

Explaining Podcast Recommendations To Users with Content Diversity Labels

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Abstract

Podcasts are available in a broad range of formats and content, and by a variety of producers. There are unique challenges with podcast recommendations that make it hard for users to distinguish between podcast episodes, and choose the right podcast to listen to. We see an opportunity to explain recommendations to users in order to help them make decisions about what to listen to. In this work, we study the characteristics of podcasts that make them different from each other. Based on a formative study with podcast experts, we find that host/guest information, format, length, and “vibe” are dimensions that constitute differences among podcasts. In a user study, we tested how highlighting such dimensions with explanatory labels impact users in a podcast selection task.

Keywords

Podcast, Recommendation Systems, Explainability

1. Introduction

Podcasts, portable and on-demand spoken-word audio content available on a variety of streaming platforms, have emerged as a popular medium for information, entertainment, and advertising [1, 2]. Podcast listening is on the rise – in 2006, 22% of the U.S. population older than 12 years were aware of podcasts; in 2021 it was over 78% [3]. More and more people listen to podcasts as they explore a broader range of genres and use more streaming platforms [4]. In addition, there is a large amount of podcast content available, with over two million podcast shows and over 48 million podcast episodes available on popular streaming platforms[5].

Because of their low barrier to entry for both producers and listeners, podcasts encourage both amateur producers and mainstream media to provide a variety of content [6, 1], breaking traditional hierarchical gatekeeping practices where only a professional can decide what to publish [7]. In addition, podcast listeners have indicated a willingness to explore when listening to podcasts. 39% of podcast listeners listen to podcasts to learn something new [8]. Because of the wide variety of content from a large set of producers combined with listeners who have indicated a willingness to explore, there is an opportunity to help listeners discover varied and diverse podcast content effectively.

Despite the large variety of podcasts offered by the

podcast ecosystem, current podcast streaming platforms, such as Apple Podcasts, Audible, Spotify and YouTube, neither fully support listener exploration of the breadth of available podcasts nor highlight the differentiating dimensions among podcast shows and episodes. These podcast streaming platforms aim to assist listeners in discovering new podcasts through recommender systems. However, listeners still rely mostly on both offline and online word of mouth (e.g., friends, family, co-workers, social media, discussion boards, etc.) and podcast cross-promotion, rather than podcast platform recommendations [9, 10].

There are also challenges for listeners to navigate podcast streaming platforms if they are interested in finding unique and appealing content. For instance, podcasts usually are released and organized in a series in the listening interface, where new podcasts are pushed to subscribers through RSS feeds [11]. In addition, podcasts tend to be long and dense (i.e., more than 30 minutes) [12], which can further constrain listeners from exploring outside of their current listening habits. Due to the limited information shown in current podcast streaming interfaces, listeners also need to actively choose when discovering new podcasts [13].

This work introduces podcast recommendations as a unique setting in which explainable recommendations are necessary. To define podcast dimensions that help podcast listeners differentiate content, we conducted a formative study with four experts in the design and evaluation of the podcast listening experience. Our formative study revealed several dimensions to highlight when supporting listener exploration of different podcast content. We found diversity of creators (e.g., ethnicity, genders, age groups, social status, etc.), differences of presenta-

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tion (interviews vs. storytelling), differences in “vibe” (light-hearted vs. more serious conversation), and differences in length, to be particularly relevant. Our findings suggest that listeners’ exploration of podcasts can be supported by showing content labels, and that these labels can increase users’ awareness of podcast diversity.

2. Related Work

2.1. Differentiation in podcasts

Finding a podcast among the large variety of available podcasts can be hard for users, since topical relevance is merely one aspect. As previous research suggests [14], podcasts vary along multiple dimensions: the specific host or guest in the episode, presentation styles, and production quality, which all help a user determine whether they are interested in listening to an episode or not. Meanwhile, episode metadata, including podcast episode titles, descriptions, along with the audio files [14, 2], create a large amount of data for podcast streaming platforms, resulting in opportunities for designers to use this metadata as a resource to help differentiate between the content. However, listeners still need to actively choose and differentiate when discovering new podcasts because current podcast streaming interfaces show limited information about podcasts [13].

One approach to help differentiate between content is via diverse recommendation so that users can navigate and identify relevant items faster in the exploratory stage [15]. Several dimensions of diversity are highlighted by previous studies [16], including diversity of entities (i.e., people, group, and organizations), topic diversity, viewpoint diversity (e.g., different angles), and medium diversity (e.g., audio, video). Yet, these dimensions do not take podcasts’ unique attributes into account. For instance, some non-textual attributes unique to podcasts may contribute to a differentiated listening experience, such as energy, seriousness, vibe, novelty of the episode, duration, number of speakers, popularity, etc., as suggested in previous research [17, 2].

Though many studies have explored specific dimensions of how podcasts differ from each other, a holistic view of how users perceive these differences is underexplored. As a result, we propose that providing ways to differentiate can help listeners make better choices.

2.2. Interface elements for podcast differentiation

Users’ interactions with podcasts are influenced by the interfaces in which podcasts are presented [18], and many podcasters rely heavily on platforms to support discovery

[19]. In this subsection, we discuss what user interfaces have been explored in the podcast ecosystem.

Current podcast interfaces are typically sequential and organized by show-level [20], which could potentially limit users’ ability to explore beyond the shows they already listen to. Similar to other long-form and episodic media (e.g., movies, television series, documentaries, etc.), one challenge for podcasts is to summarize the most interesting content from the long and dense content [21]. Due to the limitations of the audio format, which does not support skimming and browsing [22], it becomes a challenge for listeners to navigate among podcasts. One possible solution to ease the navigation of audio content is the use of summaries. Previous research has experimented with different ways to understand how users navigate large and dense content via summaries. For instance, one study proposes a way to summarize content via human and automatic methods [21]. Interface designs can also help users view an entire recorded audio conversation and allow zooming in and out to see the transcripts and listen to the audio at the same time [23]. Summaries can be also combined with a hierarchical visualization mode to allow users to explore a large corpora through intuitive visual and textual methods [24]. Instead of proposing ways to automatically summarize podcast content as in previous research, our study aims at a user-centric exploration of how users’ perceptions of a variety of podcast content is impacted by summaries.

Apart from summaries, content labels are another common way to provide snippets of information about content and enable users to filter content easily. In prior research, tags have been extensively studied as a form of content labels. Social tags can be used as a key element in recommendation systems [25]; different tag selection algorithms as well as tag designs have been tested and suggested in movie recommendations [26]. Previous studies have also investigated the reasons behind users’ tagging behaviors in photos [27]. The use of social tags can enhance navigation and search [28, 29]. Tags can also be combined with audio content for style clustering in music [30]. Previous work in content tags has been applied in web pages, movies, photos, and music, but these studies do not fully understand how the tags impact the user navigation process as well as users’ actual selections.

3. Formative Interviews with Experts

We interviewed professional podcast curators and one designer to understand how they differentiate between podcasts, and we sought to understand expert practices around supporting listeners’ exploration of various podcasts. Previous studies have shown the power of experts

in understanding users' needs [31, 32]. Therefore their expertise and knowledge about the breadth of podcast content can offer in-depth insights around users' exploration and navigation processes.

We recruited four interviewees, including three podcast curators and one designer, through snowball sampling at a podcast streaming company: I1 (male, three years of experience in podcast curation), I2 (female, two years of experience in podcast curation), I3 (male, two years of experience in podcast curation) and I4 (male, less than one year of experience in podcast playlist design and four years experience in audio design). All interviewees were also long-time podcast listeners. Each interview was conducted virtually via video meetings and lasted from 46 to 72 minutes.

Our semi-structured interviews began with self-introduction questions to learn each interviewee's professional background and personal background in podcast listening. We then asked interviewees to describe how they differentiate between podcasts, and their process of evaluating diverse and varied content for listeners, if applicable. Next, we prepared a list of various podcast episodes on a topic (i.e., Science and Nature) for interviewees. We asked the interviewees to analyze what they thought would contribute to a varied and diverse podcast listening experience and what they thought was missing from the list of podcast episodes. We also asked them to discuss current interface design elements, including search result lists, playlists, and recommendation grids, that might encourage listeners to explore more varied podcasts. We also discussed interface design elements that might prevent users from exploring different and diverse content.

4. Results

4.1. Open format leads to varied content

Our results highlight that podcasts are a unique medium that offers diversity naturally due to its low barrier to entry. As I1 mentioned, "barrier to entry creates a lot of diversity...there's no requirement to becoming a podcaster.. as long as someone can hold a conversation on a subject for an X amount of time, [and] there's not even a structure around it." The low or no barrier to entry also creates such a unique opportunity for many voices to be "elevated" and surfaced, which is not common in other mainstream media formats. Meanwhile, as podcasts become more and more popular, celebrities also use podcasts to voice their opinions. The mix of ordinary people and powerful voices in podcasts creates a diversity of voices in podcasts. Podcasts are "a great way to learn about new topics or hear things from people you might not have heard things from in your day-to-day life"(I3).

This low barrier also allows bringing "individualistic" perspectives into public discourse, or the intimate self [33], in contrast to the traditional standard. The intimacy from podcasters also makes podcast listening an intimate and personal listening experience for listeners. I2 discussed that podcasts are "just for myself" and "a self-experience," instead of for a group of people. Podcast listening is also a passive listening experience for most listeners and listeners listen to it for mainly entertainment purposes. As I3 mentioned, listeners "use podcasts to fill that space" when they "are commuting, cleaning, or some activity that's mundane."

Another unique aspect about podcasts is that listeners have control over what they listen to. Listeners themselves choose what to listen to and decide "whether or not this podcast is something that is worth listening to, as opposed to the advertising world that tells you which are the podcasts that are most worth listening to." (I1) I4 also discussed that discovering new podcasts is pull-focused, relying on users to make the decision, similar to the active pull strategy discussed by [13]. But the low barrier also means that there is "an endless amount of people talking at length about things that they know a lot about." Therefore, listeners need to actively "go after" new podcasts to discover.

4.2. Highlight aspects from different voices

Our interview results emphasize that podcasts offer a variety of different voices to listeners. As I3 defined it, podcast diversity is "about hearing from people who are outside of your own normal circles" and "being exposed to different voices." As mentioned before, the low barrier to become a podcaster enables listeners to explore things from a different perspective, and the intimacy of podcasts also create a unique opportunity for listeners to personalize the listening experience from a different angle.

Our interviewees spoke about how podcasts differ from each other, including diversity of creators (hosts/guests) from different backgrounds, ethnicity, genders, age groups, and social status (e.g. celebrities vs. non-celebrities as mentioned by I1), diversity of opinions and viewpoints, diversity of presentation ("how these things are being discussed" as mentioned by I2), variations of "vibe" (e.g., light-hearted vs. more serious conversation as discussed by I1), differences in popularity to "give more opportunity to smaller podcasts" (I3), variations in formats and mixed media (e.g., conversational, storytelling, music, etc.), differences in topics (e.g., technology vs. meditation) (I4). Among all the dimensions, a wide variety of creators is most important, since it can also naturally bring a diversity of viewpoints, as I2 argued.

As suggested by our interview results, it is crucial to

show a variety of “voices” when presenting podcasts to listeners. In our study, we define a list of dimensions that highlight the differences between podcasts and then we highlight those differentiating dimensions in the prototype. This can be achieved by current shelf-like designs or achieved by creating different tags/labels for each episodes

5. Ongoing Work: Study With Explanatory Labels

As a result of our formative study, we built a web application that presents podcast recommendations to users in the interface shown in 1. Participants were instructed to use our web application to select one episode they would like to listen to from 10 episodes shown on the interface. The episodes were from the same topic to avoid any topical effects. Users could not proceed to the next interface until they listened to the chosen episode for at least five minutes. We followed a similar approach from [22] to enable an organic exploration of podcasts. After participants listened to the selected episode for five minutes, they were directed to a survey to reflect on their podcast exploration process, including naming the episode they chose to listen to, providing a summary of the episode, and the other questions mentioned in the next subsection. Once participants finished selections, they were asked to complete a questionnaire about their preferences on how well the interface helped the user perceive the differences between the content, usefulness, and informativeness.

The prototype interface (see Figure 1) has seven key components for each episode: Episode Image, Episode Title, Publisher, Episode Description, Host/Guest Information, Audio Preview, and Diversity Labels. We use the term *diversity* to describe the differentiating dimensions of podcasts that we observed during the formative study.

We chose a list of labels to explain the differentiating dimensions of each podcast. Based on host/guest information, we had “Diverse Voices” to highlight podcasters from a wide variety of demographics. Based on the length of each episode, we had “Deep Dive” for podcasts that are very long (close to or more than 60 minutes) and “Quick Listen” for podcasts that are short (less than 10 minutes). Based on the vibe of each episode, we had “Serious Conversations” and “Light-hearted Conversations”. Based on format, we had “Solo Podcast”, “Interview Podcast” and “Storytelling Podcast.” To amplify up-and-coming podcasters, we had “New Voices” for podcasters who are new in podcast spaces. For our user study, we manually labeled each episode with the applicable diversity labels and highlighted these label(s) in blue to captivate users’ attention to the different dimensions between podcast episodes while exploring.

We recruited participants on *usertesting.com*, a plat-

form that allows researchers to view and record participants’ experiences during their interactions with the prototype. We recruited the participants from 20 to 35 years old living in the United States, who subscribe to a podcast streaming service, listen to podcasts multiple times per week, and explore new podcast shows at least once per week. We excluded participants who failed to test all three interfaces, as well as participants who tested our prototype twice. In total, we recruited 34 participants. We collected qualitative feedback from participants about what they liked and disliked about the interface, as well as measures for perceived diversity of the recommendations.

6. Discussion

We investigate how users can better differentiate among the various kinds of podcast recommendations with labels as a way to explain differences to users. In a formative study, we observed that diversity of creators (e.g., ethnicity, gender, age groups, social status, etc.), differences of presentation (interviews vs. storytelling), differences in “vibe” (light-hearted vs. more serious conversation), and differences in length, to be particularly relevant dimensions in helping people differentiate between podcasts. Further, in a user study based on a web application that explains these dimensions through labels and summaries, we observed that the label explanations help users better differentiate between varied podcast episodes when summaries are provided, and listeners selected more podcasts in total when explanations were provided. These findings indicate that explanations for differences in content may lead to more varied and diverse selection of content.

Our study suggests that listeners are able to better differentiate between podcast episodes when the differences of the content are highlighted via labels and summaries and chose more distinct and varied content. We also find that users were more satisfied with their podcast exploration experience when provided explanatory labels. This finding is consistent with prior research suggesting that users are more satisfied when they are made aware of the available options [34] and are presented with diverse content [35, 36]. These findings are relevant for practitioners who design and build recommender systems for podcasts and other types of streaming content. If the aim of these systems is to encourage diversity in consumption, providing recommendation explanations that help scaffold user awareness of the diversity of available content can potentially help achieve that goal.

We propose that explaining and highlighting the differentiating dimensions between podcasts is a first step to understand how to recommend a diverse set of podcasts to listeners. Diversity can help reflect existing differences

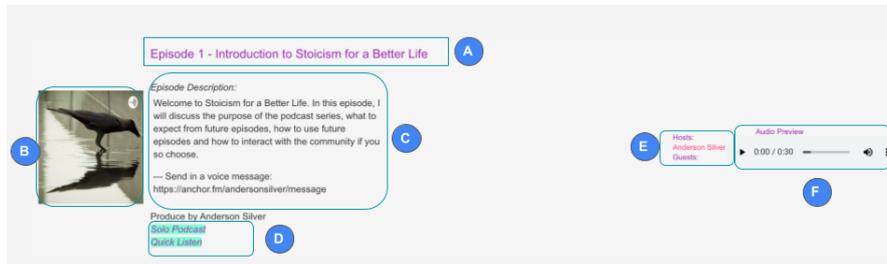


Figure 1: The data shown to users: (A) Episode Title, (B) Episode Art, (C) Episode Description from Publishers, (D) Diversity Labels Manually Selected and Highlighted, (E) Host/Guest Info by Social Media/Wikipedia/Personal Website, (F) Audio Preview that includes the first 30 seconds of the episode.

Final Interface Design.

in societies, to give equal access to any different points of view and actors, and to offer a wide range of choices for audiences[37]. From the individual perspective, listeners can be more satisfied with the options provided for them with an awareness of all the options and choices they have [34]. If listeners only encounter similar content, then they may find themselves in an echo chamber [38]. Furthermore, from the content creator perspective, it is essential for streaming platforms to encourage equitable opportunities for a diverse set of creators so listeners can encounter a broad spectrum of perspectives and backgrounds. A diverse exploration experience can then facilitate change of ideas and dialogues between different viewpoints and arguments so that users can have more informed opinions and become less polarized [39, 34].

In future work, it will be an important next step to understand how users learn and adopt their listening habits through such explanatory labels, ultimately leading to better exposure to various kinds of podcasts. Furthermore, we believe that longitudinal studies of user exposure to explanations of podcast recommendations and how it affects listening behavior will be an important next step, e.g., through analyzing long term trends of podcast discovery behavior, or the long term development of user satisfaction.

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