



Data Analysis

Project AppleCore

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Research

Purpose of Research

While we prototyped the design of AppleCore, a voice-based interface that plays a curated set of music to help users improve their mood, we realized that voice, music and emotions are intimate and personal subjects to our users. As a result, users may interact with AppleCore with expectations and results that we simply cannot anticipate on our own.

As a result, we designed a research around three main goals: evaluating the effectiveness of AppleCore on improving users' mood, understanding how AppleCore fits into users with different personas, and seeking suggestions to improve our prototyped interface.

Research Method and Data Collection

The research is mostly primary. The research is based on surveys and focus group interviews, where users have a chance to experience AppleCore's curated playlist in person. To learn more, see [Research Instrument and Data Collection of Project AppleCore](#).

Data

Summary

Collected data from the participants suggest while all participants are college students, they have different preference on the genre of music. All participants listen to music very often and often feel overwhelmed or sad due to pressure of daily studies.

For all participants, we discovered continuously listening to music that are progressively more positive can improve participant's positivity. However, the extent of improvement varies from individual to individual due to different background knowledge in music or the mood prior to the listening session.

Despite having a diverse stress profile and varied reasons for listening to music, all participants concluded the study with high praise of the interface, and indicated they are very likely to use it in the future. We attempted to gather suggestions and advice for improvements, but all participants were satisfied with the current interface, providing no new suggestions.

Visualization, Discussion and Analysis of Results

Figure 1

Table: Verbal Description of mood after hearing each song

	Participant A	Participant B	Participant C	Participant D	Participant E
Before the session	overwhelmed, but I still feel quite hopeful	confused	sad, stressed and tired all at once.	optimistic	sad, stressed and tired all at once
After hearing "Say Something"	mellow and calm	still confused, but a tad sadder	still sad	somber	reflective and sad
After hearing "Closer"	turnt and hyped	definitely happier and a lot more pumped up	tired	more upbeat	happier, more eager and more hopeful
After hearing "Titanium"	carefree and tranquil	a lot more optimistic - and very much more energetic	tired but relaxed	very optimistic	very determined

By applying the [Python NLK Text Classification](#) algorithm, we were able to classify the positivity of participants' mood after hearing each song into numeric values from 0.0 to 1.0¹. After that, we charted the findings into a line graph.

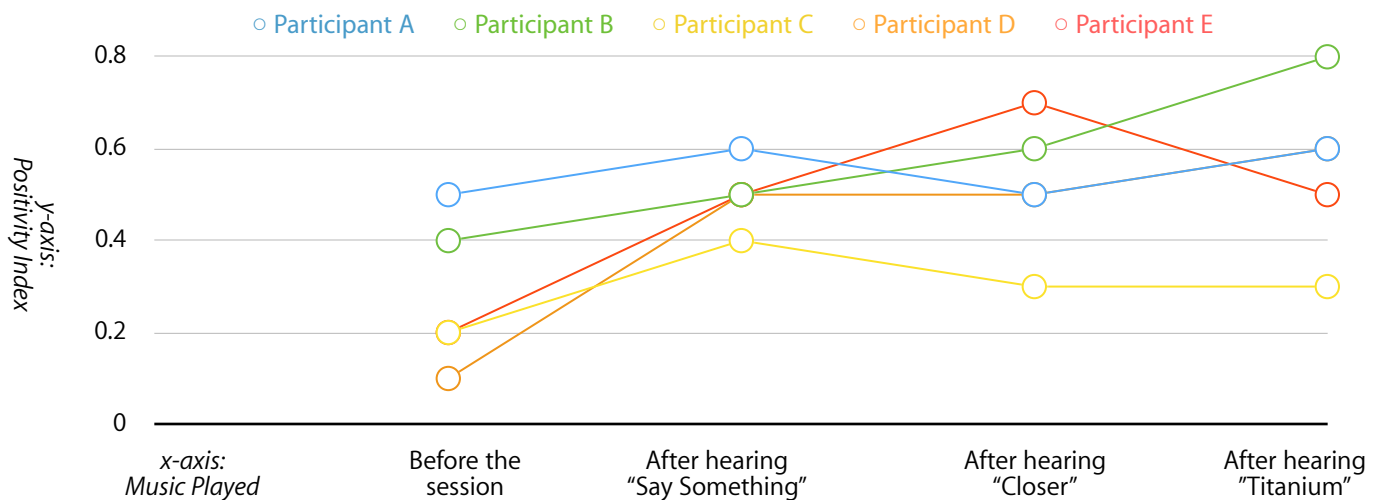
Figure 2

Table: Positivity Index of participants after hearing each song

	Participant A	Participant B	Participant C	Participant D	Participant E
Before the session	0.5	0.4	0.2	0.1	0.2
After hearing "Say Something"	0.6	0.5	0.4	0.5	0.5
After hearing "Closer"	0.5	0.6	0.3	0.5	0.7
After hearing "Titanium"	0.6	0.8	0.3	0.6	0.5

Figure 3

Line Graph: Positivity Index of participants after hearing each song



All participants' mood improved after the music playback, where participant A, B, C, D, E each saw 20%, 100%, 50%, 500% and 150% increase in positivity.

¹ Because the word "tranquil" and "turnt" are not a part of the NLK Sentiment Analysis dictionary, the analysis are unable to tag them. As a result, we replaced "tranquil" with "calm". Because the meaning of "turnt" meaning is similar to "hyped", and that "hyped" is already in the description, we removed "turnt" from the classification.

This suggests our participants experience a positive change of mood after using the interface. The common progression from “sad” and “overwhelmed,” to “**a lot more** optimistic,” “**very much more** energetic” or “**very** determined” (emphasis ours) confirms our assumption that music do improve human emotions. As the selection of music gets more upbeat and positive, the participants experience similar emotions.

However, we realized that the extent of mood improvement differs from person to person. One possible reason is that the more positive a user is before the session, the lesser the extent of mood improvement would be. This is supported by the fact that Participant E, coming in the least positive mood, 0.1, saw 500% increase in positivity, while Participant A, coming in with the most positive mood, only saw 20% increase in positivity.

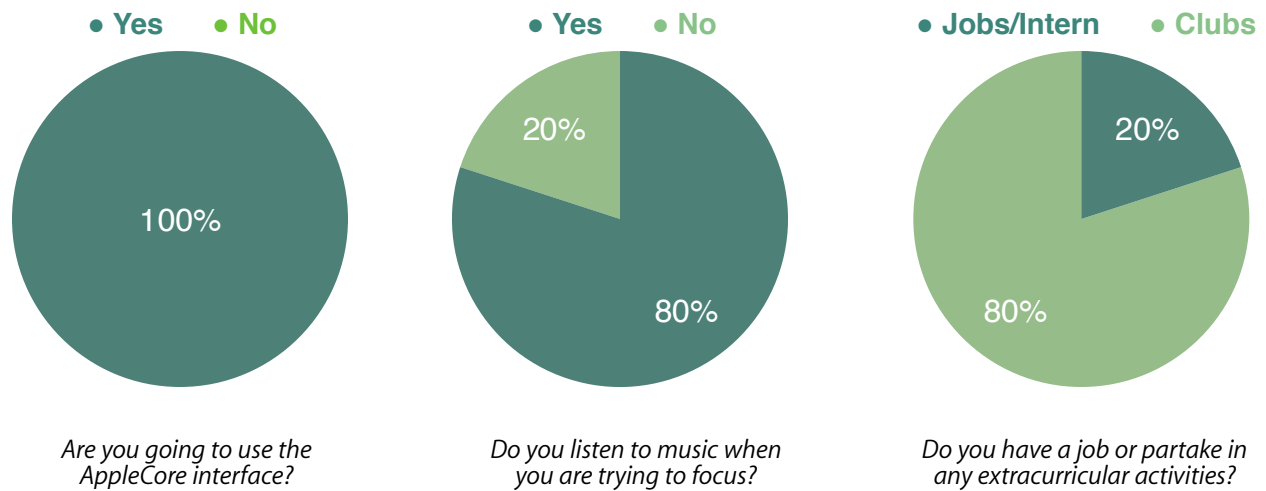
Another possibility is that the usefulness of the interface also seem to correlate to the knowledge a user has upon music. Participant D and Participant E, users with the most improvements in mood (500% and 150% respectively) are both member of some musical ensemble per indication in the survey they filled. It is possible that the more musical knowledge a user has, the more likely music is to affect their mood.

Due to limitations imposed by the need to compare mood improvement on a linear scale, the same set of music is played for each participant. It remains to be seen whether a more personal, fine-tuned selection of music, rather than a common, generic selection would improve the mood of users who already feel positive more significantly than this experiment. We believe our interface would be better designed if we incorporate these changes.

However, we shall also point out the limitation of such analysis. A person’s mood is complex and multi-dimensional, and it involves aspects beyond his or her positivity at the moment.

Figure 4

Pie Charts: Diversity of Participants



80% of our participants are college students who are currently involved in clubs rather than jobs and interns, which indicates a lower level of stress compared to the other 20%².

Our participants also listen to music for different purposes, where 80% listen to music when they are trying to focus, while others presumably do so for pleasure, motivation or alternative purposes.

Despite the difference in their level of stress and the purpose they listen to music, all participants of the study indicated their appreciation of the AppleCore interface and said they are going to use it in the future. This suggests that the AppleCore interface has a broad range of target users in different fields and with different interests. With these findings in mind, we created a profile for our target users.

² Blustein, D. L. (2013). The Oxford handbook of the psychology of working. Oxford: Oxford University Press.

Target User

As we designed AppleCore to be flexible, personal and adaptive, the result from our research suggested AppleCore serves two groups of target users, each with a unique persona. We also gave each persona a nickname: Andy and Susan.

Persona A: Andy

A busy high school or college student who is often stressed and overwhelmed by the work they do. Despite the stressful navigation around life, he/she still remains a positive outlook toward life.

While not studying music as a field of interest and only having sparse knowledge on musical theory and performance, he/she spends a lot of time listening to music and has developed a unique taste in the genre and style of music.

Persona B: Susan

An extrovert, aspiring musician who enjoys performing in public. He/she dresses fashionably and walks with confidence.

With experience and knowledge about musical performance, he/she doesn't bode well with cheesy mainstream pop music, but enjoys music that are genuine and emotive.

Bibliography

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