Digital R&D Fund for the Arts in Wales

Consortium for Research and Development for the Digital Arts in Wales (Re-DrAW)

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"To enable the use of digital technologies in the arts sector to engage audiences in new ways and to create opportunities for new business models"

Executive Summary

Background – The Digital R&D Fund for the Arts in Wales

The Digital Research & Development Fund for the Arts in Wales is a partnership between Arts Council of Wales, the Arts & Humanities Research Council (AHRC) and Nesta. The Fund's overarching purpose is:

"To enable the use of digital technologies in the arts sector to engage audiences in new ways and to create opportunities for new business models"

The Fund aims to test ideas and to pilot new ways of working in the arts and achieve a 'step change' in performance, either by expanding audience reach and engagement and/or by opening up new ways of generating financial revenues. By supporting projects to work in conjunction with a research team, the fund ensures that the experiences, ideas and transferrable learning that emerge through these projects can be shared with other organisations.

The project has benefited significantly by learning from the experience of the pilot projects in Scotland and England R and D projects which completed earlier. The smaller scale of the project in Wales has allowed for more immediate relationships to develop between the participants. The volume of applications and their geographical distribution as well as the good quality of many of the applications demonstrated developing thought about the 'digital' in many cultural organisations in Wales and indicated the timeliness of the project.

The Digital Research & Development Fund for the Arts in Wales has worked by encouraging arts organisations to connect with digital technology in order to undertake investigations from which the whole arts sector in Wales might learn. It has provided up to £400,000 in total to arts and cultural organisations during the period 2013/14 and 2014/15.

The Nesta project manager was based in the Arts Council of Wales offices and this physical manifestation of partnership led to significant benefit for the project as a whole. The process established clear shared purposes for both partners. The Nesta manager was able to contribute widely to the developing pattern of support for new thinking in ACW about the potential role of the Digital Economy for the Arts Council. The Arts Council of Wales is actively exploring their policy for further engagement of technology and the arts so the project was timely. www.Nesta.org.uk/Digital_RnD_Wales Nesta has been responsible for the day-to-day, operational delivery of the Fund.

Executive Summary

The Research Consortium – Research and Development for the Digital Arts in Wales (Re-DrAW)
During the last two decades, the convergence of a number of social and economic factors has increased the interest of universities, industry and government in the transfer of knowledge as a vehicle for economic development. This notion of Knowledge Transfer has been nuanced and the more reciprocal idea of two-way Knowledge Exchange has taken its place. The Digital R&D Fund for the Arts in Wales is firmly placed in the field of Knowledge Exchange which would encourage institutional change and develop mutual understanding amongst partners.

As such the projects relate specifically to the developing notion of the Collaborative Economy. Describing the Collaborative Economy Nesta assert:

'The ways in which we consume, contribute and participate are changing. Amidst volatile markets and the rapid proliferation of digital technologies, a new swell of collaborative organisations and activities has emerged. The implications of these emergent models of exchange are significant for policy makers, entrepreneurs and for the public'.

http://www.nesta.org.uk/event/making-sense-uk-collaborative-economy

The proliferation of relatively small scale projects, which lie at the heart of the project, responds to the nature of the Creative Economy in Wales which is diverse in size, location and aspiration. The Fund aims to enhance the innovation process within the arts sector of Wales using digital technologies. This work is of relevance to a number of priority sectors within the UK and Wales and will impact on the creative, cultural and digital economies which have been highlighted in recent reports (e.g. *Nesta*[1]). It supports *Science for Wales*[2] through promoting business innovation through the digital technologies and *Innovation Wales (2013)*[3] by improving collaboration between university and business and supporting a culture of innovation.

Re-DrAW is an academic consortium led by the University of South Wales (USW) working with Aberystwyth University (AU) and the University of Surrey (UoS). The consortium share experience in creative co-production, mobile technology and the development of communities of place and interest. Much of the work undertaken by the consortium members is underpinned by digital technologies and often undertaken with non-university stakeholders.

The partners had all worked together previously and represent a variety of different discipline areas, expertise and experience.

- The project lead, the USW has expertise in the development of mobile application and services in a commercial context, hypermedia and knowledge organisation systems and the impact of the arts socially

- The Mercator Institute (AU) specialises in languages, creative and literary translation, media, publishing and culture

- The Digital World Research Centre (UoS) has activities that span film, performance, music and sound recording, delivering a programme of work applying digital technology to arts research and practice.

All partners have a track record in interacting with arts, culture and technology providers and experiences of action research methodologies. USW leads the Creative Exchange Wales Network (CEWN) project, which is an R&D platform for academic-business and other stakeholder interactions for the creative industries in Wales.

Executive Summary

The Final report

This report provides an overview of the work of the fund in Wales. The overall timescale of the Fund's activities means that many of the impacts of the work will become apparent over a longer period than this report can reflect on. However, the individual project reports and this report in general are able to indicate a direction of travel. As with our colleagues in the Research Consortium in Scotland the primary intended audience for this report is managers and project leaders in arts and cultural organisations.

Summary/insights from the Consortium

The structure of the project in Wales allowed for a series of workshops that encouraged sharing and making learning available to other arts and cultural organisations.

The benefits of the project were seen much more widely than through the provision of digital products and services.

There were issues about the scope of projects and the expectations that there might have been to produce a viable commercial product within the time available. At least another year would have been required in most cases to produce robust and marketable legacy innovation.

Completely new partnerships need time to build trusting relationships, while pre-existing partnerships can inhibit genuine innovation and lead to repetition.

The attempt to apply quantitative approaches to measurement met the same set of issues in Wales as in Scotland:

In terms of measuring project results, many of the digital products and services produced have not been on the market for long enough to yield meaningful statistics.

Project leads typically estimated that it would take around one year of the product or service being available to users before they would have meaningful data available. Secondly, the projects had a strong R&D focus, and the collection of quantitative data can often not appropriately capture the results of such processes and was therefore not included in the programme of work.

However, where user statistics are available they point towards a close link between marketing activities and user uptake of the respective digital product or service.

Digital R&D Fund for the Arts in Scotland Consortium for Research into Arts and Technology in Scotland, CReATeS, Final Report, March 2014, Universities of Stirling, Strathclyde and St. Andrew.

Overview of the Funded Projects

iBeacons

Art Partner:
Oriel Plas Glyn y Weddw (Llanbedrog); Coleg Menai (Bangor)

Technology Partner:
Cwmni Da (Caernarfon)

Academic Partner:
Elin Jones (Aberystwyth University)

Background

iBeacon technology is a feature on the latest mobile devices and projects which utilise the new technology are rare. The technology is used to deliver extra information to visitors to arts exhibitions at Plas Glyn y Weddw and to attract visitors into the venue from the All Wales Coastal Path which passes through the grounds.

Research and Development

The project aimed to develop an iOS and Android mobile application which utilise new iBeacon technology to deliver extra information to visitors to arts exhibitions at Plas Glyn y Weddw. The research questions of the project focused on how the creative use of iBeacons can enhance visitor engagement (with the exhibition) in the arts venue, iBeacons can be used to enhance the commercial activities of the arts organization, such as sales and how the creative use of iBeacons enhance student artistic experience at Coleg Menai.

Results

The project has resulted in a carefully designed and functional mobile app that serves the aims of PGYW to improve interpretation and add multi-media experience when visitors explore the house and art gallery.
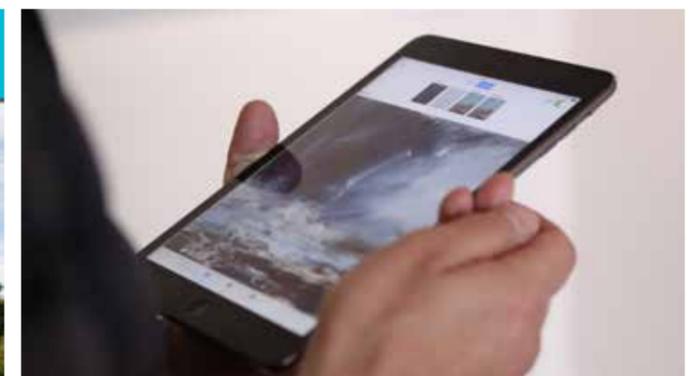
Overview
of the Funded Projects

Please Switch on Your Mobile Phones (PSOYMP)
Art Partner:
TaikaBox (Cardiff)

Technology Partner:
Moon (Cardiff)

Academic Partner:
Hamish Fyfe
(University of South Wales)

Background
The PSOYMP project brought contemporary dance into the digital age by enabling audiences to interact with the creation and performance of a new piece of dance in real time using smartphone/tablet technology. Online and in-the-theatre audiences were invited to contribute to the creation of the dance performance by accessing a web application and answering questions, sharing personal memories and feelings. The audience input was processed by dancers, choreographers and artists live on stage in a kind of 'movement factory' – resulting in the creation of a series of short dance works.

Research and Development
The primary aim of the project was to create a digital and choreographic system that allows in-house and online audiences to interact with the creation and performance of a dance show in real time and engage directly with the choregraphic process through actively choosing content and form. The research question of the project is summarised as "how the creative disruptions of new technology re-draw the relationship between audience and performance in contemporary dance practice to demystify contemporary dance and to engage new audiences".

To realise its research aims the project adapted an action research model (Koshy, V. 2012:1) and was cyclical in its nature with three residencies across Wales and a public performance event at the end of each residency. Regular public performance, tests and cyclical reflection, allowed for radical adjustment of the project to be made as it moved through its action research cycle.

Results
The project provided a space that would not otherwise have been found for an open-ended, experimental approach to digital technology development in arts organisations. Audiences engaged directly with the choreographic process through actively choosing content and form. As a result audiences that were less familiar with contemporary dance got a better chance through the digital medium to "understand"/decode the performance. The performances engaged audiences through making choices which had direct choreographic outcomes and in that sense placed audiences in a new role as 'spectator/choreographers' of a collective creative experience. The project partners learned that an incremental approach to innovation that avoids elaborate planning and evaluation procedures can create innovation and allow for risk-taking. Action Research principles allowed planning and innovation to precede in parallel rather than as separate phases.
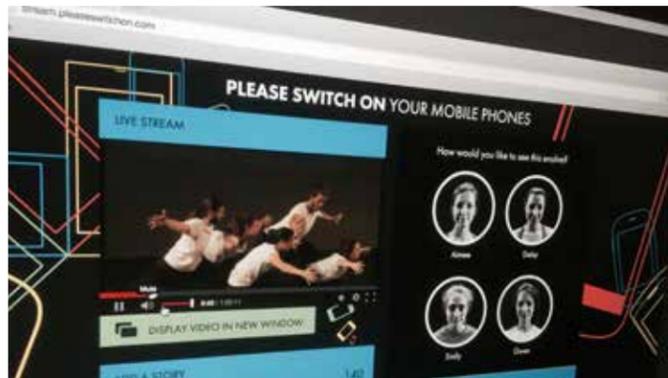
Overview
of the Funded Projects

Sibrwd
Art Partner:
Theatr Genedlaethol Cymru
(Carmarthen)

Technology Partner:
Galactic (Caernarfon)

Academic Partner:
Elin Jones (Aberystwyth University)

Background
It is a constant challenge for creative arts organizations working in a minority / minoritised / less widely taught language to appeal and communicate effectively with those who don't speak the language. Sibrwd (Welsh for "whisper") explored and provided a digital solution to the following problem: 'How to engage successfully Welsh learners and non-Welsh-speakers as audience members, in line with the artistic vision, without major budget implications or affecting the experience of Welsh-speakers?'

Research and Development
The main research aim of the project was to develop an audio description app for audiences to fully access the spoken word of any given performance, whatever language(s) they habitually speak. The project investigated the needs of different audience groups, such as Welsh speakers, Welsh learners, non-Welsh speakers and introduced technology in line with the artistic vision to diversify and expand from the core linguistic audience.

Results
Sibrwd is an innovative digital product that unlocks the issue of translation and inclusivity as it permits the distribution of translation and synopsis content digitally in an imaginative and cost effect manner: It is a free smartphone app that delivers short snippets in English in the form of whispers via headphones and text via a smartphone screen. It helps Welsh learners and non-Welsh speaking audiences to be part of the theatrical play and helps to guide the user of the app through the live performance.

Overview
of the Funded Projects

Tocyn

Art Partner:
Community Music Wales (Cardiff)

Technology Partner:
ZEQUS (London)

Academic Partner:
Dr Daniel Cunliffe
(University of South Wales)

Background
Tocyn, the Welsh word for 'ticket' or 'token', is a new and innovative online box office, built around a community interest business model that allows consumers to donate a percentage of their booking fee from tickets purchased online to arts based crowdfunding campaigns. The Tocyn website provides an online box office, but one built around a community interest business model that allows consumers to donate a percentage of their booking fees from tickets purchased online to crowdfunded arts based campaigns of their choice.

Upon completion of ticket purchases audiences are able to select a local community project to support with their booking fee. As well as raising money from ticket sales the website also allows users to support the fundraising campaigns through direct donations.

Research and Development
The main aim of the project was to develop an innovative digital ticketing system that re-purposes booking fees while at the same time taking the concept of crowdfunding to a more philanthropic, socially inclusive and community funded level. By presenting the ticket purchaser with a choice of local projects to donate to, the Tocyn system enables individuals to financially support community arts projects that they feel relevant to the wellbeing of their own communities. To realise its aims the project adopted lean methodologies and the concept of the minimum viable product development. From the outset, everything was focused on the end user. Close attention was paid to the high level user experience and the system was developed using as many readily available and free tools as possible.

Results
Tocyn was live tested at several events in various venues throughout Wales and tried to appeal to a wide and diverse audience. Events ranged from young local bands to tribute acts, critically acclaimed international artists to author in residence book club events. Tocyn has successfully demonstrated that ticket purchasing can be used to support crowdfunding campaigns. This support may be financial but it may also be achieved through facilitating longer-term relationships. The project insights reflect that the majority of the artists and art organisations buy-into the vision brought by Tocyn but at the same time they are not fully aware of the potential of crowdfunding and do not clearly understand its fundraising mechanism.

Overview
of the Funded Projects

Torf

Art Partners:
NoFit State Circus (Cardiff)
– National Theatre Wales (Cardiff)

Technology Partner:
Joylab (Bristol)

Academic Partner:
Dr Daniel Cunliffe
(University of South Wales)

Background
The Torf project investigated the provision of an engaging multichannel dialogue with the audience as a method of enhancing and expanding audience data and maintaining an ongoing relationship between the organisation and an audience. The mobile phone was selected as the application mechanism – using SMS technology that enabled audience members to exchange their data in return for engaging, performance specific content built around the core concept of a value exchange.

Research and Development
The overall aim of the Torf project was to explore playful and creative ways to capture audience data to facilitate ongoing dialogue between arts organisations and their audiences. The research questions of the project focused on data capturing requirements, audience dialogue characteristics and incentives or rewards needed for encouraging audience members to engage in the data sharing dialogue. To realise this co-design approach between the technical and creative partners and users was adopted. This was embedded within a lean project methodology which from the start recognised the need to engage with real users.

Results
Over a period of six months Torf was tested live in fifteen unique performances and one festival. The total audience at those fifteen events was 3,800 people. Torf has achieved as high as 53% engagement in the case of NTW Assembly, when the tool was embedded in to the performance and between 16 and 41% in live tests when the tool was peripheral to the performance. The tool offers the opportunity to audience members to enter into a value exchange as part of the show through participation and shared experience. Torf has proved an effective method for gathering audience data. There are currently two versions; Torf Live and Torf Alpha. Torf Live is the prototype system and Torf Alpha is an enhancement of Torf Live, the first step in producing a more complete, commercial product.
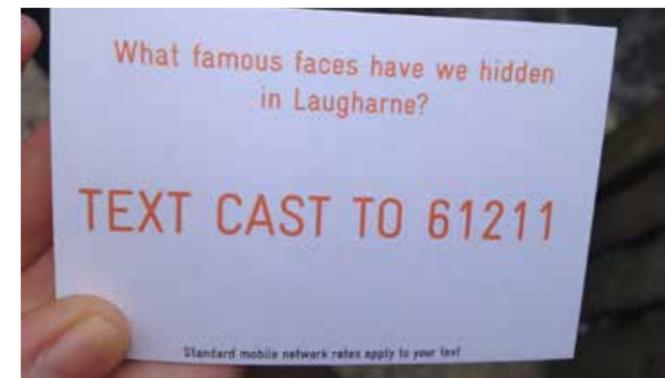
Overview
of the Funded Projects

UCAN Go
Art Partner:
UCAN Productions (Cardiff)

Technology Partner:
Calvium (Bristol)

Academic Partner:
Prof David Frohlich
(University of Surrey)

Background
Together, UCAN and Calvium developed
a smartphone application for the iPhone
that breaks new ground in technology
for indoor navigation using verbal map-
ping. Rather than instrument a space
with tags or beacons, it is annotated
with landmark pictures and navigation
instructions specially designed to be
useful to the partially sighted. UCAN GO
is a full functioning application and a
publicly released indoor navigation prod-
uct that could also set up a potentially
significant and sustainable employment
stream for visually impaired people to
develop verbal maps.

Research and Development
The main aim of the UCAN GO
project was to create a technology
-based solution for visually impaired
young people to navigate a complex
public space, such as theatre and
arts venues independently and with
confidence. The main research question
of the project is summarised as:
How to create a new lexicon and
schema for creating a "verbal map"
of a building and translate this into
an information architecture and develop
innovative software application
interface techniques for user reporting
of locations, creating virtual breadcrumb
trails and enhancing way-finding.
To realise its aims the project has
adopted user-centred design approaches
and Wizard of Oz prototyping methods
that empowered visually impaired young
people to drive the design process.
In addition, the design process followed
a ground-breaking approach based
on the early discovery that symptoms
are a more fruitful way of approaching
design than conditions or diagnoses.

Results
The UCAN GO team created a fully
functioning smartphone application
for public use that broke new ground
in disability research and mobile
technology while providing a low-cost,
low-maintenance mechanism for arts
venues to comply with requirements
for 'reasonable adjustments' under
the Equality Act (2010) in the face
of shrinking budgets and contracting
government support. The application
was tested in Wales Millennium Centre,
Cardiff, and the Torch Theatre, Milford
Haven. The UCAN GO app works
on an iPhone and requires no additional
technology, not even a mobile data
or Wi-Fi connection. This means
users can use the app without drawing
attention to themselves as 'different'
or 'vulnerable' compared to fully sighted
people. They can also have confidence
that the app is extremely unlikely
to malfunction while they are relying
on it to guide them through
an unfamiliar location.

Overview
of the Funded Projects

Arts, Archives and Technology
Art Partner:
National Library of Wales (Aberystwyth),
Yello Brick (Cardiff),
Jorge Lizalde (Cardiff)

Technology Partner:
Hoffi (Cardiff)

Academic Partner:
Prof Hamish Fyfe
(University of South Wales)

Background
What outcomes can be created when
creatives and established organisations
work together; in this case The National
Library of Wales, Yello Brick, artist Jorge
Lizalde and technology partner Hoffi.
During this R&D project the partnership
wanted to investigate how it could
create new meaning from archival
material and discover what the barriers
were for new audiences to the content
itself. The main stimulus material for this
particular R&D was the library's archive,
a vast repository of artifacts that
are of cultural importance to Wales

Research and Development
The project focused on investigating
how best to create a digital output that
is different from the outputs that the
Library are currently producing with
a view to creating engagement with
new audiences and how to make
the content more tangible and
empathetic; creating a digital experience
that elicits an emotional response.
The story of Welsh settlement
in Patagonia was used as a stimulus due
to its considerable contemporary
resonance in current debates about
national identity and timeliness since
2015 is the 150th celebration of the
establishment of the settlement in 1865.
Initial development worked through
a variety of prototypes using a number
of languages and frameworks.
As prototypes from the ideas and
concepts were developed it became
clear that what was needed was a more
robust application that could deal with
a number of stages being implemented.
After trying a number of options it was
decided to build the final experience
on HTML 5 Canvas.

Results
The prototype project was created
as a website experience that places
the user at the centre of a journey.
The team examined how different each
user's experience could be dependent
on how they interacted with the current
basic matrix of consequence questions.
In addition the collaborative team
investigated how this translated into
an emotive experience through
a conceptual interpretation rather than
an actual presentation of the archives
themselves. The project engendered
a lot of learning about the balance
between great artefacts and then how
these artefacts translate digitally.
There is an on-going debate/discussion
around what and how archival material
is used and this discussion has really
been at the fore of this project with
each member of the team bringing
an individual viewpoint about the use
of 'archival' material and what might
be acceptable. The real crux of this issue
centres on the fact that the digitised
material is only ever going to be
a representation of the original artefact.
The debate and conversations range
from creating work 'inspired by'
the archival material to different ways
of exhibiting archival material digitally.
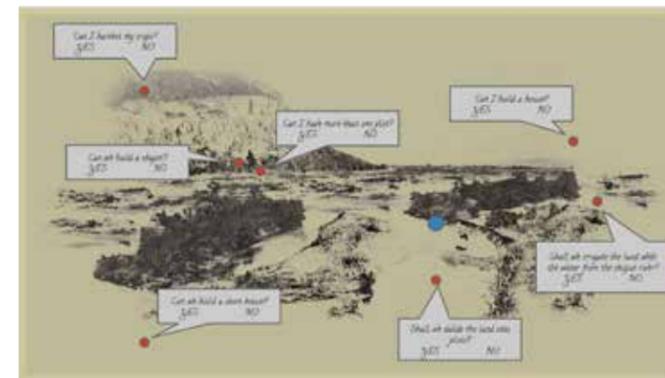
Collaboration

Collaboration Model

The primary role of Re-DrAW was to assist, advise and evaluate projects and project development. The consortium members drew upon experiences of preparatory design and action research and engaged with the rest of the project partners in a recursive collaboration activity through a mutual benefiting knowledge exchange process. Two consortium members, a primary and a secondary, were appointed on each individual project to lead on research outcomes. The appointment of academics to the projects was based on research interests and past experience criteria and this was commonly agreed during the first steering group meeting of the research consortium. The pairing of academics to projects was agreed as follows:

iBeacons: Elin Jones (Aberystwyth University), David Frohlich (University of Surrey)

PSOYMP: Hamish Fyfe (University of South Wales), David Frohlich (University of Surrey)

Sibrwd: Elin Jones (Aberystwyth University), Daniel Cunliffe (University of South Wales)

Tocyn: Daniel Cunliffe (University of South Wales), Hamish Fyfe (University of South Wales)

Torf: Daniel Cunliffe (University of South Wales), Elin Jones (Aberystwyth University)

UCAN Go: David Frohlich (University of Surrey), Hamish Fyfe (University of South Wales)

Arts, Archives and Technology: Hamish Fyfe (University of South Wales), Andreas Vlachidis (University of South Wales)

The model of collaboration (figure 1) underpinned a flow of activities between consortium members, art partners, and technical partners for addressing the research and development objectives of the individual projects. The role of the consortium was mainly to advise, recommend and to put critical input to the projects with respect to the research outcomes whilst the development outcomes were collaboratively addressed by the technical and art partners.

Despite individual project characteristics and priorities we can confidently argue that iterative design principles were adopted across all projects.

The consortium members collaborated closely with the art and technology partners on the definition and delivery of the project research outcomes. The collaboration activity between consortium members and project partners was accommodated by workshop events, project meetings and online communication and project management tools. The consortium members maintained a flexible and informal approach in their collaboration with the project partners, whilst keeping some distance from the design and development processes. This allowed them to remain unbiased in order to detect design limitations and shortfalls in research outcomes, and to propose alternatives and improvements. The collaboration approach has also helped project partners to work seamlessly towards achieving the development objectives while being reassured and advised on the research outcomes of the project. The consortium member of a project collaborated flexibly with the project partners maintaining direct communication links with the individual partners and organising regular meeting with participation of the both art and technology partners.

The consortium members have also maintained a regular collaboration activity which occurred in the form of steering group meetings or as informal and flexible liaison between primary and secondary research leads. Such collaboration activities between consortium members were significantly helpful for identifying common grounds of research and development across projects. They helped to establish a knowledge exchange dialogue between the members of the consortium and a constructive reflection process with respect to the progress of the research outcomes of the individual projects and of the Digital R&D Fund for the Arts in Wales as a whole.
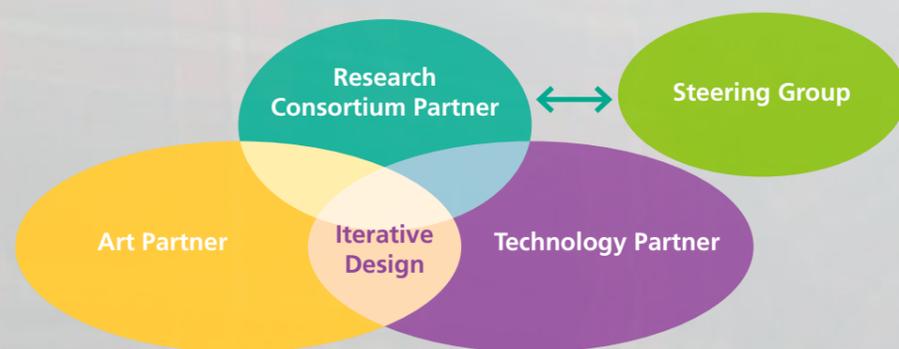

Figure 1

Collaboration

Formal collaboration activities
A range of formal collaboration activities were scheduled during the lifetime of the Digital R&D Fund for the Arts in Wales project. The activities offered the opportunity to art, technology partners and consortium members to involve in a peer-to-peer network activity, to discuss and to share knowledge and experience, gained from their engagement with the R&D projects. Two types of scheduled collaboration activities took place; i) Workshops which gave the chance for participation to project partners across the R&D fund and ii) Steering Groups meetings which were open to the research consortium members and the project management team of the fund. Overall, four Workshop events and five Steering Group meetings were organised and held in several venues across Cardiff and Trefforest, South Wales.

Workshops
The four workshops that took place during the lifetime of the RnD fund primarily aimed to promote networking, sharing of lessons, future development and project pitching activities whilst accommodating specific themes in connection with the stage and progress of the fund.

The first workshop held in the Gate arts centre (Cardiff) on the 1st of November 2013 had an induction focus. During the day workshop the participants were introduced to the aims of the R&D fund and to the role and objectives of the research consortium. The project partners got the chance to involve in a peer-to-peer network activity and to pair and discuss with the members of the research consortium the research aims and objectives of their projects.

The second workshop held at NoFit State Circus (Cardiff) on the 3rd of April 2014 had a networking and sharing focus. During a daylong workshop the projects got the opportunity to unfold their aspirations and present their ideas and objectives to other participants in the Digital R&D Fund.

The third workshop held in the Gate Arts Centre (Cardiff) on the 8st of December 2014 had a focus on future sustainable development and strategic planning. During a daylong workshop the project participants engaged with a series of hands on exercises and round table activities addressing the topics of business modelling and future-planning using the social business model canvas and the methods of backcasting.

The fourth workshop held in Chapter (Cardiff) on the 6th of January 2015 focused on pitching, project conclusion and further funding options. During the daylong workshop project participants and research consortium members got the opportunity to reflect on their experience working with the projects and to highlight advantages and limitations of the R&D fund. In addition, potential funders were invited to present the options for funding beyond the life of the R&D fund, give advice and feedback to the projects.

The contribution of the workshops was influential to the collaboration experience of the project partners. The workshops offered over 30 hours of face to face contact, networking and knowledge sharing opportunities between academics, artists, technologists and funders. The value and contribution of the workshops was recognised by participants and captured by surveys that followed the workshops.

Two separate surveys were released following the first and the second workshops that aimed to capture the overall workshop experience and satisfaction of project partners.

The survey questions addressed issues relating to workshop organisation, collaboration activities and project management. Overall, the surveys contained 24 scaled responses (agree-disagree) questions and 4 open-ended questions, resulting in 504 scaled answers and 26 feedback responses respectively.

According to the surveys the perceived workshop satisfaction and collaboration experience among project partners was very high, with just 10% expressing a neutral or negative opinion and 71% providing a positive and 19% a very positive response. Equally positive were the responses relating to networking and knowledge sharing experience with the negative responses being as low as 10%.

I found the workshop useful and helpful for networking and knowledge exchange

Agree 71%
Neutral 5%
Disagree 5%
Strongly disagree 0%
Strongly agree 19%
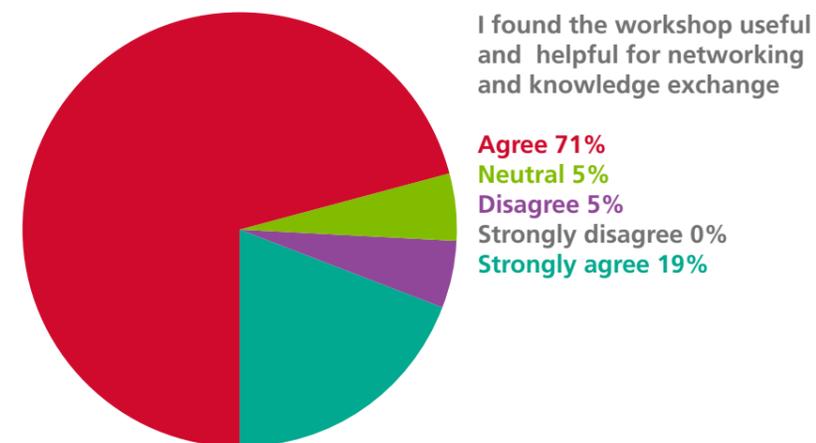
Collaboration

Slightly less positive, but equally encouraging, were the responses relating to project management and planning issues as these were discussed and addressed by the workshop sessions. Nearly 70% of the participants agreed or strongly agreed that the workshop sessions have helped and improved their understanding, with respect to project tasks, project deliverables, the role of the audience in project development, and own contribution to project aims. With regards to how the workshops sessions helped the participants to obtain a better understanding of the project evaluation methods, the responses were split almost fifty-fifty between positive and negative/neutral answers.

In addition, 57% of the participants agreed that the workshop sessions have helped them to clarify the role of the research consortium whilst 90% agreed that the academic partners' research interests and experience were relevant to the aims of their project.

Steering Group
The steering group consisted of the project research leads (four members), the research assistants (three members) and the R&D programme manager (one member). The role of the steering group was to oversee the progress of research of the individual projects, to ensure the quality of the research outcome, and to provide guidance and support to its members with respect to collaboration, communication and project management issues.

During the meetings the members of the research consortium shared a common ground for reflection, information sharing and knowledge exchange which enabled identification of research needs and problems, elucidated research objectives, and helped to steer and prioritise future actions. The meetings had a significant complimentary role to the workshops for mediating a regular dialogue between academics and for discussing finer research issues that were not in the interest of the workshops.
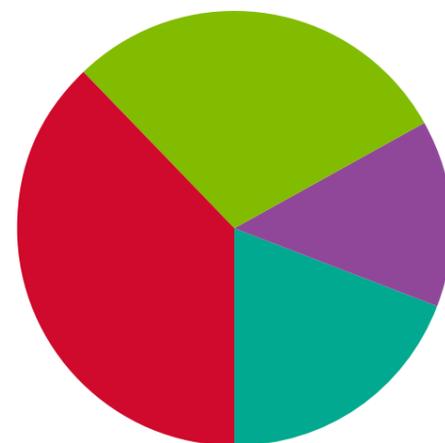
The workshop helped me to better understand the role of the consortium

Agree 38%
Neutral 29%
Disagree 14%
**Strongly disagree 0%**
Strongly agree 19%

Collaboration

Online collaboration facilities
The R&D project has adopted a range of conventional online collaboration and communications tools that are widely known and frequently used for project management and communication purposes, such as email, cloud drives and scheduling utilities.

In addition, the project has made extensive use of Trello (Fig 2), an online project management application that uses a visual method for prioritising and managing project tasks based on the Kanban method of working, where items move through different stages across a board. The flexibility and versatility of Trello in combination with the ease of use and its uncomplicated integration with cloud resources resulted in a substantial use of Trello by the vast majority of the project partners and research consortium members.

The level of use and engagement of project partners with Trello was addressed by a survey released in June 2014. According to the survey there is a clear and nearly balanced division between those (45%) who use Trello frequently (daily or weekly) and those (27%) who never engaged with the tool. In between there is a nearly one third of users who make very little (once a fortnight/month) or infrequent use (rarely) of the online project management tool.

Another interesting paradigm that reflects the level of engagement with online project management tools is the number of contributions (posts) per Trello user. There is a direct analogy between frequent Trello users and volume of online contributions. Over 45% of the Trello users have produced over 10 posts with the vast majority contributing over 20 posts. On the other hand, a significant 18% of project partners have not made any contribution and 37% contributed no more than five posts.

Figure 2

How often do you use Trello?
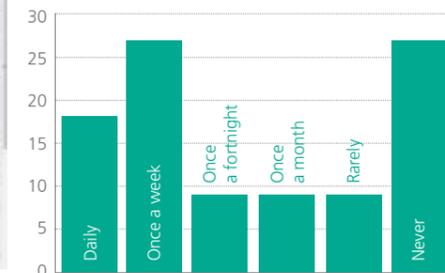
Posts per user in Trello

None 18%
1-5 posts 37%
5-10 posts 0%
>10 posts 45%
10-20 posts 9%
> 20 posts 36%

Collaboration

Collaborating with the Research Consortium
The project satisfaction survey has also addressed the collaboration experience of the Arts and technology partners with the research consortium. The vast majority of responses (73%) agreed that the model of interaction between art partners, technical partners and research consortium was well balanced and beneficial to the projects.

A noteworthy 90% of the participants agreed that research interests and experience of the academic partners was relevant to the aims of their project and over half of the responses (55%) agreed that the consortium helped to set realistic research objectives. However, 45% of participants were not clear about the role of the consortium and nearly half of them expressed a neutral or negative opinion with regards to the guidance, promptness and comprehensives of the input they received.

The above neutral and negative opinion with respect to consortium role has its basis in the application process which jointly brought arts and technology partners but did not engage the academic partners. Thus, the engagement of the consortium in the R&D process felt as an after-thought which initially affected the ownership of research of individual projects. Many arts and technology partners felt that the research outcome was a job for the consortium while the academics initially perceived their role as having a mentoring contribution and less of a hands-on engagement. Eventually the role of the consortium was clarified during the first workshop but some early momentum was lost.

Collaboration Insights
The individual project reports revealed useful collaboration insights that reflect the value of interaction between arts organisations and digital technologists which can instigate new ways of collaborating and communicating within teams and new approaches to project development. Arts partners have reported that they felt better prepared to initiate and tackle future technological challenges as a result of their involvement in the R&D project while arts partners also found the continual opportunities for feedback and input into the development kept them engaged and gave the project "a great energy and pace".

Project partners also highlighted that the success of their collaboration was based on their shared vision of what they want to accomplish. In addition, trust in the technology partner and the use of a dedicated project manager were recognised as key ingredients leading to a successful project delivery.
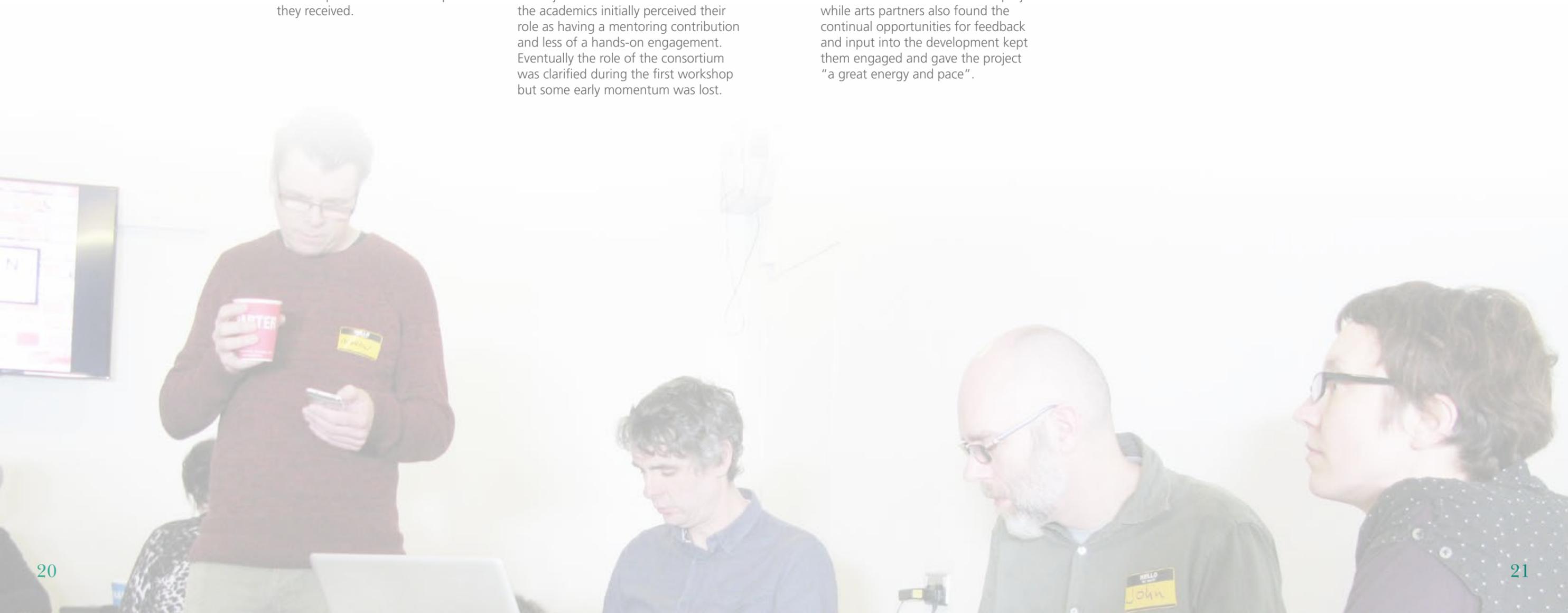
Opportunities for the arts

Skills development and peer-to-peer learning
The projects in Wales demonstrate peer to peer learning in its broadest sense, as participants in the project learnt from and with each other in both formal and informal ways. The emphasis is on the learning process, including the emotional support that learners offer each other, as much as the task or outcome itself. This area of emotional support is not one usually considered important in a professional context. The roles of teacher or learner are either undefined or may shift during the course of the learning experience.

Experimentation with new art forms
The R and D process offers a space in which artists can take formal and conceptual risks, create a context to look at different mediums of expression, explore ideas of process, test, prototype and investigate relationships with an audience. Clear examples of this can be found in the work of TaikaBox and Moon with their project 'Please Switch on Your Mobile Phones' as well as with the 'Sirwbd' project.

To collect user data.
Data is now seen as both a utility and an asset class. It has value that can be unlocked (to the limits of public consent), and protected. The National Theatre of Wales/NoFit State Circus and the 'Tocyn' project sought to discover new or playful ways to engage with audiences to create innovations in sales and marketing. Collecting user data to build a user profile has become a default activity for businesses wishing to grow their customer base. Sharing discussion about the contentious issues that grow from this allows for the development of ethical solutions that inform participants about data profiling using the information they are giving.

Archival opportunities
The experience of the Arts, Archives and Technology project indicates that the greatest challenges to institutional archiving are not necessarily technological but social and cultural. The challenge is in getting individuals to engage with the material creatively and even emotionally. However, this emotional engagement can be addressed through innovative disruptions such as computer gaming that attempt to place the payer in a context 'as if' it were real and in which significant decisions have to be made.

Innovation through practice
By actively creating a joint Community of Practice (Knowledge Networks – Innovation through Communities of Practice, P.M Hildreth ed, 2004 Idea Group Publishing,) new knowledge is constantly negotiated and a new community of practice evolves between the participants. Existing practices are reviewed through the creation of a shared practical outcome which may take the form of a product but which also has the potential to change the working practice of all involved. Some of the innovations created by the projects represent innovations for the whole practice of an organisation such as the TaikaBox and Sibrwd projects but others such as Tocyn are more incremental innovations based on continuous improvement.
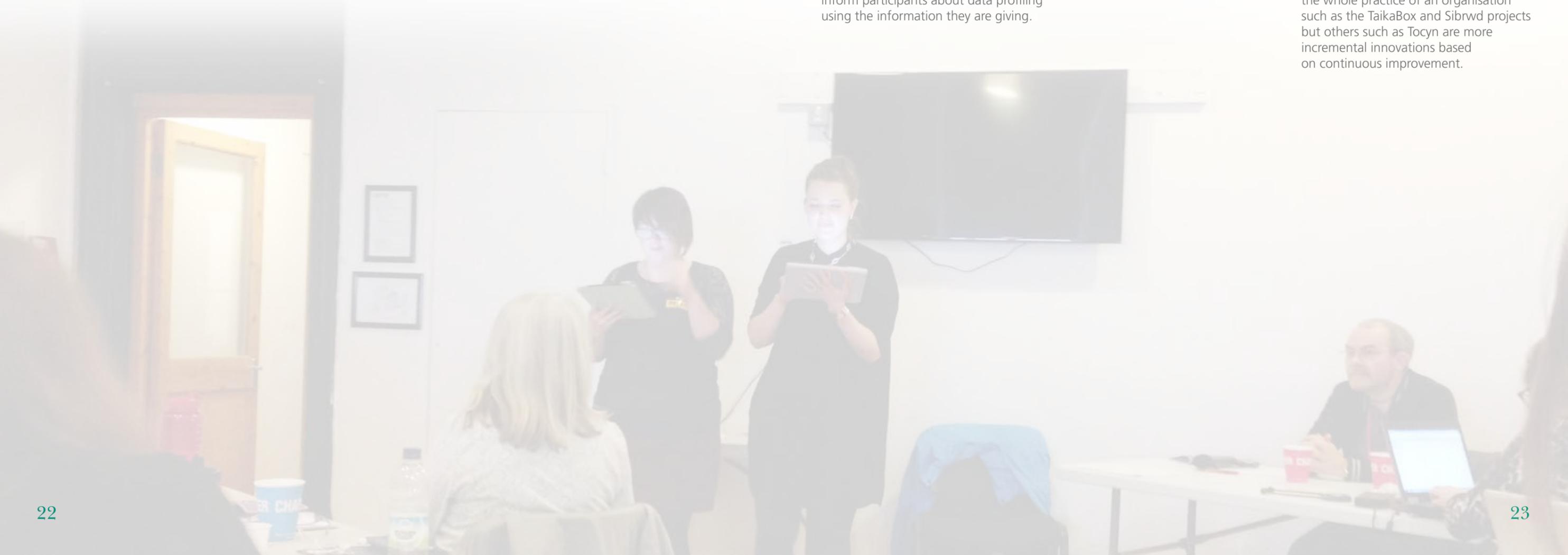
Barriers and limitations

There are a number of notable inhibitions to the innovation process –

Different languages

Differing professional languages and technology jargon sometimes leads to a lack of mutual comprehension which is not challenged for fear of appearing not to know. Inevitably when people from different backgrounds work together on shared outputs there is confusion unless people feel sufficiently secure to admit their lack of knowledge. Active attempts at interpretation need to make sure that assumptions about shared knowledge are challenged.

Experimentation with new art forms

The expectation that technology will always lead to solutions sometimes creates problems rather than solving them. Technology needs to become an integral part of cultural activity rather than being assumed to be the part that will deliver the solution if only we are 'tech savvy' enough. This assumption can lead to using technology for the sake of it rather than making an objective assessment of the current limits of the technology and seeking mutually ingenious solutions – sometimes things are done because they can be done rather than there being an established need for them to be done.

Ethics

Trust and ethics issue are very important to cultural organisations in Wales and projects like the Digital R&D project emphasise the importance of having a secure policy in relation to profiling, big data, data capture and so on. These issues cannot be left to 'marketing' in any organisation. They are the responsibility of the whole organisation.

Geography

Creative partnerships can be difficult to sustain at a distance despite the use of distance reducing technologies like skype and various forms of video-conferencing. Most participants acknowledged the value of face-to-face meetings and workshops as integral to the creative process.

Collaboration and Time

The development of an agreed framework for collaborating takes time. It is essential that people have time and space to get to know each other and to develop secure structures in which they can confidently share their expertise.

Digital Literacy

Differing levels of digital literacies within the partnerships led to varying degrees of confidence in planning.

Digital technologies for social inclusion

Building enhanced relationships with an audience and/or a community was at the heart of all the R and D projects in Wales. For example, the UCAN Go project had an integral point of reference with their membership who are young people with visual impairments. The wider group became actively involved in testing and customization opportunities.

At least two of the projects worked through the medium of the Welsh language and in doing so include both Welsh and non-Welsh speakers in the same events. The Sibrwd project explicitly sought new cultural engagement and interaction with non-Welsh speakers.

New Business Models

Co-Creation is a key ingredient to creative industry innovation based on significant input from the client. An experience or a product is "co-created" by an interaction between producer and consumer that underlines behaviours and practices of shared responsibility and ownership. During the R&D process arts and technology partners engaged in a highly collaborative activity that addressed all phases of the iterative design process including prototyping, testing, evaluating, and refining. In several projects such as iBeacons, Torf and UCAN Go, the arts partners were the early users of the prototyped applications providing prompt and meaningful feedback whilst accelerating the co-creation activity through a vibrant and well established channel of communication with the technology partner. Such experiences confirmed that co-creation models have an important role in creating conditions for social learning and adaptation in a rapidly changing technological environment.

Within a co-creative environment, arts and technology partners collaborated under a mutually benefiting business environment that enabled agility of development and responsiveness of design. The model promoted information sharing and shared ownership where technology providers become aware of the needs and processes of cultural organisations and vice-versa. Many of the arts and technology organisations involved in the R&D project are SME's having a flat or flatter project management structures than larger organisations often have. As a result responsibility for the project as a whole rested with the whole group and ownership of the outcome equally shared among the members of the team. Such project management approaches require leadership skills in areas such as conflict resolution, team building, and effective and honest communication whilst conventional project and innovation management skills remain important.

Co-creation business practices also promote innovation that does not always require invention in terms of originality. Innovation is the process of introducing changes or new elements to something already established that adds value to the end result. The majority of the projects, such as UCAN Go, PSOYMP and Sibrwd have employed well established smartphone services and technologies to provide innovative solutions for advancing the user experience. Such innovations did not require invention in terms of originality but are still legitimate forms of innovation because they introduced novel design and approaches and product solution. Crowdfunding was also recognised as an innovative business model for raising monetary contributions and promoting crowdfunded campaigns. For example Tocyn, an innovative online box office built around a community interest business model, used crowdfunding to allows consumers to donate a percentage of their booking fees from tickets purchased online to arts based crowdfunded campaigns of their choice.

New Audience Engagement

A fundamental aim of the Digital R&D Fund for the Arts in Wales was to support ideas that use digital technology to enhance audience engagement with arts projects. The fund supported opportunities for advancing inspirational and challenging relationships with new and/or diverse audiences. "Audience engagement" is a term that can cause confusion since it can be used to describe a range of audience outreach and engagement activities. In the context of this report "audience engagement" is realised in three ways:

i) widening access
ii) new forms of engagement and
iii) understanding audience better.

A significant number of projects employed digital technology solutions for advancing and promoting audience outreach strategies. Examples of using digital technology for constructing new and unique audience experiences and for understanding audiences better through data analysis are also discussed.

Widening Access
There is a general acceptance that digital technologies have the potential to reduce 'threshold issues' and allow active participation among a wider demographic than might normally engage in the arts. Arts organisations and producers have access to digital technology solutions that enable them to reach larger audiences quickly. Several projects during the lifetime of the R&D Fund adopted innovative outreach strategies that promoted access both to digital and physical audiences.

Projects, such as UCAN Go, Sibrwd, and iBeacons employed innovative solutions that evidently broaden physical audience participation to arts performances and venues. The UCAN Go mobile app enables visually impaired young people to navigate a complex public space, such as theatre and arts venues independently. The Sibrwd project developed an audio description mobile app that enables Welsh learners and non-Welsh speaking audiences to follow a theatrical play that otherwise would be hard to follow. iBeacons employed Wi-Fi technology to attract visitors into the venue from the All Wales Coastal Path which passes through the grounds. On the other hand, the PSOYMP project employed streaming technologies and live chat services to deliver a contemporary dance performance experience to an online audience that interacted synchronously with the physical audience of the performance.

New Audience Engagement

**New Forms
of Audience Engagement**
Many arts and cultural organisations are perceived to be 'not for the likes of us'. Digital technology carries the potential to unlock participation from a solely artistic audience to wider and more diverse audiences. Technological innovation can be employed to re-draw the relationship between 'actors' and audience to allow for participation beyond passive consumers of a second hand event and to attract new audiences that become active in the making process of a unique artistic experience.

Such innovations require risk-taking and commitment to learn from 'failure' that lead to a genuine development of 'novelty' and a 'fitness for purpose' result. In the case of the PSOYMP project an incremental approach to innovation through regular public performance, tests and cyclical reflection, allowed for radical adjustment of the project to be made as it moved through its action research cycle. The project endeavour to demystify contemporary dance and to engage new audiences by enabling them to interact digitally with the creation and performance of a dance in real time, brought an innovative experience to audience engagement with dance performance.

Understand Audiences
According to the Digital Culture Survey (2014) there is a growing trend among arts and cultural organisations in the use of common data-related activities for revealing audience engagement. Two particular activities are particularly common: i) using data to identify and engage with the most valuable audience members, visitors and supporters (51%) ii) using data to understand audiences better through data analysis, segmentation and/or profiling (49%).

In the realm of the Digital R&D Fund for the Arts in Wales two particular projects have employed digital technologies for understanding audiences better through data analysis and for identifying supporters and fundraising opportunities. The Torf project employed mobile phone technology for gathering audience data and for facilitating an on-going dialogue using playful and creative ways. Torf was tested live during fifteen No Fit State performances capturing audience data from as high as 53% of participants. On the other hand, the Tocyn project, employed audience data-related activities to promote philanthropy awareness and crowd-funding strategies.

The project developed an innovative digital ticketing system that re-purposes booking fees and enables individuals to financially support community arts projects that they feel relevant to the wellbeing of their own communities. The project has successfully demonstrated that ticket purchasing can be used as a fundraising mechanism to support crowdfunding campaigns.

The Welsh Context

The technological context of Wales

As the discussion about the impact of digital technology on cultures and economies has matured it has become increasingly problematised. This critical stance has advanced a more sophisticated view of the position of new technology than purely in global economic terms. Social, cultural and political aspects of the new technology are becoming central to the debate as well and this is especially important in Wales. The homogenising effect of the world wide web heightens the importance for a small nation like Wales of emphasising the local and non-homogenising impacts of new technology developments.

The strong belief that Wales can stand alone in the digital world is much in evidence amongst policy-makers. Individual nations whether they be Wales or the United States to an extent shape their own destiny and certainly make their own luck in policy terms and the developing digital world. Wales is recognising the present opportunity to shape actively rather than acquiesce passively in the current technological turn. Participation in the R and D Fund activity that is reported on here falls directly into that category.

Welsh geography, national and cultural identity, sense of community, language and economy are distinctive elements that have an influence on projects like the R and D Fund.

Geography

Wales is a country that is strongly defined by its space and terrain. Consequently one of the fundamental reasons to see Wales as distinct in the information age is its unique geography. Wales presents stark contrasts between the rural areas of Mid-Wales, the NorthWest and West on the one hand and the industrialised North and South East which contains most of the population. Parts of Wales are very sparsely populated especially in comparison with its neighbour England. The least populated local authority in England is Northumberland and even that is three times as densely populated as Powys in Wales. Separated by mountains and with 20% of its land mass being given over to National Parks, Wales is unique in its geography. In such a geographically challenging nation people have leapt on the idea that new technology will lead to the 'death of geography'. However the remaining potential of the local to exert an influence should not be overlooked. Despite advances in super-fast broad-band provision Wales still lacks a high-quality and truly nationwide digital infrastructure.

The challenges of the physical geography of Wales remain an inhibition to sustained communication. Active collaboration by skype for example would be hard to maintain between some businesses in parts of West Wales and those in Cardiff. With active collaboration in R and D being at the heart of the current ACW/ Nesta/AHRC project this can prove an inhibition. Policy to try to ensure connectedness in Wales should be directly informed by the success of projects like the Digital R and D Fund for Wales that has managed to attract and sustain projects from all parts of Wales.

Culture and identity

There are polarised views about the value of the digital economy in Wales. On the one hand new technology has the potential to revitalise the Welsh economy, communities and culture and redraw the heavy industrial history of Wales into a new and particular 'Digital Wales'. The other view is that the current advances in technology will erode Wales and what it is to be Welsh by fragmenting communities into the digital 'haves and have nots', homogenising language use in favour of the dominant world languages especially English, decentralising economic control away from individual nations towards the vagaries of global flows of capital and, at best resulting in a diluted and disenfranchised Wales. It is especially important that projects such as those supported by the Digital R and D Fund flourish in Wales so that policy can be informed by practice in the Creative Industries and so that new questions and issues arise and new practical solutions found. The fact that the R and D fund concentrated on cultural organisations has illuminated the importance of such organisations in interpreting the potential of new technology to support the interests of Wales as a whole.

The Welsh Context

The Welsh Language
Wales is officially a bi-lingual nation. The legal framework for this is provided by two Acts of Parliament, the Welsh Language Act of 1963 and 1993. The Act of 1993 provided for Welsh to be treated on the basis of equality with English.

The 2011 census showed that 562,000 or 19% of the population spoke Welsh to any degree of fluency. The rural parts of North and West Wales have a majority of bilingual residents whilst the Eastern Counties have a monoglot majority. The majority of Welsh speakers live in these English speaking areas since the majority of everyone in Wales lives in them. These and other anomalies and its continually precarious nature as a national language have led considerable policy and political determination to be shown in stimulating Welsh language use. The establishment of Welsh as one of the languages of the internet is now firmly established as an ideal space in which Welsh Speakers can freely communicate. The exponential advance of Facebook, twitter and other social media has provided more opportunity for the Welsh language.

A number of cultural organisations such as Theatr Genedlaethol Cymru, the Welsh Language National Theatre which was founded in 2003 work predominantly through the medium of Welsh. The use of the internet has been keenly appropriated as a place for the use of the Welsh language. However the Internet, for example, overtly continues to embody American qualities in terms of language, technical development and user values. Realistically English will remain the 'lingua franca' of the web and the computer industry more generally.

It is against the background of the cultural restriction of the internet, ie predominantly White, American and male that projects which embrace linguistic and cultural difference like the 'Sibrwd' project here are essential in resisting the potential marginalisation and homgenisation of minority languages in new technology practice.

The Economy
The Economy of Wales is fragile with the majority of its employment being found in the Service Sector. The advance of the digital economy in Wales which allows for business to be located anywhere and still sell globally is clearly significant for the economy of Wales. Progress has been made in the provision of digital public services and bridging the digital divide but more needs to be achieved through harnessing the creativity and innovation in the domain. The Digital R and D Fund provides precisely for this. This kind of innovation has social and cultural implications as well as purely economic ones and this is exemplified in the rest of this report.

Findings and Conclusion

The purpose of this final report is to present a whole project analysis of the Digital R and D Fund for the Arts in Wales. The report analyses the results, impact and learning emanating from the projects and is offered in addition to the seven detailed reports from each of the funded projects. Across the funded activity the emphasis was on collaboration, innovation and the development of a digital 'product.' It was possible to make the following detailed findings and conclusions – The structure of the project in Wales allowed for a series of workshops that encouraged sharing and making learning available to other arts and cultural organisations. These workshops were valuable throughout the whole project in providing motivation, information and a sense of shared purpose.

There were issues about the scope of projects and the expectations that there might have been to produce a viable commercial product within the time available. At least another year would have been required in most cases to produce robust and marketable legacy innovation.

Completely new partnerships need time to build trusting relationships pre-existing partnerships can inhibit genuine innovation and lead to repetition.

The attempt to apply quantitative approaches to measurement met the same set of issues in Wales as in Scotland –

In terms of measuring project results, many of the digital products and services produced have not been on the market for long enough to yield meaningful statistics.

Project leads typically estimated that it would take around one year of the product or service being available to users before they would have meaningful data available. Secondly, the projects had a strong R&D focus, and the collection of quantitative data can often not appropriately capture the results of such processes and was therefore not included in the programme of work.

However, where user statistics are available they point towards a close link between marketing activities and user uptake of the respective digital product or service.

Digital R&D Fund for the Arts in Scotland Consortium for Research into Arts and Technology in Scotland, CReATeS, Final Report, March 2014, Universities of Stirling, Strathclyde and St. Andrews.

Findings and recommendations

To be successful Digital R and D in Wales should:

1 Do more than concerning itself only with financial growth through audience development i.e focus on both the social as well as the financial value and outcomes generated by the digital innovation. All the projects, including those based around clear business models had an active social dimension.

2 Go further than focusing on additionality of input/output i.e. not just examining the success or otherwise of the project in terms of the 'newness' of its outputs but also in terms of the social benefit accrued. Avoid the temptation to confuse invention with innovation.

3 Solve how to evaluate as well as measure R and D in order to provide a useful guide for policy makers.

4 Define what "impact" means beyond increase of performance around a single output. This should include not only the short term but also long term dimensions of R and D.

5 Take place in clear stages providing a phased evaluation – All the projects took an iterative approach to the work, which allowed for a cyclical action research approach to be adopted.

6 Avoid isolation – a great deal of learning was had through regular meetings of the whole group of projects. Peer to peer learning was essential to the sense of shared intentions and methodologies. Much of the most creative work was undertaken in action and together rather than in a planning session for example.

7 Research in relation to the overall project should provide a clear link between evaluation and research. The distinction between academic reporting and evaluation was not clear at times.

8 Projects should be encouraged to explore mechanisms such as Open Data access, digital skills and the proliferation of open source projects or creative commons licenses. Exploring new digital tools for including people should be measured through the development of indicators, as well as taking time to understand how to undertake measurement and evaluation. A clear need was established for organisations to be 'up-skilled' to be able to undertake research activity themselves.

9 Strategic decision making as a form of research is now of greater importance than a "longitudinal" mutually benefiting knowledge exchange/transfer process from the funder's point of view. This will be clarified in the second (forthcoming) phase of the R & D fund.

10 Those organisations that supported the role of a Project Manager for the R & D Fund activity were at a distinct organisational advantage. There was a clear consensus that future applications to the Fund should be required to include the role of project manager/production manager.

11 Review is necessary of the role and function of the academic partnership in the overall project. Whilst there is a view that such relationships are valuable the current model of consortium activity is not considered to be the right model for engaging academics.

Conclusions

The Fund has Wales has successfully achieved its overall aims. New alliances have been formed between leading cultural organisations and technology providers which have enriched the knowledge base and practice of all those who have taken part. The project establishes a collaborative model for the future in developing capacity and desire for mutually beneficial innovation between the magisteriums of technology and culture.

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