"My Library Has Just Been Obliterated": Producing New Norms of Use Via Software Update

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ABSTRACT

Software updates are commonly perceived as tools for fixing flaws and improving functionality. In this paper, we problematise this view by showing how software updates may also be used by vendors to create new norms of use that control user behaviour and reduce their agency. We explore the nature and aftermath of a controversial software update that was released by Spotify in June 2019. By analysing almost 3,500 reactions to this update, we show how it removed and modified several features in ways that severely affected users' capability to organise, navigate, and maintain their music libraries, while it pushed modes of listening that delegate song selection to Spotify. Elaborating upon our results, we discuss how updates may be used as political tools that privilege certain forms of behaviour while restricting others. We also portray updates as sites where ongoing struggles and negotiations regarding user agency and digital ownership take place.

Author Keywords
Protocological power; psychological ownership; normative affordances; Spotify; music streaming; critical computing

INTRODUCTION
In the HCI community there is an increasing awareness that, as experts in studying and designing interfaces between humans and technology, we have a responsibility to examine the social implications of our work [44, 4, 49, 13]. This includes exposing instances in which computing systems reinforce power structures that deprive users of agency [29]. This paper exposes how software updates can be exploited by IT companies as a means to manipulate user behaviour and exert normative control over software use. We illuminate this topic by examining one of Spotify's recent updates, discussing how it can be framed as an attempt to exert control over music listening.

Spotify is a music streaming service whose ontology has evolved several times throughout its influential, albeit brief history [18]. Arguably, the biggest change happened in 2013

with the so-called *curatorial turn*. Following a model previously implemented by other streaming services (such as Pandora), Spotify's *curatorial turn* entailed the traditional search-based access to music gradually being replaced by a new *lean-back* approach, in which users delegate song selection to Spotify (ibid.). Spotify staged this ontological change via successive updates of its UI, which has gradually shifted from providing a search-based interface to providing a playlist- and recommendation-based interface; a transformation that has placed more control over listening habits in the hands of Spotify (ibid.).

On 13 June 2019, Spotify released a substantial update that was presented as a series of "*sleeker, cleaner, smarter*" improvements that would give users "*more control*" over their listening experience and allow them to access content in a more "*personalized, streamlined manner*". However, in the days that followed the update, there was a massive outcry online. Thousands of Spotify users expressed their outrage about the transformed UI, stating that "*nothing was added, only useful features were removed*" and that the update "*massively reduced the ability of the user to access music*".

We start our investigation by scrutinising the characteristics of the 13 June update, the critiques of Spotify users, and the response of the company based on the analysis of roughly 3,500 comments publicly posted online. We identify the features that were modified and removed with the update and discuss how these modifications introduced new norms of use that drastically worsened the listening experience of many Spotify users. We then suggest that this update should not be dismissed as a matter of bad design; rather, it should be considered against a broader trend where software functionalities are purposefully modified via incremental updates in the interest of establishing control on behalf of platform owners [5, 23].

By combining humanistic and scientific epistemologies and methodologies [4], this article contributes to the HCI community in two ways. First, we expand upon literature concerning software updates [52, 53, 22] by critically scrutinising their strategic role in producing new norms of use aimed at diminishing user agency and exerting control over user behaviours. Second, we contribute to debates around how technology influences the way in which people listen to, search for, and curate music [9, 28, 39] by showing that music streaming services function as sites where ongoing cultural struggles, tensions, and negotiations regarding ownership of cultural content and digital technologies take place.

In the remainder of this paper, we review previous research on software updates. We then present theories and concepts borrowed from humanities to set the stage for our research. Next, we describe the Spotify update and how we collected and analysed data on user reactions to the update. We report our analysis that identified the list of features that were changed in the update and discuss how they contributed to creating new norms of use. Finally, we generalise our findings, offering broader reflections to the HCI community.

BACKGROUND

Software updates
Software updates are commonly described as procedures by which software vendors can maintain or extend the functionality of a product after its market release and while it is already being used by customers [22, 23].

Fleischmann and colleagues distinguish between two types of software updates: *feature updates*, which change functionalities by adding or removing features, and *non-feature updates*, which fix flaws or other aspects that do not directly affect user interaction [22]. Franzmann and colleagues have later extended this model to also account for a third type of update: *design updates*, which change the visual appearance of software to improve usability and ease of use [24].

A corpus of literature that is relevant to our work focused on how well users receive software updates. An update is generally well-received when it positively disconfirms expectations [2, 22] and when it introduces new and useful functionalities [22]. By contrast, negatively received updates can be caused by: i) "feature creep" - i.e. the silent addition of features that result in over-complicated products or unwanted changes [16, 23, 52, 54]; ii) high switching costs - i.e. when updates force users to spend time re-learning how to use the system [23, 54], thus causing performance dips [11]; iii) worse UI functionalities [51]; and iv) lack of reasons for updating [33, 53].

A series of unpopular updates have recently received scholarly attention [1, 5, 23, 24, 46]. In October 2015, an unpopular update was released by Tumblr, which removed the commenting feature "replies" [30]. The removal of this feature was negatively received by many users, who voiced their concerns online to the point that the company decided to restore the feature after 6 months. Another notorious examples is the February 2018 Snapchat update, which caused an online backlash shortly after its release. After a series of public protests, Snap Inc. publicly acknowledged that the update had worsened the user experience [24] and rolled back the update to the previous version. These examples illustrate how updates do not follow a linear progression towards perfection, but may also give rise to conflict.

By studying the negative effects of updates, previous HCI research has identified a number of design recommendations that should be followed when releasing software updates. These recommendations include: i) providing transparency by giving users informed consent with respect to any relevant changes in the software [52, 54]; ii) protecting older ways of using the software to facilitate transitioning to the new version [5]; and iii) offering control over features that are removed, added, or modified [54].

In this paper, we focus on controversies regarding feature modification and removal in software updates. So far, these updates have not received much attention within the HCI community, as our scholars have been mostly concerned with updates on security issues [53, 52] or on understanding user reactions to update notifications [20].

Endorsing Chun's statement that "users have become creatures of the update" [10], we argue it is imperative that our community broadens its investigations to account for how updates can be used as tools of control to disrupt and impair user agency. Such disruptions, we will argue in the paper, can be understood as expressions of *protocological power* and are intimately connected to adjustments in the *normative* affordances of user interfaces.

Protocological power and normative affordances
Building on the works of humanist scholars Deleuze [15], Castells [8], and Galloway [25], Švelch describes *protocological power* as instances where cultural and political power is exercised through digital protocols, information networks, and distributed communication systems [50]. Whereas the exercise of social power has historically relied on hard and disciplinary tactics (such as legal punishments or violent physical repercussions), the concept of *protocological power* highlights how power is enacted through technology, which guides and adjusts behaviours in subtle ways - for instance, by regulating access to tools and resources.

Švelch introduces the concept of *protocological power* when discussing the power dynamics of software updates in the context of computer games. The role of game updates, he argues, has shifted from functioning as a form of technical support to being actively used as a strategical tool for controlling gameplay. By doing so, Švelch suggests that updates can have a significant impact on user agency, as they help govern user behaviours through discreet adjustments of software functionality.

In this paper, we borrow the concept of *protocological power* to explore the active role of Spotify in shaping and guiding practices of listening through software updates. Similarly to other music streaming services, Spotify is not a neutral or passive *intermediary* that simply transmits music from artists to listeners, but rather, in a Latourian sense, an active *mediator*, that interferes in processes of distribution [18, 35]. This active and mediating role was heightened around 2013, when Spotify started curating, promoting, and recommending music to a greater extent, thereby exercising increased control over its users' listening habits (ibid.).

Spotify primarily enforced this curatorial turn by adjusting the affordances of its user interface [18]. A critical inquiry into user interfaces has been steadily present in the agenda of HCI researchers, where interfaces are often described as *zone[s] of affordance* that foreground some elements over others and thus guide user interaction [17, 48, 26] by making certain types of behaviour easier or more difficult [48].

A critical investigation of interface affordances can offer perspectives into what actions are allowed and what are not allowed and establish frameworks of action that suggest that users "ought to do this and not that" [48]. These affordances are thus *normative*, in that "technically possible uses become more or less normative through productive constraint" (ibid.).

Following Manovich's description of user interfaces as political tools that shape user agency and forward particular ways of viewing the world [32], affordance analysis can shed light on how IT companies exercise control over what users are allowed or not allowed to do. In the case of streaming media services, the interface design might be used to regulate how audiences discover, sort, and organise music [37].

In what follows, we explore how the modifications introduced by Spotify's 13 June update affected the affordances of the app, changing users' abilities to curate and navigate music and thus creating new norms of use. In order to understand the complexity of this space, however, it is crucial to grasp the specific modes of musical ownership that are embedded in streaming services. Such modes of ownership constitute an underlying premise that guides how users can engage with music on the platform. The following section therefore unpacks how the business model of streaming services position users *vis a vis* the owners of streaming platforms in specific ways.

Psychological ownership
One factor that characterises all user behaviours on music streaming platforms is the subscription-based business model. Since the availability of consumer devices to reproduce recorded songs, musical ownership implied that users possessed physical copies of records that they could keep. Streaming services introduced a new relationship between the listener and the musical content they puchase. Rather than *possessing* a concrete commodity, users *rent* access to a music service through regular subscription fees [3].

This mode of ownership places a significant amount of power in the hands of online platforms, while users sacrifice long-term ownership of a finite number of songs for accessing virtually infinite online music catalogues [21]. In doing so, the power dynamics between users, rights holders, and music distributors also shift. Users become dependent on the everyday actions taken by streaming services, at the same time as streaming services become dependent on the renewed subscription contracts of users.

Ever-increasing tensions and conflicts exist regarding subscription-based business models, especially as users assert and vindicate their rights to streamed music archives (as we will shortly discuss). Here, the concept of *psychological ownership* comes into play. Psychological ownership is "the state in which individuals feel as though the target of ownership or a piece of that target is *theirs*" [41]. This concept, which has been extensively applied to describe different modes of possession, also grounds Sinclair and Tinson's work on psychological ownership of streamed music [47].

The authors argue that users of music streaming services can experience feelings of ownership, despite the lack of actual ownership. This perception of ownership is due to the amount of creative effort and mental energy that users invest in curating playlists and organising music consumption [47]. The streaming service becomes meaningful as a possessions as users invest time and resources into curation and cultivation, but, as Watkins and colleagues warned, "it is only under conditions of full ownership that consumers can engage in the curatorial, ritualistic or habitual practices needed to transition commodities into personal possessions" [55].

The absence of "full ownership" in streamed media thus creates a tension between streaming companies, which regard their products as services, and users, who regard them as possessions [55]. At times, this tension is perceived as a threat of uncertainty to the feeling of ownership due to the constant modification of licensing agreements between labels, artists, and streaming companies [47]. Another threat comes from companies' power to change at any time their agreement with users that they signed via the acceptance of terms of commercial agreement, thus removing any guarantees that a service that users subscribed to will remain the same [55]. As a consequence, user-curated archives and playlists, as well as the mental energy that has been invested in it, are at risk [47]. Thus, in the so-called *post-ownership* era, paying for a service provides no guarantee over future uses and payment is no longer conductive to forms of ownership [47].

To sum up, the withdrawal of virtual possession has obvious benefits for the streaming service providers, who act as gatekeepers for music, films, and news. It is thus in their best interests to "convince those who currently prefer ownership to switch to access-based consumption" [31]. The ways in which users benefit from this post-ownership are less clear.

Psychological ownership has emerged as a matter of interest for HCI scholars in the last few years, but has so far concerned augmented reality [42] and avatar customisation [6]. Discussions regarding virtual possession were also proposed early on by Odom and colleagues [40]. However, to our knowledge, no previous work studied how incremental software updates are used as a tool for streaming companies to create new norms of use that obstructs digital possession. This is a topic that we will address in this paper.

JUNE 2019 UPDATE
When Spotify rolled out a new release on 13 June 2019, it was presented as any other update. On the AppStore, the description of the update was short and only stated the following:

"*We're always making changes and improvements to Spotify. To make sure you don't miss a thing, just keep your Updates turned on. Bug fixes and improvements in this version include: Fixed performance issues*".

The focus on "fixing performance issues" seems to suggest that the update would not directly affect user interaction (in Fleischmann and colleagues' categorisation, the update would thus be considered a *non-feature update* [22]). However, it did not take long before Spotify users realised that, contrary to what the company stated, the update was not only a matter of technical maintenance. Rather, it comprised a significant revision of available features and modes of interaction. A massive online backlash immediately followed this release.
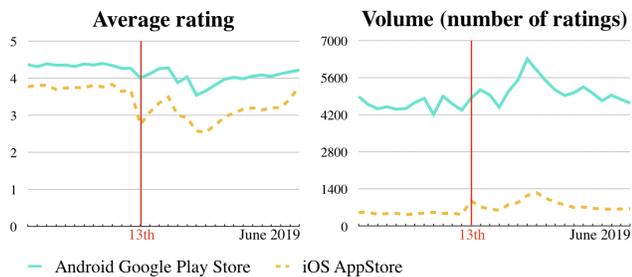
Figure 1. The evolution of Spotify ratings as collected from the AppStore and Play Store in June 13, 2019.

Users voiced criticism of the removal of numerous features from their applications, hindering them accessing their music libraries as they used to.

Later the same day, Spotify tried to fix the tumult in a blog post (`tiny.cc/24dkaz`), stressing that its "*refreshed*" user interface would help users *"manage and access... audio content in a more personalized, streamlined manner"*. The blog post also indicated a revamped podcast section: "*the new design gives you more control over your podcast listening experience*" and on the music side, it claimed that the updated Library features would "*get you to the content you want faster*" (ibid.).

As Spotify withheld from listing the actual changes it introduced with the update, we set out to scrutinise the characteristics of the update, and particularly the list of features that it added, modified, or removed. We then analysed how these changes produced new norms of use that affected users' listening behaviours.

Impact of the update on user rating

We started our investigation by measuring the general temperature of user reception of the update. Adopting the method used by Franzmann and colleagues [24], we scraped the ratings of the mobile Spotify app for both AppStore (iOS) and Google Play (Android) versions. We collated data on user ratings for the whole month of June 2019 to observe whether and how the update affected the short-term average rating. We also collected information on the volume of ratings posted over this period. Finally, in order to isolate the ratings that were only relevant to the update, we filtered the data, keeping only the ratings that had been posted with associated comments containing the word "update".

Figure 1 shows the evolution of the average ratings (*left*) and the volume of submitted ratings (*right*) of the Spotify app throughout June 2019. The graphs indicate that the average rating decreased immediately after the update and that the event caused an increase in the over-all number of ratings.

We then conducted a comparison of the average ratings before and after the update.[1] These results showed that the average rating score decreased by 20.9% on AppStore and 8.9% on the

Google Play Store, and that the number of ratings increased by 45.7% on AppStore and 12.7% on Google Play. When filtering the data to include only the ratings associated with textual comments including the word "update", we saw an even bigger increase in negative ratings: the average rating decreased 30.0% on the AppStore and 19.7% on the Google Play Store; the number of ratings increased 81.4% and 92.8% respectively.

This analysis reveals that the update was negatively received by many Spotify users, but offers little information on the reasons for this dissatisfaction. Identifying such reasons is the objective of the analysis presented in the next section. Specifically, we aimed to isolate the list of removed and modified features, and to identify the new norms of use introduced by the update.

Methodology

We performed our investigation with a qualitative analysis using data consisting of unsolicited comments that Spotify users left online on a variety of services.[2]

Data sources

The first source of data was user replies to the official Spotify support account on Twitter, called @SpotifyCares. On 13 June, @SpotifyCares announced: "*We have made some changes to how Your Library works! Now you'll only save the content you intend to*". Later the same day, two other tweets were posted to inform followers that Spotify had first tried and then succeeded in solving some initial functionality issues that users had reported. We isolated and analysed the 815 replies that these three tweets generated (including @SpotifyCares re-replies) within the first 30 days following the update release.

The second source of data was comments posted in the official Spotify community forum (`community.spotify.com`), where numerous threads were created to discuss the update immediately after its release. First, we identified all forum threads that received comments in the two weeks following the update. Then, we isolated those threads whose title contained the word "update" or that might have been related to the update (e.g. "My Library has no A-Z sidebar", "Just tell me why", and "Off to Apple Music we go!!"). We then checked the opening post of each of these threads to establish whether its content was indeed referring to the June 2019 update. Provided it was, we stored all the comments from the thread in our dataset. A total of 164 forum threads survived the selection, which totalled in 1,608 individual comments. Almost half of these comments (702) were posted in a single thread ("Bring Spotify's old UI back"), which was closed by Spotify 13 days after the update.[3]

A third source of data was Reddit, one of the world's most popular online communities. In the days immediately following the update, several threads were created to discuss the update.

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[1]When analysing how the update affected user ratings, we had to account for the fact that a) not all users received the update on June 13; and b) users might not have installed the update immediately. For the rating analysis, we considered a window of 12 days before and after the update.

[2]All the comments were collected on 12 July, a month after the update; thus all the figures below refer to the number of comments posted up to that day.

[3]This thread had already been initiated on 2 February 2019 by a Spotify user who had received a beta version of the update at the beginning of the year. On the day of the update, this thread already contained 303 comments.

We saved in our dataset all the comments (943) from the four threads that received most comments: "BRING BACK OLD SPOTIFY!" (403 comments); "New mobile update sucks!" (360); "PSA: voice your complaints to @SpotifyCares on Twitter - they track the number of cases. They don't care about reddit posts/upvotes." (97); and "Are you absolutely serious?" (83).

Analysis

In total, the dataset of comments consisted of 3,366 comments (815 Twitter replies to @SpotifyCares, 1608 comments on Spotify's official forum, and 943 comments from Reddit). We manually analysed all the comments and stored those that were relevant to our investigation in a separate database. A total of 359 comments (roughly 11,000 words) survived this selection.

The analysis of the data evolved over three stages. First, we analysed the comments to specifically identify the features that had been modified or removed by the update. Every time one or more users complained about a feature that was either removed or modified, we systematically compared the new version of Spotify with a pre-update version to cross-check whether i) the feature was indeed present in the previous version of the app; and ii) the feature was actually removed.[4] Our cross-check identified a few false positives (i.e. issues that users wrongly reported as being caused by this update), which we discarded from the list. Eight features were eventually identified.

At stage two, we investigated Spotify's reaction to the backlash. Since precedents exist of companies reverting to the previous version of an app when faced with strong adverse reactions from their users [24, 30], we aimed to observe whether and how Spotify took accountability for the update, accepted users' complaints, and offered to address them.

The core of this research comes from the third stage of the analysis. We aimed to identify the ways in which the modified and removed features (which we identified at stage one) had an impact on users' listening behaviours. We performed a thematic analysis using the 3,366 comments. The coding followed a deductive approach: we had pre-existing coding frames that described what *affordances* were foregrounded and what were hidden by these feature changes. We then iteratively clustered codified data into themes, which described the *norms of use* that were produced as a consequence of these new interaction possibilities. For instance, the codes "harder to navigate without a scroll-bar", "more steps to take", "recently played difficult to browse", and "all songs in a single playlist" were clustered in the theme "Impaired navigation". At the end of the process, we identified four overarching norms of use that were produced by the update.

RESULTS

Removed and modified features

Users' greatest indignation concerned the number of features that had been removed or modified. In this section, we list the most relevant feature changes that affected user listening behaviours.

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[4]This cross-check was performed on the Android version of Spotify, as it is possible to install older versions of the app on Android.

Feature 1 – Removal of alphabetic scroll bar
Before the update, users could navigate their music libraries via an alphabetic scroll bar, visible on the right side of the screen. The update removed this scroll bar.[5]

Feature 2 – Modification of recently played tracks
Prior to the update, the Library displayed a list of recently played songs. After the update, this feature was moved outside the Library and its functionality was reduced in the following ways: i) when tapping on a recently played song, the new interface takes the user to the *Artist* page or to the song's *Album* or *Playlist*, rather than playing the actual song; ii) the list of recently played tracks can no longer be accessed offline; and iii) the list can no longer be edited.

Feature 3 – Saved songs are now in a playlist
Prior to the update, the Library included a *Songs* menu that included all songs that users *liked*. The update moved these songs to the *Playlist* menu, under a newly created playlist tab called *Liked Songs*. As opposed to the previous *Songs* tab, this playlist tab does not include: i) the songs that users have *saved* (rather than *liked*); and ii) the albums that users have *saved*.

Feature 4 – Changed the function of the Artist page
The *Artists* menu previously listed all the artists that a user had saved a song or an album from. The update removed this feature: the new *Artist* menu, instead, lists the artists that users had "followed" by *liking* their page. Moreover, prior to the update, tapping on an artist's name used to take the users to the songs and albums that the user had saved of that specific artist. After the update, tapping on an artist's name takes users to their *Artist* page, which contains all songs and albums of the artist, rather that the artist's songs the users had previously saved.

Feature 5 – Only full albums showing in the library
The *Album* menu only shows full albums saved by the users. Before the update, it used to show every album the user liked at least one song from. As a consequence, all the partial albums that users had saved are no longer present in their libraries.

Feature 6 – No download of individual songs
The possibility of downloading individual songs on the device for offline access was removed by the update.

Feature 7 – Restored deleted downloads
Spotify users were previously able to download albums and then selectively remove songs from these albums that they did not want in their libraries. This functionality was removed by the update. Additionally, all the songs that users had removed using this functionality suddenly reappeared in their libraries.

Feature 8 – Podcast interface prioritised
The update put the Podcasts section in a much more central position in the UI. As visible from Figure 2, the Podcasts section is now made as hierarchically important as the *Music* section.

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[5]In a successive update released on August 2019, Spotify reintroduced the alphabetic scroll bar, but only for the Artist page (thus not for Songs, Playlists, or Albums).
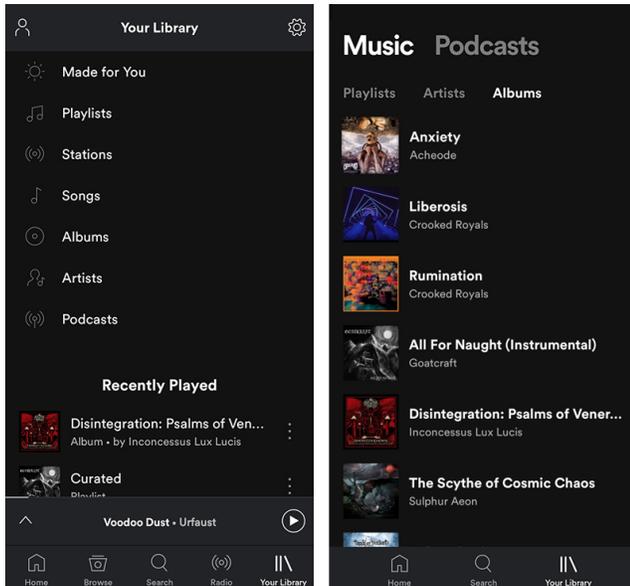
Figure 2. **In comparison with the old interface (on the left), the new interface (on the right) increased the visual and functional priority of the Podcast section.**

Spotify reaction

Contrary to Spotify statement that the update "*fixed performance issues*", the analysis above reveals that the update had significant effects on the app functionalities. As a result, Spotify users promptly asked for the old UI back on several online forums. Notwithstanding these complaints, Spotify mostly held back from offering support in the online forum to the numerous requests to roll back the update. Among the 164 identified threads, in only 21 cases (12%) did Spotify reply to their customers' concerns.

By contrast, its customer support account on Twitter (@SpotifyCares) replied to nearly all user comments. These replies, however, were mostly standardised. Regardless of the complaint of the user, most replies from @SpotifyCares started with the following line: "*Sorry to hear you're not enjoying the new look!*", implying that the update was only a matter of visual redesign (as opposed to functional revisions). Next, the replies focused on alleged benefits introduced by the update: "*The changes make it easier to navigate and find the music you love*"; "*The changes should give everyone a better listening experience*"; "*The refreshed 'Your Library' was developed to help you manage and access your favourites faster*".

In many cases, users were not satisfied by the vagueness of these answers, the ambiguity of which might have been a deliberate strategy to obfuscate the real nature of the update [45]:

> ""New and Improved" my left foot!!!! How is getting rid of an alphabetized list of my saved artists any bit of an improvement???"

> "Don't reply how "you've made this update to make it easier to find music we love" because, obviously if that was your goal, we would have rolled back the app. I

have met a whopping 0 people who want this update in any form. I have met a bunch completely pissed about it, though."

When users demanded more information, especially about the removal of features, @SpotifyCares mostly declined accountability: "*We can't make any promises*"; "*We don't have any info on this right now*". When asked to roll back to the previous version of the app, the answer was always something along these lines: "*Unfortunately, the update can't be reverted*".

After weeks of user complaining, Spotify released a blog post that explained: "*With new personalized Music and Podcast tabs you can better organize your library and find your content faster*" and suggested users become accustomed to the new ways in which the library was organised. In other words, in contrast with other companies that rolled back to previous versions when faced with strong adverse reactions to an update [24, 30], Spotify did not show any public regret regarding the new update, nor any intention to reintroduce the removed features. Conversely, they asked users to align their listening behaviours with the new ways in which they intended the app to be used.

PRODUCED NORMS OF USE

In the previous section, we illustrated how the update modified Spotify's functionalities in numerous ways, introducing new affordances that affected how the app can and cannot be used. We clustered these affordances into groups that describe the new norms of use that were produced by the update. In this section we present these new norms, indicating what types of behaviours and habits were adjusted by the update. Given the importance of accounting for reflecting individual reactions, we base this analysis on quotes and comments left by Spotify users.[6]

Volatile libraries and downloads

As a consequence of the modifications of the *Artist* and *Album* menus (Features 4 and 5 discussed in the previous section), large parts of users' libraries were suddenly deleted. Many users reported that these changes irreversibly compromised their ability to curate and maintain their personal libraries.

> "This update was unnecessary and removed functionality that was vital to how I used the service. I have paid for premium for years, and had built up a library of hundreds of saved artists. I used that saved artist page to pick my music, and now those saved artists are gone. For no apparent reason." [F]

> "I used to like some songs of an album and be able to go to my albums an see that record there in alphabetical order, now I go to albums and like 3/4 of my saved music disappeared because it's not the full album saved." [T]

By contrast, the update populated users' libraries with unwanted tracks - i.e. tracks from saved albums that users had previously deleted from saved albums suddenly reappeared in their libraries (Feature 7).

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[6]We indicate in squared brackets whether a comment was posted on the Spotify Official Forum [F], on Twitter [T], or on Reddit [R].

"Over the last 4 years I'd edited down 100's of albums to the best 3 or 4 tracks on each album to build a library of MY Best 2000 songs of all time. I was really proud of this Alphabetical Library. It was a complete unique work of art. 2 weeks ago all this was instantly un-done by Spotify. Every album track and bonus demo/live track I'd deleted just re-appeared! I was gutted! They'd willfully destroyed my 4 year old personally curated music collection." [F]

"I had downloaded lots of albums, and deleted selected songs from those albums I didn't want to keep so that I could listen to the albums anytime without the songs I didn't want. But all of a sudden all of the songs I had removed from downloads reappeared in the albums! Is all of my work erased?". [F]

These comments indicate that the source of users' indignation was about not being able to continue using Spotify in the way they were accustomed to. Despite being premium users and despite the time they invested in curating their libraries, their virtual music collections were drastically altered overnight with no explanation.

The effects of the update on downloads (Feature 6) also had an impact on the music that had already been downloaded on users' devices. By removing the possibility of downloading individual songs, the new interface only allows users to store virtual copies of full albums or playlists, but not individual songs.

Disqualified listening behaviours
Many users felt alienated by the new ways in which Spotify intended the app to be used, specifying that the new version of the app made obsolete their own personal ways to interact with their collections.

"I had to fiddle with an unintuitive UI that actively tried to keep me from listening to the music in the way that I wanted." [F]

"You've invalidated the way I and a large additional portion of your userbase listens to music for no discernible reason." [F]

These feelings of alienation were direct consequences of the modified features. In particular, the modified functionalities of the *Artist* menu (Feature 4) was detrimental to users who previously organised and accessed their music via that menu. After the update, the *Artist* menu included all the songs ever recorded by an artist, rather than those that users had shown appreciation of (as used to be the case); a modification that disrupted the way in which many users used to access their libraries:

"This update completely butchered the way I am using your app. I like to browse Artists, open some and listen to the saved songs. I cannot [do that] now." [F]

"I feel like the app is now unusable to me and I feel like I have lost access to my music collection which is shattering for me as I used Spotify every single day, music is a huge part of my life. I could use it easily and quickly when I could go to Library/Artist and find any song I had saved, be it a single song, a partial or whole album." [F]

The reduction of the functionality of the *Recently Played* list (Feature 2) also resulted in many users not being able to use their app as they were accustomed to.

"As someone who doesn't use playlists + pretty much relies on the recently played and songs tab, this has pretty much destroyed the entire user experience." [T]

"I was depending on sorting my 200 albums by "Recently added" to enforce some kind of intelligible order, but now all of that is inaccessible." [F]

Similar negative reactions were generated by the modification of the *Album* menu (Feature 5):

"For me the biggest issue is that the "Albums" tab only shows FULL albums that I've saved, whereas it used to show every album from every track I'd saved even if it was only one or two tracks from the album. Now those are all gone, which was a significant portion of my library." [F]

"Partially saved albums is all I ever navigate by. 99% of my saved albums are partial. Now half of them is gone, possibly never to be found again, the other half redirects to a full album page - full of songs I don't want to listen to! I didn't spend hours and hours of saving and deleting certain songs to make a perfect library, just so all my effort is taken away again by an update which makes everything far more complicated." [F]

Notably, the update did not appear to bother users who have a small library of songs or that only use playlists:

"The library UI is now what I always wanted it to be, but I have a small amount of songs/artists saved, so I understand some of the complaints." [R]

"Honestly I already used Spotify the way they are making everyone conform to, so for the most part I'm unaffected by it, but yes, I like it." [R]

Despite being positive towards the update, this last user talks about Spotify *making everyone conform to* specific ways of using the app. That the update privileged users with small libraries was also suggested by other, less positive, comments:

"They're trying to please the demographic of people who have <100 songs in the library. It's absurd." [R]

"Who exactly is this update for? The people who only have 100 or fewer songs in their library?" [F]

Impaired navigation
Dozens of users agreed that the update introduced several changes that made it harder to curate and navigate their libraries:

"In general after this update it feels like supporting flows for song curation is no longer a focus for Spotify as those flows are now buried under an entry point (liked songs), under a tab (artists), under another tab (your library)." [F]

The removal of the alphabetic scroll bar on *Albums* and *Songs* menus (Feature 1) was mentioned by many users as a modification that made it particularly hard and time-consuming to browse their music collection.

> "If I want to play a song that starts with "Z", I have to manually scroll all the way to the bottom instead of tapping the "Z" letter on the right side like before." [R]

> "A scrolling alphabet bar is essential for finding an album or song quickly". [F]

The removal of the scroll bar is arguably the feature change that left users the most baffled as they could not find possible rationales for Spotify's decision to remove such a useful feature.

> "What do we gain by getting rid of the alphabet on the right side of library scrolling? 1 pixel wider albums?"

Other feature changes resulted in more lengthy and complicated navigation. For instance, the following comment refers to the displacement of the user-saved songs into a single playlist (Feature 3):

> "Spotify used to have a pretty well organised database. You could travel through your library in different ways: artists, albums, title, and everybody get used to this powerful UI. But strangely they got the idea to throw away the tree base to just give a simple playlist of more than 1000 songs." [F]

> "This new update makes it impossible for me to navigate or browse through my library, instead putting all of my saved songs into one very inconvenient playlist of 8,890 songs. My library that I've built over years basically doesn't exist now". [F]

The downsizing of the *recently played* list (Feature 2) was also perceived by many users to be a decision that negatively affected navigation:

> "Navigating my recently played now is a huge fucking hassle and used to be so convenient." [R]

> "(The recently played menu) is a horizontal scroll (harder to use than a vertical one) with limited content and no "infinite scroll" and it it's a web view so it doesn't work offline. " [F]

Pushed to use playlists and podcasts

Many users interpreted the update as an attempt by Spotify to push users to use playlists, confirming what other scholars have previously suggested [18].

> "I understand this update as trying to push other features some people dont use, but in doing this they have essentially done away with any way to listen to music except through playlists." [F]

> "It's a complete change away from a library of music (which is what I pay for) to a bunch of playlists and a social media type following of artists and it sucks bad." [F]

For the same reasons, but with opposite reactions, other users reported appreciation for this change:

> "I like this better too. Every day I skip the home tab and go directly into playlists, so now I save a tap." [R]

Spotify's way of promoting playlists appears to be complicating access to and navigation of personal libraries. This holds particularly true for those situations in which users cannot dedicate cognitive and physical resources to song selection, such as while running or driving:

> "If I am running and I have to scroll through so much crap it's disorienting." [R]

> "Now I have to unsafely try to navigate through menus just to play more music while driving." [F]

Many users perceived the update as an attempt to push users to use podcasts, a behaviour change that was possibly facilitated by the change described in Feature 8. This norm of use was introduced by means of visual affordances that promoted the Podcast section of the app.

> "these continual updates to prioritize podcasts and playlists over a variety of views of your LIBRARY and not just a playlist of Liked Songs really puts a damper on my love of this service." [F]

> "The update was to simply better market Spotify Podcasts. It's purely a marketing tactic."[F]

DISCUSSION

By elaborating on the results of our study, in this section we propose two ways in which the identified norms of use produced by the update were functional to Spotify for i) reducing user agency over song selection, and ii) disqualifying virtual ownership.

Reducing agency via protocological power

> "I now feel like I can't choose what I want to listen to and Spotify has the right to choose for me." [F]

In business discourse, software updates are commonly presented as "improvements" that enhance user agency and/or repair broken or malfunctioning software [10]. This was also the case when Spotify first introduced its 13 June update, which Spotify promised would "*fix performance issues*" and "*give everyone a better listening experience*". Such improvement-oriented depictions of updates align with *techno-solutionist* ideologies that view technological advancements as inherently progressive [34] and updates as necessary responses to unilaterally-perceived design "problems" [12]. However, from the perspective of the user, updates may work in the exact opposite way, as the features that drew users to subscribe to a service may be discontinued by software updates [56, 36].

Based on user comments and reactions, our analysis suggests that Spotify's 13 June update was not received as an "improvement" by large parts of its user community. Instead, Spotify users engaged in loud protests against the company on social media and in online forums. We argue that Spotify's decision to remove and downgrade features in the update constitutes an expression of *protocological power*; i.e. an effort to discreetly

steer, adjust, and withdraw users' access to tools and resources via software updates [50]. Our analysis has shown that the update did not introduce any new features to the Spotify app, but it effectively disqualified listening behaviours that were available to the user, as they became incompatible with the new version of the app.

Previous research has shown how Spotify has gradually modified its user interface to visually and functionally privilege a *lean-back* listening approach, thereby gaining more control over listener behaviours [18]. In particular, this shift has occurred as Spotify has visually prioritised curated content and reduced search functions (ibid.). Our study highlighted that Spotify has not only encouraged *lean-back* listening experiences via its UI through positive reinforcement (such as friendly promotions of curated content) but has also actively and purposefully *curbed* user agency and *lean-forward* listening experiences by compromising users' abilities to maintain and curate personal music archives and freely navigate within the app. Thus, the 13 June update can be framed as a technical adjustment that reduced user agency, while enhancing Spotify's control over users' listening behaviours.

On the whole, the 13 June update illustrates the power and control that music streaming services exert over user behaviour. Streaming services carry a significant (protocological) power to constrain "what users can and cannot do with the music files and music players they are given, what choices users have over how they discover, sort, organise and use their music, and how these various services all contribute to larger databases that shape the ways users encounter cultural commodities" [37]. By reducing user agency and exerting control over their actions, the update extended Spotify's efforts to manipulate its users' behaviours within the app. Notably, this observation is in direct contrast with Spotify's description of the update as a way to give its users "*more control*" but is aligned with The Echo Nest's[7] vision of a "zero UI music player" that "knows what you want next so you don't have to interact with it at all" [43].

The norms of use produced by the update not only attempted to reduce user agency, but also tacitly dissuaded users from maintaining their own library:

> "Spotify has always hated the fact that it had to give users a library in the first place. They don't want you listening to music you know and love. They want to herd you into new music so that they can act as a discovery service for the new hits [...] Why do you think the 10k library cap never got bumped up to the 100k[8] that would match Apple Music and GPM (Google Play Music)?" [R]

This comment points out a tension between stored and streamed data, which streaming companies try to resolve by blurring the local library and the cloud services to offer the illusion of increased control [37]. This tension is the focal point of discussion in the next section.

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[7]The Echo Nest is a Spotify-owned data analytics company.
[8]The user is referring to the limit imposed by Spotify, enabling to save at most 10,000 songs in the Library.

Withdrawing ownership

> "Feels like I need to go back to just loading up music on my phone and forget about streaming."[F]

Our analysis revealed that the update was not simply a matter of a "*new look*", as Spotify deceptively presented, but it was a vehicle for introducing several structural modifications to users' libraries. As a result, the painstaking work that many users had put into curating what they considered their *own* virtual possessions was nullified by the update. Several users perceived this dispossession as a yet another coerced action perpetrated by Spotify to infiltrate user libraries to the point that "the music we own is becoming less and less ours" [37].

The modifications introduced by the update created new affordances that seemed to discourage the use of Spotify as an iPod, where music is locally stored and thus always present. The update indeed promoted streaming (i.e. fluid and more flexible and vulnerable forms of *accessing* content) while reducing the ability to download musical content (i.e. stable ways of handling content that are more similar to *owning* it), thus putting into practice Spotify's own vision that "music streaming has obviated the need for storage at all" [28].

These observations offer new material for discussion on the ephemerality of subscription services. It has been pointed out that music streaming services are not only offering the illusion of perpetual access to infinite songs and movies, but also the liberation from the "burdens of ownership" [55]. It has also been noted that the ways in which streaming services remove ownership pose several threats to the users, whose access to (paid) services can suddenly and disruptively be altered by modifications of licensing agreements among music industry stakeholders [47] and of the terms of agreement that users need to accept [55].

What has not been noticed before is that feature modification enacted by software updates can also significantly alter users' abilities to keep and maintain musical archives. The sudden and disruptive introduction of updates might be a threat to the virtual forms of ownership that companies offer their users. With the 13 June update, Spotify effectively crafted new norms of use that disarranged and dismissed users' habitual ways of accessing and curating their own libraries, possibly in an attempt to dissuade those forms of music access.

The aspect related to curation is particularly important for discussions around digital ownership. As the perception of ownership is inextricably linked to the amount of creative effort and the mental energy that is invested in curating libraries and organising music consumption [47, 55], users' sense of ownership over streamed music was greatly destabilised and thrown into debate by the update. As users surrender curation capacities to cloud services, it indeed becomes difficult for them "to define what constitutes *their* music" [14]. As one user angrily put it (emphasis included in original post):

> "What were you thinking? We feel at home in your App. We build *our own* music library - we feel like vinyl store owners carefully compiling our catalog of good music. This update invaded our homes and pushed *our* content

away from us. This is emotional. Look through all the new posts, people really feel hurt." [F]

This reflection highlights the unequal power relations that exist between users and streaming companies. The update did not only curb user agency, but also withdrew users' sense of ownership, exposing them to the vulnerability of their music collections, whose existence is at risk with each new update. Thereby, the update constitutes a strategical intervention into ongoing struggles over property rights and content accessibility in the digital domain.

User agreements of streaming services specify that users do not *own* the music they stream but they only purchase the license to *use* the music [3]. This update reminded Spotify users that they have never been the owner of the music and that they will always be at the mercy of the service. Perhaps some of the negative reactions from the users came from being confronted with the reality of this power disparity.

Other considerations for HCI

This work is positioned in the emerging fields of HCI research that seek to expose the cultural and ethical consequences of interaction design [4, 44, 29, 49, 13]. We have demonstrated that software updates can be used to contain user agency and impose normative forms of behavioural control.

These results forward and amplify calls for HCI research that continues to shed light on the often unequal power relations that are embedded in software [29]. As HCI researchers, we should follow up with our proposed design recommendations, identify instances in which they are neglected, and critically interrogate the ideologies and norms that are embedded in software.

As online service providers have an increasingly important influence over cultural consumption, the social and financial norms they forward must be continuously questioned and interrogated by members of our research community. We need to keep scrutinising the editorial functions of online content distributors [38] and build counterpowers [29] that minimise the risk of losing ownership over digital possessions.

Our study also offers new topics for HCI debates regarding virtual possession of music [40], and highlights how software updates shape and enforce particular modes of online ownership and access. Therefore, there is also a need to question the effects of software updates on users' abilities to access culture and create sustained and meaningful relationships with music by maintaining personal archives; an observation that should be expanded to also account for other streaming media (e.g. podcasts, videos, and games).

Finally, by endorsing the recent trend in Humanistic HCI [4], we have shown the benefit of studies that combine HCI research with humanities epistemologies and perspectives on technology and thereby establish a bridge between our field and social theory. Scholars in the humanities are increasingly agreeing on the importance of studying zones where users meet technologies (i.e. interfaces) [48] and we believe that social theory concepts such as *protocological power* [50] pro-

vide a fertile ground for future interrogations into the role of technology in everyday life.

CONCLUSION

By combining a corpus of work from HCI, Media Studies, and the Digital Humanities, this article offers HCI researchers an alternative epistemological stance that redefines the role of updates; from tools for fixing flaws, improving functionality, and heightening user experiences, to tools for influencing user behaviours and exercising protocological power. Specifically, we have shown how that, via software updates, streaming media services can artfully complicate users' abilities to maintain personal libraries and limit their agency when deciding what music to play.

It is important to acknowledge that Spotify is not alone in its efforts to control user behaviours. Instead the tendency to use technology to govern the actions of users is reflected in most online services who have commercial interests in regulating what their customers do. Therefore, our discussions regarding Spotify's disruptive update must be understood within a wider context where user freedom and agency are continuously challenged. It is also possible that this specific update may not have entirely been the result of malicious design choices. After all, history is full of poor design decisions.

However, history is also full of intentionally-deceptive UIs [27]. Notably, not only did Spotify decline to take responsibility for the unrest caused by the update, but evidence suggests that the company was possibly aware of the negative effects that such redesign would have. Many of the modified features are the exact opposite of what Spotify researchers have recently identified as features their users want: i.e. easy navigation of the content of their library; being able to easily organise their own collection; being able to locate content in the future by saving tracks to their library; and avoiding taking more actions than expected to locate the desired content [28].

Thus, it is difficult to understand the rationale behind Spotify's June 2019 update, unless one considers it in the context of the company's efforts to push specific modes of listening [18, 19, 7, 43], which disclose a desire to control *how* and *when* users listen to *what* music.

In the future, we encourage examinations of the unstated effects of software updates that may lead to 'update unrests' [1] and thereby question the inherent 'good' of technological development [12, 34]. Ultimately, the user protests that followed Spotify's 13 June update show how technologies for music consumption *could be otherwise*, and serve as an important reminder of the need to unpack the political dynamics of online platforms and the use of software updates to create new norms of use.

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