JISC

JISC Final Report

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Institute for Learning and Research Technology

Greening Events

Final Report

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Executive Summary

The Greening Events project conducted an exploratory investigation into how to reduce the negative sustainability impacts of planned academically related events (such as conferences and seminars, training, administrative and project related events) whilst gaining the maximum benefit from them. It also focused on the role that digital technologies could play in helping to reduce the negative sustainability impacts of these kinds of events. The project was divided into two related strands:

Systemic Impact Investigation

This aimed to explore a way to understanding the sustainability related impacts of academically related events from a system wide perspective – rather than only the direct impacts of an event - and so possible options for reducing their overall negative impacts. A broad range of methods were used to gain insight into:

- the nature of the systems of which academic events are a part
- approaches to modelling, representing and communicating the systemic impacts that events have at present
- approaches to modelling, simulating, representing and communicating the impacts of any changes to the practices related to events

Event Tools

This aimed to explore the potential for using mobile and web-based information services to support event attendees to make more effective use of public transport, cycling and walking options. The project developed and trialled a range of tools to support physical events and assess to what extent better information and better use of commonly available technologies (such as mobile phones) could improve the sustainability of a wide range of physical academic events. The project built on the software tools produced by previous JISC-funded work (the CREW and Mobile Campus Assistant projects) at the ILRT and trialled them with real academic events.

The underlying goal of the project was to begin to identify and map out on a wide-scale the key issues, factors, initiatives, gaps in knowledge and understanding, defined by the intersection of *events, sustainability issues and event enabling ICT*. Given the wide scope and complexity of this area the project findings report (***Appendix D***) aims to give a flavour of the issues and opportunities associated with 'greening events' rather than a comprehensive review. An annotated bibliography was also produced to provide a set of starting points for those interested in taking these issues further (***Appendix C***).

1. Background

The Greening Events project was a small exploratory project with just under 1.0 FTE split across 3 roles (project management, analyst and technical developer) working for 12 months. The project conducted an investigation into how to minimise the negative sustainability impacts of academic related events (such as conferences and seminars, training, administrative and project related events) whilst gaining the maximum benefit from them. It used real academic events as case studies and looked at the role that digital technologies could play in helping to reduce the negative sustainability impacts of these events, as well as developing a systemic impact analysis methodology to help event organisers conduct assessments of the sustainability impacts of their events.

The project built on two earlier JISC-funded software development projects, the Collaborative Research Events on the Web (CREW) project[1] and the Mobile Campus Assistant project[2]. The CREW software uses Semantic Web and Web 2.0 technologies to link event information ranging from data about delegates and presenters to recorded event presentations and annotations made by participants in a social software context and the Mobile Campus Assistant project provided a platform to extend travel related information to case study delegates.

The project also made use of the experience of the project analyst, Paul Shabajee, who has worked at Hewlett Packard research labs with WWF and other partners over the last two years to develop approaches to conducting these forms of systemic assessment.

1.1   Context

HEIs increasingly have to respond to HEFCE directives on sustainability policy, and this study was intended to support the better planning of events and event attendance throughout the research community (and potentially beyond) in the context of the "Green Agenda".

Academic events such as conferences, congresses, workshops, project and programme meetings, grant reviews, seminars, departmental away-days, training events, business and strategy planning meetings, etc. are fundamental to, and deeply integrated with the operation of virtually every aspect of academia. Such events fulfil a wide range of roles and have a wide range of intended consequences, for example, dissemination of research findings or best practices, decisions made, new skills learnt, policies developed, grants awarded, advice given, marketing done, innovation stimulated, etc. They also have many positive incidental or unintended consequence, e.g. informal networking and 'corridor talk' that facilitates new (often serendipitous) collaborations, enables 'catching up' on community 'news', allows new staff/researchers to get to know the key people and culture of their chosen field, providing 'reflective time away from the office', increasing the reputation of the host

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[1] CREW (Collaborative Research Events on the Web) http://www.crew-vre.net/
[2] Mobile Campus Assistant http://mobilecampus.ilrt.bris.ac.uk/

institution, etc. There are many other external 'incidental' benefits e.g. economic benefits to local communities and other companies involved in enabling the event to happen, cultural benefits of significant events being hosted in specific towns/cities.

There are also however negative environmental and other social and economic impacts. For example a significant focus at present is the 'carbon' impact of such events, Hefce estimated[3] that air travel (for business purposes) in the academic sector represented a total of the order of 30,000 tonnes CO_2 in 2006. A small study in an institute at UCL[4] estimated that their academic staff has an average work related travel (non-commuting) carbon footprint (CO_2 only) of the order of 2,000 kg CO_2 per person per year. For comparison the average annual CO_2 (eq) emissions per person per year in the UK as a whole is of the order of 7,000 kg CO_2 per person per year[5], travel being a highly carbon intensive activity.

Greenhouse Gas (GHG) emissions and consequent risks of damaging anthropogenic climate change associated with event attendance is one kind of impact, however the overall environmental, social and economic impacts of events are very much broader. For example events necessitate the procurement, use and consumption of resources, all goods used must be manufactured, they produce waste, directly and indirectly employ staff, require venues and infrastructure, they might disrupt local services for local residents as well as add money to the local economy.

Whilst we are not aware of any systemic study of the scale and/or profile of academic events in the UK or worldwide it does seem clear that the cumulative impact of these events both positive and negative can be very significant. Academic events range from the many day-to-day business and project meetings to fewer but still significant number of very large international conferences (some having 10,000+ delegates) coupled with the fact that there are roughly 180,000 academic staff in the UK[6] with some 380,000 staff in total; which is around 1.2% of the UK working population (approx. 30 million).[7]

Over the last few decades the rise of ubiquitous broadband internet access in homes and institutions and associated technologies such as video conferencing, live video streaming and remote and mobile conferencing software, means that there is increasing use of such technologies to enable, support and enhance events ranging from small business meetings to large congress'. The technologies enable fully virtual, hybrid (dual face-to-face and virtual) events and the technology based enhancement (or amplification) of face-to-face events.

The potential affordances (opportunities afforded) by these technologies to displace face-to-face event attendance and/or enhance event experiences whatever their nature, leads to the potential for dramatic changes in the environmental, economic and social impacts of the kind noted above. Collectively we call these 'sustainability' related impacts.

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[3] (using a simplified methodology based on uk average figures)
[4] http://www.ucl.ac.uk/silva/environment-institute/research/carbon
[5] http://www.decc.gov.uk/en/content/cms/statistics/indicators/ni186/ni186.aspx
[6] http://www.hesa.ac.uk/
[7] http://www.statistics.gov.uk/downloads/theme_labour/LMS_Q&A.pdf

The Greening Events project was founded on the idea that in order to *meaningfully understand the impacts of events* overall we need to assess not simply the immediate impacts but also to the indirect and knock-on system wide impacts. For example:

In the case of 'carbon' footprints due to Greenhouse Gas emissions, immediate or direct emissions linked to a face-to-face conference might include, fuel burnt in transport of delegates to attend events, electricity generation for the venue and accommodation during an event, etc. Indirect or less obvious impacts include the travel of organisers to evaluate venues, to plan the event, commuting travel of venue staff, an appropriate share of the 'embedded carbon' in the equipment, exhibition materials, buildings, travel infrastructure, etc. that make the event possible.

There are also less obvious and less tangible indirect effects that need to be included, e.g. so called 'rebound effects', which often offset (or reinforce) attempts to reduce negative impacts to a lesser or greater extent. For example if in a particular case, video conferencing was used as a direct substitute for what would have been a face-to-face event with a significant air travel component and overnight accommodation involved, then money will have been saved by the organisation and possibly the delegate(s). This 'spare' money will now be spent (or invested) and so the net carbon footprint of the use of the technology will/should include the carbon impact of the spending/investment of that money. If the spending is on 'carbon' reduction activities the net impact may be more positive than if it is on highly carbon intensive impacts, which might be even greater than the savings.

The same thing applies to time, if not making the journey means that there is more productive time available then the impacts of that extra productivity need to be accounted for. These 'carbon' based illustrations (there are many more examples of significant indirect impacts) show that understanding net impacts of an event requires a systemic approach.

Greening Events also highlights the fact that, in nearly all cases, planning any event will require balancing positive and negatives impacts with respect to different aspects of sustainability. For example choosing the location of an event, for a national event it may be that in terms of minimising carbon footprint it would be preferable to hold the event in Birmingham, Manchester or London (due to centrality and good public transport links). However the socio-economic and academic impacts on more peripherally located towns and cities and HE institutions may well be highly negative. There may be specific policy, 'business' or academic reasons why locations may be chosen that are far from optimal in terms of carbon, e.g. attempts to engage particular geographically located communities that have historically been under-represented, or a focus on engaging with industry sector and a particular location is best for their representatives.

The Greening Events project therefore aims to help stakeholders involved in academically related events make more effective decisions about the sustainability impacts of events when planning, attending or developing policy related to events.

1.2 Aims and Objectives

The overall aim of the Greening Events project is to help investigate how best to balance the need and desire of getting the most from academic related events while minimising the sustainability impact of them. The two main objectives were:

1. To undertake a systemic impact investigation[8] to explore the primary, secondary and tertiary (direct and indirect) sustainability impacts of events. This investigation combined other factors such as financial costs and the less tangible but no less important social, personal and organisational costs and benefits of people attending the events, thus enabling a more rounded exploration of the balance between costs and benefits.

2. To explore the use of a variety of technologies to help minimise the sustainability impact of events. To do this the project built on two earlier JISC-funded software development projects and will lead to prototype software that will allow the event organisers to effectively plan their events and attendees to get connected and/or get information (including via mobile devices) towards "greener events".

The overall aim did change focus during the life of the project to take a step back from just looking at how to minimise the sustainability impacts. Instead the project focussed on rethinking events systemically in order to make them more effective and to reduce the negative sustainability impacts.

1.3 Methodology

The project was made up of two distinct parts:

1.3.1 Systemic Impact Investigation

The systemic impact investigation aimed to examine and understand the sustainability related impacts of academically related events from a system wide perspective (rather than only the direct impacts of an event).

A broad range of methods were used to gain insight into:

- the nature of the systems of which academic events are a part
- approaches to modelling, representing and communicating the systemic impacts that events have at present
- approaches to modelling, simulating, representing and communicating the impacts of any changes to the practices related to events

Specific methodologies employed included: literature scan/review, review of existing assessment methodologies, observational case-studies, event attendee questionnaires, semi-structured interviews of event organizers, venue managers and participants and initial practical investigations into the suitability of modelling

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[8] Originally this was conceived as a 'systemic impact assessment', this changed during the project as the issues and approaches became clearer

techniques such as, Life Cycle Assessment (LCA), soft-systems methodology, systems dynamics and agent based-modelling for modelling and communicating the systemic impacts of academic events.

1.3.2 Event Tools

The project developed and trialled a range of tools to support physical events and assess to what extent better information and better use of commonly available technologies (such as mobile phones) could improve the sustainability of a wide range of physical academic events.

The project built on the software tools produced by previous JISC-funded work (the CREW and Mobile Campus Assistant projects) at the ILRT and trialled them with real academic events (see section below for details).

1.4   Case Studies

The Greening Events project used the workshops and events of two national services hosted at the Institute of Learning and Research Technology (ILRT) as the main case studies to gather data, test out the technology tools and solicit feedback from the event participants. The two services involved were:

1.4.1 JISC Digital Media

JISC Digital Media[9] is part of the national JISC Advance service, and provides advice guidance and training to the UK's Further and Higher Education community to ensure that digital media resources being created used and managed within the further and higher education community meet the teaching, learning and research needs of individuals and institutions within the UK. As part of their advisory role they run regular training courses and workshops at the ILRT offices in the University of Bristol. We piloted an online questionnaire with the delegates of a JISC Digital Media Workshop in late March, this gathered information about their journey to the workshop, how they would have spent their time had they not attended the event and their views on the positive and negative consequences of attending the event. Subsequent questionnaires (four in total) also asked for feedback on the use of the online tools (see *Appendix A* for survey questions). The responses from the delegates were a little disappointing in terms of numbers of replies to our online questionnaire, despite the full support and co-operation of JISC Digital Media staff. This was generally because the workshops were quite intensive hands-on events and typically there wasn't time in the actual workshop for the participants to fill in an online feedback questionnaire. Some analysis of the results is provided in Section 3.3.

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[9] JISC Digital Media http://www.jiscdigitalmedia.ac.uk/

1.4.2 Higher Education Economics Network

The Economics Network[10] of the UK's Higher Education Academy provides publications, events, funding opportunities and other resources to support university teachers of economics. The Network held a one-day eLearning Symposium at the University of Bristol on the 9th September 2010, which the Greening Events project used as a particular case study. The online tools were made available to delegates in advance of the meeting to allow them to plan their travel, project staff also presented their work at the Symposium[11] and followed up with an online questionnaire. Again the numbers of responses were disappointingly small, despite email reminders from the Economics Network staff. Because of this the project decided to commission some further evaluation work to investigate where technological interventions may be useful for supporting events (see Section 3.3.1).

1.5   Steering Committee

A Steering Committee was set up to provide advice on the direction of the project, help identify critical success factors, advise on the sustainability plans for the toolkit and evaluate the outputs of the project in their own work settings (where appropriate). The group consisted of representatives from the two national services used as case studies; JISC Digital Media and the HE Economics Network, two members of the Corporate Social Responsibility group in ILRT and the Head of the Sustainability Department at the University of Bristol. The committee met five times during the project and provided very useful advice and guidance to the project team, especially around possible use cases and additional features for the event tools.

2.   Implementation

2.1   Systemic Impact Assessment

The highly multi-disciplinary nature of the study of events and systems modelling and assessment led to a very wide-ranging literature scan. After some experimentation with available online bibliographic services, the references for the identified documents (journal publications, books, reports and websites) were collated using a combination of citeulike[12] and mendeley desktop reference manager[13]. These were then compiled into a pdf document grouped together under appropriate headings, including:

- Sustainable Events Guides and Guidelines
- Environmental and Social Life Cycle Assessment (LCA) inc. Carbon Footprinting – Standards

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[10] The Higher Education Academy Economics Network http://www.economicsnetwork.ac.uk/
[11] Presentation slides available from http://www.slideshare.net/dhiom/greening-events-project-presentation-for-the-he-economics-network
[12] http://www.citeulike.org/
[13] http://www.mendeley.com/

- Sustainable Events Management
- Economics
- Academia & Academic Events
- Sociology of Science & Research
- Systems Thinking, Approaches & Modelling
- The Event Experience and Event Amplification
- Virtual Communications (Video & Tele Conferencing and Working)
- Sustainable Procurement
- Behaviour Change

Given the time and resources available it was not viable to conduct or write up a full literature review however the scan identified key areas of literature which was then scanned for key insights and where relevant these were reviewed in more depth.

2.1.1 Interviews & Profiling of Academic Events

Confidential semi-structured and informal interviews were undertaken with a range of individuals involved in events from different perspectives:

- Event organisers (of face-to-face, fully-virtual and hybrid events)
- Event attendees (of face-to-face, fully-virtual and hybrid events)
- Venue managers/coordinators
- Regional (business) tourism officer
- Exhibitors at face-to-face events
- Academics from a range of fields, e.g. sociology, economics, computer science, engineering, human geography, education and educational technology.

These were complemented with small questionnaire studies of event attendees of some of the case study events (see below). Areas investigated in these surveys included:

- Motivations and criteria for attending the event
- Travel choices
- Perceived benefits of events at different levels (individual, organisational, others)
- Sustainability related concerns
- Awareness of sustainability issues related to events
- The role/potential of virtual events to substitute or complement face-to-face events
- How perspectives of specific disciplines bring insights to understand systemic impacts of events

Again the results and learning gained from these studies fed into the development of the toolkit documents and also the development of the software tools.

In addition we conducted case studies of events. In all there were five events for which various aspects of the events were case studied:

- JISC Conference 2010 (pre-case study)
- JISC Digital Media training events (various)
- Institutional Web Managers Workshop 12th-14th July 2010
- Higher Education Academy Economics Network eLearning Symposium 9th Sept 2010
- DevCSI (Developer Community Supporting Innovation) Mobile Web Workshop 27th Oct 2010

Aspects of the events that were studied included:

- Use of technology (integral to conference and by delegates)
- Use of resources and energy
- Event practices (inc. planning of events)
- Catering practices
- Venue management practices
- Travel choices of delegates
- Spending of delegates in the local (venue) area

These studies provided very significant insight into the practical planning and operation of events and their impacts. They also provided grounding illustrations of ideas and findings from literature and interview studies and case-studies and increased our understanding of the various kinds of sustainability related impacts of events.

2.1.2 Systemic Modelling and Analysis

Academically related events are a part of many interlocking and inter-related systems, e.g. research, educational, economic, environmental, social/developmental, technological, infrastructural, etc. In order to model the impacts of events across this range of systems and types of impact it would be necessary to identify the significant components of such a model and their relationships, and so understand which of the many approaches to systems modelling will be most helpful in understanding the impacts of events and any interventions or changes in behaviour, policy, etc. and in what context.

Identifying the key components of the systems and factors and their relationships was problematic because our scoping literature review found that there appears to have (perhaps surprisingly) actually been very little systematic research into the nature and roles of academic events. This means that much of the systemic thinking and modelling work has involved drawing together what is available and beginning to integrate analysis to develop systems models.

The multi-disciplinarity nature of the project subject domain has lead to a strong belief that developing an understanding of the impacts of (systemic) events effectively will require work by a multi/interdisciplinary team. As we conducted the investigation into the factors involved, it became clear that it would be helpful to have a greater understanding of how different disciplines would 'think about' and/or 'model' various aspects of events, e.g. how sociologists and/or educationalists might

study an academic event as a social/learning event in the context of the lives of academics and academia as a whole and impacts on wider society, how they would identify the important issues, outcomes, factors and how they related, how (and if) they would model those impacts. Similarly these questions apply for other key disciplines, e.g. leisure and tourism and event/venue management, environmental sciences, sustainability/development studies, development psychology /environmental psychology, management, design, built environment, human geography, transport, politics/public policy, computer science, engineering, medicine and health, and many others. Such collaboration, given time and resource constraints, was not possible, beyond informal interviews (see above).

With regard to approaches and tools for modelling, a range of approaches have been investigated including; soft systems, systems dynamics (causal loop/stock and flow), Life Cycle Assessment (inc. carbon foot-printing), scenario planning and various approaches to economic modelling. Simple examples of these have been explored, e.g. models illustrating how particular kinds of re-bound effects come in to play.

2.1.3 Synthesis of Event Guidelines

There are a number of existing guides and checklists to help organisations to reduce the sustainability impacts of their events (see the annotated bibliography ***Appendix C***) and these have typically been produced to support a particular organisation or event. A synthesis of these guidelines was produced using qualitative research software Nvivo. The documents were imported into Nvivo and each guideline was assigned a node for the source e.g. Defra Guidelines and then typically 3 or 4 headings to describe if it was a core or additional recommendation, who it applied to e.g. event organisers, event suppliers, etc and the themes it related to e.g. transport, waste reduction, etc. The resulting set gave a good overview of the current advice for 'greening' an event across a range of different sectors. Further work was then carried out to remove duplicate guidelines, edit sentences where necessary and to pull out a subset, which was considered to be most applicable to an academic audience. See ***Appendix B*** for a copy of the Greening Event Guidelines.

2.2   Event Tools

The software tools built during this project were mostly created using existing systems and services such as Flickr, Google Maps, etc to show how these technologies could be used to allow event delegates to more effectively plan their journeys and as a consequence to hopefully make greener travel choices. The information tools were tailored to a specific event and designed for use by an event organiser to publicise information about the event venue. They can be tailored to use an event organisers own branded look and feel but would ideally be incorporated into their own event management system.

The tools were based on two existing software systems developed at ILRT by Web Futures: CREW and Mobile Campus Assistant (MCA).

2.2.1 CREW software

The version of the CREW software developed for the Greening Events project is available from the Google code repository at:

https://crew.googlecode.com/svn/branches/GreeningEvents

CREW runs as a Java application built using the Spring Framework[14] and Apache Maven[15]. It was designed as a service that is able to harvest event feeds from a variety of sources in RDF/XML format and make these available via a search and faceted browse interface. Together with other features for displaying event outputs such as video, the system enables user comments to be associated with the event metadata. For the needs of Greening Events, some of the functionality of CREW was not required, such as the parametric search interface, since for our purposes only one or possibly a series of events from one event organiser would be available through the service. In fact, for the tests, we directed users directly to the information about the single event they were attending, by-passing the search interface altogether.

One feature necessary for our requirements that was missing from CREW was the ability to create the event metadata that was to be displayed, since the system was designed to display only event metadata harvested from other systems. The development work for CREW therefore included the creation of a new package within the system to provide an administrative interface for event organisers that allows them to generate metadata about their events and make this available as an RDF/XML feed to the main CREW service. In addition, to allow comments within CREW about the event to be made available to the MCA software for display (as an extra means of communication between delegates and between event organisers and delegates), a facility for converting event comments to an RSS feed was also created.

The remainder of the development time was taken in adding the Google Maps API to extra pages within the system that would automatically generate routes and directions from various start points in the locality to the event location. This required some reworking of the existing code. The Google Maps API could then make use of Latitude and Longitude coordinates entered by the event organiser via the new event creation interface. In addition, use was also made use of the ability of Google Maps overlays to be constructed from Google Earth KML files. These can be generated by various means (such as mobile phone GPS mapping features) and pasted in to the event creation interface. The interface was also enhanced using the Google Maps API to allow an event organiser to generate the required coordinates with a simple point and click on a map.

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[14] Spring Framework Software http://www.springsource.org/
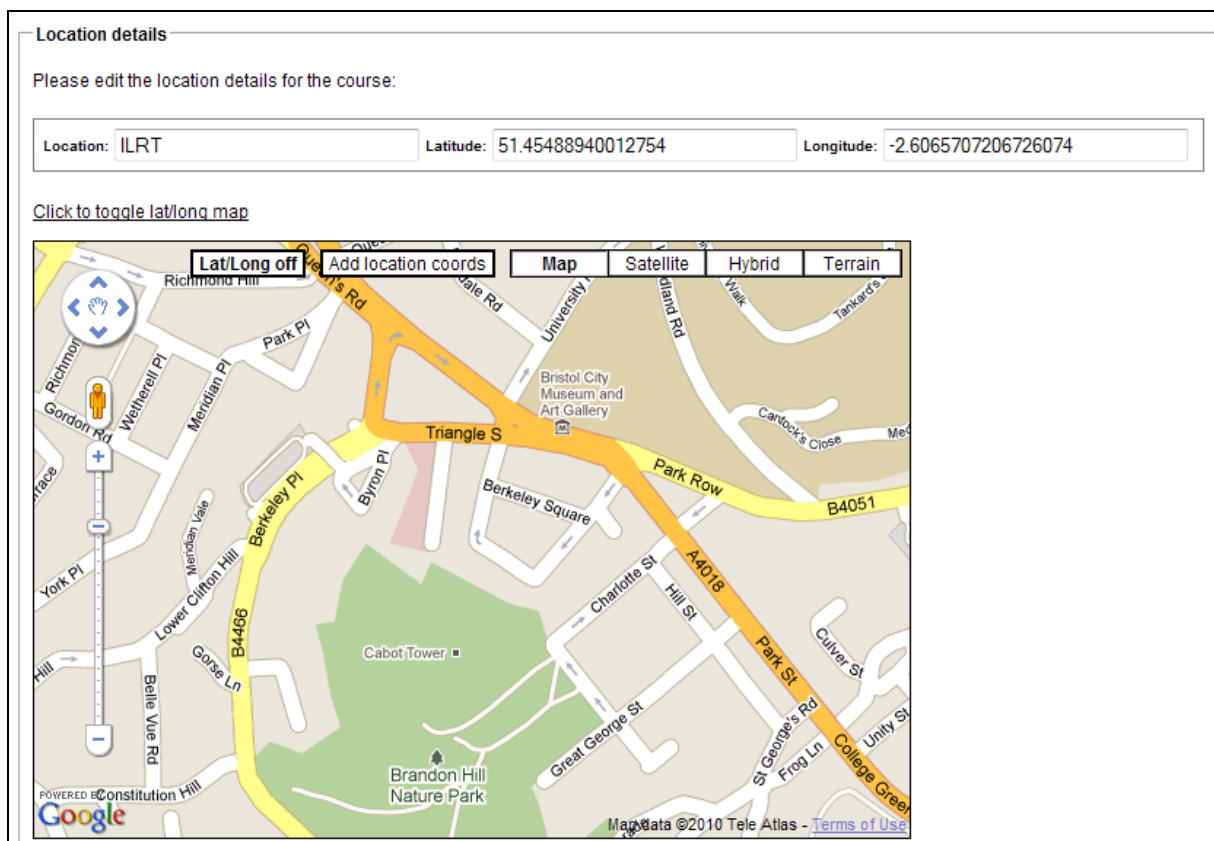[15] Apache Maven Software http://maven.apache.org/

Illustration 1 - Admin interface showing Google map for generating location coordinates

Other publicly available APIs were also used to add features to the event pages, such as links to Flickr for providing photographs of walking and bus routes to the event location, and access to a Carbon Footprint calculator.

The final function to be added to the software was the Journey Sharer application. This allowed delegates to enter a post code for work or home and request a list of other delegates who lived or worked within a specified range. The system can then send an email to selected delegates with a journey sharing request.

The outcome of the development work with the CREW software was therefore to allow an event organiser to generate a series of web pages about their event, containing route maps and directions and photographs of the route, by use of a web form wizard that guides them into entering the necessary metadata. The metadata is then converted to RDF/XML and used to generate the site pages. Other than customising the HTML and CSS needed to format the styling of the site, all pages are generated automatically.

2.2.1.1   Software development issues and future work

Since CREW had been designed to display event information harvested as RDF/XML feeds, for the Greening Events project we created an event organiser package to create and output stored metadata in this format. This approach shows that events metadata could be shared between different systems. In particular, whilst the metadata describing the event location, together with associated start

points for routes to the location cannot at present be re-used between events, this is a feature that could be developed in the future. This would mean that not only would an event organiser only have to key in the location metadata once for all events that they ran, but that common event locations could share their metadata with other event management systems.

The Carbon Footprint calculator works using a simple IFrame that connects to a service provided by Travelfootprint.org. It would be more useful to have access via an API to the underlying functions of this or a similar service. This would allow us to display carbon footprint information for different journeys to the event location given in the event metadata without requiring the user to enter any data themselves. (A starting address could be pulled from their profile). The data could also be integrated more meaningfully into the different journey options provided by the CREW software.

2.2.2 Mobile Campus Assistant (MCA)

Mobile Campus Assistant (MCA) had only minor changes made to the code for the project and the public version of the software is available from:

https://github.com/ilrt/mca/

MCA is also a Java application built using Apache Maven. The system has the ability to aggregate data from RSS and Atom feeds, as well as XML, HTML and Google calendar data. It is possible to implement a new Harvester that can harvest any data source and store it as RDF. In addition, it has the ability to display maps generated using the Google Maps API.

MCA could be used largely as is for the purposes of the Greening Events project. Development work focused on two areas.

MCA for Bristol already provided a Google map of bus stops around the university campus and city with links to latest bus times which was very useful for our project. In addition to this, we wanted to replicate the Google Map walking route from Bristol Temple Meads railway station to the event location that we had created using a KML file for the CREW software. This was generated using the existing MCA map page as a template and using our own KML file. The KML file included placeholders that linked photographs on the Flickr site with locations on the route map.

We attempted to alter the code that detected the user's location based on GPS information from smart phones, so that the map would follow the user as they walked to the event location. Whilst working with some Android powered phones, there were issues with the way this worked with the iPhone and hence this feature was eventually dropped. Instead, the application attempts to determine the location of the user once only if they are within a specified radius of the event location or defaults to Bristol Temple Meads. It would be useful to undertake further work to create an application that could follow the user along the route.

The other issues with the mapping was that the interface had been designed to be optimised to a standard iPhone setting, which did prove a barrier when users viewed

maps through some smart phones with larger screen sizes (this issue is already being addressed with the next version of MCA).

The second area looked at was adding a social networking element to the project by allowing MCA to display comments added to the event page in CREW and to display Tweets with a given hashtag, which could potentially be written by delegates via mobile phone apps.

The MCA code is designed to construct pages of lists from harvested RSS feeds, but there was an issue with the RSS output generated by the Twitter API. This included non-standard output that caused problems with the Java RSS library used by MCA and required some tweaking of the code to filter out the non-standard components. Another issue with displaying CREW comments and Tweets was that list item descriptions in MCA are displayed without author information, which made it more difficult to interpret the comments.

Although MCA was easy to configure for our purposes, the one main drawback with the software as it stands is that it is necessary to manually edit the configuration files for each event, i.e. to alter contact details, map location coordinates, the link to the route KML file, the comments RSS feed, and the Twitter event hashtag. For future development, it would be useful to write an interface to MCA that could reconfigure the system based on the same metadata used within the CREW software.

3.   Outputs and Results

3.1   Systemic Impact Investigation

All of the exploratory work was used to help provide the necessary basis for understanding and beginning to model events in their larger contexts and so understand their wider impacts (positive and negative). The report on Rethinking Events (see *Appendix D*) documents the thinking and findings from this strand of the project and includes:

- An overview of 'academic events'
    - o Roles (academically related) – intended, incidental and unintended
    - o Systemic nature of academically related events – their wider roles (economic and social), systems that they are part of
    - o Sustainable ICT
- Rethinking events and the sustainability implications of:
    - o Why do we have planned events?
    - o How the goals and purposes of events might be met
    - o Where an event is held – physical or virtual
    - o When an event happens
    - o Who should be involved
- Rethinking and extending evaluation
    - o Using sustainability assessment tools and methodologies
- Future of events

3.2 Event Tools

3.2.1 Pre-Event Tools

The pre-event tools were designed for use by delegates as part of their travel planning for an event. They were linked to from an installation of an amended version of the CREW software. The screenshot below show the Home Page of the CREW installation using the JISC Digital Media branding
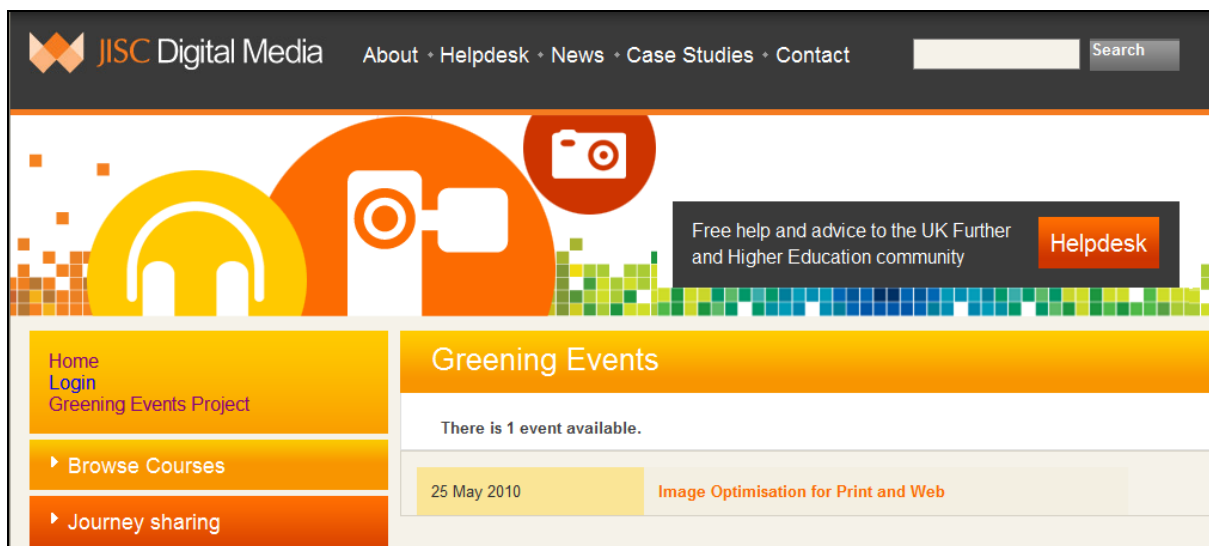

Illustration 2 – Greening Events CREW Installation for JISC Digital Media

3.2.2 Features

3.2.2.1 Travel Footprint Calculator

This allows a user to compare the carbon emissions of different methods of travel. We used an online calculator produced by Camden Council[16] for this purpose. Although it was useful to add as a proof of concept, it proved far too complicated and confusing for delegates, as it required the user to add details such as the type of diet they consumed if they were calculating their emissions from walking or the type of train they were travelling on if calculating the emissions from rail journeys. A simpler, more pared down calculator would be preferable for any further implementations. A screenshot of the Travel Footprint Calculator from the HE Economics Network version of the site is shown below:

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[16] Travelfootprint Calculator http://www.travelfootprint.org/about

Project Acronym: GE
Version: 1.0
Contact: d.hiom@bristol.ac.uk
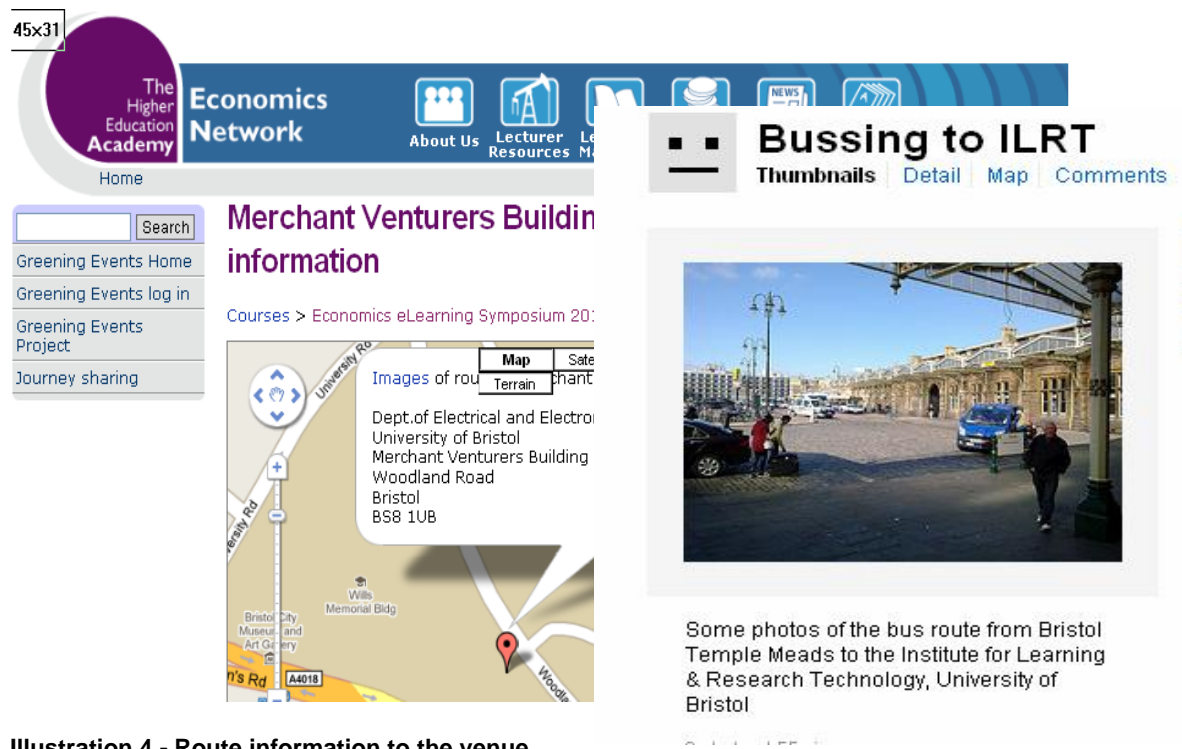Date: 18th January 2011

Illustration 3 – Travel Footprint Calculator

3.2.2.2 *Location information - Images of route to venue*

This feature provides photos of the bus stop outside the train station and other images along the bus route with associated information about the journey. This fairly simple tool is based on anecdotal feedback that delegates don't like to take buses as they don't know the area and are worried that they will get off at the wrong stop, for example a quote from one of the case study delegates:

> "If you don't use public transport normally it can be a learning experience e.g. if you need to get off a bus at a bus stop in a town you've never visited how do you know when you are there?"

Ideally providing this sort of visual information would give people confidence to try taking the bus rather than jumping in a taxi. Screenshot shown below shows the image map and Flickr photos of the route to the venue:

Illustration 4 - Route information to the venue

3.2.2.3   Location information – Walking routes from station to venue

The CREW software has been customised to allow the event organiser to add event metadata, which will automatically generate location information including directions from one or more local start points, such as a railway station. This information is displayed using the Google Maps API and is linked to extra information such as online route photos stored on Flickr and optional user generated route information using the KML metadata format. The KML files were originally produced using the Nokia Sports Tracker (there are various similar apps available on Android and IPhone). However the routes were not particularly accurate and later implementations were created using Google Earth to manually draw the routes and generate the KML. Photographs were added using Placemark tags in the KML data. This provides a walking map of the route from the bus and train station to the venue using Google Street View. One of the suggestions that we didn't have time to implement was to add in cycling routes and bike lock up points to the maps to encourage delegates to consider cycling.
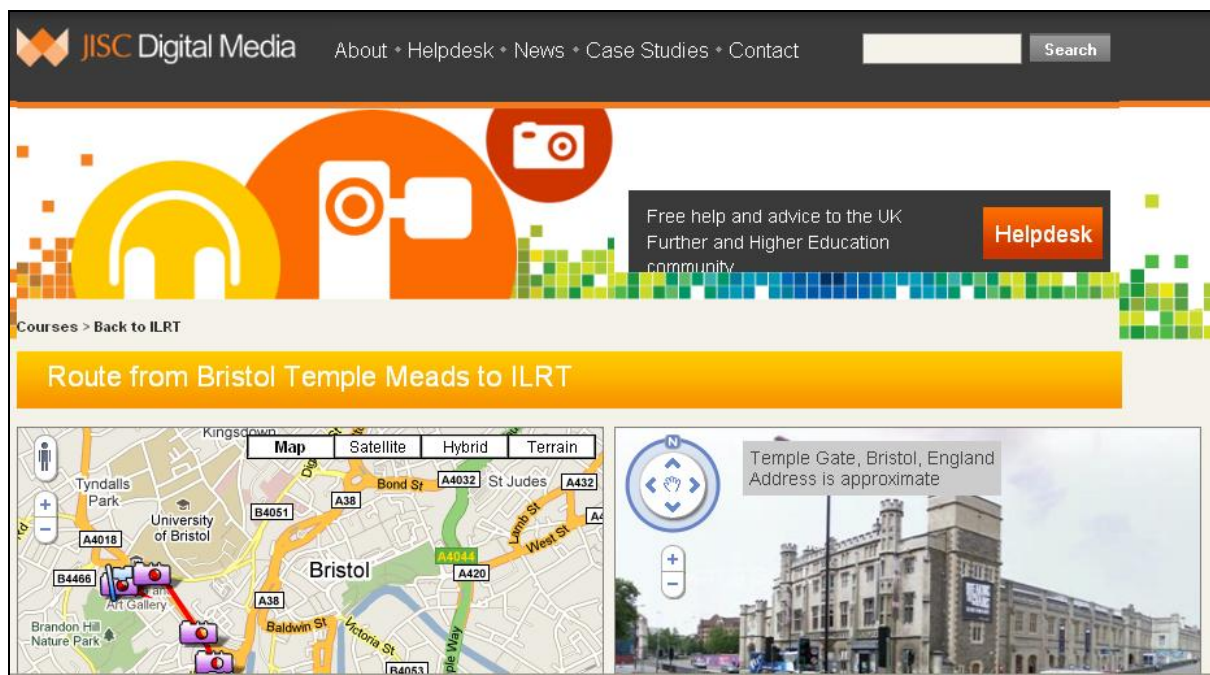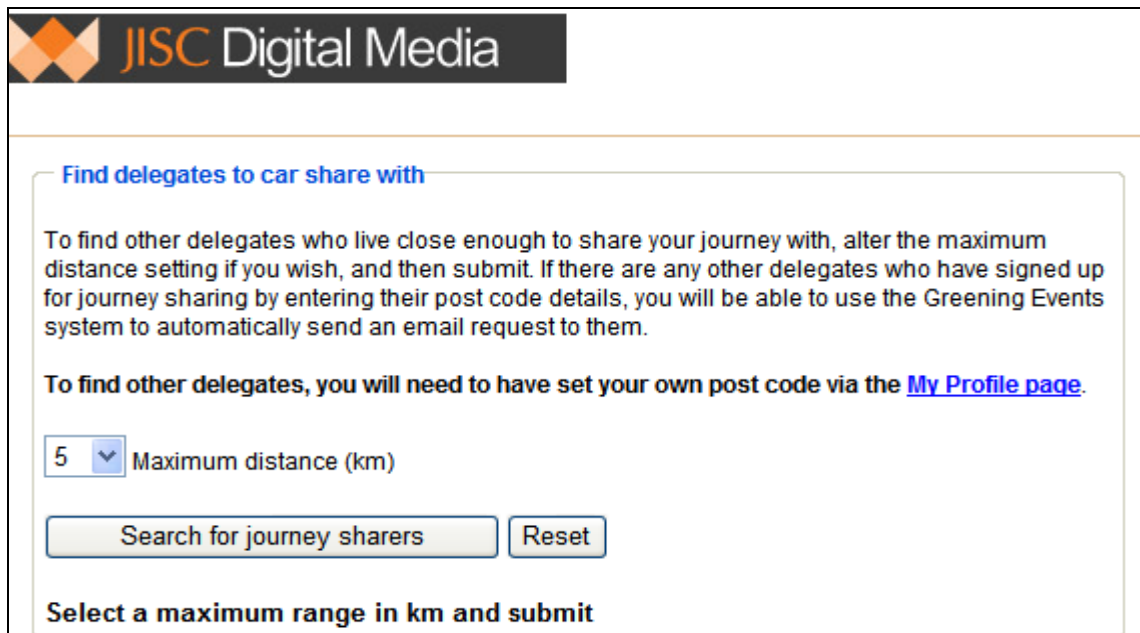
Illustration 5 – Street view walking route from the train station to the event venue

3.2.2.4   Course comments

CREW provided the ability to add comments to the event page; delegates might use this to ask questions about travelling to the event that can then be shared with other delegates. The event organiser might also use this to broadcast additional travel information about the event. The CREW annotation system for enabling users to add comments on events was enhanced to generate an RSS feed of event annotations. These can be picked up by the mobile web site provided by MCA to give users live information related to their travel journeys.

3.2.2.5   Journey Sharing

This was an optional feature added in a later implementation that users could sign up to by adding the postcode of their journey start point (which may be home or work) and then look to see if there are other people nearby who are going to the same event and would be willing to share the journey. This might be to car pool, share a taxi to the station, etc. Unfortunately due to the timing of the implementation and relatively low response rates we didn't receive any end user feedback on this feature but it would be interesting to see how event delegates viewed such a feature.

Illustration 6 – finding journey sharers

3.2.2.6 Mobile Site

The tools here were designed for use with smart phones when people are actually en-route to the event. It was built using the Mobile Campus Assistant (MCA) software.
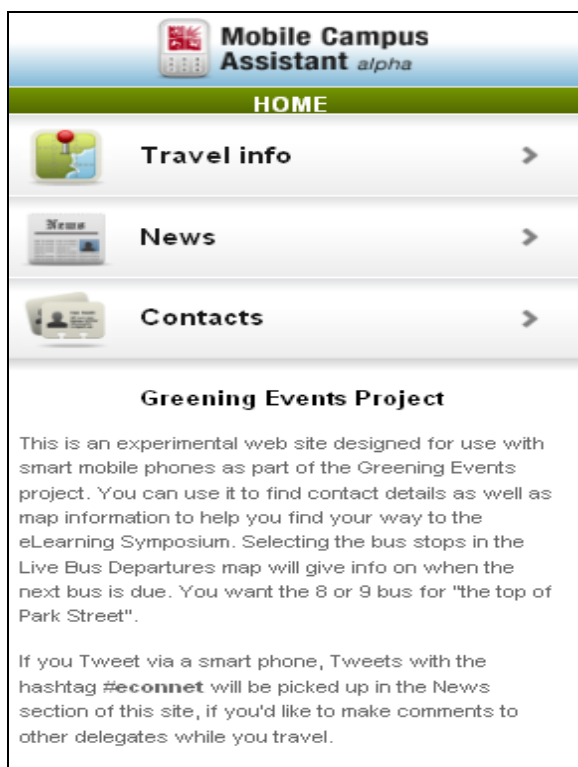

Illustration 7 – Greening Events version of Mobile Campus Assistant

3.2.2.7   Travel information – Walking route to event

This is the same walking route map from the pre-event site but designed to be used whilst walking to the venue. We had hope to have a page in the MCA software pointing the same Flickr bus route photos but MCA doesn't yet allow for the addition of simple static pages and the developer didn't have the time during this project to add this functionality.

3.2.2.8   Travel info – Live bus departures

This information links through to actual departure times of buses so that an event delegate can check whether there is a bus ready to leave when they arrive at the train/bus station.
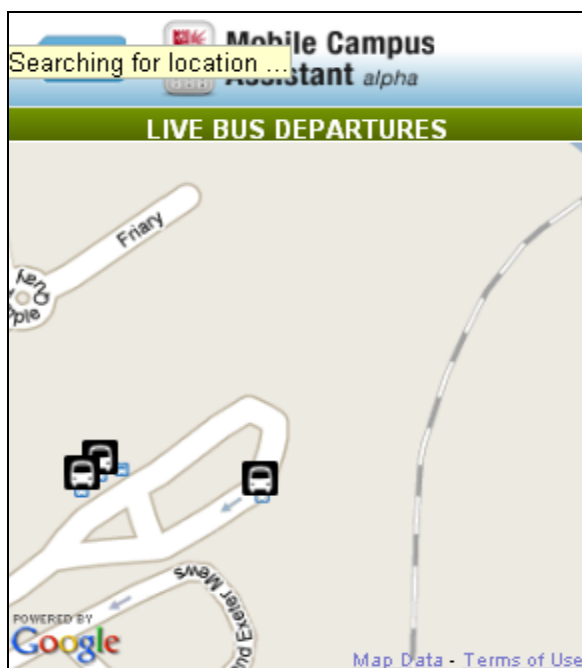
Illustration 8 – Live bus departure information

3.2.2.9   News – course comments and event tweets

The comments are picked up from the pre-event site and displayed via an RSS feed. Event organisers and delegates can send messages via twitter. One potential use of this for delegates might be to announce they are at the railway station and to ask if any other delegates would like to share a taxi or walk to the venue together. Organisers might use it for last minute information to alert delegates to problems with traffic, road closures, etc

3.3   User Feedback

Online questionnaires were used with the Case Study services (JISC Digital Media and the Economics Network) throughout the Greening Events project to gather

feedback on travel preferences and to inform the iterative development of the online tools. A total of six surveys were run between March and September, 27 out of a possible 66 responses were received (40.9%), however the surveys were iterative and questions were mostly optional so there is a spread of responses.

The responses suggested that the majority of delegates (57% n=14) did not own a 'smart' mobile phone i.e. a phone with GPS capabilities but the majority did tend to use 'social software' sites such as Twitter or facebook (63% n=27).

71.4% n=7 looked at the Greening Events information prior to travelling to the event (containing venue and route information) and only 14.3% n=7 looked at the mobile web pages before or on the day of the event. Anecdotal feedback from the case study organisers and delegates suggest that this low response rate is mostly down to time pressure for delegates but it may also signal that attitudes to green travel are still relatively neutral.

Which is closest to your position regarding travel?" (n=18)

I always think about the environmental impact of my travel to these type of events	44.4%
I normally give little thought to the environmental impact but the Greening Events facilities/software did make me consider this	5.6%
I normally give little thought to the environmental impact and still wouldn't despite these types of facilities/software	0%
I normally give little thought to the environmental impact but the Greening Events facilities/software would make me consider this	44.4%
I normally give little thought to the environmental impact and still wouldn't despite these types of facilities/software	5.6%

Are there any problems associated with attending events that you think web-based information services could help solve? (E.g. while planning to attend or travelling) (n=10)

"My concern when travelling to an event is arriving on time and not getting lost so I usually take a taxi for example to get there but walk back to the station at the end of the day. Walking directions on a smartphone would be useful (I did check the "walk-it" link that was provided in the joining instructions (very useful) email sent before the day"

"For people who do want to travel by taxi it might be useful to set up a taxi sharing forum or something similar to make it easier to share transport. "

"Would make it easier to see if walking really was an option, rather than just assuming you need to get a taxi to the event."

"Micro details of the venue/train/bus station. If you don't use public transport normally it can be a learning experience e.g. if you need to get off a bus at a bus stop in a town you've never visited how do you know when you are there?"

"Prohibitive costs of smart phone contracts"

"More advice on suitable accommodation - and could rate hotels by their environmental policies"

3.3.1 Additional User Research

Some additional user research was carried out to supplement the case study data. In particular this was used to try to identify key points in a traveller's journey where technological interventions may be useful and also to provide some improvements to the prototype tools developed for the Greening Events project. To mimic the effect of holding an academic event the travel behaviours of visitors to the ILRT (project's host department) at the University of Bristol were studied during October and November 2010. There were 3 main strands of research:

- Pre-journey survey
- Diary study during journey
- Post-journey survey

In addition a short 'expert-review' of the Greening Events tools was carried out. Some of the main findings are reported here but see ***Appendix E*** for the full report.

3.3.1.1 *Pre-journey survey*

This was a short online survey to establish preferred modes of transport of visitors, the predicted transport for the journey to Bristol, expectations for the journey ahead and attitudes to public and private transport. The survey was also used to recruit visitors to take part in the diary study and post-journey survey. As an incentive to fill out the survey, responses were put into a prize draw for an Amazon voucher, 25 visitors completed the survey during October and November 2010.

The majority of respondents (84% n=25) most frequently used trains to attend events/meetings during the last year but only 60% predicted that they would use the train to get to the Bristol event

Car:	28.0%	7
Train:	60.0%	15
Coach:	0.0%	0
Other (please specify):	12.0%	3

Reasons given for preferences for particular forms of transport were:

Car

- *"Cheaper and more flexible"*

- *"Convenience"*
- *"Too many changes to make train travel feasible for this journey"*
- *"Easier based on other commitments before/after meeting"*

Train

- *Quickest, cheapest and most convenient"*
- *"Ability to work on the train"*
- *"Driving makes me grumpy"*
- *"Easiest way for me to reach Bristol*

The visitors were asked whether they thought their journey would go to plan, the majority (84%) felt it was likely or very likely that their journey would go exactly as planned. Expected reasons given for the journey not going to plan:

Car

- Traffic congestion
- Weather slowing driving speed
- Getting lost
- Finding parking

Train

- Delays/cancellations with train service
- Missing trains
- Buses, which are often late
- Getting lost walking around Bristol

3.3.1.2   *Diary Study*

Respondents to the pre-journey survey who indicated they would be travelling by train were given the option of taking part in a diary study (a small incentive was provided to those who submitted diaries of their journey). Each of the 11 visitors who volunteered was asked to plan their journey (and report on it), provide a pre-journey itinerary and record key events during their journey (an event being a change in attitude/location/transport mode/interactions with people/online tools). These events consisted of a description of the event, location, feelings and a statement of anything that would have been done differently. Those with smartphones were asked to email responses in real time and to record any screenshots or items of interest to their surroundings. Those without smartphones used a datasheet to record their responses.

The diary study outlined some key issues in the use of public transport:

- Planning is very important - this is the point at which key decisions are made
- Overcrowding and delays are major pain points
- The hardest part of the journey was often from the train station to the venue; visitors sometimes get confused by bus options, or get lost when walking.

> There is great potential for technology and improved resources to take the pain out of this key decision point.

3.3.1.3 Post-journey Survey

A short online survey was sent to respondents to establish the mode of transport used, positive and negative aspects of the journey, use of information tools to support the journey, use of mobile-based tools during the journey. 23 visitors completed the post-journey survey.

With regard to positive aspects of the journey, these included:

Car

- Shorter overall journey time
- Surprisingly easy traffic
- Parking was really easy
- Door-to-door
- Easy and fast

Train

- Could do something else (relax, read, eat, talk to colleagues, work, enjoy views)
- Walk from station in nice weather
- Simple and not too slow

In terms of negative aspects:

Car

- Car park fees
- Finding parking
- Traffic delays
- Getting lost in the city

Train

- Getting up earlier and arriving home later
- Crowded and loud carriages
- Waiting for connections
- Worry about missing connections
- Delays
- Walking up steep hills
- Locating the building itself
- Confusion about bus routes
- Anxiety from travelling alone
- No internet connection

With regard to the use of the information tools provided by Greening Events:

- 8% (n=13) of people who caught a train visited the 'Travel information to the ILRT' webpage before their journey
- Only 25% (n=8) people who drove a car visited the 'Travel information to the ILRT' webpage before their journey
- 45% (n=9) of train travellers who looked at the webpage said it affected their decision on how to travel to the event, in comparison with 50% (n=2) of car drivers who looked at the webpage

Overall resource usage & usefulness
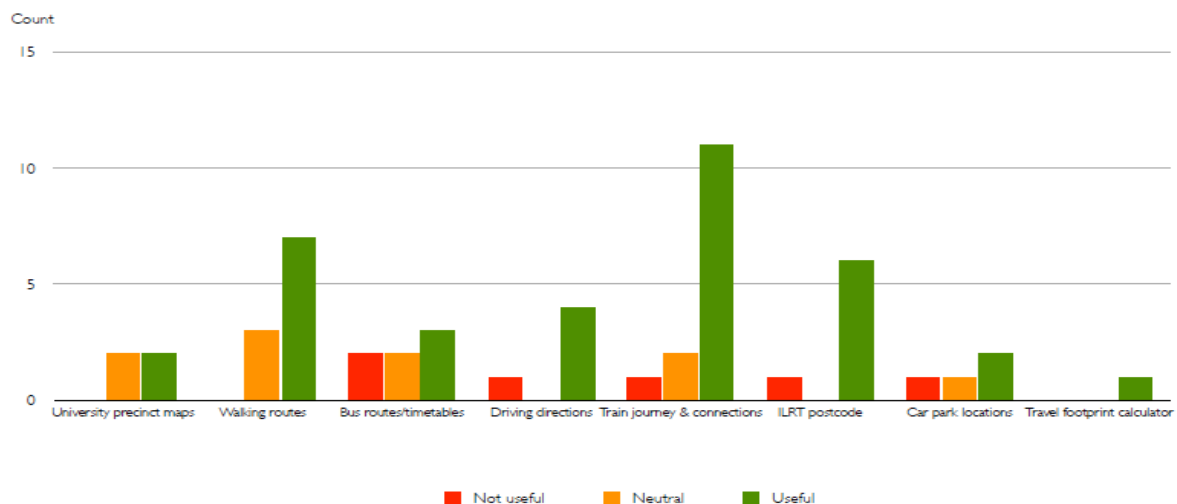
- Only 18% (n=23) of people used the Greening mobile website during their journey, all of whom came by train and not car.
- Three of the four people who used the mobile website found it useful/very useful, mentioning the live bus timetable, the photographs of features, and the walking route that logged person's location, so could check walking in right direction
- The visitor who didn't find the mobile site useful mentioned that it was too small on their device:
  "... it always appeared aligned to the left side of my iPhone when I held it horizontally... every time I clicked on Bus timetable, it complained about my current location. I agree that it was meant for the campus (being a native app) tour but as a user I was expecting to see the map of the campus regardless of my current location. It was only showing two items on the menu until I accessed it from the event room when I could see all menu items."

In response to whether they would do things differently next time:

- 73% (n=23) of people wouldn't change how they travelled if they had to do the journey again
- The 27% who would change gave the following reasons:

- o *"Driving would save an hour each way and avoid overcrowding"*
- o *"I would catch a direct train to BTM"*
- o *"Would walk to station rather than use the bus due to bus delays and slow route"*
- o *"Would catch a train next time"*

The transport attitudes (expressed in both the pre- and post-test surveys) of people who eventually travelled by car (n=8) to those who took the train (n=12) were compared. A Kruskal-Wallis test was used to test for statistical differences between attitudes of car and train travellers.

There were no significant differences between the attitudes of car drivers and train travellers; however, it may be that the relatively small sample sizes were insufficient to detect any effects. Two tests were of borderline significance at the p=0.05 level:

- Those travelling by car considered it to be more difficult to change to using public transport than those who travelled by train
- Car drivers were more likely to think that they couldn't lead their everyday life without a car

Other suggestive (but non-significant) trends were:

- Travellers felt safe on their journey, irrespective of transport mode
- Car drivers were more likely to be impressed by public transport users than other public transport users
- Train travellers were more likely to have interesting and productive journeys
- Car drivers were more likely to feel 'free' during their journey

Implications for Greening Events Technology Tools

Most travel decisions are taken (and resources are accessed) prior to the journey, so the point of pre-journey planning is critical for potentially affecting travel decisions. To support this, providing a single website where all relevant travel information is provided will minimise perceived pain points of public transport:

- Statistics for punctuality and problems may help to persuade visitors that the majority of trains do run on time e.g. First Great Western have a Public Performance Measurement (PPM), which currently stands at around 83%
- Reduce the perceived fear/risk of visitors by helping them visualise their journeys more effectively via walkthroughs of the journey, images of the buses, and provide clear explanations of walking routes from bus stops.
- Provide strong motivators for walking such as calorie counts, time required and interesting sites.
- Provide testimonials (social proof) from other visitors who have walked the route

The results suggest that car drivers will be hard persuade to take the train (particularly those who live a distance from mainline stations). The only way to change this behaviour is to affect motivation:

- Provide a psychological hook that will at least force drivers to consider 'doing the right thing'; for example, inviting visitors to take part in a 'sustainability challenge' with a goal of reducing carbon emissions for an event by a specified amount year-on-year (obviously this could also extend to other areas of the event)
- Provide up-front information about roadworks and the availability/price of parking nearby; these are pain points for motorists and may help to tip the balance towards a greener option

Mobile devices are going to be increasingly important in terms of empowering visitors to use public transport in increasingly effective ways (in theory, making use of public transport more viable).

- Mobile apps and sites need to tailor their content to the most important and relevant tasks for visitors in specific contexts. For example:
    o Step-by-step walking routes (using current location) with in-app photos of key landmarks
    o A particularly high level of detail at the start and end of the journey to support finding bus-stops at the station, and the final destination.
    o Live and timely information (e.g. time to destination, estimated time of next bus) For geo-aware apps (e.g. walking routes, live bus times) users need to be able to plan/visualise ahead, so to support visitors effectively these need to be accessible and usable from outside of Bristol (i.e. provide options for specifying locations within Bristol, or defaulting to Temple Meads where appropriate)
    o All resources on the main event website should also be made available for viewing in any bespoke event-based mobile app.

4.   Outcomes

The two main objectives of this exploratory project were:

1. To develop a prototype systemic impact analysis methodology and use it to conduct assessments of the primary, secondary and tertiary (direct and indirect) sustainability impact of events.

2. To explore the use of a variety of technologies to help minimise the sustainability impact of events.

4.1.1 Systemic Impact Analysis Methodology

The original aim of developing a prototype methodology was reassessed during the project as the issues and approaches became clearer and this was changed to a systemic impact investigation which aimed to explore a way to understanding the

sustainability related impacts of academically related events from a system wide perspective. The investigation spanned a wide range of complex and multidisciplinary areas and given the project's exploratory nature and restricted timescales and resources it unfortunately wasn't possible to produce a comprehensive review of all the findings of the project. Instead the main outcomes were outlined in the Rethinking Events document (***Appendix C***) as well as a synthesis of existing sustainability guidelines for physical face-to-face events (***Appendix B***).

4.1.2 Event Tools and Technologies

4.1.2.1   CREW

The CREW events software developed by the Web Futures team at ILRT was customised for use with the Greening Events project. The functionality of CREW for searching a database of harvested events and displaying complex metadata and event artefacts was far greater than required for the needs of this project. Hence future work with CREW would ideally isolate only those packages within the application required, in order to reduce compilation times and storage. Of particular use to us due to the restricted timescales for the development work, was the framework provided by CREW for generating pages of events information automatically from event metadata. This was enhanced in the Greening Events project to display the additional travel information and functions we wished to trial.

However, as CREW was designed to only display events harvested from external sources, a package was added to the system that was effectively an event repository. This allowed us to create event metadata via a forms wizard and output this in an RDF/XML format for harvesting by the rest of the system. This was then used to generate the pages of the web site. Although a future events toolkit would ideally be more integrated, the above approach did highlight the ability to encode all the necessary metadata as RDF, demonstrating a means by which event venue information, with a sustainable impact, could be shared between event management systems.

CREW is a Java Web application created using the Spring Framework. An issue for any toolkit created is how it would integrate with an existing events management system used by an event organiser, possibly running in a different software environment. A major issue to be considered would be how information about delegates could be shared between a system used for event registration and the Greening Events toolkit. The Greening Events technologies might therefore be best incorporated into existing event management systems, or alternatively the toolkit expanded to include other event management functions.

4.1.2.2   Mobile Campus Assistant

Although the Mobile Campus Assistant software needed comparatively little customisation to demonstrate the features we were interested in, it is far less easy to configure; requiring proprietary, formatted text files to be edited and then recompiled

into the Web application. The most useful approach would be to develop a method for configuring the MCA web site based on the same RDF metadata used by CREW. The administration interface for the CREW event creation package would then configure both systems.

At present, MCA only displays pages converted from harvested RSS feeds together with the Google maps. It is not possible, for instance, to create textual web pages other than the home page. It would also be useful to allow interactive features such as adding comments to events, or entering a start location to generate carbon footprint information. As mentioned above, a means of tracking a user as they walked to an event location using GPS would be a particularly useful addition to the software.

5.   Conclusions

Taking a systemic perspective leads naturally to the conclusion that it is simply not possible to predict how events will change over the next years and decades. Events and the way that we use them will continue to co-evolve with socio-economic, cultural, technological and environmental changes.

The key foci of the Greening Events project have been sustainability and technological factors – in those areas it seems highly likely that dramatic developments are likely to occur over the next decades.

- Sustainability concerns such as climate change, efficiency of use and access to water, energy and mineral resources, loss of biodiversity and habitat, etc. show no signs of reducing in significance. The same is true of social and ethical issues surrounding for example working conditions, equality, transparency, etc. which are systemically inter-twined with environmental issues

- Technological developments, both through invention and innovation in the use of existing technologies are likely to provide very significant opportunities to continue to re-think the way that we 'do' events. For example the development of mobile networked technologies, location based services, display devices such as e-readers, flexible displays and 3D camera/displays, increases in broadband accessibility and speeds and associated services and in the longer run technologies such as holography. However it seems likely that the most impactful technologies will not be those we might expect.

- Socio-economic, professional and cultural contexts are also likely to have significant parts to play in how events evolve. It is very common to have research, business and other projects that span continents, increasing globalisation means the way events are used and the contexts in which they are held will continue to co-evolve in those contexts.

6. Implications

The *Rethinking Events* report illustrates some of our thinking as the initial phase of Greening Events came to an end. This is, as we have stressed, tentative – one of the most significant lessons of the project is how much is not yet well understood in this area.

The Greening Events II project[17], funded under the JISC's Greening ICT programme, is a partnership between the University of Bristol and UKOLN[18]. It will take the findings of Greening Events project and investigate some of the most basic questions identified, e.g. profiling the use of events across an institution (Bristol University) to help fill in some of the most fundamental gaps in our knowledge. It will also further develop the ideas and practices represented in Greening Events to develop a toolkit for effective use of sustainable events guidelines and practices and event amplification by those using and planning events.

7. Recommendations (optional)

- Detailed information gathered/survey(s) conducted to enable more accurate assessment of the amount, nature and role of academically related event attendance, organisation and use by HE and FE institutions.

- HE and FE communities work with the wider event industry to enable and further develop effective means of assessing the sustainability related impacts – positive and negative of events. That this is done from a systemic perspective.

- Where HE and FE institutions are hosting or organising face to face events they use existing and developing best practice as reflected in sustainable events guidelines (see *Appendix B*). At a minimum that sustainability related goals and evaluation criteria are integrated into existing event organisation processes.

- Event organisers explore options to use ICT based tools and services to enable events to be more effective in meeting their explicit and implicit goals. And that they are actively supported in that exploration by organisations and communities – including JISC - who have experience and expertise in the use of the technologies.

- That further research is conducted into the multiple explicit and implicit roles of academically related events within the wider research, pedagogic and socio-economic contexts. This is so that informed decisions can be made when re-thinking events so avoiding or acknowledging the risks of negative unintended consequences of changes.

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[17] http://www.jisc.ac.uk/whatwedo/programmes/greeningict/organisational/events2.aspx
[18] http://www.ukoln.ac.uk/

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UKOLN <http://www.ukoln.ac.uk/>

9.   Appendices

Appendix A - Example Survey Questions

Appendix B - Green Event Guidelines

Appendix C - Greening Events Annotated Bibliography

Appendix D - Rethinking Events Report

Appendix E - Additional User Evaluation Results