in 'real' situations have the capacity to raise achievement across a range of subjects and to develop better personal and social skills. When these experiences are well planned, safely managed and personalised to meet the needs of every child, they can:

- Improve academic achievement
- Provide a bridge to higher order learning
- Develop skills and independence in a widening range of environments
- Make learning more engaging and relevant to young people
- Develop active citizens and stewards of the environment
- Nurture creativity
- Provide opportunities for informal learning through play
- Reduce behaviour problems and improve attendance
- Stimulate, inspire and improve motivation
- Develop the ability to deal with uncertainty
- Provide challenge and the opportunity to take acceptable levels of risk
- Improve young people's attitudes to learning

Giving young people responsibility for achieving these outcomes helps them to learn from their successes and failures.

Learning outside the classroom provides support for many different curriculum areas. Linked to the curriculum, these activities provide direct and relevant experiences that deepen and enrich learning.

A LOtC 'Quality' Badge

DCSF has contracted PricewaterhouseCoopers (PwC) to develop a 'quality' badge for LOtC provider organisations or settings. This will help to achieve Aim 3 of the Manifesto, which states that "We will offer learning experiences of agreed high quality".

DCSF envisaged one quality assurance 'badge' that would be will be instantly recognisable and trusted by local authorities and schools. As a result, LOtC organisations or settings having this badge will be:

- ✓ Safe (i.e. they are managing risk effectively)
- ✓ Offering high quality teaching and learning experiences

To achieve this, we have asked PwC to:

- Work closely with those who have developed a system or are developing one
- Consult users (local authorities and schools) and LOtC providers
- Develop ONE system only that brings any existing badges across all Manifesto activity sectors under ONE umbrella
- Develop a system that is low cost, financially sustainable and ensures minimal bureaucracy for LOtC provider organisations or settings
- Have a full quality badge system in use by September 2008

»» continues

After a series of consultations and development workshops with both users and providers, a preferred option has been agreed with DCSF. This option involves two routes for providers to achieve the quality badge. It builds on existing schemes, avoids duplication of effort for providers and also allows providers in sectors with no current awarding bodies to apply for the quality badge.

The route providers take will be determined by the degree of risk management required to manage the activities offered by providers. Providers will not be able to choose the route they take; the route will be determined by the activities they offer. End users will see only one badge and will not be aware of the different routes.

- **Route 1** will involve setting up a new Code of Practice for providers who offer activities that are deemed to have a lower requirement in terms of risk management. This route will also include random quality assurance visits for providers who have signed up to the Code. The running of this Code of Practice will be contracted out by DCSF.
- **Route 2** will involve an external assessment for providers for activities that require a higher degree of risk management (for example outdoor adventure trips). DCSF and PwC will nominate awarding bodies for each activity sector, using existing awarding bodies that have been working with DCSF on the EVAC safety badges and others as needed. Awarding bodies will incorporate the LOtC quality indicators into their existing indicators and put quality at the heart of assessments.

In order to achieve a consistent level of quality across both routes, the quality indicators will be the same for both routes and have been developed by PwC, the Manifesto National Advisory Group and DCSF.

LOtC quality badge – high level generic quality indicators

The quality indicators below are applicable to both routes 1 and 2. The term user refers to both teachers or other leaders and young people:

The provider:

1. Has a process in place to plan the learning experience effectively
2. Provides accurate information about its offer
3. Provides activities, experience or resources which meet learner needs
4. Reviews the experience and acts upon feedback
5. Meets the needs of users

Safety indicators are still to be added.

Ecsite-uk recommends that as a sector, we all use the LoTC Badge to indicate to teachers the quality of the learning experience that our centres provide and to act as one of a number of quality benchmarks

In advance of the launch we ask you to endorse this vital Government-backed initiative by adding your organisation to the list at **www.teachernet.gov.uk/teachingandlearning/resourcematerials/outsideclassroom/**

Measuring science centre impact

By Dr Sue Cavell (and Ecsite-uk) — *Head of Research and Evaluation, Techniquest, Wales*

Science centres have to address the question of their impact on the communities in which they function. In what ways do we provide a public service? What is the value provided by our activities? Do we have a measurable effect on society at large? Can we justify our case? (Persson, 2000)

Whilst most, if not all, science centres and museums undertake evaluation of their activities in order to determine whether they have achieved the prescribed outcomes for the audiences, few have investigated the long-term impact. This has become of vital importance in the battle to secure ongoing funding.

One methodology that has proved useful for measuring impact is that of the Generic Learning Outcomes (GLOs) developed by the Research Centre for Museums and Galleries at Leicester University. The GLOs have been adopted by the museum sector and are used widely to determine the learning that is taking place during a range of activities and programmes.

The special feature of the GLOs is that they investigate other types of learning besides cognitive learning, for example affective and motivational learning. Since these are key features of the learning that takes place in informal settings such as science centres, this methodology has enormous potential for determining the long-term impact of science centres.

The DCMS-backed Generic Learning Outcomes have already been adopted by the museum sector and by a number of Science & Discovery Centres to measure learning

Many of Ecsite-uk's member Science & Discovery Centres and Museums have started to recognise the value of GLOs, and how they can be utilised within their own institutions. A number have already adopted the toolkit and spent considerable time training and working with their staff to demonstrate how GLOs can be incorporated into the day-to-day running of their organisation. This has been key in obtaining 'buy-in' from staff, and providing the required level of support needed to fully embed the methodology e.g. as demonstrated in the Techniquest case study.

Ecsite-uk strongly recommends that all UK Science & Discovery Centres use the GLO framework for all future exhibitions and programmes evaluation of learning and impact

> "We believe this framework provides a simple and flexible tried and tested toolkit through which we can together consistently measure the impact of the learning we provide throughout the UK"
>
> *Dr Penny Fidler*

Training and support can be provided

The Museums, Libraries and Archive's Generic Learning Outcomes

In the GLO model, individual learning experiences of all kinds - creative, intellectual and social – are organised into five major categories as shown below.

1. Knowledge & understanding

- Learning facts or information
- Making sense of something
- Deepening understanding
- Learning how museums, archives and libraries operate
- Making links and relationships between things
- Using prior knowledge in new ways

2. Skills

- Intellectual skills – reading, thinking critically and analytically, making judgement
- Key skills – numeracy, literacy, use of ICT, learning how to learn
- Information management skills – locating and using information, evaluating information, using information management systems
- Social skills – meeting people, sharing, team working, showing an interest in the concerns of others
- Emotional skills – recognising the feelings of others, managing feelings
- Communication skills – writing, speaking, listening
- Physical skills – running, dancing, manipulation, making…

3. Attitudes

- Opinions about ourselves e.g. self-esteem
- Opinions or attitudes towards other people
- Attitudes towards an organisation e.g. museums, archives and libraries
- Positive attitudes in relation to an experience
- Negative attitudes in relation to an experience
- Reasons for actions or personal viewpoints
- Empathy, capacity for tolerance (or lack of these)

4. Enjoyment, inspiration, creativity

- Having fun
- Being surprised
- Innovative thoughts, actions or things
- Creativity
- Exploration, experimentation and making
- Being inspired

5. Action, behaviour, progression

- What people intend to do (intention to act)
- What people have done
- A change in the way that people manage their lives including work, study, family and community contexts
- Actions (observed or reported)
- Change in behaviour
- Progression – towards further learning, registering as a library user, developing new skills – is the result of a purposive action which leads to change

Case study by Dr Sue Cavell

A strategic focus at Techniquest is the determination of the long-term impact of all our programmes and activities whether on-site in Cardiff Bay, at one of our satellite centres, or as part of our Wales-wide outreach programme.

The GLOs have been adopted across the organisation and have formed the basis of questionnaires and interview protocols for measuring the long-term impact of a number of our programmes including our KS2 Maths Outreach Kit, the Student Volunteer Scheme, as well as a number of our Science Theatre shows. These investigations are ongoing and are part of a substantial programme of evaluation and impact investigation.

The GLOs have been used successfully to determine the immediate impact of many of our shorter programmes such as the Summer Theme activities on the docks behind Techniquest. A developing resource of sample questionnaires and interview protocols to determine the GLOs is available to staff via our intranet for adaptation for a variety of activities and programmes. Thus we ensure that, at Techniquest, we are working together to conduct evaluation and impact investigation consistently and to the same high standard across the organisation. We have found the GLOs to be a valuable tool in this.

Summary

Some learning about the use of GLOs is already being shared across the Ecsite-uk network and this will increase in 2008-9. However, we propose that Science & Discovery Centres and Museums work closely together to develop methodologies within the GLO Framework for use by all Ecsite-uk members to determine the impact of their work.

In this way the Science & Discovery Centre and Museum sector will be in a position to demonstrate the very substantial impact it has on audiences across the UK.

If you currently use the GLOs and would like to host a training session, or would like to attend a training session, please contact us

References

www.inspiringlearningforall.gov.uk

Public Understanding of Science, Vol. 9, No. 4, 449-460 (2000)

Science centres are thriving and going strong! Per-Edvin Persson, Finnish Science Centre, Finland

Museums, Libraries and Archives Council (2002) Inspiring Learning for All; available at http://www.inspiringlearningforall.gov.uk/

Visitor Attraction Quality Assurance Service (VAQAS)

Ecsite-uk recommends that all of its members sign up to VAQAS to benchmark their quality as visitor attractions and their ongoing commitment to customer care.

VAQAS was launched nationally in 2001 and is the consumer-focused quality assessment service for all types of visitor attractions. It helps to identify strengths of an attraction and highlights development areas based on industry examples and is run by the DCMS-backed VisitBritain. Over 800 visitor attractions, from The London Eye to small museums, have benefited from participation in the service.

> "The service does not attempt to grade attractions but will assess each on its own merits using objective quality benchmarks, provided by the industry"
>
> *VAQAS assessor*

VAQAS has worked closely with Regional Development Agencies and Destination Management Organisations as well as national associations such as the Museum, Libraries and Archives Council and regional consortiums. It is licensed to Visit Wales, operates in the Channel Islands and has given advice to the national tourist boards of New Zealand, Denmark and Malta, among others.

Assessing quality can be a slightly contentious issue. High quality to one person may not be high quality to another. It is not the role of VAQAS to assess whether someone will like or dislike an attraction. Rather, to compare and contrast similar types of attractions in an objective manner. The sharing of best practice between attractions is central to the VAQAS service.

Achieving a high quality visitor experience is seldom achieved by chance but will almost invariably be the outcome of careful planning and anticipation of visitors' needs at all levels, not just age levels, but also interest and intellectual levels

How does it work?

The assessment covers the whole visitor journey from telephone enquiries to the visit. The service is annual and carried out at any time the attraction is open to visitors.

Assessments take into account the type and style of the attraction, so an assessment of a rural discovery centre will be quite different from that of a national science museum. Styles of presentation and interpretation will differ, and visitor expectations will reflect that. Quality is therefore assessed in context, relative to the sector of the industry in which the attraction sits. In all areas, specific attention is given to cleanliness and customer service. The visit is followed by a debrief and a report, including the identification of staff training needs.

Members of VAQAS benefit from:

- **The Guide to Best Practice** – a practical guide providing examples of best practice from all sectors of the attraction industry
- **The Self Assessment Toolkit** – a practical aid to plan quality developments at your attraction
- **An In-depth Quality Assessment** – of all areas of your attraction
- **An Accessibility Advice Leaflet** – with practical advice on meeting the needs of visitors with disabilities and guidance on the Disability Discrimination Act (DDA)
- **A One-to-One Debrief** – instant feedback on the visit and other aspects of your operation

The Centre for Life ©

- **A Report** – highlighting aspects of quality, development issues and providing an important reference tool
- **Accreditation** – as a Quality Assured Visitor Attraction
- **Promotion** – Use of the VAQAS quality marque in local, regional and national tourism guides
- **Enhanced promotion** – on www.visitbritain.com and www.enjoyengland.com and in the opening pages of the Yellow Pages

The MLA use VAQAS as a requirement for their registration process
The Highways Agency uses VAQAS as a criteria for brown tourist signage

2008 VAQAS fees

Annual visitor numbers	Joining fee for all new applicants (£)	Annual fee (£)
0-20,000	85	230
20,001-50,000	95	280
50,001-100,000	165	340
100,001-250,000	175	425
250,001+	185	525

For Members in England

To apply to join VAQAS, telephone 020 8563 3373, or email vaqas@visitbritain.org

For Members in Wales

VisitWales uses VAQAS. For further details contact quality.tourism@wales.gsi.gov

For Members in Northern Ireland

Please telephone Dr Penny Fidler 07791 554 029

For Members in Scotland

VisitScotland (formerly known as the The Scottish Tourist Board) uses a five level star-grading system to indicate the standard of customer care and range of facilities on offer at assessed establishments.
To become part of this scheme, contact qainfo@visitscotland.com

enjoyEngland.com
QUALITY ASSURED VISITOR ATTRACTION

Ecsite-uk urges all UK Science & Discovery Centres to join these Quality Assurance Services to set a benchmark of their quality as visitor attractions

Part 3
Sharing best practice

Science centre funding and the creation of a Scottish Science Centre Network

Professor Stuart Monro OBE — *Scientific Director, Our Dynamic Earth, Edinburgh*

The Millennium Commission funded capital projects but did not contribute to revenue funding. Throughout the world there are virtually no science centres that survive without some public funding. Revenue funding and funding for future developments therefore became increasingly important not only to Our Dynamic Earth, but to all of the science centres in Scotland. One of these, The Big Idea was also funded by The Millennium Commission. It occupied the site of the former Nobel factory just to the north of Irvine in Ayrshire and opened on the 15 April 2000 as an inventor centre stimulating creativity especially in young people. In 2003 The Big Idea went into receivership and closed its doors to the public.

It was recognised that what had happened to The Big Idea could also happen to other science centres in Scotland in a 'domino' effect. Following this event the Chief Executive Officers of the remaining Scottish science centres joined discussions with Jim Wallace, then Deputy First Minister and Minister with responsibility for science in the Scottish parliament, concerning future funding options.

Undoubtedly, the demise of the Big Idea was the catalyst for action to protect the sizable Scottish asset represented by the four other science centres, namely Satrosphere in Aberdeen, Sensation in Dundee, Our Dynamic Earth in Edinburgh and the Glasgow Science Centre. Other initiatives were also underway, most importantly the work of the Scottish Science Advisory Committee, which had been set up in the wake of the publication of the Scottish Science Strategy to advise Ministers on science policy. The committee recognised the value of informal science education and felt that as museums and art galleries were funded from the public purse, organisations that communicated science, which underpinned the Scottish economy, should likewise be the recipient of public money.[1]

The Scottish Science Advisory Committee recognised the value of informal science education and felt that as museums and art galleries were funded from the public purse, organisations that communicated science, which underpinned the Scottish economy, should likewise be the recipient of public money[2]

In June 2004, acknowledging the recommendations of the Scottish Science Advisory Committee, Ministers decided to initially provide £5.1 million over two years for the four remaining science centres. Funding subsequently stabilised over the 2006–7 and 2007–8 periods at £3.7 million. The critical statement is that £3.7 million per year investment was protecting a £130 million investment and communicating science to over 700,000 people. As part of the funding package a four year strategy was developed by the Scottish Science Centre Network with the Scottish Executive which set objectives for the period 2005–9.[3]

The strategy outlines the objectives of the Scottish Science Centre Network in relation to:

- Science curriculum 3-18
- Links with further and higher education institutions
- Links with industry
- Encouraging science as a career

This is seen as an evolving strategy forming the basis of the development of the Scottish science centres as catalysts for science communication.

1 www.scottishscience.org.uk/main_files/pdf/Publications/final_Annual_Report.pdf; accessed 22 February 2008

2 www.scottishscience.org.uk/main_files/pdf/Publications/final_Annual_Report.pdf; accessed 22 February 2008

3 www.scotland.gov.uk/Publications/2005/12/06113103/31038; accessed 22 February 2008

Now that the Scottish Science Centre Network is functioning it is becoming clear that effective science communication will be very much better if connections can also be made with the SetPoints, the Science Festivals and other science communicators in Scotland. The objective is to allow access to a science event to at least all children in Scotland and by an integrated approach there is a greater chance of achieving this objective.

It is becoming increasingly important that the benefit of science centres in bringing added-value to science engagement is demonstrated and quantified. In Scotland this has been done by Her Majesty's Inspectorate of Education (HMIe). An inspection took place in November 2007 which resulted in the publication of a report that highlighted the strengths and weaknesses of each of the science centres. The follow up to this report has been the submission of action plans by each science centre to address all of the issues raised and a further action plan detailing the future activities of the Network. This report has proved to be a valuable stimulus to improvement in the educational product in each centre. A further inspection of Generation Science, the 'outreach' arm of the Edinburgh International Science Festival, is currently (2008) being carried out.

£3.7 million per year investment was protecting a £130 million investment and communicating science to over 700,000 people per year

The Scottish Government agreed in December 2007 to continue their vital support of the Scottish Science Centres Network, providing approximately £7.5m over three years (approximately £2.5m a year until 31 March 2011) giving the Scottish Science Centres the opportunity to plan strategically for the next three years.

As with other recent Scottish Government funding announcements, this discretionary support is dependent on the Network delivering on key outputs and outcomes, one of which is visitor numbers[5]. This support is absolutely vital to the continuing operations of the Network of Scottish Science Centres and we commend the Scottish Government on their foresight, innovation and leadership in recognising the strength that can be achieved through partnership between our Government and our Science Centres.

4 **www.hmie.gov.uk/documents/publication/sscn.pdf**; accessed 22 February 2008

5 Pers. Comm. with Joanne Ward, Science and Society Team, Office of the Chief Scientific Adviser, The Scottish Government

Informal science learning
A quality assurance framework for Scotland

Dr Robert Hoyle — *Director of Science, Glasgow Science Centre*

Pursuing quality accreditation is something that many top companies spend a lot of time, energy and investment pursuing. How can science centres, with their slender resources, compete?

Aims

Formal learning experiences are subject to stringent quality assurance process. But what about informal learning experiences such as those delivered in a science centre? How can you ensure that you are delivering a quality science learning experience and that visitors are receiving a guaranteed standard?

Glasgow Science Centre aimed to work with other science centres in the Scottish Science Centres' Network to create a quality assurance framework with respect to the science learning provision offered at each centre.

Developing quality assurance standards is a key element for the future success of the informal science learning sector. If we are to build confidence and sustainability in the experiences we have on offer, it is important that we develop quality standards across the board.

Background

Following the HMIe 'Review of the Contribution of the Scottish Science Centres Network to Formal and Informal Science Education'[1] the network identified that establishing a quality assurance framework with respect to learning provision was a key strand for future development.

Seen in context with other quality frameworks — 5* VisitScotland (recognition of standards as a visitor attraction) and Investors in People (recognition as a quality employer) — this new framework looks to address the area of informal learning in science centres and ensure that quality is a common thread that runs through everything we do.

Our roadmap to change

We created a clear roadmap of how we were going to create a quality assurance standard and check that it was rigorous, relevant and sustainable. These are the key steps we would advise others to take:

» **Step 1** Establish a working group of key stakeholders (Scottish Science Centre Network, SETPoint Scotland, HMIe Inspectors).

» **Step 2** Review other areas of quality assurance to create a best practice model. Our frames of reference included- HMIe, LearnDirect Scotland 'Pledge to Learners' and the Museums Libraries and Archive framework for evaluation (Generic Learning Outcomes).

» **Step 3** Draft a specific 'Pledge to Learners' for informal science learning.

» **Step 4** Review and develop evidence requirements.

» **Step 5** Review each pledge in turn and reflect on how well you are able to demonstrate effectively the attainment of quality in each area.

» **Step 6** Set in place action plans to address identified areas for improvement.

» **Step 7** Consider establishing informal science engagement kite mark of quality.

1 www.hmie.gov.uk/documents/publication/sscn.pdf

The outcome: A pledge to learners

The following learning pledge was developed:

The Scottish Science Centres Network is helping to create, support and sustain a lifelong engagement with science learning and work towards all learners becoming:

» successful learners
» confident individuals
» responsible citizens
» effective contributors[2]

As such the Scottish Science Centres Network undertake to:[3]

» offer the time, place, pace and style of learning that most closely meets your needs.
» give clear communication that helps you make the best personal choices about learning programmes.
» provide learning materials that inspire, challenge and engage; that are relevant to your own personal, work and study interests; and actively involve you in practical examples and hands-on experience.
» provide you with access to trained, motivated, welcoming, engaging specialist staff.
» to work with you to develop opportunities that link what we offer to key areas of your life such as work, family, citizenship and your own personal development.

Potential for future development

This is a work in progress and we would welcome other science centres to join us and help shape this initiative.

Contact

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Director of Science

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50 Pacific Quay
Glasgow G51 1EA

0141 420 5029

robert.hoyle@glasgowsciencecentre.org

2 www.curriculumforexcellencescotland.gov.uk

3 Adapted from LearnDirect Scotland 'Pledge to Learners'

Gift Aid: opt in or opt out?

Donna Speed — *Operations Director, At-Bristol*

Introduction

Gift Aid has always been a subject which evokes considerable debate and discussion, and the following account details our experience of the scheme at various stages of its lifecycle, highlighting both the difficulties encountered and celebrating the successful high points!

Gift Aid prior to legislative changes (pre-April 2006)

Where no additional donation was required from our visitors and we simply needed their personal details and consent. At this point our conversion rate averaged 55%. The process was relatively straightforward and in our experience, the majority of visitors were happy to oblige since it did not involve any additional cost to them and they were delighted to support our core mission of making science accessible to all.

Gift Aid post-April 2006 a reasonable success story

Following the imposed legislative changes where we asked for an additional voluntary donation of 10% without offering a corresponding tangible offer, take up was, unsurprisingly, minimal. The Visitors Services Team found it increasingly hard to sell the scheme given that they had nothing to offer in return for the donation, especially as the visitor could not always visualise the activities that the revenue generated would help to support, e.g. our outreach programme to hard-to-reach groups.

As a consequence, various options were investigated with a view to amending our offer and therefore directly influencing the conversion rate.
Alternatives included:

1. Converting all day tickets involving an eligible Gift Aid donation to annual tickets and
2. Providing a tangible gift (e.g. a pen or guidebook) within the pre-determined guidelines.

Neither of these, however, were deemed suitable or financially viable and so the decision was taken to

3. Offer vouchers in exchange for the 10% donation to be redeemed in the shops or cafes, or with face-painting (when available).

Gift Aid: Opting-in and the offer of vouchers

Towards the end of 2006 we continued with opt-in and included the offer of vouchers and found that uptake was on average 20%. The main difficulty lay in trying to explain the scheme without increasing the dwell time at the till point and finding the right terminology to promote the scheme without it appearing a hard sell.

Gift Aid post-September 2007- Opt-out: a phenomenal success story

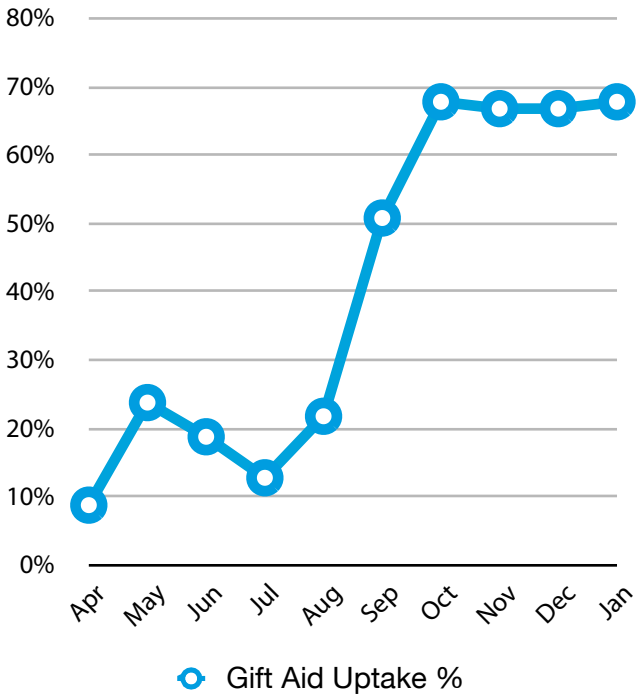
A year later, following extensive evaluation, we consequently amended our offer to an opt-out system, still with the incentive of redeemable vouchers. Visitors were given the opportunity to opt-out of the scheme if they decided not to participate or if they weren't UK tax payers and therefore ineligible, and our IT systems re-calculated the total transaction cost removing the Gift Aid component from the base price. Our promotional literature, website and admissions systems were all amended accordingly in order to reflect both prices, and to support the changes and as a direct consequence, the conversion rate has risen dramatically to an impressive 68%.

Feedback from the Visitor Services Team clearly demonstrates that this new approach is a much easier one to promote and has been extremely well received by our visitors. The flexiblity to redeem the vouchers in a number of areas has proved enormously successful, especially in conjunction with face painting which appears to have a direct impact on significantly enhancing the visitor experience.

Conclusion

Whilst the new Gift Aid scheme can sometimes be a somewhat convoluted process, its success and the resulting revenue generated, proves vital to our financial health and therefore our long-term sustainability as an educational charity.

At-Bristol Gift Aid uptake 2007–8



As a footnote from Ecsite-uk, further information on Gift Aid is available from **www.giftaidvisitor.co.uk.**

Also of interest to our members is The Consultation on Gift Aid: the Government's response published in March 2008.

Advertising and the bottom line

Alan Martin — *Marketing Manager ACIM, Dundee Science Centre (Sensation)*

Introduction

Having worked on both sides of the advertising fence it never ceases to amaze me how many tourism businesses still make advertising decisions based on the personality of the salesperson rather than return on investment.

Not only that, but many business operators still equate marketing as advertising, which in many cases means that business objectives are not being met and limited budgets are being wasted when more cost-effective methods could have been used.

Another problem with advertising is that it is very difficult to accurately monitor its effectiveness. The famous statement by Lord Leverhulme "I know that half of my advertising budget is wasted, but I don't know which half" will strike a familiar ring even today.

Advertising can and does work but not all advertising will work; in fact most of it probably won't, so how do you know where you should be advertising? The bad news is that there is not one hard and fast answer to this question as it depends on your individual circumstances.

You can see what methods of advertising your competitors are using as an initial steer but ultimately you will need to try it once to see if it works for you. You can only know this if you monitor the effectiveness of your advertising.

> "I know that half of my advertising budget is wasted, but I don't know which half"
>
> *Lord Leverhulme*

Back to basics

You will probably receive upwards of ten sales calls a week from people trying to sell you advertising. Some of these calls you will probably dismiss right away as not suitable, but the majority will probably sound quite interesting, particularly if you are being offered a special 'late availability' deal. Sounds too good to miss, but is this advertising going to work for you?

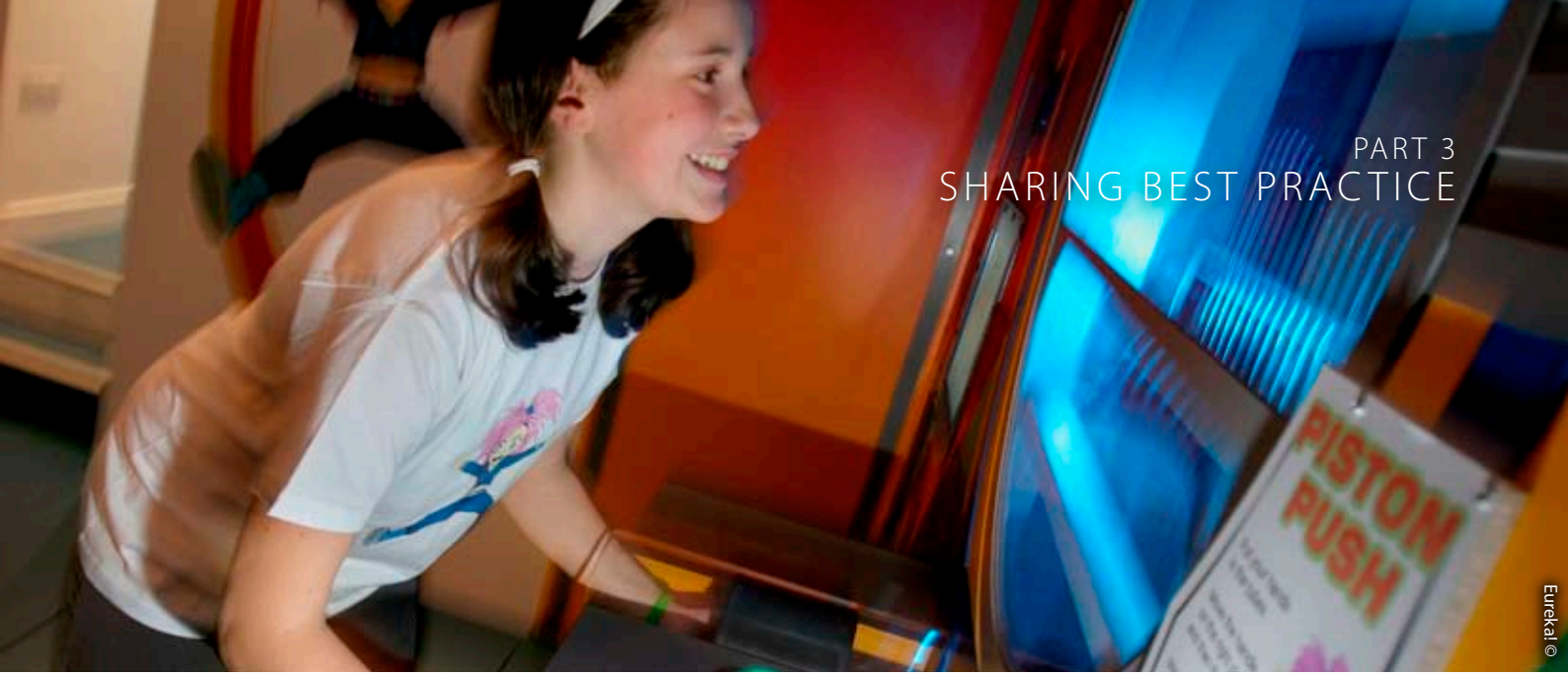
The answer is that it depends! Firstly, does it fit with your target market? You will already have a pretty good idea where most of your visitors come from so you can use this as an initial filter. There is no point in advertising in an area where you don't currently get many visitors (unless you have identified this geographic area for future development).

Secondly, does the advertising opportunity target your traditional customer profile and fit in with your seasonal business in terms of time-scales? You should also consider the time involved in putting together an effective advert. Many late availability deals are last minute and don't give you much time to put an ad together.

There is no point in negotiating a good deal on the advertising space and producing a sub-standard ad because you were rushed. I have seen this happen on many occasions and it is a complete waste of budget.

If you are happy that the opportunity you are considering reaches your target audience, you have time to put together an ad and you have managed to negotiate a good deal, then by all means give it a try.

This is not the end of the story however! You need to make sure the ad is working for you and if not, don't do it again. To do this you need to know how much business the advert has generated.



Eureka! ©

Monitoring effectiveness

This is more difficult than it sounds because people can see or hear an ad and not take action for weeks, months or even years later, so how can you accurately monitor how effective your advertising has been?

Without continuous surveys, it is virtually impossible to detect people who have seen previous ads but not acted for a long period of time. However you would hope that the majority of people acting as a result of your ad will visit your attraction soon after being exposed to your ad message.

There are other methods that you can put in place to monitor the effectiveness of your ads. These include:

- Data gathering – EPOS or manual visitor surveys for awareness and geographic origin
- Unique code put on each ad
- Staff asking where did you hear about…?
- Monitoring visitor numbers over a pre-defined period

Conclusion

When considering advertising you need to be sure of your business objectives and make sure you monitor it effectively. Advertising works best when your objective is to raise awareness but this might not necessarily translate into visitor action and therefore profit.

Advertising should not be used in isolation. Used properly, advertising should form part of the promotional mix, as other methods of promotion are more successful in generating sales.

Running an advertising campaign to raise awareness, backed up with PR and combined with a good sales promotion to prompt action, is an example of how advertising should be used as part of an integrated plan, not as a stand-alone activity.

In 2008, Ecsite-uk is setting up The UK's Science Centre Marketing and PR Forum to share ideas, knowledge and best practice amongst professionals in our field.
To find out more, simply email marketing@ecsite-uk.net

Using other revenue streams to support a science centre

Ian Simmons — *Science Communication Director, The Centre for Life, Newcastle*

The Centre for Life is based in Newcastle-upon-Tyne's city centre, where it is part of an innovative science village. It was a Millennium Project and opened in 2000. Initially its hands-on exhibitions focused on genetics and biotechnology, but it has subsequently extended to more general science. As well as its exhibitions The Centre for Life offers a science theatre, a Dome with immersive films and planetarium shows, and a motion ride. It also houses LifeLab, an education centre that provides over 60 different taught workshops to students from primary age to postgraduates, the largest such programme in Europe.

The science village concept has always been an innovative one, representing a departure both from the concept of how research is done - in a prominent city centre building not on a campus or a remote science park - and how a science centre operates.

In terms of how a science centre operates, Life has been able to work closely with leading scientists on-site, together developing many of its exhibitions, public programmes and education activities, creating a unique synergy of research and communication. Secondly, it has led to a very different business model to most other centres.

From the outset of the project The Centre for Life has had other revenue streams built into its business plan to support its science communication mission as it was clear that no cultural institution of this kind would generate sufficient revenue from mission-based operation to fund its operation at an effective level, even if it charged for entry and for its education services, as The Centre for Life does.

There are a number of revenue streams, which together provide 80% of the cost of running the science centre out of the profits they generate from their own operation.

The commercial businesses that support the science centre operation are conducted through a trading company wholly owned by the International Centre for Life Trust that gift aids its profit to the charity to carry out its charitable science communication mission

Commercial businesses that support the science centre operation

The commercial businesses that support the science centre operation are conducted through a trading company wholly owned by the International Centre for Life Trust that gift aids its profit to the charity to carry out its charitable science communication mission. The businesses that come under the trading company are as follows:

Shop – As with most science centres, The Centre for Life (Life) features a gift shop selling souvenirs and science-related items.

Cafes – The Centre for Life has two cafés on its premises, one at the front of the building which is open to non-visitors and features franchised Starbuck's coffee, and a second café further into the building open only at weekends and school holidays to serve more substantial meals.

Conference and Banqueting – The Centre for Life has substantial kitchens centrally located in the building. On one side they open onto the café for visitors, on the other they serve The Centre for Life's Conference and Banqueting Centre. This is a suite of separate rooms that can be hired for a wide range of purposes by businesses and the public. It is not part of the science centre itself, has a separate entrance and is rarely used for science centre activities. It has several meeting rooms that can be hired and a large hall that is used for

everything from Bar Mitzvahs to medical conferences and church services. The conference and banqueting team also run themed public events such as Murder Mystery Nights, 80s Disco Evenings and 007-themed dinners. The kitchens are capable of dealing with prestige banquets for over 400 people, whilst still servicing the needs of the science centre cafés at peak times.

Bioscience Building – Part of the science village that makes up the greater Centre for Life is a building that houses incubator suites and laboratory facilities leased to biotech start-up companies, universities spin-offs and other similar organisations.

Bars and Nightclubs – Along the side of the square between the science centre and Bioscience is a row of bars and nightclubs that are a significant focus of Newcastle's vibrant nightlife. All of these are leased from The Centre for Life by their operators and the revenue is, as with the other businesses, applied to the science centre core mission.

Times Square – The square itself is also part of the Life estate and is available for lease for public events. These have included car launches, music events and an annual visit by the Ladyboys of Bangkok.

Ice Rink – From November to February The Centre for Life runs an ice rink in Times Square on a commercial basis. This is the most successful rink in the North East and is heavily used because of its sheltered city centre location.

Market Keeper's House – In the centre of Times Square is a historic house, remaining from the days when the site was a cattle market. This is leased to a design company.

Institute of Human Genetics – Above the nightclubs in Times Square is the University of Newcastle's Institute of Human Genetics, in a building that also houses an NHS fertility clinic. It is here that the university carries out its ground-breaking stem-cell work. This is also part of The Centre for Life's estates and has the potential to generate up to £1 million per annum in rent at commercial rates.

Multi-Storey Car Park – To the rear of the site there is a multi-storey car park, partly for the convenience of Life visitors, but also to serve the city centre more generally. This is owned by the Trading Company and all its profits go to The Centre for Life.

Together these businesses have a turnover of £3.9 million per annum and contribute £1.6 million to the Science centre to subsidise its operation

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Together these businesses have a turnover of £3.9 million per annum and contribute £1.6 million to the science centre to subsidise its operation. These make the centre self-sufficient in day to day operation, although external funds are still needed to fund major redevelopment of the content.

Potential for future development

Whilst the potential for future physical development is relatively limited since all the land and buildings in The Centre For Life estate are fully occupied, there is considerable potential for business development. For example this year the ice rink season was extended to include February half-term, which resulted in a substantial increase in visitor numbers, both to the rink and the centre during that week. There is also much potential for increasing the number of rentals of Times Square and expanding the usage of Conference and Banqueting facilities. Currently the wedding market is being targeted for development and there is potential for additional themed events as well. There is also potential to develop the cafes further. These have increased turnover several-fold over the time the centre has been open, the provision of Starbuck's coffee recently has led to a considerable increase in usage for example. There is also the possibility of running an attraction of some kind in the square during the summer period as a warm weather equivalent of the ice rink.

Advice to others

- If setting up a new science centre facility, think about potential revenue streams and take the opportunity to build them into both the physical and the business plan from the start. It is relatively easy to build a car park or conference centre if it goes up at the same time as the rest of the buildings, it is much harder to finance them or find space for them if you are trying to retrofit them.
- Do not be reticent when thinking commercially, employ appropriately skilled people and do it properly rather than dabbling. Having someone who just does it on the side without the right background is a recipe for losing money not making it.
- Being commercial doesn't need to undermine the mission.
- Locate your centre as close to the heart of the city as possible. Many of the commercial ventures that support Life would not work if we were situated on the outer rim of the city.
- Car parks are wonderful things – your visitors need them, but so do other city users, and at science centre off peak times, e.g. just before Christmas, they even out the income flow as at that time they are stuffed with Christmas shoppers.
- Do your research properly before committing to a major commercial activity – just copying what someone else has done rarely works. Everyone's local market is different and to be a success it has to meet local need.

Techniquest's Wales-wide outreach provision for schools

Dr Anita Shaw — *Development Director, Techniquest*

Techniquest's mission is to engage people with science and to motivate them to learn more. This remit includes the full range of STEM subjects. Its primary audience is the people of Wales and it aims to actively deliver its mission in a way that is equitable in terms of where people live, and in response to the relative 'need' of different sections of society.

Techniquest has developed and delivered an extensive and high quality schools programme (including in-reach and outreach) from its centre in Cardiff Bay since 1992 and it currently runs programmes for students from Early Years to post-16. Techniquest@NEWI also provides an exciting schools programme from its site on the campus of the North East Wales Institute in Wrexham.

In the financial year 2006–7 Techniquest reached 70,942 Welsh school students and over 44,000 students from England through the schools programmes

Supporting STEM teachers

Techniquest has an excellent reputation as a developer and deliverer of programmes linked to the National Curriculum and post-16 specifications. Recent quotes from teachers include:

> "The presenter was fabulous with the children and made the workshop age appropriate"

> "The session was obviously well-planned and resourced. It was delivered enthusiastically and clearly, with good use of questioning"

> "Thank you for a fantastic opportunity for all the children. They were all engaged and enthusiastic throughout the session"

> "It gave the pupils the opportunity to plan, develop and evaluate through collaborative group work"

Techniquest is able to work in this way due to its strong partnerships with teachers, science advisors and other educationalists. It works closely with these groups through courses in continuing professional development, focus groups and its advisory committee to ensure its programmes support teaching practices and are current and relevant.

2008: Major changes in the Welsh Education System

There is a great need for the sort of programmes offered by Techniquest in Wales. There are big challenges in the coming years for the teaching and learning of STEM-based subjects in Wales with changes to all parts of the education system from age three years to 19 years from September 2008. From that date the new Foundation Phase for Wales (3–7 year olds) rolls out across the country, and the new Key Stage 2 and 3 curricula and new A-level specifications will be implemented in schools; the Key Stage 4 curriculum is in its second year of operation. In addition, schools are now offering the Welsh Baccalaureate.

Taken together, these new guidelines represent an enormous change in the type of teaching that will be carried out in Welsh schools from September 2008; these new curricula have a different emphasis and approach to the curricula that teachers have taught previously. Consequently, the teaching of STEM will require a great deal of support from other agencies, such as science centres, STEM-based industries, higher education institutions and education or business providers.

A model for low-cost outreach throughout Wales

Parts of Wales are amongst the most disadvantaged in the UK and this has implications for the long-term prosperity of the country. Fifteen out of the twenty two unitary authorities in Wales have an average GDP per capita below 75% of the European Union as a whole. Those in rural communities are disadvantaged through a combination of large distances between services and poor transport links.

In response to this need Techniquest is expanding its services to provide a Techniquest experience to every KS2 pupil in Wales three times per year and to all other pupils once per year. Although school visits to the fixed sites at Techniquest in Cardiff and Techniquest@NEWI are important to this, much of the additional provision will be through specially designed low-cost outreach programmes delivered from local 'hubs' in eight centres around Wales. The main sites in Cardiff and Wrexham act as hubs, and a third hub at Llanberis in North West Wales is already up and running. Further hubs are being added each year and each will train presenters, deliver equipment and foster local links and partnerships. All schools will be no more than 50 miles away from their local hub.

Techniquest has researched, developed, designed and evaluated three main types of programme for schools to be delivered through the hubs. All of the programmes are supported by pre- and post-visit resource materials for teachers. These programmes are:

» **Kits** – These are sets of tabletop exhibits that can be used in schools and the community to engage young people in science, engineering, technology and maths. Each Kit comprises 11 interactive exhibits which can be transported in the back of a small van.

» **Shows** – These are interactive presentations for Key Stages 2, 3 and 4. Each presentation comprises interactive demonstrations and lasts for the length of a lesson.

» **Workshops** – These provide opportunities for students to work in teams on scientific challenges where they are required to consider evidence, develop observational skills and to think creatively.

A total of 15 different outreach programmes are presently offered at Key Stage 2, Key Stage 3 and post-16. Techniquest is currently seeking funding to develop these programmes further, tailoring these to the needs of teachers in the delivery of the STEM curricula from Foundation Phase to Key Stage 4 and post-16 specifications.

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Some of the issues with the delivery of the programme, and the ways that Techniquest is addressing these are as follows:

» Co-ordination Wales-wide. Techniquest has recently installed a new bookings system which is administered from Cardiff.

» Alerting schools to the programme. Techniquest works closely with partners in each hub area, including the local education authorities, science advisors and Careers Wales to market the programme to local teachers. Where training is required (for the Kits programme), Techniquest runs courses for teachers in collaboration with teacher support agencies.

» Reaching remote schools with low student numbers. Where the school is particularly small and therefore the costs are high, Techniquest offers reduced rates to ensure that those in greatest need are not discriminated against.

In the year 2007–8 Techniquest reached over 92,000 participants through its outreach programme

For more details of the outreach programme, please contact Dr Anita Shaw, Development Director, Techniquest. anita@techniquest.org

Community open days at Thinktank
Can you increase sustainability whilst increasing diversity?

Hannah Shepherd — *Thinktank, Birmingham Science Museum*

Aims

To increase visits from the communities local to Thinktank.

Objectives

- Offer free entry to local residents from inner-city Birmingham
- Provide an enjoyable day out for new and returning visitors
- To diversify audiences to Thinktank – socioeconomic and cultural diversity

Thinktank have been running Community Open Days since January 2005 and have continued to hold these days bi-annually. Local residents bring their voucher to gain entry for two adults and four children.

The marketing team can target the voucher distribution at areas where people are under-represented in our visitor profile. These vouchers are numbered so that we know how they found out about the open day and identify distribution methods that are working. This has demonstrated that the best redemption comes from our partners that help to promote us. Mail outs and free papers haven't worked so well.

> The best voucher redemption comes when partners help to promote us. Mail outs and free papers haven't worked so well

To help ensure that we do receive visitors we invest in community outreach to build partnerships and use established community networks, local nurseries and schools to help us promote the offer to local families.

On the open days themselves we make sure that we have our core family offer of shows and activities and plenty of staff on the day so that visitors have a great time and want to return.

We carry out research to make sure that we are responsive to our audience and that we can find out what has stopped people from visiting previously, which often turns out to be not knowing what is on offer.

The outcomes have been varied

These days have proven so popular that on the last open weekend we had nearly 6,000 visitors over two days and sold over 30 family season tickets to voucher holders. People have a great time and the research suggests they will return; in addition we increase our sales of season tickets. Our audience has become much more diverse since these open days started from both a socioeconomic and cultural perspective, and has been one of the most significant factors in attracting people from the areas local to the museum.

> We had 6,000 visitors on our last open weekend, with significant secondary spend in the planetarium, shop and café

Financially there is significant secondary spend in the planetarium as well as in the shop and the café on these open days in addition to the sale of season tickets. There is little impact on the income as only voucher holders get in free – the paying visitors still pay admission. First time visitors on these days do return later as paying guests.

Operations on the day can be easily managed as a busy day and planned for quiet times of the year.

Thinktank ©

Key recommendations:

Get out there and ask people what they want – the best method of getting people to come to you is word of mouth, if people just get a voucher from an organization they know nothing about they just won't bother!

Make sure that you create a great atmosphere on the day so that people want to come back!

Make sure that the shop and café are well stocked and take time to think about the possible food requirements of your audience.

Make the voucher clear and straight-forward so that people know exactly what is on offer, Free, Family, Fun!

Future Development:

Science centres are here to excite and engage us all with the issues that affect our lives. Opening up what we do to more people helps us in working towards a scientifically literate society.

Joining forces to strengthen operations Satrosphere and Dundee Science Centre (Sensation)

Paul Jennings — *CEO, Dundee Science Centre*

Early interventions and successes

Following an extended period of turbulent trade for Satrosphere, Aberdeen's science centre, the Satrosphere Board asked the Chief Executive of Dundee Science Centre (Sensation) to carry out a whole business review of the centre. This review, conducted in September 2007, identified 29 recommendations which fell into the categories of finance, management, efficiency and effectiveness.

The urgency of Satrosphere's situation was such that much of the focus of this review was on maintaining solvency, strengthening the centre's financial management and reporting and developing suitable governance structures which would allow the centre to move forward on a more professional footing. Of greatest urgency was the need to significantly reduce the centre's cost base and maintain positive cash flow.

As a function of this review the Satrosphere Board also asked to be presented with a range of options in terms of how it might move forward. The poor financial health of the organisation meant that options identified were limited to:

» Closure of Satrosphere
» Continuing to operate but on a much slimmer staffing structure
» Continuing to operate on a much slimmer structure but supported by another 'similar' organisation with compatible skills or expertise

The Board elected to adopt all recommendations and subsequently engaged in discussions with Dundee Science Centre (located 60 miles south of Aberdeen) about how it might support a future effort to recover Satrosphere. A six month contract was duly entered into and coincided with seven redundancies (a recommendation of the review) that reduced Satrosphere's overheads by in excess of £200,000 a year.

During this six month period Dundee Science Centre was able to leverage over £500,000 of value through Satrosphere, achieved through a combination of cost reductions, funding successes, release of previously withheld grants and contractual re-negotiations. Several members of the Dundee Science Centre management team gave considerable support to these efforts. The skills brought by this team included leadership, IT & facilities, operations, projects, HR and marketing, and this team worked closely with the remaining Satrosphere staff in tackling a range of legacy issues. Within the initial contract period almost all of these issues were dealt with, positioning Satrosphere to now begin looking forward. Satrosphere is expected to secure a full financial turnaround within a further 12 months but continues to require assistance in the medium term.

Looking forward

Beyond the early tactical but necessary actions highlighted above, Dundee Science Centre has negotiated a continuing involvement in Satrosphere beyond 31 March 2008. It is the opportunities latent in this longer term relationship that hold the potential to make both organisations much more efficient and effective in moving forward.

While by no means exhaustive, early possible examples include:

» Sharing of educational activities and development of new joint ones
» Joint funding bids
» Joint marketing activity – Dundee Science Centre managed the design, print and distribution contracts of both centre's annual leaflets for 2008. Dundee Science Centre also created a new Satrosphere website (**www.satrosphere.net**) by using its own site as a template. These initial examples maintain the distinctiveness of each centre while having also achieved considerable cost savings for both centres

Eureka! ©

PART 3
SHARING BEST PRACTICE

- Shared intelligence – the websites of both centres share content management systems that allow early benchmarking. Due to the similar size of both centres benchmarking between a range of performance indicators is anticipated. These are currently being developed across the Scottish Science Centre's Network
- Economies of scale – the potential for this has been touched on in human resource e.g. do you really need two IT experts, and marketing teams that cover the whole range of both commercial and non-commercial activities?
- Purchasing power – two businesses, even small ones, have more buying power than one
- Sharing of resources – Dundee Science Centre developed a Summer exhibition called 'Vanishing Ice' in 2007, this same exhibition headlines at Satrosphere from Easter 2008. Satrosphere has a range of portable exhibits that have been on display in Dundee for several weeks
- Stakeholder development – two or more centres working closely together is likely to have appeal for a wider range of both audiences and stakeholder groups including academic, industrial, funder and political
- Developing shared expertise – in a longer term relationship expertise can be developed in ways that have mutual benefits for both organisations

In order to move these and other opportunities forward a shared team has been identified. This group will be supported by a steadily developing team within Satrosphere during phase two.

The early outputs of the process outlined above have led to the continued operation of one science centre and have the potential to considerably strengthen two in a relatively short period of time.

Keeping a science centre alive via a vibrant corporate events business

Matthew Beck — *Managing Director, Magna Science Adventure Centre, Rotherham*

The mission of a science centre is to inspire, engage, and create learning opportunities. Like all other places where this happens – museums, schools and libraries, running a science centre does not make money. However by running a successful corporate events business we can subsidise the loss-making educational activities of the charity.

Aims

Magna is situated in the former steelworks in Templeborough, Rotherham and is an educational charity. It is comprised of three separate business activities; Science Adventure Centre Visitor Attraction, Science Education Centre and Corporate Events, which are highly interdependent upon each other. Magna Enterprises Ltd is the trading company and encompasses the corporate events, retail catering and retail shop, and all of its profit is gift aided to the charitable trust. Each business is growing at a steady rate; visitor attraction and education at 5% and corporate events at 20%.

Catering was taken in-house in November 2004 to ensure quality control for both corporate hospitality and the visitor attraction restaurant and café.

Key developments 2004-8

Magna opened at Easter 2001 and achieved higher than budgeted visitor numbers with a predicted fall in numbers in subsequent years. In order to achieve the growth required, new developments have been added since 2004:

Sci-tek & Aqua-tek – the UK's largest interactive outdoor play area augmented the existing outdoor area and in 2006 the UK's largest outdoor interactive wet play area was added. These developments made Magna the place to visit whatever the weather whereas previously it was seen only as an indoor attraction.

Living Steel, Steel Reveal and Behind the Scenes Steel Tours – Magna opened with the 'Big Melt Show', the awe inspiring re-creation of the steel works in operation using noise, light, fire and pyrotechnics. To augment the cultural heritage of the building the above developments have been added as they also target a different market sector. A cultural heritage course (accredited with a community involvement and volunteering award), unique to Magna, has just been successfully piloted and is likely to be the blueprint for further diplomas. These developments emphasise the uniqueness of the building and have augmented all three business areas.

In-house catering and corporate development – Catering was taken in-house in order to improve the quality and consistency of the food and service both in the visitor attraction and banqueting. The corporate development included new, purpose built kitchens with a new restaurant above, which is used for all business areas.

PART 3
SHARING BEST PRACTICE

Indoor Bungee and Awesome Foursome – Extreme sports were introduced in partnership with the UK Bungee Club. The uniqueness of the building meant that the highest indoor bungee jump could be relatively easily installed in the Face of Steel. This attracted a different audience into Magna, who have been encouraged to use the rest of the visitor attraction. The addition of the zip wire, abseiling and parachute descender has grown the target audience but also means that these activities are available to be used during holiday periods and for the education and corporate training markets.

Concerts and events – Pulp, The Arctic Monkeys, The Sugarbabes, Hawkwind and several Tidy Music dance events took place at Magna up to 2007. Since the corporate development was completed, concerts and dance events have been re-launched with three taking place in 2007 and eight planned for 2008. The uniqueness, capacity of the building and new facilities allow larger standing concerts to be staged at Magna and as Magna operates its own bars as part of its catering offer, these events are successful business operations. Magna also organises its own major fund raising events with an annual fireworks display for example and also operates a full calendar of events for the visitor attraction.

Travelling exhibitions – Magna is part of the Ecsite-uk travelling exhibitions consortium, which has meant that Animated Adventures, Love Sport and Eye for Colour have supplemented the visitor attraction offered over the main season. This has been a cost-effective method of refreshing the visitor and educational offering and given extra value to our customers.

Business development – This is a continual process as Magna continues to grow and develop and is essential in order to meet all of our customers' expectations. All three business areas have undergone change with new business development structures, which incorporate customer service and quality. A volunteer scheme was launched in 2006 which has benefited all operational areas and includes 'non traditional' volunteers such as refugees and those wishing to return to work.

»» continues

Outcome & Benefits

Due to these developments and business strategy Magna has managed to achieve a small operating surplus, in order to subsidise the educational activities. The visitor attraction catering will make a contribution of £30,000 (2007–8) which will rise to £60,000 (2008–9) whilst improving the quality of food and service for the customers. High quality catering staff can be employed due to the scale of the corporate events business but the visitor attraction customers also benefit from these standards.

Consequently Magna has won many awards, below are just a few:

- RIBA Stirling Prize Winner 2001
- YTB White Rose Awards Winner Business Tourism 2005 and 2007
- Enjoy England for Excellence Gold Award Business Tourism 2006
- YTB White Rose Awards Winner Best Tourism Experience 2006
- YTB White Rose Awards Runner Up Large Visitor Attraction 2007
- Yorkshire Business Insider Business Tourism Large Venue Winner 2008

Future development potential

Continued growth as per the above aims is predicted for 2008–9, in line with the five year plan.

The **'First Vision' project**, a collaboration between Magna, Rotherham College and Rotherham LEA, is training school children in chef and front of house catering skills. It is a unique project and will increase in numbers next year. The students will gain qualifications whilst on the one day a week course before continuing their qualifications at college and moving on into the industry.

Magna catering is already managing the more prestigious dinner banquets for various local organisations and assisting and advising The Source, Meadowhall with its catering requirements. Magna will further roll out its catering offer to cover the local business parks just opening around it.

At the present time there is no national centre for steel in the UK. Magna believes that such a centre should exist and that there is no better place to house it than in a former steel works in the home of steel (Sheffield or Rotherham).

How can such a small centre maximise education visits and public engagement

Sue Halliday — *Education Manager, Catalyst Science Centre, Widnes*

Catalyst has a history of creating exciting education workshops and shows. Our challenge has been that for many years we were known as 'The Museum of the Chemical Industry', not the most exciting title in the world!

The early days saw a limited range of workshops geared for upper primary and lower secondary pupils. The subjects tended to be based around the historical context of the centre, so soap became a firm favourite as it mirrored the soap making history of the building during Victorian times.

Over time, education officers began to be more creative and soon we were offering shows based around simple, effective and well-tested demonstration techniques such as freezing objects in liquid nitrogen.

We now offer activities across the whole educational range from Nursery to A level; however our main customers are still primary and lower secondary pupils. After a dip in school visitor figures we now see numbers rising rapidly as we encourage schools to book more activities per visit.

Recent expansion (building our 3D theatre and laboratory) has meant that schools now book for at least two activities per visit. A typical day will include a trip around the three galleries, a show or workshop and probably a film. We have linked some of our workshops to the films and suggest them as a package. This varied day helps us to deal with large numbers of secondary pupils who get bored easily and tend to be less well disciplined than younger children.

We keep close links with teachers in schools and LEAs. Our own education team is mainly freelance and still work in education often within the LEA so we keep abreast of trends in the curriculum.

> Our own education team is mainly freelance and many work within the LEA

In a recent project working with Museums, Libraries and Archives (MLA) and local early years experts we developed a new session for pre-school children in our observatory which is an amazing teaching space with a 360º glass view. The sessions use role-play inspired by the industrial landscape viewed through the windows and are proving to be huge fun for all involved.

Our public programme during school holidays is extremely popular. We are a small centre but we use every space possible to make sure there is plenty going on. For example:

- We run family workshops and shows which are very interactive
- We have quiet corners where science stories are told to young children
- We run one of our 3D films throughout the day
- We run activities in the lab, e.g. a crime scene set up so visitors could solve the unexpected death of one of our scientists

> This year our small education team will deliver over 900 workshops

This year we will deliver over 900 workshops to schools, an amazing achievement with only five education staff, most of whom are part time.

Yet we are not sitting on our laurels. We have four possible teaching spaces which means we could accommodate about 1,500 activities per year, even more if we are creative with the space we use. Our biggest challenge now is to recruit enough freelance staff to run all these sessions. Our programme is extensive and it takes about six months to train someone.

I believe reasons for our current success stem from enthusiastic staff who are well-trained and confident and who know that the content they are delivering is based firmly in good quality education.

PART 3
SHARING BEST PRACTICE

Eureka! ©

Science, especially chemistry, can sometimes be seen as dull, irrelevant or too difficult for people to understand.

Our motto is that we should be making chemistry fun, relevant and tangible. After all chemistry is fundamental to our existence, it's what we're all made up of, and what makes up the whole world around us.

Property assets contributing to revenue

Terence McAuley — *Director of Finance, At-Bristol*

Introduction

It seems universally the case that centres cannot survive on ticket income alone, or even with the additions of the inevitable shop and café. What is needed is some form of 'endowment' or other income streams to prop up the mission.

This explains how At-Bristol came up with what we believe to be a sustainable solution.

At-Bristol

At-Bristol was established in 2000 as a Millennium Landmark Project with £44.3m from the Millennium Commission and a further £43.4m from Bristol City Council, the South West Regional Development Agency and private sector partners. It was part of a wider Harbourside regeneration project, which is still ongoing.

The centre offered three principal attractions:

» *Explore* – an interactive science centre housed in a converted Great Western Railway goods shed (an early example of reinforced concrete construction and a listed building)
» *Wildwalk* – a 'story of life' exhibition incorporating live exhibits and a botanical house
» *IMAX* – a 3D giant screen cinema

In addition we house, uniquely in a science centre, the Science Learning Centre South West. This is separately funded by DCSF. To At-Bristol it adds a degree of weight in our relations with other funders, who see us as perhaps a more 'serious' organisation than might otherwise be the case.

At-Bristol was set up with two exhibitions (*Explore* and *Wildwalk*), an *IMAX* and a car park. By 2007, with the development of a successful corporate hire business, we had an 'endowment' business with a net surplus of £1 million. We also had two exhibitions, one with a net cost of £1.2 million and one with a net cost of £600,000.

With no public sector support, the maths did not add up, but removing the £1 million 'cost' exhibition did. There is also the prospect of a rental income from the vacated building.

In April 2007 the decision was taken to consolidate and to close half of the visitor attraction (*Wildwalk* and the *IMAX* building) keeping open the most popular elements of the attraction, Explore and the Planetarium. Whilst not ideal in mission terms, it is a lot better than closing completely.

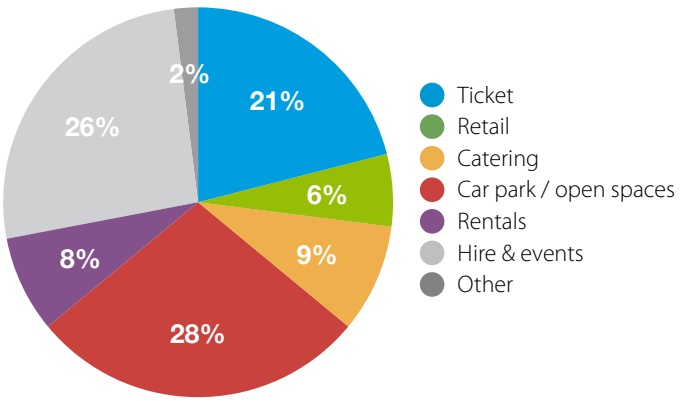
Income sources

It is illuminating to compare our projections made when we opened in 2000 with our current projections. In the original planning, ticket income was seen as the main driver of income.

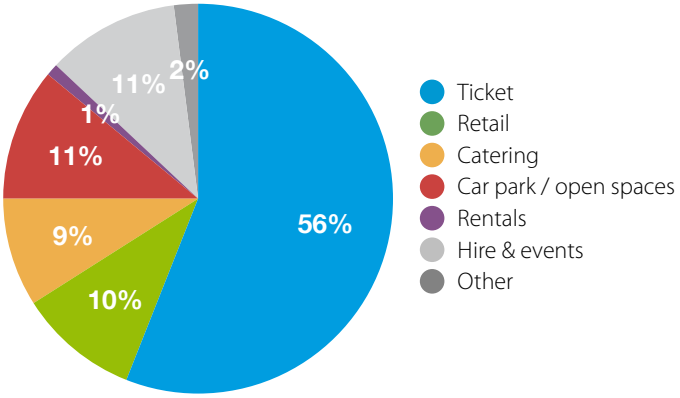
At-Bristol – Percentage of Earned Income

Commission catering turnover grossed up

2008–9 plan



2000 plan for 2005–6



The additional revenue generators can be summarised as:

» **The Explore Shop** – This sells a particularly fine range of merchandise for the visitor at the end of the visit. It has been noticeable that having only the single exhibition has increased 'dwell time' in the shop and increased spend per head by some 35% this year.

» **Explore Café** – This is an out-sourced operation for which we receive a commission. We did try running it in-house after an initial franchise period, but found that without proper expertise it was not a sensible proposition.

» **The Car Park** – This generates considerable income which is both predictable and stable. It was fortunate for us that the car park was designed as a good size to accommodate both At-Bristol and an adjacent Arts Centre, whose funding was withdrawn by the Arts Council. As the Harbourside development has proceeded, so the car park income has grown to the point where it accounts for some 28% of our earned income.

» **Corporate Hire** – In the original plans for Explore, an additional top floor was added to the existing Explore building, consisting of a large interior space and terracing overlooking the harbour on one side and the cathedral on the other. It was intended as a temporary exhibition space, but it did not take long to realise that it would be far better suited to form the core of a corporate hire business, as a valuable additional income stream, now some 26% of the total. In addition to the top floor we make use of the open spaces and, out of hours, the foyers and classrooms. It is apparent that there are many separate markets to explore (Indian Weddings, as an example) and we are still learning.

» **Rentals** – We now require less office accommodation for our smaller operations thus can achieve a rental income on vacated office space. In the future we also anticipate some rental income from the vacated Wildwalk/IMAX building.

Conclusion

The above additional income streams generate nearly £2.5 million, some 74% of our total income, and contribute about £1 million a year to support the charitable activities of At-Bristol. Clearly this is a big tail for this particular dog!

Working closely with a wide variety of partners

David Ellis — *Finance Director, Magna Science Adventure Centre, Rotherham*

Aims

Magna is situated in the former steelworks in Templeborough, Rotherham and is an educational charity. It is comprised of three separate businesses; Science Adventure Centre Visitor Attraction, Science Adventure Centre Education Centre and Corporate Events, which are highly interdependent upon each other.

Magna Enterprises Ltd is the trading company and encompasses corporate events, retail catering and a retail shop and all of its profits are gift aided to the charitable trust. Each business is growing at a steady rate, the visitor attraction and education at 5% and corporate hospitality at 20%.

Magna aims to develop successful partnerships in all of its business operations.

Key partnerships

We believe strong partnerships contribute to the continued and ongoing financial sustainability of Magna by enabling us to share best practice, benchmark and develop additional and better offers to the general public. Among Magna's portfolio of partnerships are;

Yorkshire Attractions Group – Magna is part of this group of nine key visitor attractions in Yorkshire. The group works in partnership in benchmarking, marketing initiatives, quality enhancement, customer service, catering and retail operations.

Yorkshires Magnificent Venues – Magna is part of this group of eight key unique venues in Yorkshire. This group works in partnership and is focused on the corporate hospitality market. Again the group shares marketing initiatives, e-marketing and joint attendance and exhibitions and conferences.

South Yorkshire Police – Magna rents a building to SYP for its LifeWise initiative. This teaches every Year 6 school child in South Yorkshire about the health and safety issues of everyday life in a street scene. Magna managed the project in the early years to give it a good start and still works on joint marketing initiatives and joint visits for the schools.

Rotherham MBC – Magna works in partnership with the local authority throughout its business from assisting it in hosting major events (e.g. the launch of Dolly Parton's learning library and hosting the local authority national tourism conference) to educational learning partnerships with their schools improvements team. A cultural heritage course (accredited with a community involvement and volunteering award), unique to Magna, has just been successfully piloted and is likely to be the blue print for further diplomas. The 'First Vision' project, a partnership with the LEA, Rotherham College and Magna which takes 15 vulnerable and at risk 14 year old school children out of school for one day a week over two years and teaches them chef and front of house catering skills to national qualification standards. This is a unique collaboration and due to its success is to be repeated next year. Magna is also working in partnership on a theatrical project, 'Steel Men', and a choir project for 400 primary school children. Magna staff also go into schools and colleges to mentor and advise students in particular fields of study. One staff member has been assisting the LEA as a Cad Cam support technician in their Centre for New Technologies.

Engineering Associations – Magna is working in partnership with engineering associations in hosting the Faraday lectures and has worked with local companies in encouraging local secondary school children into careers in science and engineering.

Investors in Education – Magna works in partnership with Rotherham Chamber and Tidy Music in hosting careers days and business studies days and also staff go into schools and mentor business enterprise projects.

Universities – Magna has worked in partnership with both Sheffield University and Nottingham University on projects such as FBI Head Scanning, the NESTA torch technology project, Living Robots etc.

Phoenix Training Group – This enables long-term unemployed people to resume work and continue into full time employment. Already, in two years, four new staff are permanently employed at Magna through this scheme.

Creative Minds – By working in partnership with Creative Minds, Magna has assisted science clubs to be formed in local primary schools, whilst teaching the teachers. Summer science clubs have also operated during the school holidays along with after school science classes at Magna for primary school children.

Travelling Exhibitions (2006–8) – Magna is part of the Ecsite-uk travelling exhibitions consortium, which has meant that Animated Adventures, Love Sport and Eye for Colour have supplemented the visitor attraction offering over the main season. This has been a cost effective method of refreshing the visitor and educational offering and given extra value for our customers.

Outcomes and benefits

Working with a wide variety of partners has undoubtedly helped Magna to achieve a small operating surplus, despite having to subsidise the educational business. Joint marketing initiatives with Yorkshire Attractions Group and Yorkshire Magnificent Venues have helped keep up Magna's profile and produced good leads for the corporate events business.

The close working relationships with Rotherham Council and local colleges, universities and schools have also produced benefits both quantifiable and unquantifiable. One notable example occurred in September 2007 when a local primary school lost the use of six classrooms for a number of weeks. The Council asked Magna for help and we were able, at short notice, to turn meeting rooms into classrooms and provide the children with school meals. From this we received a considerable amount of public relations benefit and a lot of good will.

Future developments

Future educational partnerships are currently being formed with both the pakistani and afro-caribbean communities focussing on the cultural heritage of the steel industry.

Corporate sponsorship and membership opportunities and partnerships are currently being developed with various national companies. This involves partnership working across all aspects of the business.

Working in partnership with corporate sponsors Catalyst Science Discovery Centre and Novelis Recycling

Julie Burgess-Wilson — *Director, Catalyst, Widnes*

How do we work with corporate sponsors? How can this relationship be of mutual benefit and create added value?

Firstly let me explain a little about Catalyst; we are a small independent science centre situated in the North West of England. Catalyst started life as the Museum of the Chemical Industry and over the years has grown up to become the science centre it is today. We still house the museum, but by no means is this our raison d'être. Catalyst offers innovative and inspiring science from Key Stage 1-5 with a focus on Key Stage 2-3

At Catalyst we have a purpose-built education centre and a newly installed fully-equipped laboratory. Cutting-edge technology is used to produce interactive 3D films in the Alchemy theatre. The 'World of Opportunities' careers gallery takes visitors on a 'day in the life' trip around science with young ambassadors in various science industries. Supporting galleries also offer hands-on science and other curriculum-based activities and allow each visitor to have a journey of discovery in their own time or in teacher-lead sessions.

Catalyst attracts approximately 30,000 visitors annually with around two-thirds of these visits originating from schools. In 2007 Catalyst taught 545 lessons in addition to offering free 'Saturday Science Clubs' and self discovery at Catalyst.

Catalyst is run by a charitable trust and in the beginning was supported largely by ICI and other chemical industry partners. However as the industry shrunk and ICI withdrew, funding for Catalyst became a real problem with the possibility of closure becoming very real on several occasions.

In June 2004 when I came to the business, (and I deliberately say business!) one of my first tasks was to look at viability. Coming from a business background (latterly from the Co-operative Group and Boots plc) I was struck by the tremendous educational value offered by Catalyst and it soon became apparent that it would be doing the North West a great disservice if this facility was to be allowed to close.

As any good manager would do, I looked first at costs, those needed and those that were a 'nice to do'. My mantra in the early days was 'we can spend if this was at least cost neutral but if not, then we would not'.

Focusing then on incoming funds, it was clear that admission charges were simply not enough to cover the costs and there was little income from the café, shop or from conferencing activities. Clearly some changes were needed!

Coming from an industry and commercial background, it was obvious to me that asking for generic funding as a gift was not attractive to most businesses, especially in a shrinking world and where all expenditure has to offer a return. Clearly there was a need to understand what objectives industry partners had and where Catalyst could help deliver those activities.

As part of a Neighbourhood Renewal Fund (NRF) project Catalyst was involved in, I met with Novelis, a recycling company. What prompted them to be involved with this project I wondered? I met with marketing manager Diana Caldwell who explained: "Novelis Recycling is an accredited reprocessor of packaging and as such, issues Packaging Recovery Notes (PRNs) under the Government's producer responsibility legislation. The company discharges its obligation to reinvest income from the sale of PRNs by developing and supporting communication and education programmes to promote recycling."

So, Novelis were charged by Government to promote education in recycling, but it was difficult to show how and what they did, often resulting in scepticism of the value of recycling by the public. On the other hand Catalyst specialises in science education and has facilities and expertise to demonstrate the value of recycling. In addition Catalyst had expertise to help Novelis with their education resources.

Catalyst ©

Having agreed that there was indeed some common ground, we started by working together to support each other in joint objectives, ours a need for funding, theirs a need to get educational resources to help develop some of the resources for schools. Having successfully worked together for a few months, Catalyst offered the chance for Novelis to get involved in a new project, cutting-edge virtual tours, using 360º photography creating the feeling of virtually being in the filmed environment.

From the Novelis perspective, schools visiting the plant was not possible due to the extreme heat produced and resultant risks associated with such a factory environment. So, this project 'opened' the plant up. For Catalyst it gave a strong industry real time virtual tour to visitors and provided greater funding opportunities for the science centre.

By working in partnership, Catalyst and Novelis have identified mutual needs and delivered great solutions for both parties. Most notably Catalyst has a three year funding programme with Novelis and together both have achieved what could only have been possible in partnership.

Novelis recently won PRN industry awards for education in respect of this project and the Novelis Values in Action European award, proving the value from the Novelis perspective. Diana Caldwell, marketing manager at Novelis Recycling says:

> "For Novelis this project has raised the profile and reputation of the company, and aluminum, within the local community and far beyond.
> More people are now aware of the plant and its unique role within the locality, the UK and Europe"

Appendix 1: Methodology

Data for this report was collected from 25 Ecsite-uk Science & Discovery Centres in a survey developed and administered by Ben Gammon and Yvonne Harris in 2007. Data collected refers to outputs and impacts delivered by Science & Discovery Centres in the financial year 2005-6. Additional discussions with some Science & Discovery Centres were held in February 2008 to supplement incomplete data sets relating to visitor numbers. The report also includes evidence drawn from the 41 submissions by Science & Discovery Centres to the Science and Technology Committee Inquiry into the funding of science centres in October 2007.

A questionnaire was developed with input from Ecsite-uk's previous director Melanie Quin (in-post until Jan 2007) and the Ecsite-uk Committee and previous Chair. One version of the questionnaire was used for centres in England, Wales and Northern Ireland, and a bespoke version of the questionnaire was developed for Scottish centres in order to take account of the differences in age categories of school pupils. A further bespoke questionnaire was developed for organisations with permanent satellite out-stations so as to capture the data from all of their visitors. All questionnaires are available on the Ecsite-uk website.

Pilot versions of the questionnaire were sent to 15 senior members of staff at six Ecsite-uk organisations in December 2006 for feedback on the wording of questions and to assess whether or not museums and Science & Discovery Centres would hold such data. Following this consultation the survey was revised. This revised survey was emailed to 52 Ecsite-uk member organisations in January 2007. The names of individuals to whom the survey was sent were taken from a list of contacts supplied by Ecsite-uk.

Four supplementary questions were sent by email four weeks later and the deadline for completing the survey was duly extended until 9 March 2007. In mid-March follow-up phone calls were made and emails sent to organisations that had not returned their survey. These organisations were given until 31 March 2007 to submit their data.

As with previous Ecsite-uk surveys the response rate for this survey was nearly 50%. Where appropriate, data from the 2005 survey (covering the financial year 2004-5) has been included in footnotes to this report to provide a fuller picture. Nine museums and Science & Discovery Centres provided data in the 2005 survey but not in the 2007 survey; these were: the Eden Project, Glasgow Museums, Royal Botanic Gardens Kew, MAGNA Science Centre, MOSI Manchester, the National Maritime Museum, the Royal Observatory Edinburgh, Satrosphere Science Centre and the Scottish Seabird Centre. However care must be taken when considering such data since the questions used in the 2005 survey were different from those used in the 2007 survey and it is likely that some of these figures will have changed between the periods covered by the two surveys (i.e. 2004-5 and 2005-6).

We are extremely grateful to the following organisations for generously giving their time to contribute to the 2007 Survey. With continued UK-wide commitment to openly sharing information, Ecsite-uk can gather and present increasingly robust evidence of the impact Science & Discovery Centres have on the nation.

1. Armagh Planetarium
2. At-Bristol
3. Centre for Life
4. Dundee Science Centre (Sensation)
5. EUREKA!
6. Glasgow Science Centre
7. Inspire Discovery Centre
8. INTECH
9. Jodrell Bank Visitor Centre
10. Look Out Discovery Centre
11. Magic Mathswork travelling Circus[1]
12. Natural History Museum
13. National Museums Liverpool
14. National Museums Scotland
15. National Space Centre
16. National Stone Centre
17. Our Dynamic Earth
18. Royal Botanic Garden Edinburgh
19. Science Museum
20. Techniquest
21. The Deep
22. The Horniman Museum
23. The Observatory Science Centre
24. The Oxford Trust
25. Thinktank

1 Ecsite-uk member Magic Mathworks Travelling Circus offers solely outreach

Acknowledgements

We are grateful to the following people who have been instrumental in the creation of this report:

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