# "Even More or Less": A data-rich interactive podcast player

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## ABSTRACT

Podcast players make poor use of the capabilities of the screen-based devices people use to listen. We present a podcast playback interface that displays charts, links, topics and contributors on an interactive transcript-based interface. We describe how we used paper prototyping to design the interface and what we learnt by doing so. We share preliminary results from a public online evaluation of the interface, which indicate that it was well-received. The new features were considered interesting, informative and useful, with charts and transcripts emerging as the most popular features.

## CCS CONCEPTS

• **Human-centered computing** → *Hypertext / hypermedia.*

## KEYWORDS

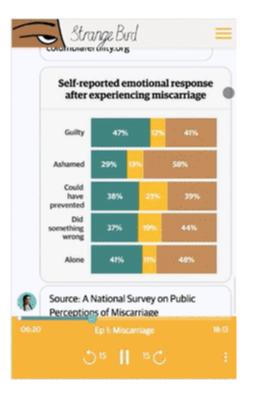podcasts; radio; player; transcripts; data

**Figure 1: Screenshot of the *Strange Bird* podcast player from Guardian Mobile Labs [16]**

## INTRODUCTION

Podcasting is a rapidly-growing medium for consuming audio content. 13% of UK adults now listen to a podcast in an average week – up from 7% four years ago [14, 15]. Radio listening is also shifting to digital platforms. 52% of UK adults have downloaded a radio app (up from 35%) and 8% of UK adults regularly use radio catch-up services (up from 6%) [14, 15].

87% of podcast listening in the UK is done on screen-based devices [15]. A screen provides the opportunity for displaying additional information and providing interaction features. Despite this, podcast players do not make good use of these capabilities. We are interested to learn what information and features can be used to enhance podcast and radio listening. Through this process, we hope to develop new listening experiences that fit the needs of younger audiences.

This paper describes an experimental podcast player with an interactive data-rich interface. Listeners can navigate by topic or using a transcript, view relevant charts and images, follow related links, view contributor profiles, and share clips.

One potential application of this technology is to tackle "fake news" by displaying the data used in a programme and its source. For this reason, we collaborated with the BBC Radio 4 programme *More or Less*, which uses data and fact-checking to debunk incorrect or misleading statistics.

## BACKGROUND

Podcast distribution is primarily achieved using RSS or Atom feeds and MP3 file downloads. This existing infrastructure already has limited support for including artwork, show notes, chapters and timed text [10–12]. However, less than half of podcast players display show notes correctly [4] and support for chapters in podcast players is very poor [3]. There have been several attempts in recent years to enhance podcast listening using text messaging, web applications and mobile apps.

*Amplify* used SMS text messaging to enhance radio programmes . By texting the programme when prompted, listeners would receive supplementary information. The producers found this built trust and created a deeper, more personal relationship with their audience [17]. However, SMS has limited functionality and cannot be synchronised with audio playback.

The Guardian's Mobile Innovation Lab released a custom web-based player for their podcast *Strange Bird* [16]. The player, shown in Figure 1, featured a chat-like interface that sent listeners related visualisations, images, sources and links. Listeners also had the option to enable push notifications to alert them to new content. Labelled horizontal lines were used to indicate new chapters. In a survey, 97% of respondents said they "would consider listening to this format again" [9].

*FastForward* was an interactive podcast player developed by BBC R&D as part of work on proto-typing news story formats for 18–26 year-olds [7]. The web-based interface displayed a transcript that played synchronously with the audio. Users could navigate the audio by scrolling through the
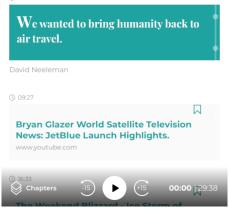
**Figure 2: Screenshot of the *Entale* user interface**

transcript. The interface also featured a horizontal progress bar that used colours to segment the programme by speaker. Focus group participants found the interface intuitive. They used it to skip to interesting bits, or review things they'd missed [6].

*Entale*[1] is a start-up company that recently launched an enhanced podcast player app for iOS. The interface, shown in Figure 2, included a scrolling timeline of images, links and quotes. Each scrolling timeline represented one chapter of a podcast. You could skip chapters by swiping left or right, or by opening a list of chapters. A progress bar on the right used dots to indicate where items feature in the chapter. Links and chapters could be bookmarked for later consumption. The app also featured a tool for creating and sharing a custom audio snippet [2]. This is similar to the *Shortcut* tool from *This American Life* [8], but uses waveforms rather than transcripts.

In January 2018, Spotify announced their plans to launch a service called *Spotlight*. It will use the Spotify app to add photos, videos, and text to audio content, such as podcasts and audio books [5].

These previous systems have shown how web applications and mobile apps can be used to enhance podcasts with a variety of information and features. However, a lack of published user test results mean it is still unclear which information or features listeners value most, how these should be presented, or how they affect the podcast experience. In this paper, we describe the design of our enhanced podcast player and present initial user testing results.

## DESIGN METHODOLOGY

We began the design of our player by compiling a list of the information we could feasibly generate during radio production. The list included topic segments, contributor identities, transcripts, links to related information, and images. We then used paper prototyping to choose which of these we should offer to listeners, and how we should present them. We recruited ten volunteers from BBC R&D and BBC Radio with a self-declared interest in podcasts. To quickly capture a wide variety of concepts and ideas, we scheduled ten individual 30-minute prototyping sessions to take place in a single day.

As two-thirds of podcast listening is done on smartphones [15], we based the designs on a template of a mobile phone. The large amount of information, and limited space in which to display it, made the design process challenging. Our volunteers had to be very selective about what to show, and when. For efficiency, we prepared paper cut-outs for the information available to be arranged onto the template. However, volunteers were free to draw any other information they wanted to add. As the volunteers designed their interface, we encouraged them to describe what they were doing and why.

## DESIGN RESULTS

The design process revealed that there were some elements on which most people agreed, but also many design choices where opinions differed.

**Figure 3: Six of the ten paper prototypes**

### Common design elements

Most designs started with a play/pause button and basic programme information, such as name, episode title and artwork. Everybody listed the topics and displayed the currently-playing topic. All designs had an interactive seek bar, segmented by topic, that would jump to the start of the topic when clicked. Additionally, short synopses for each topic were often included, which we hadn't anticipated. Most designs included a button to share the current topic, rather than the programme as a whole.

Related charts and images were included on all designs. Some suggested video, 360-degree images and text could also be added. External links formed part of all designs, to guide listeners to background information and to enable onward journeys.

Finally, the name, role, picture and profile of each contributor were included, as well as an indication of who is currently speaking. It was hoped that this would help listeners better understand the credibility of contributors.
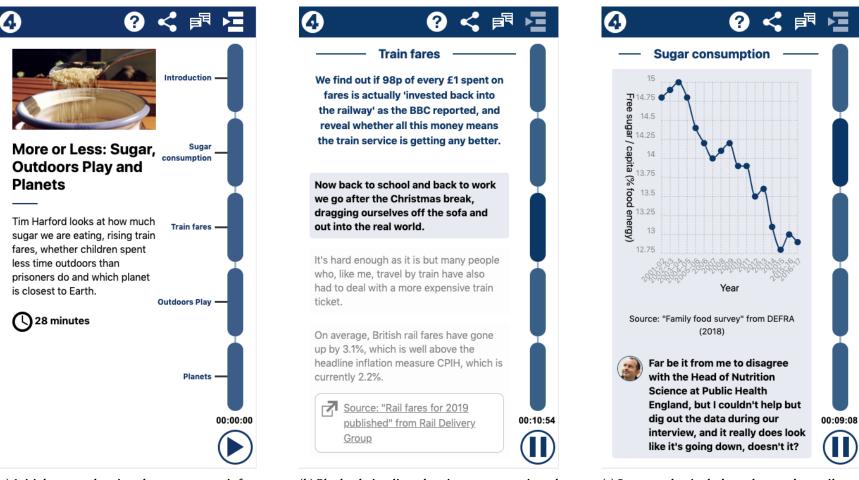
### Divergent design elements

Transcripts were the most controversial element of the design. Opinion was split between including them, not including them, or only having them as an option. Some thought they were an unwelcome distraction from listening. Others thought they were an important navigation tool. However, one benefit we hadn't previously considered was that they could assist non-native speakers, or the hard-of-hearing.

Everybody included a seek bar with topic labels in their design, but used different orientations and topic labelling techniques. Most chose a horizontal bar, but one design used a vertical bar, and another used a clock-like visualisation. Some designs displayed pop-up topic labels when the seek bar was first clicked. Others expanded and contracted labels as the seek bar was scrubbed. Each decision has its pros and cons, so the best design was not clear.

Other contentious design choices included which contributors should be displayed and when, which navigation buttons to include, and whether or not to notify the listener of new information using sound effects or push notifications.

### DESIGN DECISIONS

We chose to display a transcript that seeks the audio to that position when clicked. We know from previous research that interactive transcripts are a highly effective navigation technique [1]. Including a transcript resolved several other design choices. We could remove all other navigation buttons, and display contributors as part of the transcript. Transcripts have the side-benefit of helping people understand what it being said. For those who find transcripts distracting, we included the option to switch them off.

(a) Initial screen showing the programme information and expanded topic sidebar

(b) Playback timeline, showing current topic and synopsis, current segment and an external link

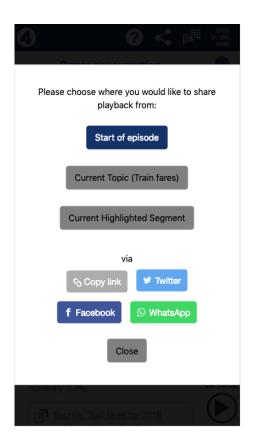(c) Segment that includes a chart and contributor thumbnail image

Figure 4: Screenshots of the final user interface design

We opted to use a vertical bar to display topics as it freed up more vertical space for the content. This went against popular opinion of our volunteers, but aligned with the design of *Entale*. We sized each topic equally, rather than by duration, to ensure they were visible on small screens. The placement of the sidebar on the right replaces the classic scrollbar, so we thought users would find it fairly intuitive. The vertical layout also gave us space to the side in which to display topic titles.

Finally, contrary to the design of the *Strange Bird* prototype, we decided not to alert users to the presence of new information using sound or notifications. The feedback we received was that the listening experience should not be interrupted. So long as there was enough information, users should quickly learn to seek it out by themselves.

## SYSTEM DESCRIPTION

Our final interface design is shown in Figure 4. It is formed of a timeline, a sidebar, and a menu.

### Timeline

We used a vertically-scrollable timeline to display all of the programme content. The top of the timeline (Fig. 4a) displays the programme artwork, name, synopsis and duration. Below, there are a sequence of segments, divided into several topics. Labelled horizontal lines mark the topic boundaries and a short synopsis is displayed beneath (Fig. 4b). Each segment includes a transcript, but can also optionally include a chart or link. When clicked, the audio seeks to that segment, and the currently-playing segment is highlighted.

When a contributor first speaks, a segment with their name, role and picture is displayed. Subsequently, their thumbnail image appears alongside the transcript each time they start speaking (Fig. 4c). Clicking on either the segment or thumbnail image opens a dialog box that displays the contributor's image, name and role, with a link to their biography.

### Sidebar

A vertical sidebar on the right is used to display and navigate topics. Before playback, topic labels appear alongside the sidebar (Fig 4a). During playback, the user can click the sidebar to display the topic labels, and click again to navigate to the start of a topic. The currently-playing topic is highlighted in the sidebar.

### Menu

The top menu contains buttons to open a help dialog box, share content, toggle transcripts and toggle the sidebar. The share button opens a dialog box, shown in Figure 5. Users are given the option to share a link that begins playback at the start of the episode, or the current topic or segment. Unlike *Entale* or *Shortcut*, the entire episode is still available when shared, rather than just a snippet.



**Figure 5: Screenshot of the share dialog box**

## EVALUATION METHODOLOGY

We wanted to see how audiences would react to our podcast player, and understand which elements of it they valued. We used a platform called *BBC Taster*[2] to evaluate our interface. Taster is a part of the BBC website in which we can pilot experimental media experiences to a large audience. It has a built-in rating system, and a survey system based on multiple choice questions with a single answer. In addition to the survey, we logged all user interaction events for those who consented.

Our survey questions and options were:

(1) How was your experience of the show?
- Better than usual / Same as usual / Worse than usual
(2) What was your favourite feature?
- Transcripts / Contributors / Topics / Charts / Links / Sharing clips
(3) How did you find the new features?
- Interesting / Confusing / Useful / Distracting / Informative / Unnecessary
(4) Where did you look while listening?
- At the player / Another app / Away from the screen
(5) Should we make more shows this way?
- Yes / No

For question 3, we informally surveyed colleagues to gather the three most popular positive and negative descriptors. The motivation behind question 4 was to understand whether the rich visual interface affected the way people listened.

## EVALUATION RESULTS

We launched the pilot on 8th February 2019, to run for three months. In this section, we provide preliminary results from the first seven days of the pilot.

During that period, 1044 people tried the prototype, of whom 71 (7%) participated in the survey. 75% identified as male and 20% as female, with a roughly equal split between 16-44, 45-54 and 55+ age groups. The average age of a Radio 4 listener is 57 [13], which may explain the skew towards older participants. 50% of participants used a mobile phone, 37% used a desktop PC and 14% used a tablet device.

### Overall impressions

The star ratings, shown in Figure 6, show that 84% of people gave the pilot a 4-star or 5-star rating. When asked whether the BBC should make more shows this way, 89% of participants said yes and 5% said no. 80% said their experience of the show was "better than usual", 7% said it was "same as usual" and 6% said it was "worse than usual".
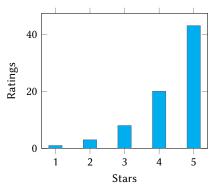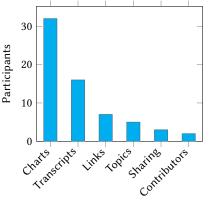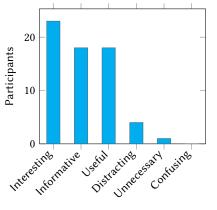
[2]https://www.bbc.co.uk/taster

**Figure 6: Overall ratings of the pilot**

**Figure 7: Responses to "What was your favourite feature?"**



**Figure 8: Responses to "How did you find the new features?"**

**Features**

Figure 7 shows the features that were selected as favourite by participants. Charts were most popular, followed by transcripts. Figure 8 shows the words people chose to describe the features. 92% of participants chose a positive descriptor over a negative one. 72% of participants said they looked at the player while listening, with 14% looking away from the screen and 5% looking at another app.

**DISCUSSION**

The response to our prototype was very positive. In our survey, most participants said their experience was better than usual, that they wanted more content made this way, and gave the pilot a high score. This indicates that there is an appetite for enhancing audio content with data and interaction features.

Charts were the most popular feature, but this may have more to do with their role in telling the story in the programme (e.g. Fig. 4c) than their value in general. Some programme formats may work better with some features than others. Our understanding of this will increase as we experiment with different content.

Transcripts can help with orientation, navigation, and comprehension. However, during the design process, there were mixed opinions on whether to include transcripts or not. In our survey, a quarter of participants selected transcripts as their favourite feature, which is encouraging. However, more research is needed to discover the reasoning behind this.

The survey system we used only supported single answers to multiple choice questions. This limited the type of questions we could ask. Although some features were not people's "favourite", this does not imply that they don't add value. Rank ordering may be a better way to understand the relative value of features.

Our implementation assumed that everything was speech. However, most content is a mixture of speech, music and effects. There may be opportunities to add value by, for example, listing the title and artist of music tracks, and tying these into music services and recommendations.

Finally, nearly three-quarters of participants said they looked at the screen while listening. This indicates that the presence of visual information may change the way people listen to the audio. It is important to understand what impact, if any, they have on comprehension, immersion or enjoyment of the sound.

**FURTHER WORK**

Two-thirds of those that tried our pilot consented to user interaction tracking. This has so far provided us with over 20,000 interaction events. We will analyse these to learn more about how users actually interacted with the pilot. Additionally, we plan to run an in-depth qualitative study to better understand the role of enhanced audio content, focusing on the underserved 16–34 age demographic.

We created the metadata for our pilot manually. However, to be able to deliver this sort of experience on a more regular basis, new production tools and workflows are required. To avoid increasing production costs, we will investigate how semantic audio technology, such as automatic speech recognition, could assist producers in enhancing their content.

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