Enabling Polyvocality in Interactive Documentaries through 'Structural Participation'

David Philip Green [1+2] **, Simon Bowen** [2] **, Jonathan Hook** [3] **, Peter Wright** [2]

[1] Department of Computer and Information Sciences, Northumbria University, Newcastle upon Tyne, UK.
d.p.green@northumbria.ac.uk

[2] Open Lab, Newcastle University, Newcastle upon Tyne, UK. s.bowen@ncl.ac.uk; p.c.wright@ncl.ac.uk

[3] Digital Creativity Labs, Department of Theatre, Film and Television, University of York, York, UK. jonathan.hook@york.ac.uk

ABSTRACT

Recent innovations in online, social and interactive media have led to the emergence of new forms of documentary, such as interactive documentaries ('i-Docs'), with qualities that lend themselves to more open and inclusive production structures. Still, little is known about the experience of making and/or participating-in these kinds of documentary. Our two-year *in-the-wild* study engaged a large community-of-interest in the production of an i-Doc to explore the ethically-desirable yet challenging aim of enabling multiple subjects to have agency and control over their representation in a documentary. Our study reveals insights into the experiences of participating in an i-Doc and highlights key sociotechnical challenges. We argue that new sociotechnical infrastructure is needed, that frames both 'executory' and 'structural' forms of participation as symbiotic elements of a co-design process.

AUTHOR KEYWORDS

Documentary; Interactivity; Participation; Co-Design; Grassroots; Narrative; Authorship; i-Docs

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

It is widely acknowledged that documentary can be a positive force for enabling public discourses and facilitating social change [43, 46] and it is an area of burgeoning interest within HCI [4, 17, 31]. The documentary scholar Mandy Rose has recently suggested ways that documentary could be 'more like participatory design' [56], but there is a mutual value in bridging the disciplines of documentary scholarship and HCI. Issues such as the ethics and politics of representation, the need for sensitive engagement methods and sustainable models of digital support are being tackled across both disciplines in ways that could be mutually informative.

John Grierson seminally defined documentary as *"the creative treatment of actuality"* [33] but despite the breadth

of interpretations, Grierson's earlier use of the term in 1926 [18] established a conceptual model that is still prevalent today. We still tend to think of documentaries as stable, singular artifacts, with identifiable authors and linear narratives; connecting with large audiences via mainstream distribution channels. New forms of documentary, however, subvert some of these 'defining' characteristics, yet remain true to Grierson's vision. By incorporating elements of social media, interactivity, transmedia (multiple platforms), gamification, and branching, 'rhizomatic' (networked) or open-ended narratives, documentaries such as *Highrise* [35], *Fort McMoney* [24] and *Bear71* [7] are pioneering unique digital experiences and revealing a wide range of possibilities for the documentary form. Within this work, we have adopted the term 'i-Doc' [2] (an abbreviation of 'interactive documentaries') as a broad descriptor for this *heterogeneous* and *heteromorphic* documentary format.

In this paper, we begin by suggesting that documentary-making remains characterized by strongly authorial voices, yet i-Docs have the – largely unrealized – potential to be more balanced, via different kinds of participation. We then describe a two-year 'participatory project', which explored how i-Doc making could be configured to incorporate participation in different ways. Based on our observations, we propose there is a need for new infrastructure to support participation in i-Doc making. Specifically, we advocate for better tools to nurture pre-existing (eco-)systems of media, and advocate co-design as an approach to establishing a position (an angle) that can help stimulate meaningful interactions between people and documentary media. We highlight a distinction between 'structural' and 'executory' participation (terms with equal relevance to interaction design) and argue that a sensitive combination of both is required to enable 'polyvocality' in i-Docs.

Our research sheds new light on the challenges of finding the right socio-technical infrastructure to configure participation with diverse publics [8, 39, 40].

The Problem with Documentaries

Both traditional (linear) and interactive (non-linear) documentaries (i-Docs) streamline the messy contradictions of real life into relatively accessible, legible forms. As simulacra of 'actuality', there is always a danger of *misrepresentation*. This is particularly the case when power lies disproportionately in the hands of *authors*, whose responsibility is split between ethical sensitivity to *subjects* and the need to produce a text that is legible to *audiences*.

Polyvocality (literally "many voices") is a semiological term [14] (of literary origin [3]) that describes the co-existence of multiple different perspectives within a text. It has been proposed as a quality that new forms of documentary might embrace [46] to circumvent the ethical shortcomings brought by strongly authorial voices, who are often also *outsiders* [53] that lack the sensitivity of *insiders* - or fellow subjects. The argument follows that non-linear narratives are better suited to polyvocality, since they attenuate the distortions of single authors (whether they are outsiders *or* insiders) into a more balanced, overall impression.

This argument is reflected in recent literature about i-Docs, which suggests they are well-suited to facilitating nuanced representations of heterogeneous communities and the diverse qualities of user-generated media [31]. However, most agree that enabling participation in i-Docs is challenging, and its potential is under-realized [26, 1, 49].

Presently, despite their potential to be more participative, i-Docs have tended to adopt the same centralized, authorial production structures and *tokenistic* forms of participation that have characterized traditional, linear documentaries [46, 13]. An i-Doc commissioned by a local authority might enable citizens to articulate their concerns, especially if it was developed with their involvement from the outset, but what – in practical terms – is needed to make this happen?

MAKING I-DOCS

i-Doc authorship is a technologically complex practice that remains under-explored in CHI, yet it is an increasingly popular form of non-fictional making, and there are a variety of digital tools emerging to support it. MIT's *Docubase* [20] lists 21 tools, yet almost all require mobile (Android/iOS) or web (HTML5, CSS, Javascript) development skills. GUI-based systems such as *Klynt* provide sophisticated interactive media-authoring functionality, but even their complexity is above the entry-point for most non-professional users. Like video editing tools, they are designed primarily for single-users. They are also evolving, arguably at an even greater pace. *Korsakow* was originally based on a proprietary technology (*Adobe Shockwave*) that has now been superseded by W3C-standard multimedia formats such as *HTML5* and *CSS3*. Open-source content management systems (e.g. *WordPress*), powerful languages (e.g. *PHP / JavaScript*), frameworks (e.g. *Bootstrap* and *Angular*) and APIs that integrate the functionality of other systems (e.g. social media) now provide a robust baseline of technological infrastructure for i-Docs. Unfortunately, the technical competencies required to engage with and configure these tools exclude all but the most determined non-professionals.

Acknowledging this technological complexity, some have adopted a more hands-on approach. *Popathon*, aims to "*grow a community of web-native storytellers*" through "*an international series of hackathon events bringing together media makers, technologists and designers to prototype the future of web-native storytelling.*" Popathons, however, are also based on an *HTML5* media framework (*Popcorn.js*), which – like similar frameworks (e.g. *Video.js* and *JQuery*) – requires familiarity with *JavaScript*. Just like learning to make linear narratives by video editing, learning to make interactive narratives is not just a creative challenge, but a complex technical one.

Hence, despite a great potential for i-Docs to be more participative, this currently applies more in-principle than in-practice. In-part, this is due to technical constraints, but there are social factors to consider as well.

Polyvocality and Participation in i-Docs

"*What is an author?*" [25] is a more relevant question than ever, as we begin to question how i-Docs might become more participative (and through this, more polyvocal). Social media, blogs, forums and content aggregators (e.g. *Storify*) all enable diverse forms of multiple and de-centralized authorship. User-generated media publishing platforms (e.g. *YouTube/WordPress*) suggest community-led documentary is a more feasible prospect than ever. Still, successful examples remain rare. Non-professionally-produced media runs the risk of becoming lost in the *sea of data* [22], trapped within *filter bubbles* [51], or exploited as raw materials by professional media producers [42]. Much more sensitive support is still required for non-professionals to connect their stories meaningfully with audiences.

A number of documentary projects have experimented with production techniques that reveal interesting 'dialogical' configurations of participation. *Question Bridge* [55], *Speaking Openly* [58] and *What is the Digital Public Space?* [32] each 'seed' (professionally-produced) content, to stimulate responses from non-professional contributors.

Speaking Openly, for example, uses a '100 minute' structure to frame a dialogue between ten participants, each submitting a ten-minute video (in their own time) in response to the preceding clips. The result is a 100-minute long, mediated conversation.

Question Bridge uses a branching narrative structure to present questions and answers about black male identity. Beginning with a single, seeded, question, each participant answers one (or more) question and then asks another, which is then answered by one (or more) new participants. The *Question Bridge* interface allows audiences to follow lines of questions and answers from multiple contributors.

Although these projects facilitate rich, mediated social encounters, which evolve into equally rich interactive narratives, they still fail to provide "*structural agency*" [41]: the ability to inform the context in which this dialogue occurs, or allow users to initiate their own conversations. Ultimate control remains in the hands of the professional producers and the voices of the participants are channeled through narrative structures designed by professionals.

The Canadian documentary maker Kat Cizek has pioneered a more longitudinal, co-creative approach to documentary production and authorship. *Highrise* (2009-), for example, is a "*multi-year, many-media, collaborative documentary experiment… that explores vertical living around the*

world" [35]. This is a rare example of a *participatory i-Doc*; a kind of documentary 'ecosystem' [49] that realizes Davenport's vision of an "evolving" documentary [19], or Gaudenzi's "living" documentary [26], where participation takes different forms, at different times.

Another example of a participatory i-Doc is *Quipu* (2015), a transmedia project about a forced sterilization program in Peru in the 90s. "*Using a specially-developed telephone line, an interactive documentary, a radio campaign and a feature documentary, we are providing the framework for those affected by this policy to tell their story in their own words and bring it to an international audience. The story emerges as the archive of testimonies and responses grows.*" [54] *Quipu* unites a variety of participatory approaches (including an innovative telephone method for engaging rural participants) to highlight a controversial sociopolitical issue via an open-ended, non-linear narrative.

The authors of these projects have all developed bespoke structures that enable different kinds of contribution and interaction. Yet we still identify *Highrise*, for example, as a documentary *by Kat Cizek*. *Highrise*, as an "*exploration*" of "*vertical living around the world*", has a methodological and thematic conceit. My *Facebook* wall, despite being populated with *my* content, still adopts a form that is defined and controlled by *Facebook;* one that subtly prioritizes a particular "*way of seeing*" [2]. Documentaries invariably represent 'many voices' (e.g. interviews with different people), but they remain 'univocal' when these voices are streamlined through a single 'way of seeing'; whether this is via a linear *or* a non-linear narrative. A different kind of participation, which Literat calls "*structural participation*" [41] could overcome this.

Structural Participation

Almeida and Alvelos equate i-Doc authorship with designing *a pattern of trails through a landscape of images*. This metaphor is a useful way of thinking about structural participation, which seeks to give participants, "*a say in the conceptual and artistic design of [a] project.*" It is distinguished from "*executory participation*" (e.g. liking, commenting and even uploading content to an existing system) in that it concerns the *form* of the documentary, not just its *content*. Structural participation, incorporated into the participatory design approaches pioneered by Cizek, for example, suggests a de-centralized process of designing a documentary's formal structure. Given the flexibility of the i-Doc form, could the *pattern of trails* be 'co-designed' to represent a 'co-created' *landscape of images*? Can participants be supported to develop the *form* of the documentary (via structural participation) and its *content* (via executory participation). If so, what infrastructure is needed to enable this? Can we even support *multiple patterns of trails* through the same landscape of images, reflecting multiple 'ways of seeing'?

Infrastructuring

User-centered perspectives on the experiences of participating in i-Docs are hard to find within emerging discourses, and the ways in which structural participation might be configured, in practical terms, is under-researched. However, recent research within HCI advocates "infrastructuring" as an approach to empowering 'publics' [40]. Infrastructuring has been defined as, "*the work of creating socio-technical resources [...] that might include participants not present during the initial design [stage]*" [39:247]. Björgivsson describes infrastructuring as an *ongoing* process [8], that aims to configure sensitive combinations of human and technological support. Infrastructuring, in the context of i-Docs, suggests the need for sustainable configurations of creative making, interactive artifacts and design, with different stakeholders, at different times. The concept of 'meta-design' [23] suggests fluid roles in which *users* become *designers*. In translating this approach to i-Doc making, we have three 'actors' rather than two: *producers*, *subjects* and *audiences* rather than *designers* and *users*.

To explore the potential for accessible and inclusive configurations of these actors within i-Doc making, we developed a study with a large community, framed around the production of an i-Doc. Our aims were to undertake a longitudinal, large-scale production and obtain user-centered insights into the following questions:

- *What are the fundamental challenges relating to configuring participation in an i-Doc?*

- *What socio-technical infrastructure is needed to support polyvocality in i-Docs?*

RED TALES: AN INTERACTIVE DOCUMENTARY

Red squirrels (*sciurus vulgaris*) are a popular wild mammal species, native to the UK. Red squirrel populations have declined in the UK since the introduction of the grey squirrel, which became an established 'invasive species' after being introduced in the late 19th Century from the US. Grey squirrels carry *squirrel pox*, a disease that is fatal to red squirrels but asymptomatic in greys (i.e. it kills red squirrels but not grey squirrels).

RSNE (Red Squirrels Northern England) are a UK-based conservation organization who are part of a widespread community, united by an interest in red squirrels and their preservation in the UK. RSNE co-ordinates volunteering activities across the region and are a key gatekeeper organization within the community.

A practice referred to as "grey-culling" (killing grey squirrels) is one of several methods used to protect the remaining populations of red squirrels in Northern England and Southern Scotland. Grey culling is, however, a controversial topic both inside and outside the community. Other methods include hand-making roadside signs urging drivers to slow down (red squirrels often become roadkill). Many within the community are less active. There are, for example, some relatively apolitical 'appreciation societies'.

The community-of-interest is thus formed of a large number of individuals and smaller, local community or interest groups, each with their own social networks (and

corresponding websites, social media, etc.) and different ideals and motivations. Many of these groups are connected with RSNE – and with one-another – although many are isolated and/or otherwise self-contained. The exact size and demographic distribution of the community is indeterminate since there are no formal geographical boundaries or central, formal memberships. However, the community is spread out over a wide geographical area spanning Northern England (37,000km²), which includes a large proportion of rural areas. The community includes many retirement-age adults, as well as younger and older adults.

A 'Participatory Project'

Our initial aim was to collaborate with RSNE on a documentary production, drawing upon participatory action research methodologies to ensure that it would be *of-value* to the community. We therefore aligned the aims of the project with RSNE's remit to raise public awareness of red squirrel conservation efforts.

During our first conversations with RSNE (in 2013), where the possibility of a research collaboration was initially mooted, the idea of co-creating an i-Doc was not proposed at all. Rather, discussions revolved around co-creating a linear documentary. At this time, however, there was a peak of research interest in i-Docs and co-creativity [15, 16, 26, 31]. Hence, the idea to produce an i-Doc was discussed and agreed with RSNE.

We now characterize this evolving process as the first stages of a "*participatory project*" [44]. McCarthy & Wright acknowledge a degree of "*precariousness*" in projects where participation is configured in unusual ways – in this case, what began as a crowdsourced linear documentary shifted towards a co-designed i-Doc; a shift motivated by our ongoing aim to produce something of-value to the community. We acknowledge this precariousness to be a result of working 'in-the-wild', within a dynamic and sometimes challenging environment.

MAKING RED TALES

Film Competition

To research the topic of red squirrel conservation, we visited three group meetings in rural areas to learn about squirrels and get to know the community. We encountered a predominantly 50-60+ age group, with a shared interest in spreading the red squirrel conservation message. Many reported to possess video or photographic materials of red squirrels and some (but not all) had experience of digital content sharing platforms such as *Flickr* and *Instagram*. Many were active on social media. We learned of a popular photography competition (organized by the community), which used the winning entries to produce an annual printed wall calendar. Inspired by this, we set up a film competition to 'crowdsource' materials from the community. An open call for "*photographs, videos, stories, sounds and songs*" was promoted via posters sent to various groups and venues; and online via social media and a website. A photography workshop with a well-known wildlife photographer and trail cams were offered to the

winners. Entrants could upload submissions via the website or post physical items to a postal address. Entrants were asked to provide a description of their submissions and given the opportunity to opt-in consent for their submission to be used in 'a documentary'. 16 of 18 entrants consented. The competition attracted 42 entries from 18 people, with submissions including a collection of self-published DVDs, a song written specifically for the project, digital and physical photographs and edited and unedited digital videos. Two judges (a popular local photographer and a biology professor from a local university) selected a winner and the competition received some local press attention.

Developing the i-Doc

We already had a corpus of media from the film competition when the idea to produce an i-Doc was proposed-to and developed-with RSNE. A plan was made to 'seed' the i-Doc with content from the competition and allow new submissions so that it might grow over time but our first challenge was to co-design the form of the i-Doc.

i-Doc Phase 1 - Design Workshops (August 2014)

Our starting point for developing the i-Doc was two half-day workshops. The aim was to engage the community and develop an outline structure by co-designing its core elements. We advertised the workshops via social media, through word of mouth, via RSNE and posters sent to local community groups. One was held in the North East of England (12 attendees) and one in the North West of England (5 attendees). Both workshops were structured around four activities:

1. '*What's in the bag?*' A story sharing exercise, based on items participants were invited to bring along.
2. '*What's in an i-Doc?*' A presentation of existing i-Docs, followed by a discussion.
3. '*Who participates?*' Mapping the social, physical and digital connections within the community.
4. '*What's the story?*' A structured discussion about what the i-Doc should be about.

The workshop resulted in the development of four key 'themes' for the i-Doc; "*Red Squirrels & Grey Squirrels*", "*Squirrel Pox*", "*My Community*" and "*What Can We Do?*" In addition, a map and timeline of red squirrel sightings, and a credits page were proposed as a way of providing geographical context and acknowledging multiple contributors. Based on these requirements, we selected *WordPress* as a flexible, open-source, database-driven platform upon which to build the i-Doc.

i-Doc Phase 2 - Participation Hub (Sept 2014 – March 2015)

The aim of the next phase, an online 'participation hub', was to engage users with the project's online presence and facilitate lightweight contributions in the form of votes towards decision-making. We began in September 2014 with a *Voicepoll* (an online poll which allows new items to be added), shared via Facebook and email, which asked participants to vote on a name for the project. 'Red Tales' was chosen, so the filmmaker registered a suitable domain,
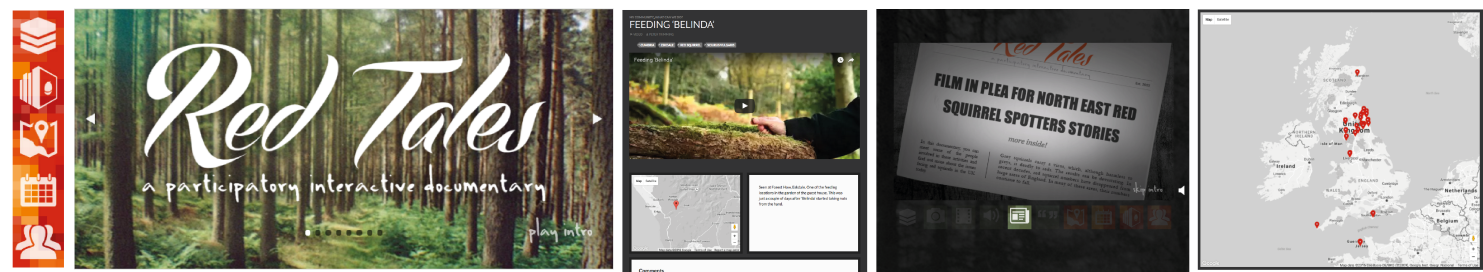
Figure 1 - Red Tales. http://www.redtales.co.uk
Left-to-right: Homepage (+ navigation icons); Content ("Feeding Belinda" by Peter Trimming); Introduction; Map

designed several logo ideas (based on the workshop materials) and set up a *WordPress* site with polls to allow voting on the final logo, colour schemes and final themes. An upload portal was set up for new content (using *Gravity Forms*, which integrates with *WordPress*). Weekly requests for new contributions or additional information were sent to registered users via email. We produced a downloadable user guide to explain how to register, make contributions, provide structured ratings and comment on different aspects of the prototype.

i-Doc Phase 3 – Red Tales (March 2015 – June 2015)
In response to the input from the participation hub, a prototype *i-Doc* was developed and released in-place of the participation hub. Navigation icons (Fig 1, left) linked to five interfaces: '*Archive*', '*Themes*', '*Map*' (Fig 1, right), '*Timeline*' and '*Credits*'. These interfaces presented the content in various ways, alongside metadata (title, location, date and author). A social media plugin was used to manage user-accounts and the MySQL database was manually modified to integrate social media content / additional metadata (e.g. geocodes). Interfaces were designed to present content either as a spatial collage (Archive & Themes), geospatially (Map), chronologically (Timeline) or by number of contributions (Credits). For the Archive and Themes pages, randomly generated thumbnail galleries were implemented that presented the diverse content in an aesthetically consistent manner. Structured contextual metadata (e.g. 'location: Hexham') provided clickable navigation to the other parts of the interface (e.g. Map).

i-Doc Phase 4 – Red Tales 2.0 (June 2015 onwards)
In June 2015, in response to feedback from several users, another development phase added a video introduction sequence that was dynamically populated with content from the database (video pt1) and a new feature was added enabling users to build and share their own collections of media (around bespoke themes). Also based on feedback form users, a simple censoring (blurring) of images with the 'squirrel pox' tag was also added, with a warning that the content may be graphic (resolved with a single click) (video pt2).

REFLECTING ON RED TALES

Understanding Participants' Experiences
During the 2-year project, which concluded in September 2015, *Red Tales* was populated with 80 photographs, 22 videos, 2 songs, 5 news articles and 1 book chapter from 25 registered users. Some entries depicted conservation activities (e.g. grey-culling, squirrels afflicted with pox and home-made road signs) but many were relatively 'apolitical' (e.g. photographs depicting 'cute' red squirrels).

In addition to collecting media content and metadata, workshop recordings and email exchanges, we conducted formal interviews with several participants during the project. In the following section, we focus our analysis (non-exclusively) on 4 in-depth, semi-structured interviews (lasting between 30 and 90 minutes) with four different participants, which were all conducted after the i-Doc launched publicly in June 2015. These participants were chosen as characterizing different levels of engagement with the project. The names used are pseudonyms.

Amy works as 'Engaging Communities Officer' for RSNE and has been involved throughout the project, including helping to facilitate and recruit participants for both workshops.

Bob is retired and won the film competition with his submission, 'Serenading the Squirrel'. He lives in a rural town in Northern England. He is a well-known, vocal figure in the community, was an active participant throughout the project and attended workshop 2. He has contributed large amounts of video content to *Red Tales*, primarily through competition entries (supported by his 'computer guy').

Cara lives in the green belt of a city, where red squirrels often visit her garden. She engaged intermittently throughout the project, including attending workshop 1. She contributed a collection of photographs to the competition and added additional data via the 'participation hub'.

Dan works as a project manager for a Scottish red squirrel conservation charity. He engaged towards the end of the project by experimenting with the site and uploaded a single image from a trail camera.

	Amy	Bob	Cara	Dan
Preliminary interviews				
Film competition		winner		
Design Workshop 1				
Design Workshop 2				
Catch-up Interviews				
Participation Hub				
Live i-Doc				
Follow-up Interviews				

Figure 2 – participants' different areas of engagement

We incorporated a high level of critical reflection throughout the project, via a research diary. At the end of

the study, the authors of this paper used the research diary and the workshop data to inform a reflective exercise, which resulted in the production of a timeline of the key events and a 4000-word reflective account of the process.

We analyzed the interview data and the reflective account using a combined inductive/deductive approach. We generated codes from the data using inductive thematic analysis [9], which were then gradually refined into five themes that responded to our research questions. This process ensured our analysis reflected our research aims, but remained grounded in participants' accounts of the project. Our final analysis is framed around these themes.

Bringing a community together and representing its diversity is challenging

Our aim from the outset was to make a documentary that reflected the (whole) community, so we set out to bring together diverse content, in different forms, from different places, at different times, from different people with different perspectives and opinions. Achieving this required awareness of the topic and some basic knowledge of the community. Although the community was geographically widespread, obtaining a corpus of media, online and via post, was straightforward. We obtained media via the film competition, including a number of non-digital contributions (e.g. printed photographs with hand-written descriptions, Hi8 and mini DV tapes). Some participants also contacted us with offers to show us places where red squirrels could often be seen. We did not anticipate receiving 'media-less' contributions and there was no easy way of acknowledging these contributions in our i-Doc interface (as the credits were dynamically generated based on media contributions). For some, however, secrecy was a virtue; publishing 'inside knowledge' might have undermined its value (for example, if a local woodland became swamped with squirrel-spotters, thereby scaring them away). A number of participants were happy to share photographs, but did not want to publish *where* they had taken them. This suggests a need for new ways of bringing together media with different combinations of metadata.

Some participants suggested the i-Doc should represent diverse opinions; "*I think it's important to have a rounded viewpoint*" [Amy], clarifying RSNE did not want to, "*let our perception of it dominate.*" Dan suggested the i-Doc should represent multiple perspectives, but ultimately align with one side of the argument; "*I think you've got to see two sides of the argument, but our bit is about saving the reds*". Others proposed that the i-Doc should focus on the conservation agenda and opposed the idea of including "*the other side of the story*" (such as the opinions of those who oppose grey-culling). "*It is supposed to be about the reds and saving the reds… I wouldn't* (like it if it was taken over by a well-known anti-grey-culling campaigner) *if he wants to do something on grey squirrels then let him do what we've done and take it onto his own site.*" [Cara].

Discussions at the workshop ranged from the issue of censorship, "*you don't want anybody ranting and raving*"

[Cara], to the question of who would be responsible for moderating content. Amy suggested the need for "*curation... somebody who might take on that role*", but acknowledged moderation might also be necessary, "*Say there was a pox outbreak and you got 100 articles about the same pox outbreak, how would you 'weed' that?*" Amy suggested sensitivity may be necessary when, for example, passionately held opinions are presented as 'facts'; "*It's hard isn't it, if someone who is clearly passionate ... [but] you do have to be careful that stuff that is demonstrably wrong or out of date doesn't take over.*"

Gatekeepers and facilitators influencing project and artifact formation

The film competition was designed in response to a simple challenge facing RSNE; "*we've got lots of images and videos on our Facebook and Twitter pages, but they are rarely useful as it's not clear where and when they were taken and – on their own – they don't tell much of a story...*" We asked for contextual information that ultimately shaped the metadata design of the i-Doc. Our interactions with RSNE thus shaped the i-Doc from the outset. Dan noted, "*you could tell that the big push had been in Northern England – it's obvious that you've been working closely with RSNE.*"

Although our intention was to share control of the project with the community, participants voiced frustrations at their lack of creative and technical confidence; "*I'm not able to reach out because I'm not technically experienced enough to handle the computer*" [Bob]; "*Creatively, I don't have a particularly creative brain, so what it looks like visually, I don't know what I would have imagined anyway, probably something a lot more boring*" [Amy]. As researchers and facilitators with professional expertise, we played a central role in prototyping and implementing the system. However, through workshops, the participation hub, and by implementing a system that incorporates existing media (as Dan put it; "*there's no point reinventing the wheel*"), we were able to develop, through several iterations, an i-Doc that incorporated ideas from different participants.

Projecting responsibility and ownership onto others

There were a number of different perceptions of the i-Doc's role. Should it be a vehicle for a particular perspective, a forum for debate, or both? We ultimately designed the interface to reflect Amy's desire for ambiguity, "*we (RSNE) want people to have that kind of curiosity and go and find out more.*" Nonetheless, we observed a variety of different perceptions of ownership of the project, with some participants referring to what "*we*" could do [Amy] and others to what "*I*", "*they*", or "*you*" could do [Dan / Bob], or what "*members of the public*" could do [Cara]. Amy expressed a sense of responsibility for what was perceived to be a lack of uptake in the i-Doc after the launch. "*It hasn't clicked yet…. a bit of that will be my fault not promoting it, but it just doesn't seem to have caught imagination yet. I don't know why that is.*" [Amy]. In most cases, ownership of the project was attributed either to

RSNE or us, with participants describing "*your end product*", or, "*that's your website, not my website*".

Building critical mass and connecting with audiences
Some participants reported a frustration with the failure of the mainstream media to represent the topic of red squirrel conservation; "*the BBC have never made a documentary on the red squirrel... The Scotsman have turned it down. The Sunday Post have turned it down. They're not interested.*" This was reflected in a sense of disappointment when *Red Tales* had yet to reach a critical mass; "*I get the feeling Red Tales is not fully... built up.*" Some participants felt that a critical mass would be needed before audiences would connect with the project, "*at the moment, the issue is there's not a big enough resource pool to pull stuff together… once that builds, the stories will come out… that will be interesting*" [Amy]. Dan suggested, "*the most active participants would be those who are already involved or have a vested interest*".

Most participants expressed a desire to attract attention to the i-Doc, although the participants did not necessarily have large audiences in mind. "*It's got to be aimed directly at government*" [Bob]. Some suggested prominent figures might act as spokespersons: "*Celebrities. That always hits the spot with some people*" [Cara]; "*Just recently we have Prince Harry comes up and immediately there's photographs of a red squirrel in the national press!*" [Bob]; "*You'll have to get Prince Harry*" [Cara]. Another idea to engage audiences, tentatively suggested by Amy, was 'trolling' the site with irreverent or provocative content to try and stimulate responses: "*it needs something different, something unusual, something quirky… controversy is a driver, but is it click bait? Is that a good thing to do?*"

Trajectories of participation
Amy, who had a vested interest from the outset, expressed hope that "*it snowballs and it does it itself and it doesn't need me, you, others prodding people all the time to do it.*" Many acknowledged the potential value of the i-Doc as a way to "*keep up-to-date .... are we winning the battle or not?*" [Cara] and some saw the potential for an active role in keeping it up-to-date, "*Priorities change - and understanding changes - so if it's alive and you can modify it and say, 'hey, this new thing has happened'…*" [Amy]. However, Dan described the topic as "*a moveable feast.*" and Bob's concerns reflect the permanence of the topic, "*Obviously when your project is finished, you're not just going to spend your life thinking about red squirrels. You're going to move on ... I'm still carrying the bat at 82.*" Yet for many, documenting red squirrels is a lifelong passion, "*I've always had this passion and… my work that I set out just to record as a hobby, has now turned into a passionate appeal for the future of the creature*" [Bob]. For others, the appeal of the subject was more transient. As Amy described, some (potential) participants "*get really into taking pictures of red squirrels and explore it further and become involved in conservation*", whereas some (photographers) "*just want to bag however many species -*

it's just, 'there's a red squirrel' and then move onto the next thing - they just want to use them to raise money, sell photos, sell cards.*"

Our participants tended to prefer face-to-face engagements, with one participant reflecting, "*That first workshop, I really enjoyed that… You can discuss things, which you haven't got if you're just sitting there in front of a PC on your own, trying to look at stuff... We seemed to get through a lot of stuff, the practical stuff like thinking about things and writing things down and I like that because it gets you thinking*" [Cara]. The participation hub did not connect as meaningfully with participants. Simpler online interactions, such as the Voicepolls were popular (with each of the 6 polls gaining between 103 and 129 (anonymous) votes from unregistered users). However, only 4 participants (of 29 registered users) engaged with the activities on the hub during its 12-week lifespan. Some participants reported that they were "*not aware*" of the hub [Bob], but others claimed to lose interest in it due to a perceived lack of momentum; "*because it spanned a couple of years, it went off the boil and I started doing other things. I sort of lost my momentum with it*" [Cara].

DISCUSSION
As a project that evolved during its early stages, the shape of *Red Tales* as a blueprint for future i-Docs is imperfect. Its ebbs and flows were also sometimes less satisfying than we expected or hoped for. Nonetheless, it was a rewarding and revealing *participatory project*. Here, we discuss some of the key challenges we encountered, drawing equally upon the value of *lessons-learned* [28] as from the successes of the project.

We began by asking two questions about *the fundamental challenges relating to configuring participation in an i-Doc* and the *socio-technical infrastructure needed to support polyvocality in i-Docs*. Beginning with the question or infrastructure; we succeeded in our aim of developing a 'polyvocal' i-Doc by engaging participants in its design (via workshops, dialogue and an online 'participation hub') and content production (via a film competition, an upload portal and the i-Doc itself); bespoke activities, tailored to the community. We succeeded in representing multiple perspectives without prioritizing any one 'position', according to our aims, by embracing "ambiguity" over, for example, a clear agenda of advocacy or activism. However, for this reason, we struggled to maintain momentum over the course of the project and we encountered many challenges that signpost key areas where different approaches might have been preferable, or where additional resources were required. The following sub-headings represent challenges to configuring participation, where socio-technical infrastructure is needed.

Devolving Authority and Embracing Polyvocality
After the film competition, our first major challenge was to design a reflective, sense-making and boundary-identifying process relating to the media corpus. As we have suggested, narratives are ideally-suited to establishing these kinds of

boundaries but, in their poetic forms, they expose 'authorial' *ways of seeing*. Enabling multiple people to have a role in the establishment of narrative boundaries is fundamentally challenging (it necessitates rigid hierarchical structures within mainstream filmmaking for example). Enabling a heterogeneous, geographically dispersed, untrained community to participate in this process was even more challenging.

By choosing to focus upon red squirrel conservation, we inherited certain boundaries from the topic itself, and the submissions from the film competition provided some initial material around which to focus our aims. However, the initiation of *Red Tales* (by us and RSNE) had a formative influenced upon perceptions of ownership. This had implications in terms of political representation (who was involved), as well as what was represented (and how) within the i-Doc. Gatekeepers and facilitators often play a central social role within communities-of-interest but, in this case, their involvement alienated those in the community who did not associate with them (and those who were intimidated by our presence as 'outsiders').

Greater sensitivity to the social dynamics of a community is needed here. A key challenge is to find ways of balancing the formative momentum brought by enthusiastic members of a community with engaging and valuing marginalized members. The challenge at the heart of this is to help the community perceive – and value – its own breadth and depth, and to identify overlapping areas of shared concern, without doing so *authorially* or 'falling-in' with one side of an argument or another. New authorship tools for i-Docs might aim to support narrative boundaries that are democratically-determined, transparent, and potentially also dynamically reconfigurable.

Balancing Positioning and Polyvocality

The diverse perspectives of our target community presented other interesting challenges. It was not simply that there were different perspectives on, for example, whether grey-culling was moral or amoral (although this divided opinions). Participants also had strong opinions about the i-Doc itself; some felt it should represent balanced opinions ("*both sides of the story*") and some felt it should represent a particular perspective ("*our bit is about saving the reds*").

We characterize this as a tension between the values of *agonism* (dialogue) and *advocacy/activism*. Drawing on received wisdom that database-driven i-Docs naturally represent multiple viewpoints and suggestions from some participants that ambiguity would be a desirable quality, we implemented a broadly inclusive (and therefore relatively *apolitical*) system. Unfortunately, this resulted in some uncertainty about what the i-Doc was *about* and what it was *for*. Some participants (e.g. Bob) projected their own (activist) agenda onto the i-Doc, whereas others projected ownership of the i-Doc onto others – specifically, RSNE and/or the researchers. The unforeseen consequence of these projections ranged from some frustration about the lack of a clear direction, to a lack of momentum as a cumulative result of disengagement. If polyvocality is the balanced presentation of different perspectives, i-Docs require configuring from the outset to make sure this aim is clear to participants to avoid any uncertainty-of-purpose.

To borrow a maxim from the BBC, documentaries are usually intended to *inform*, *educate* or *entertain*. To facilitate investiture, i-Docs might need to identify with one (or more) of these positions. Whether this is framed as a decision to focus on informing, educating or entertaining audiences, or whether it is about valuing agonism, activism, advocacy or even apoliticism, *positioning* the i-Doc is an important decision. i-Doc producers might seek to get around this 'cold start' problem by establishing an i-Doc with a particular position, but then enabling adversarial perspectives to emerge through careful metadata design but new techniques and strategies are needed to help co-ordinate the devolution of initiation processes and the subsequent (or simultaneous) *positioning* of an i-Doc.

By way of an example, we might imagine a documentary that is styled and presented one way when some condition (e.g. clips tagged 'anti-grey-culling') are weighted in a particular way, another when they are more balanced, and another way again if the balance tips the other way. How these formal qualities are designed is the key question.

Structural Participation *Defines* the *Form* and *Role* of Executory Participation.

Executory participation concerns both the interactions afforded by the i-Doc interface (e.g. scrolling, clicking) and the contribution of content (e.g. media and metadata).

Structural participation should aim to collectively *define* the *role* and *form* of executory participation within the i-Doc. At a basic level, this involves interaction design, such as defining how the i-Doc operates at the level of the individual user (e.g. if a user scrolls quickly, important information is flagged). It could also involve defining the global form in a way that affects all users under certain conditions. More advanced considerations include the parameters of these adaptations and conditions; are they *temporary* or *permanent*; *immediate* or *gradual*? Are there limits to the extent that changes occur?

A simple example from *Red Tales* was the implementation of a resolvable blur on the 'gruesome' squirrel pox images based on feedback from a participant. Another example might have been if the number of contributions tagged 'grey' exceeded those tagged 'red', the name 'Red Tales' might switch to 'Grey Tales' and the color scheme or even URL update to reflect. The aim of structural participation should be to develop ideas for structural metaphors with the community. To enable this, new techniques are needed as well as the technical infrastructure to support them.

Structural Participation as a Design Challenge

As we discovered, enabling structural participation in an i-Doc is challenging. Like recent i-Doc productions (e.g. *Highrise, Hollow,* and *Quipu*), we drew inspiration from design methods in our efforts. Workshops were found to be "*enjoyable*" and "*engaging*" methods, as they "*got people*

thinking" (more so than our online engagements). The success of our workshops suggests that, if we approach structural participation as a *design* challenge, (rather than a documentary production challenge *per se*), we encounter a solution space with a rich history and a shared set of moral and pragmatic concerns.

We used a combination of workshops, interviews, iterative design, high-fidelity prototypes, e-voting and online participation systems to try and divest structural agency but we could have used any number of design approaches from within the SIGCHI community. Hook's 'creative responses' (to gently provocative videos) [36], combined with iterative, dialogical techniques (e.g. *Question Bridge*) might generate materials to 'seed' a documentary. 'Medium probes' suggest ways of testing the water with specific platforms [21]. Other techniques facilitate intra-community relationships, trust and transparency in different ways to those used in established patterns of documentary-making. Cultural probes [29], for example, might help 'outsiders' connect with community members before developing a participation methodology [cf. 62]. Design games could help organize collaboration between people with various competencies and interests [10]. The list goes on.

The challenge facing documentary, as with any user-centered design challenge, is to tailor participation methods to users' needs. *Quipu*'s telephone line is a good example of a sensitive method of tailoring *executory* participation to rural participants, but we need to be equally sensitive when developing strategies for structural participation. This speaks to a need for *configuring participation* and *infrastructuring*, but it also gives us a language through which to frame our own observations from *Red Tales*.

Configuring a Participation Ecosystem
Vines et al. outline key considerations for configuring participation [61]. By identifying 'initiators' and 'benefactors', for example, they highlight the need for sensitivity to power politics in participative contexts. Documentary authorship has tended to be a 'formative' process, but prioritizing initiators or early-adopters over late-adopters threatens the kind of balanced representation that polyvocality aspires to. As we have demonstrated, this can lead to skewed perceptions of ownership like we observed in *Red Tales*.

Our approach was nonetheless revealing. Although we began with a form of 'executory participation' (the film competition) and we configured structural participation as a secondary, yet 'formative', activity (via workshops), we iterated through several phases of *executory participation* (asking for new content) and (re-)*structural participation* (via the participation hub and through open feedback). This oscillation between executory and structural forms of participation was not our original aim, but it highlights the potential for structural participation to be an ongoing (as opposed to exclusively formative) process.

Indeed, solidifying an i-Doc's structure from the outset could lead to 'early-adoption bias', that could be as

distorting as a strongly authorial voice. To mitigate against this, we must consider 'structural' and 'executory' participation as two facets of the same ongoing challenge. We have discussed how structural participation can be used to define the form and role of executory participation, but (as we demonstrated in *Red Tales*) the latter can also *inform* the former. From a 'cold start', this represents a stereotypical 'chicken and egg' scenario: which comes first? We need to understand the knock-on effects of either configuration if we are to develop a generalizable strategy.

Reflecting Existing Ecologies
In many cases, we can circumvent this dilemma by building upon existing media-making activities. Not all, but most of the content submitted to *Red Tales* was made before the project started and some existed in other forms (e.g. on *YouTube*) first. Recent work on volunteer-based community artifact ecologies [9] advocate reflecting existing socio-material ecosystems, urging caution against interventional, *monolithic* systems. i-Docs should avoid becoming *just another social media platform* and instead aim to reflect (and potentially inform) existing social and user-generated media. Where content is distributed across multiple platforms, integrating them within an i-Doc is a key technical challenge for the future. More robust, permanent APIs and open metadata structures could be key to enabling this.

Building on existing momentum is seemingly logical, but it can also prioritize the *mobilized* over the *yet-to-mobilize*. Few systems currently support bridging existing content and new content by identifying, collating, curating and moderating diverse materials, mapping people's existing self-representations or enabling meta-political dialogue (e.g. balancing agonism and advocacy). Our findings suggest the need for new ways of enabling – and then dynamically facilitating – the process of 'bringing together' diverse perspectives and media.

Infrastructuring i-Docs
The concept of infrastructuring reminds us that, while digital technologies introduce unprecedented opportunities for unskilled people to engage in (hitherto) highly-skilled processes, it is unethical for 'outsiders' to engage people and then disengage without a well-formed exit strategy. The voices of those who do not (or cannot) engage with a process in its early stages, are equally important to documentary's polyvocal ambitions. Taylor et al.'s toolkit for 'leaving the wild' [59], suggests solutions for ethical community technology handovers, which could provide a useful way of overcoming this challenge.

Towards a Sociotechnical Toolkit for Structural Participation in i-Docs
Structural participation in i-Docs requires diverse techniques that can be tailored to each scenario. Our findings point to the need for a sociotechnical 'toolkit'; something like a combination of MIT's *Docubase* (with its focus on examples and tools) and [43]'s Participatory Video Handbook (with its applied focus and practical techniques).

It would take the form of guidelines for those seeking to configure participation in an i-Doc.

This toolkit might include ways to support connecting i-Docs with audiences in ways that minimize 'the filter bubble effect'. For example, where engagement with the i-Doc artifact is low, strategies for stimulating it might include reaching out to under-represented parts of the community, stimulating discourses relating to the emerging narrative, highlighting imbalances or flagging missing elements. If 'agonism' had been agreed upon as a core value within *Red Tales*, for example, this might have taken the form of gentle 'trolling', such as soliciting input from the 'anti-grey culling' lobby. Techniques to support the community engage sponsors, spokespersons or endorsements could help raise the profile of the i-Doc via existing media, social networks, or in physical locations where encounters with the i-Doc might be meaningful to members of the public. For *Red Tales*, museums or UK National Trust properties would be ideal locations for situating these encounters. These decisions are another facet of the potential for structural participation.

CONCLUSION

Where documentary films present *authored, linear narratives*, and i-Docs present *authored, non-linear narratives*, participatory i-Docs might aim to *facilitate emergent, non-linear, polyvocal narratives*.

In other words, if rationalizing a complex topic into a simple narrative can be considered less important than sensitively representing its nuanced politics, margins and tensions, i-Docs represent an opportunity to embrace a more 'polyvocal' approach to documentary making.

We argue that one way to achieve this is by adopting a bimodal model of participation; one that relates to both the documentary's content (via executory participation) and its form (via structural participation).

We described how most i-Docs support basic 'executory participation' via interactions such as scrolling, liking, etc. *Red Tales* was designed to facilitate more *active* executory participation (i.e. media and metadata contribution). We characterize *Red Tales* as an *open-corpus i-Doc* (a manifestation of the *evolving* or *living* documentary), in contrast with a *closed-corpus i-Doc* where the primary corpus of media is fixed.

Received wisdom suggests that open-corpus, participatory i-Docs should supplement and reflect (rather than duplicate) existing media ecosystems (e.g. social media). However, this raises a number of technical challenges, such as the need for reliable, accessible and otherwise stable APIs that enable inter-operability and long-term stability when combining media from multiple platforms.

In addition to more *active* forms of 'executory participation', we suggest that 'structural participation' could enable polyvocality by engaging people in the design of an i-Doc's formal structure(s). Our study suggests new infrastructure is required to support this kind of participation within i-Docs.

Part of the role of structural participation is to *configure* executory participation. It therefore offers a framework for participation on two levels. A challenge to realizing this framework is the need to ensure fair representation by overcoming 'early-adoption bias', perhaps via adaptive infrastructuring or transparent, democratic (as opposed to invisible, algorithmic) reconfiguration.

In either case, there is a need to balance polyvocality with the need for a 'position' that both participants and audiences can identify with. This might be achieved by embracing the heteromorphic potential of the i-Doc form: one documentary, multiple 'positions'. However, this should be approached carefully and sensitively and certainly requires further research.

Future work might therefore explore the ability to personalize an i-Doc's structure and share this restructured form. Dynamically shaping experiences of media content is not new [30, 60], but bridging 'executory participation' (e.g. 'likes', or new content) with dynamic media structures is an interesting technical challenge, particularly when it is framed as a co-design challenge. Co-designing algorithms that process data from interactions could provide a locus for interesting forms of structural participation. Dovey has expressed concerns about the meaninglessness of media structured by the *"invisible logics"* of algorithms [49]; participatory algorithm design could facilitate new ways of seeing, interacting with and understanding documentary media. Data visualization tools (e.g. *D3*) could be leveraged to make the algorithms visible, but more accessible methods are required to make the algorithmic logic of an entire i-Doc *visible* – both to participants and non-participating audiences.

As well as suggesting the need for new tools to support structural participation, we have identified a design space for a sociotechnical *toolkit* for infrastructuring i-Docs. The aim of this toolkit is to provide ways of sharing control and nurturing polyvocality by embracing diverse perspectives. Cizek calls for more empowering roles for documentary 'subjects' (or *"the people formerly known as subjects"*) [15] but we should also interrogate *"the people formerly known as producers"* and *"the people formerly known as audiences"*.

Broadly speaking, the questions we must continue to ask are **who** is representing **who** – **to whom** – **to what end, and how?**

REFERENCES

1. Andre Almeida and Heitor Alvelos. 2010, An Interactive Documentary Manifesto. *Interactive Storytelling*, (2010), 123-128.

2. Judith Alston and Sandra Gaudenzi. 2015. Interactive Documentary: Setting the Field. in *Studies in Documentary Film*, (2015).

3. Mikhail. M. Bakhtin, 1984. *Problems of Dostoevsky's Poetics*, Minneapolis: University of Minnesota Press.

4. Tom Bartindale, Guy Schofield, and Peter Wright. 2016. Scaffolding Community Documentary Film Making using Commissioning Templates. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). ACM, New York, NY, USA, 2705-2716*. DOI: http://dx.doi.org/10.1145/2858036.2858102

5. John Berger, *Ways of Seeing*, London, Penguin Classics, 2008.

6. Janak Bhimani, Toshihiro Nakakura, Ali Almahr, Masaaki Sato, Kazunori Sugiura, and Naohisa Ohta. 2013. Vox Populi: Enabling Community-Based Narratives Through Collaboration and Content Creation. In *Proceedings of the 11th European Conference on Interactive TV and Video (EuroITV '13). ACM, New York, NY, USA, 31-40*. DOI http://dx.doi.org/10.1145/2465958.2465976

7. *Bear71*. Retrieved 22nd Sept, 2015. http://bear71.nfb.ca/#/bear71

8. Björgvinsson E, Ehn P and Hillgren PA (2010) Participatory design and 'democratizing innovation'. In: *PDC '10: Proceedings of the 11th biennial participatory design conference, Sydney, Australia, 29 November-3 December 2010. New York: ACM Press, pp. 41–50*

9. Susanne Bødker, Henrik Korsgaard, and Joanna Saad-Sulonen. 2016. 'A Farmer, a Place and at least 20 Members': The Development of Artifact Ecologies in Volunteer-based Communities. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing (CSCW '16). ACM, New York, NY, USA, 1142-1156*. DOI: http://dx.doi.org/10.1145/2818048.2820029

10. Eva Brandt. 2006. Designing Exploratory Design Games: a Framework for Participation in Participatory Design? In *Proceedings of the ninth conference on Participatory design: Expanding boundaries in design - Volume 1 (PDC '06), Vol. 1. ACM, New York, NY, USA, 57-66*. DOI: http://dx.doi.org/10.1145/1147261.1147271

11. V. Braun, and V. Clarke, (2006) Using Thematic Analysis in Psychology. *Qualitative Research in Psychology, 3* (2). pp. 77-101.

12. Axel Bruns. Towards Produsage: Futures for User-Led Content Production in F. Sudweeks, et al. (eds) *Proc' Cultural Attitudes towards Communication and Technology*, pp. 275-284. 2006.

13. Michael Chanan, *The Politics of Documentary*, London, BFI, 2007.

14. Daniel Chandler, *Semiotics*. London, Routledge, 2004.

15. Kat Cizek and Gerry Flahive, "The People Formerly Known as Subjects: Documentary Collaboration in the 21st Century", *MIT Video* Retrieved Sept 2nd, 2016 from http://video.mit.edu/watch/the-people-formerly-known-as-subjects-documentary-collaboration-in-the-21-century-13328/

16. Kat Cizek, "The Art, Ethics and Technology of Documentary Co-Creation: Visiting Artist Katerina Cizek". Retrieved April 12th 2016 from http://video.mit.edu/watch/the-art-ethics-and-technology-of-documentary-co-creation-visiting-artist-katerina-cizek-29953/

17. Clara Crivellaro, Rob Comber, John Bowers, Peter C. Wright, and Patrick Olivier. 2014. A pool of dreams: Facebook, politics and the emergence of a social movement. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14). ACM, New York, NY, USA, 3573-3582*. DOI: http://dx.doi.org/10.1145/2556288.2557100

18. Ann Curthoys, Marilyn Lake Connected Worlds: History in *Transnational Perspective, Volume 2004* p.151. Australian National University Press

19. Glorianna Davenport. 1997. Dexter and the evolving documentary. In *Proceedings of the fourth ACM international conference on Multimedia (MULTIMEDIA '96). ACM, New York, NY, USA, 441-442*. DOI: http://dx.doi.org/10.1145/244130.244464

20. *Docubase*, MIT. Retrieved September 22, 2015 from http://docubase.mit.edu/

21. Betsy DiSalvo and Parisa Khanipour Roshan. 2014. Medium probes: exploring the medium not the message. In *Proceedings of the 2014 conference on Designing interactive systems (DIS '14). ACM, New York, NY, USA, 239-248*. DOI: http://dx.doi.org/10.1145/2598510.2598580

22. Jon Dovey and Mandy Rose. 2012. Were Happy and We Know It : Documentary: Data: Montage in *Studies in Documentary Film*, 6 (2). pp. 159-173.

23. Gerhard Fischer. 2011. Beyond interaction: meta-design and cultures of participation. In *Proceedings of the 23rd Australian Computer-Human Interaction Conference (OzCHI '11). ACM, New York, NY, USA, 112-121*. DOI: http://dx.doi.org/10.1145/2071536.2071553

24. *Fort McMoney*. Retrieved August 31st, 2016 http://fortmcmoney.com/#/fortmcmoney

25. Michel Foucault. "What is an Author?" The Author Function; translation Donald F. Bouchard and Sherry Simon, In *Language, Counter-Memory, Practice*. Ithaca, NY: Cornell University Press, 1977. pp.124-127

26. Sandra Gaudenzi, 2013. "The Living Documentary: from representing reality to co-creating reality in digital interactive documentary". *PhD Dissertation*. Goldsmiths, University of London, UK, 2013.

27. D. Galloway, K. B. McAlpine, and P. Harris, (2007) 'From Michael Moore to JFK Reloaded: Towards a Working Model of Interactive Documentary', *Journal of Media Practice 8* (3), 325-339

28. William Gaver, John Bowers, Tobie Kerridge, Andy Boucher, and Nadine Jarvis. 2009. Anatomy of a failure: how we knew when our design went wrong, and what we learned from it. In *Proceedings of the SIGCHI Conference*

on *Human Factors in Computing Systems (CHI '09). ACM, New York, NY, USA, 2213-2222*. DOI: http://dx.doi.org/10.1145/1518701.1519040

29. Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. Design: Cultural Probes. Interactions 6, 1 (January 1999), 21-29. DOI: http://dx.doi.org/10.1145/291224.291235

30. William Gaver, Andy Boucher, John Bowers, Mark Blythe, Nadine Jarvis, David Cameron, Tobie Kerridge, Alex Wilkie, Robert Phillips, and Peter Wright. 2011. The photostroller: supporting diverse care home residents in engaging with the world. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11). ACM, New York, NY, USA, 1757-1766*. DOI: http://dx.doi.org/10.1145/1978942.1979198

31. David Philip Green, Simon J. Bowen, Christopher Newell, Guy Schofield, Tom Bartindale, Clara Crivellaro, Alia Sheikh, Peter Wright, and Patrick Olivier. 2015. Beyond Participatory Production: Digitally Supporting Grassroots Documentary. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15). ACM, New York, NY, USA, 3157-3166*. DOI: http://dx.doi.org/10.1145/2702123.2702203

32. David Green, Clara Crivellaro, and Jimmy Tidey. 2015. Interactive Design Documentary As A Method For Civic Engagement. In *Proceedings of the ACM International Conference on Interactive Experiences for TV and Online Video (TVX '15). ACM, New York, NY, USA, 161-166*. DOI: http://dx.doi.org/10.1145/2745197.2755518

33. Grierson, John, 1933. "The Documentary Producer", 1933. *Cinema Quarterly vol.2 no. 1*. pp. 8-24.

34. G. R. Hayes. 2011.The relationship of action research to human-computer interaction. *ACM Transactions on Computer-Human Interaction*, *18*(3), 1–20.

35. *Highrise*. Retreived 12th April 2016. http://highrise.nfb.ca/

36. Jonathan Hook, David Green, John McCarthy, Stuart Taylor, Peter Wright, and Patrick Olivier. 2011. A VJ centered exploration of expressive interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '11). ACM, New York, NY, USA, 1265-1274*. DOI: http://dx.doi.org/10.1145/1978942.1979130

37. Henry Jenkins. *Convergence Culture: Where Old and New Media Collide*, NY, USA: NYU Press. 2008.

38. *i-Docs*. Retrieved September 22, 2015. http://i-docs.org/about-i-Docs/the-symposium/

39. Christopher LeDantec and Carl DiSalvo, Infrastructuring and the formation of publics in participatory design, in *Social Studies of Science*, 43(2) 241–264

40. Christopher LeDantec, *Designing Publics*, Boston, MA, MIT Press, 2016.

41. Ioana Literat, The Work of Art in the Age of Mediated Participation: Crowdsourced Art and Collective Creativity in *International Journal of Communication 6* (2012), 2962–2984

42. Alberto López Cuenca, Artistic Labour, Enclosure and the New Economy, in *Afterall: A Journal of Art, Context and Enquiry*, Issue 30 (Summer 2012), pp. 4-13, University of Chicago Press.

43. Nick Lunch and Chris Lunch. 2006. *Insights into Participatory Video: A Handbook for the Field*, Oxford: Insightshare, 2006. Retrieved Sept 22, 2015 from http://insightshare.org/resources/pv-handbook

44. John McCarthy and Peter Wright, *Taking [A]part: The Politics and Aesthetics of Participation in Experience-Centered Design*, MIT Press, Cambridge, MA, 2015

45. Adrian Miles 2013, 'Click, think, link: interval and affective narrative' in Matt Soar and Monika Gagnon (ed.) *Database | Narrative | Archive: Seven Interactive Essays on Digital Nonlinear Storytelling*, Alliance for Networking Visual Culture, Montreal, Canada, pp.1-11

46. E-J. Milne et al. (eds.), *Handbook of Participatory Video*. Altamira Press: Plymouth, 2012.

47. Rosaria Munson, *Telling Wonders: Ethnographic and Political Discourse in the Work of Herodotus*, The University of Michigan Press, 2001

48. Kate Nash. 2012. Modes of Interactivity: Analysing the Webdoc, in *Media*, *Culture & Society*, Mar'12 34:195-210

49. Kate Nash, Craig Hight and Catherine Summerhayes. *New Documentary Ecologies: Emerging Platforms, Practices and Discourses*, Palgrave, Macmillan, 2014.

50. Bill Nicholls, *Introduction to Documentary*, Indiana University Press, 2010

51. Eli Pariser, *The Filter Bubble: What the Internet is Hiding from You*. Penguin, New York. 2012

52. *Popathon*. Retrieved September 22, 2015. http://popathon.org/

53. Calvin Pryluck, 1976. Ultimately We Are All Outsiders: The Ethics of Documentary Filming, *Journal of the University Film Association*, Vol. 28, No. 1 (Winter 1976), pp. 21-29

54. *Quipu*. Retrieved 22nd September, 2015. http://www.quipu-project.com/

55. Clarence Reynolds, 2012. The Question Bridge Project, *V. Network Journal 19.3* (May/Jun 2012): 58-59.

56. Mandy Rose, speaking at 'The Art, Ethics and Technology of Documentary Co-Creation: Visiting Artist Katerina Cizek'. Arts at MIT. Retrieved September 22nd, 2015 from https://www.youtube.com/watch?v=owL2hQGsS7E (30:00-36:00 approx)

57. Guy Schofield, Tom Bartindale, and Peter Wright. 2015. Bootlegger: Turning Fans into Film Crew. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15). ACM, New York, NY, USA, 767-776*. DOI: http://dx.doi.org/10.1145/2702123.2702229

58. *Speaking Openly*. Retrieved September 22, 2015 http://speakingopenly.co.uk/

59. Nick Taylor, Keith Cheverst, Peter Wright, and Patrick Olivier. 2013. Leaving the wild: lessons from community technology handovers. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). ACM, New York, NY, USA, 1549-1558*. DOI: http://dx.doi.org/10.1145/2470654.2466206

60. Marian F. Ursu et al. 2008. ShapeShifting TV: interactive screen media narratives. *Multimedia Syst*. 14, 2 (July 2008), 115-132.

61. John Vines, Rachel Clarke, Peter Wright, John McCarthy, and Patrick Olivier. 2013. Configuring participation: on how we involve people in design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). ACM, New York, NY, USA, 429-438*. DOI: http://dx.doi.org/10.1145/2470654.2470716.

62. Jayne Wallace et al. 2013. *A design-led inquiry into personhood in dementia*. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '13). ACM, New York, NY, USA, 2617-2626*. DOI: http://dx.doi.org/10.1145/2470654.2481363