Students' Perception on Using Spotify Towards Their English Pronunciation

Joyce Purba ¹ Laura Natalia ², Lusiana Sapira ³

^{1,2,3} Universitas Palangka Raya, Palangka Raya

¹ joycepurba8@gmail.com, ² lauranatalia287@gmail.com, ³ sapira.lusii01@gmail.com

ABSTRACT

The purpose of this study is to investigate students' perceptions on the use of Spotify application in improving their pronunciation ability. The participants of this study were 10 sixth-semester English education students at Palangka Raya University. The research design used in this study was qualitative description. Data were collected through a questionnaire and interview that assessed the effectiveness of using the Spotify application for students in improving their pronunciation ability. There were 10 questionnaire items and 5 items for the interview. The results of this study revealed that the use of the Spotify application helped students to improve their pronunciation ability, intonation, and vocabulary acquisition.

Keywords : perception, pronunciation, improving, english songs, spotify

1. INTRODUCTION

Pronunciation has an important role in communication because it can help people to understand what is said, in this case pronunciation involves how a person produces the correct sound and words (Hornby et al., 2000). According to Frankel (1984), there are two stages of learning how to pronounce a word; (1) the receptive/list stage where we can distinguish significant sounds and patterns by listening to language. This means that the first step we must take to learn the pronunciation of a word is to listen to its language. We can get it by listening to a language through movies, talk shows or music; (2) the productive/speaking stage where after we listen language, then we can try to pronounce the words we heard before.

As we know there are many regional accents in Indonesia, such as Javanese, Dayak, Sundanese, etc. Therefore, for some people, they may find it difficult to pronounce English words. According to Suprayogi & Pranoto (2020), students may experience difficulties in pronouncing English words, this is due to the features of English phonology is different from Indonesian phonology. As a result, this affects students in learning English speaking skills. In addition, most students are lazy to check words in the dictionary and students cannot develop their speaking skills (Mandasari & Aminatun, 2019; Pratiwi & Ayu, 2020). To overcome this, one way that is focused here is to listen to songs in English to increase students' interest in improving pronunciation.

There are numerous music streaming services available, including Joox, Spotify, and YouTube. Spotify is the most essential choice in this scenario because the application is simple to use and the features it provides are pretty intriguing. Spotify is a digital music streaming service that provides a wide range of songs in English from various musicians. Users can search for music by artist, album, genre, or even mood, among other options. It also provides customized playlists and radio stations. Users can also make their own playlists and share them with their friends.

Despite the significance of pronunciation in English, it becomes one of the most difficult challenges to master (Dmitry Petrov cited in (Nurullayevna, 2020b)). English learners often encounter problems with their English pronunciation due to differences between their mother tongue and the language being acquired (Yusmita & Angraini, 2017). English learners need help with connected speech for fluency and the correspondence between sounds and spelling, it will be hard for English learners to pronounce the word correctly, so there are many problems that learners have when they deal with the pronunciation.

Riswanto & Haryanto (2012) in Mulatsih (2015) stated that when people communicate with other, they made a mistake in pronouncing the word, sometimes English learners pronounce differently from the writing and their speech will not be understandable to the listeners. Internal factors include the motivation, interest, attitude, and intelligence of the learner. A learner's external factors are those that come from the world outside of them, such as the environment and the learning materials (Mulatsih, 2015). Furthermore, with improper pronunciation or having limited pronunciation ability can cause a decrease in learners' self-confidence (Mulatsih, 2015), also leading to the risk of misunderstandings and meanings that are not conveyed, and becoming ineffective communication (Nurullayevna, 2020). So, pronunciation is crucial (Cakir & Baytar, 2014). It makes to aware of different

sounds and sound features. Concentrating on sounds will give one knowing where to emphasize words, and all of this provides additional information about spoken English and helps to reach its meaning.

Several studies on students' perception of English songs for pronouncing skills have been conducted. For instance, Makasoe et al. (2022) discovered students' positive response to English songs, which English songs may be a helpful media for learning pronunciation. Iqbal (2018) revealed students' believed that English songs may improve their English pronunciation since they gave a method for pronouncing English words. Similarly, Raudyatuzzahra (2020) indicated students' positive attitudes toward the benefits of using English songs to increase their enthusiasm and their pronunciation skills. Despite the students' positive attitudes toward English music, only a few of the studies used digital music streaming as the medium. Following the identified research gap, this study prompted to learn about students' perceptions of using Spotify for English pronunciation. The current study attempts to provide answers to the following research questions:

What is students' perception of using Spotify towards their English pronunciation?

1.1. English Songs in Learning Language

A song is music that frequently contains lyrics (E. Pratiwi, 2018). Songs appeal to people of all ages and backgrounds. Songs, especially English songs are now used by teachers and students to improve their English skills (Andayani, 2022; Hadi, 2019), such as listening (Listiyaningsih, 2017; Solihat & Utami, 2014), speaking (Nuraini & Rusmiyati, 2022; Sagita et al., 2020), vocabulary (Phisutthangkoon, 2016; Sari et al., 2019), and pronunciation skills (Farmand & Pourgharib, 2013; Mulatsih, 2015b). In conclusion, songs are an effective way to learn and develop English language skills.

1.2. Spotify

In 2005 the idea for Spotify was first proposed by Daniel Ek and Martin Lorentzon. They developed the idea for Spotify until the official app was successfully launched on 7th October 2008 (Crook & Tepper, 2015). Spotify is a music streaming service that provides many exciting features and millions of songs to listen to, that has grown in popularity globally in recent years and is widely used by younger generations worldwide, including in Indonesia (Zhang et al., 2013; Netti & Irwansyah, 2018; Maghfiroh & Putri, 2022). Particularly in this digital era, where the younger generation prefers to listen to music online and practically via

smartphone (Netti & Irwansyah, 2018). As a result, this music application makes it easier to listen to songs. In addition, this can be used as an alternative media for learning English, with the lyrics feature in Spotify while listening to English songs there will be lyrics consisting of new words, and this helps students to know how to pronounce them (Kusuma Dewi & Sukarni, 2020).

1.3. Pronunciation

Pronunciation is an important part of English for communicating with other people because there is a difference between the symbol and the sound (Mulatsih, 2015). When we communicate with others, we must not only have a good vocabulary but also good pronunciation. Olii (2021) stated that in English, different sounds will have different meanings. On the other hand, language skills have a broad scope, not only covering writing skills but also speaking skills, however, most people usually communicate using verbal language. Pronunciation, according to Aufa (2017), is an action or how to pronounce words; speech, the way of speaking a word, especially the way it is generally accepted or understood; and the graphical representation of the way a word is pronounced, using phonetic symbols. Pronunciation is an important skill because English has differences between its sounds and symbols. Even if we have a large vocabulary, it means nothing if we don't know how to pronounce the words correctly.

1.4. Previous Study

Alsadae & Sase (2022) aimed at finding out what students' and teachers' perceptions were about using English songs to teach and learn English pronunciation. They discovered that both students and teachers thought songs might help teach and acquire English pronunciation. The findings support the incorporation of music into curricula and extracurricular activities. Similarly, Anjani & Lubis (2023) explore three students' impressions from various colleges in Indonesia on using the Spotify application to improve their English pronunciation. The results showed that using Spotify improved all participants' English pronunciation, particularly in terms of word and meaning. In a related yet different application, (Rahmania & Mandasari (2021)'s goal of the study was to determine students' perspectives on the use of the JOOX application, particularly their pronunciation. According to the results, the majority of students agreed that JOOX helped them improve their

pronunciation. Based on the reviewed literature, it is possible to conclude that students have a positive perception of using English songs to improve their pronunciation.

2. METHODS

This study used a one-shot survey design with six basic research survey techniques and some interviews. The first step was planning the main questions, which are about beliefs that can be answered most precisely through the survey method. The second step was to determine which population would be included in the study. The study's participants were the sixth-semester students of the English Language Education Study Program at the University of Palangka Raya in Central Kalimantan. There were about 95 students enrolled in the sixth semester of 2023 in this study program. However, because there were several provisions in the selection of the population, in the third step, sampling was conducted. The sample was chosen by means of purposive sampling. The sample judged to be typical, or representative was chosen from the population. It allows choosing the sample based on the judgment and knowledge of the population.

The fourth step was constructing the instrument. Questionnaires and interviews were the instruments used to gather the data from the sample. The questionnaire included closed-ended and Likert-scale questions designed to elicit definite answers from students via questionnaire questions and student opinions via interview questions. There were 12 questions (11 closed-ended questions and 1 Likert scale question) in the questionnaire, and these questions were grouped into dimensions, which are pronunciation, beliefs in using English songs, and Spotify. For the first dimension, the questions were about their opinion of their pronunciation. For the second dimension, the questions are about how they think English songs work for their pronunciation. In the last dimension, the questions are about how they utilize Spotify and how the application improves their English skills, especially pronunciation.

The fifth step was the survey, followed by the interview. The questionnaire is in Google Forms as an online platform, and the questionnaire link was distributed to students to be filled out within one week and closed at the end of the time. Besides that, students were also asked to conduct interviews, answering several questions that had been provided. Finally, after the data were collected, the sixth step was performed, which was processing the data. The last step included statistical analysis, calculating the percentage of the questionnaire on questions, interpreting the results, and reporting the findings.

3. RESULTS AND DISCUSSION

3.1. Result

The questionnaire is grouped into three dimensions, namely exposure to pronunciation, beliefs in using English songs, and Spotify use. There were various responses to the provided questions based on the questionnaire, which consisted of 12 items distributed to the respondent. This is the tabulation data from the questionnaire.

No. Question Yes No (%) (%) 2 Have you ever used English songs using Spotify to improve your 100% 0% English pronunciation? 7 Have you ever used English songs to focus on improving specific 80% 20% aspects of pronunciation like consonants or vowels? Are there any improvement to the aspect that you focus on when 70% 30% 10 listening to English songs on Spotify?

Table 1. Exposure to pronunciation

Table 1 provides data on the exposure of participants to English pronunciation through the use of Spotify and English songs. Based on the table, it can be seen that the use of English songs on Spotify is a popular method for improving English pronunciation, with all participants having used this method. However, not all of them concentrated on practicing specific pronunciation aspects, as only 80% of the respondents focused on this. Out of these, 70% believed that they have seen improvement in the specific aspect they were working on by listening to English songs on Spotify.

Table 2. Beliefs in using English songs.

No.	Questions	4	3	2	1
1	How often do you listen to English songs using Spotify?		0%	70%	30%
3	Do you think listening to English songs can help improve your pronunciation?		10%	50%	40%
4	How effective do you think listening to English songs is for improving English pronunciation?	0%	30%	40%	30%
9	Since using English songs on Spotify, have you noticed any improvement in your English pronunciation?	0%	10%	80%	10%
12	Would you recommend using English songs on Spotify as a way for other English learners to improve their pronunciation?	0%	10%	50%	40%

Table 2 presents data on the beliefs of participants in using English songs on Spotify to improve their English pronunciation. The table comprises five questions with the respective percentages of participants who answered on a four-point scale ranging from "4" (most negative) to "1" (most positive). Based on the table, 70% of respondents often listen to English songs using Spotify. Regarding the effectiveness of using English songs on Spotify to improve English pronunciation, 50% of respondents agree that listening to English songs can help improve their pronunciation, while only 30% think that it is not an effective method. However, a majority of respondents (80%) have noticed some improvement in their English pronunciation since using English songs on Spotify and 50% of respondents would probably recommend this method to other English learners.

Table 3. Spotify use

No.	Question							
	What types of English songs do you find most helpful for improving your							
5	pronunciation?							
	Slow ballads	Pop songs	Rock songs	Other				
	10%	60%	0%	30%				
	What is your typical method for listening to English songs on Spotify to improve							
	your pronunciation?							
6	Listen to the lyrics and try to	Focus on specific	Sing along to the	Other				
	mimic the pronunciation	sounds or words	song					
	30%	10%	40%	20%				
8	What aspects of English pronunciation do you struggle with the most?							
	Vowels	Consonants	Words stress	Other				
	30%	10%	60%	0%				
11	What the advantage of Spotify in helping your pronunciation?							
	Spotify has a lyrics feature	Very diverse music	Complete list of	Other				
		library	songs with various					
			genres					
	80%	10%	10%	0%				

Table 3 provides data on the usage of Spotify by participants in their efforts to improve their English pronunciation. The table contains four questions, each with multiplechoice responses. Based on the table, it can be concluded that pop songs are the most helpful type of English songs for improving pronunciation, followed by slow ballads and other types of songs. The majority of respondents prefer to sing along to the songs as their typical method of listening to English songs on Spotify to improve pronunciation. The aspect of English

pronunciation that respondents struggle with the most is word stress, followed by vowels. The advantage of Spotify in helping pronunciation is mainly attributed to its lyrics feature, which is highly appreciated by 80% of the respondents. Additionally, Spotify's diverse music library and complete list of songs with various genres are also mentioned as advantages, although to a lesser extent.

Furthermore, interviews were undertaken to strengthen the reliability of the questionnaire findings. The questions posed during the interviews were focused on:

- 1. What motivated you to start using songs to improve your pronunciation?
- 2. Have you noticed any improvements in your pronunciation since using English songs on Spotify? If so, can you describe them?
- 3. Do you find it easier to learn pronunciation through Spotify compared to other methods, such as studying grammar rules or practicing with a tutor? Why or why not?
- 4. Are there any English songs or artists on Spotify that you find particularly helpful for improving pronunciation? What is your reason?
- 5. Would you recommend others to use English songs on Spotify to improve their pronunciation skills?

The interview results are shown below.

1. What motivated you to start using songs to improve your pronunciation?

The majority of the participants indicated that they initially used Spotify for entertainment purposes only. However, certain participants mentioned that their lack of confidence in their speaking skills motivated them to use Spotify for language learning because it provides an entertaining learning experience. Furthermore, the majority of participants stated that they learnt pronunciation indirectly by listening to English songs on Spotify. This finding supports the results from the second interview question, which suggested that the participants experienced improvements in their pronunciation while using Spotify. Therefore, the results reveal how Spotify can be used as a language learning tool and how it can offer an enjoyable and interesting learning experience.

2. Have you noticed any improvements in your pronunciation since using English songs on Spotify? If so, can you describe them?

Based on the interview results, the majority of participants reported an improvement in their pronunciation after listening to English songs on Spotify. They shared that they practice their pronunciation by singing along or imitating the songs they hear. In addition, some participants suggested helpful strategies such as listening to acoustic versions of songs and starting with slow-tempo songs before progressing to more challenging ones with difficult vocabulary.

- 3. Do you find it easier to learn pronunciation through Spotify compared to other methods, such as studying grammar rules or practicing with a tutor? Why or why not? Participants witnessed that learning pronunciation through Spotify is an enjoyable experience because it offers a fun and engaging learning experience through song listening. The application's attractive and clear design makes it easy to navigate and use. Furthermore, the accessibility of the platform and its useful features such as lyrics and genre-based song lists were appreciated by the users, who found it convenient to find songs that suited their preferences.
 - 4. Are there any English songs or artists on Spotify that you find particularly helpful for improving pronunciation? What is your reason?

The participants mentioned a variety of artists and songs genres that they enjoy listening to on Spotify, including Lil Uzi, Sza, Libianca, Khalid, Charlie Puth, Lizzo, Maher Zain, and Elvis Presley. One participant specifically mentioned that they liked listening to Doja Cat's "Candy" because of its interesting melody. Another participant highlighted Zoe Clark's "Zero Feelings" due to its repetitive lyrics and rhymes that make it easy to sing along to. The participants also shared their appreciation for Country songs, citing the clear pronunciation and tempo of the singers, as well as the straightforward lyrics that make it an ideal genre for practicing pronunciation.

5. Would you recommend others to use English songs on Spotify to improve their pronunciation skills?

According to the participants, listening to English songs on Spotify is a highly recommended method for practicing pronunciation, and they suggest it to other students as well. Singing along to songs is a common strategy for learning among students since it is enjoyable and engaging. Moreover, Spotify's lyrics feature has been regarded as an essential tool for learners who have difficulties recognizing the words spoken by the singer. Spotify is a convenient and beneficial platform for improving English pronunciation because of these aspects.

According to the results of the interview and questionnaire in the table above, students had a positive perspective regarding using Spotify to improve their English pronunciation. Despite the positive findings, there are also identified some limitations to using Spotify for improving English pronunciation. Some participants noted Spotify should not be used as the sole method of practicing pronunciation. It can combine with other methods as a supplement to maximize the effectiveness of pronunciation improvement.

3.2. Discussion

The study's findings highlight the potential benefits of using Spotify as a tool for improving English pronunciation. Exposure to English accents through English songs can assist learners develop a better understanding of English pronunciation and intonation patterns.

As indicated by the questionnaire result that the students that have used Spotify even often use it, not for entertainment purposes only, but also to motivate them to use Spotify as an entertaining way to learn their English pronunciation. The majority of participants stated that they learned pronunciation indirectly by listening to English songs on Spotify.

In terms of students' perceptions as a participant in the interview revealed that Spotify can be utilized as an effective tool for learning English pronunciation. Many participants reported improvements in their speaking skills after listening to English songs on the platform, which they found to be an enjoyable and engaging learning method. The accessibility, design, and features of Spotify, such as lyrics and genre-based song lists, were highly appreciated by the users. The participants recommended Spotify to other students as a fun and practical way of practicing pronunciation, and they shared helpful strategies such as starting with slow-tempo songs and listening to acoustic versions. Overall, the findings suggest that Spotify can provide an exciting and effective means of learning English pronunciation.

So, the result is consistent with the previous study's findings. By providing a rich source of English speech models and opportunities for practice, Spotify can serve as a tool for improving students' English pronunciation.

4. CONCLUSIONS

In conclusion, this study aimed to explore the perspectives of students on using Spotify toward their English pronunciation. Through questionnaire and interviews with ten participants, it found that the use of Spotify was perceived positively, it mainly assists as an effective and engaging method to improve English pronunciation. Due to some reasons why, Spotify assists students with their English pronunciation, such as;

- Spotify provides an engaging and enjoyable way to learn English pronunciation through variety songs, which make the learning process more interesting and effective.
- Spotify is easily accessible and convenient to use, allowing students to practice English pronunciation anywhere and anytime.
- The availability of diverse songs on Spotify, pop, or RnB. Give different exposure accents, which can help them understand the pronunciation of word in context.

Furthermore, the participants also reported an increase in their vocabulary. Despite it this study has some limitations, including the small sample size, which may limit the generalizability of the findings. Nonetheless, the findings of this study contribute to the growing literature on the use of technology in language learning ad provide insight into the potential benefits of using Spotify as a tool to improve English pronunciation.

5. REFERENCES

- Alsadae, S. F., & Sase, A. S. (2022). The use of song in teaching English pronunciation (students and teachers'perceptions). https://www.researchgate.net/publication/358943914
- Andayani, E. S. (2022). Implementation of the use of song as a method of learning English for children.
- Anjani, P., & Lubis, N. (2023). Tertiary students' perceptions on Spotify application in improving English pronunciation. In Indonesian Journal of ELT and Applied (IJEAL Linguistics (Vol. 2, Issue 1). https://jurnallp2m.umnaw.ac.id/index.php/IJEAL
- Aufa, N. (2017). Using movies to increase students' pronunciation.
- Çakır, İ., & Baytar, B. (2014). JOURNAL OF LANGUAGE AND LINGUISTIC STUDIES Foreign language learners' views on the importance of learning the target

- language pronunciation. In Journal of Language and Linguistic Studies (Vol. 10, Issue 1). www.jlls.org
- Crook, J., Tepper, F. (29 Juli 2015). A Brief History of Spotify. TechCrunch.com. Diakses dari: https://techcrunch.com/gallery/a-brief-history-of-spotify/ (27 November 2017)
- Farmand, Z., & Pourgharib, B. (2013). The effect of English songs on English learners' pronunciation. http://www.isicenter.org
- Frankel, D.G (1984). Learning How to Pronunce a Language. London
- Hadi, M. S. (2019). The use of song in teaching English for Junior High School student. (Vol. ln English Language in Focus (ELIF) 1, Issue 2). https://jurnal.umj.ac.id/index.php/ELIF
- Hornby, A. Sydney., Ashby, Michael., & Wehmeier, Sally. (2000). Oxford Advanced Learner's Dictionary of current English. Oxford University Press.
- Igbal, R. (2018). Students' perception on the impact of English pop songs toward their English pronunciation's skill at UIN Ar-Raniry. https://repository.arraniry.ac.id/id/eprint/2878/1/skripsi%20full.pdf
- Kusuma Dewi, S., & Sukarni, S. (2020). The Influence of Students' Habit of Listening to English Songs on Their Pronunciation Ability (Vol. 7, Issue 2).
- Listiyaningsih, T. (2017). The influence of listening English song to improve listening skill in listening class. 1(1).
- Maghfiroh, D., & Putri, S. (2022). THE USAGE OF SPOTIFY APP TO IMPROVE STUDENTS' PRONUNCIATION SKILL AT SMP NEGERI 3 NGRONGGOT NGANJUK THESIS EGLISH EDUCATION DEPARTMENT FACULTY OF TARBIYAH AND TEACHER TRAINING STATE INSTITUTE OF ISLAMIC STUDIES PONOROGO.
- Makasoe, I., Liando, N., & Rombepajung, P. (2022). Students' perception on the use of English songs to learn pronunciation. In JoTELL Journal of Teaching English (Vol. Issue 10). 1, https://dspace.uii.ac.id/bitstream/handle/123456789/29055/16322069%20Ra udyatuzzahra.pdf?sequence=1&isAllowed=y
- Mandasari, B., & Aminatun, D. (2019). Uncovering students' attitude toward vlogging activities in improving students' speakin ability (Vol. 8, Issue 2). https://fkip.ummetro.ac.id/journal/index.php/english
- Mulatsih. (2015a). 8. PRONUNCIATIONABILITY BY USING ENGLISH SONG IN INDONESIAN STUDENT OF UNSWAGATI CIREBON.
- Mulatsih, D. (2015b). Pronunciation ability using English song in Indonesian student of UNSWAGATI Cirebon. Journal of English Language and Learning, 2, 294–199.
- Netti & Irwansyah. (2018). Spotify: Aplikasi Music Streaming untuk Generasi Milenial.
- Nuraini, N., & Rusmiyati, Y. (2022). The effectiveness of English song "Driver Licence" to improve student speaking skill. In Januari (Vol. 6, Issue 1). https://doi.org/https://doi.org/10.30601/dedikasi.v6i1.2143
- Nurullayevna, S. N. (2020a). European Journal of Humanities and Educational Advancements (EJHEA) The Key to Effective Communication Is Pronunciation. https://www.scholarzest.com
- Nurullayevna, S. N. (2020b). The key to effective communication is pronunciation. European Journal of Humanities and Educational Advancements (EJHEA), 1, 5-

- 7. https://www.scholarzest.com
- Olii, S. T. (2021). The use of songs as teaching media to improve students' pronunciation fluency. https://doi.org/https://dx.doi.org/10.32535/ijabim.v6i1.1087
- Phisutthangkoon, K. (2016). Effectiveness of English song activities on vocabulary learning and retention. www.iafor.org
- Pratiwi, E. (2018). Using song to enhance learning in English classroom.
- Pratiwi, Z. F., & Ayu, M. (2020). The use of describing picture strategy to improve secondary students' speaking skill. In Journal of English Language Teaching and Learning (JELTL) (Vol. 1, Issue 2). http://jim.teknokrat.ac.id/index.php/english-language-teaching/index
- Rahmania, A. H., & Mandasari, B. (2021). Students' pereption towards the use of Joox application to improve students' pronunciation. In Journal of English Language Teaching and Learning (JELTL) (Vol. 2, Issue 1). http://jim.teknokrat.ac.id/index.php/english-language-teaching/index
- Raudyatuzzahra. (2020). Students' perception on the use of English songs to learn English pronunciation at a private English course in Mataram. https://dspace.uii.ac.id/bitstream/handle/123456789/29055/16322069%20Ra udyatuzzahra.pdf?sequence=1&isAllowed=y
- Sagita, M., Ramlan, & Vita, N. (2020). The effect of using English song on the students' speaking skill. In Jurnal Sains Riset | (Vol. 10, Issue 1).
- Sari, I. P., Asahra, E. E., & Yana. (2019). Improving students' vocabulary mastery using English song. Project, 2, 410–415.
- Solihat, D., & Utami, P. L. (2014). Improving students' listening skill by using English songs. Journal of English Education, 3. http://journal.uniku.ac.id/index.php/ERJEE
- Suprayogi, & Pranoto, B. E. (2020). Students' perspectives toward news voiceover activity in pronunciation class.
- Yusmita, A., & Angraini, N. (2017). THE EFFECTS OF ENGLISH SONGS ON THE SEVENTH GRADE STUDENTS' PRONUNCIATION ACHIEVEMENT IN SMP SRIJAYA NEGARA PALEMBANG. 6(1).
- Zhang, B., Kreitz, G., Isaksson, M., Ubillos, J., Urdaneta, G., Pouwelse, J. A., & Epema, D. (2013). Understanding user behavior in Spotify. IEEE. https://doi.org/10.1109/INFCOM.2013.6566767