Classifying Music User Groups and Identifying Needs for Mobile Virtual Music Services

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ABSTRACT
This paper presents the results of qualitative interviews conducted with musicians and listeners about their music activities and use of social media services. The paper describes different music user groups, their wishes and what services are needed from a mobile network virtual environment. This information can help developers design new mobile network services from the user experience points of views.

Categories and Subject Descriptors
H5.m. [Information interfaces and presentation] (e.g., HCI): Miscellaneous.

General Terms
Design, Experimentation, Human Factors

Keywords
mobile music activities, musicians, music listeners, user experience, social media, virtual environment.

1. INTRODUCTION
The last 10-15 years has seen the rise of a number of new trends. Mobile phones have turned into small mobile computers. Smart phones and tablets with touch screens have become very popular in a very short time. At the same time, Massive Multiplayer Online games (MMOs) and social media applications have become popular.

The music industry has seen big changes with the increasing use of online music stores and streaming services. This has resulted in the need to research different search engines and recommendation systems to help the user select the music that they want. At the same time, there has been a concern that new digital music services will kill recording industry [16].

This paper is a part of a larger project which is looking at a mobile solution that will combine network virtual environments and social networking for the purpose of identifying attractive new services. In this case, the study is looking at understanding the user driven needs of music listeners, musicians and industry and exploring possible mobile virtual worlds that would be of interest.

This paper presents the results of qualitative interviews made with listeners and musicians. Questions relate to music listening habits, band activities and use of social media, NVEs and computer and console games. The study indentified different music user groups in order to understand user's needs for new services. This paper describes the users' wishes and needs for mobile network virtual environment from music listeners and musicians points of views. As a contribution the paper provides valuable information for developers in order to create services with good user experience and utility.

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2. RESEARCH OF MUSIC SERVICES
This section describes some of the related research that revolves around the music environment, including listening habits, virtual world applications, videos, mobile music and social networks.

Music is a powerful driver for social networks that helps connect music groups with their fans, e.g. through MySpace [3][4]. In their study of presence services, Bentley and Metcalf [2] studied the use of a social music application whereby members can notify other people within their social circle of the music they are currently listening to in order to study the impact on how people behave. Mobile social network research has often focused on utilizing location aware context in order to facilitate communication, information querying, geo-tagging, rendezvous, privacy and presence. [6][8][10][9][5][4]. Other research into mobile social networks have music themes but the music aspect is seconded to the mechanisms of mobile social networks and the needs of the various music users are not ascertained [1].

Liikkanen and Lahdensuo [19] have studied popularity of mobile music device utilization regionally and globally. According to them, globally an average of one tenth of all commuters publicly display their mobile music gear. However, much more devices are sold. This underuse can reflect the demands of the moving situation. Listening to music might seem too immersive while still navigating and following traffic and other commuters. [19]

Music streaming services (e.g. last.fm, Spotify) includes recommendation feature and recommending the right type of music is an important factor from user experience point of view. Lehtiniemi has studied different music recommendations systems in his experiments. According to 63% of the 42 participants, it was important to see a reason why some song had been

recommended to him/her. Åman and Liikkanen [18] have made a survey of music recommendation aids and present modified goals for these aids in order to improve user satisfaction. According to them, the recommendation systems should explain how the systems works, allow users to tell the system it is wrong, helps users to make good decisions, convince user to try or buy, help users to make decisions faster and increase users' confidence in the system. [18]

Because there is hundreds of millions of songs available on the Internet, there is a need for new music search and discover tools for analyzing data. Lambiotte and Ausloos conclude that peoples listening habits are quite diverse and are not limited or confined to any narrow genres. [7]. In order to be able to develop query-by-description system, which retrieve music, Barrington et al. [15] developed a social game that collects tags about music. This game, "Herb It", is deployed on Facebook and it is designed to collect both musical and social data. Since music is often used in social situations, their game is found to be more interesting to users when it encourages social interaction. [15].

In addition to music consumption, the use of video material has increased. New video streaming technologies have the potential to change video watching so that it is a more active, socially engaging experience. Weisz et al. [11] have studied the activity of chatting while watching video online. They investigated how groups of friends and strangers interact, and find that chat has a positive influence on social relationships, and people chat despite being distracted. [11]

Cesar et al. [13] have studied social sharing of videos and especially how people can fragment, annotate, enrich and share videos via the personal content management application. Their study indicated that users like the capability of creating clips from videos, enrich them and send them to someone. The users also wanted to have a secondary screen for other usage than controlling the media. A secondary screen would allow users to edit and send content without interrupting co-viewers who are watching television. [13] New touch screen mobile phones and video cameras include applications for video and photo recording, editing and sharing.

Frank et al. [11] has developed a set of systems that support creation and navigation in musical spaces, both in the real and virtual environments. They created a virtual MusicSOM Cafe in the AudioSquare, where on each table of the cafe a certain type of music is being played and neighboring tables have similar sounding styles. A Users avatar can walk through the cafe perceiving gradual transitions of musical styles on the different tables and can select the seat containing the music they like the most. [11] This is an interesting service if it can increase the user's breath of experience and new social interactions and contacts based on individual's music taste.

Jumisko-Pyykkö et al. [14] have proposed design guidelines for User Experience (UX) design of mobile 3D TV and video. They present requirements relating to these three categories; user, system and service, and context. According to them mobile 3D services needs to fulfill entertainment and information needs; users want to relax, to spend time, and to learn by using mobile 3D services. Mobile 3D systems should offer both mono (audio or visual) and multimodal (audiovisual) presentation modes and easyily shift between multimodal and visual 2D-3D presentation modes. The proper size for mobile 3D content is between 3-5 inches. Viewing mobile 3D content takes place in public and private locations and indoor and outdoor contexts, potentially on public transport, in parks, cars, cafes, waiting rooms and at home. According to them, mobile 3D content is primarily for private context and focused viewing, but there is also a need for shared viewing. [14]

These research works indicate that the activities and needs of mobile music users are large and diverse. Especially when we are studying the topic from both consumers and musicians points of views. Internet is full of different online music stores and streaming services. Likewise, it is full of music applications and social media services. However, our purpose is not to invent requirements for yet another new similar service. Instead, we are aiming to find those aspects that could help designers to develop network virtual environment with 3D user interfaces (UI) for mobile devices (e.g. touch screen tablets) in respect of desired and useful content based on different user groups needs.

3. RESEARCH OF MUSIC SERVICES

Music users' needs were studied by interviewing consumers, musicians and gig organizers, all together 16 persons (4 females, 12 males). Age varied from 27 to 50 years while the average age was 34. The duration of interviews varied from 30 minutes to 1 hour. Residence distribution varied from Southern Finland to Lapland. Half of the interviewees came from city of Oulu (pop: 140000), 3 persons came from smaller cities (pop: 40-60000) and 5 from municipalities (pop: 8000-16000). Having participants from cities and the countryside enabled us to study how music needs and activities varied when distances are longer and the amount of available music events differ.

Interviews focused on listening, consuming, rehearsals, having gigs and going to festivals. Also the use of social media, game playing and virtual environments were asked in order to better understand the users' background and interests. The aim was to gather information of music users' activities, needs and wishes which can be used to design a good user experience for a mobile network virtual environment. In this phase, the amount of interviewees was small, because the aim was to investigate music people's needs and activities for mobile virtual services, and later iteratively evaluate design solutions with music users.

3.1 Music User Group Classification

At first, we classified three general groups: consumers, musicians and producers. After the interviews, we realized that consumers was far too general a term and that there is a great variation in the way people listen and use music. These different patterns are important as the needs of the user vary considerably. Consumers were then described in a more detailed level and are called Listeners. In addition to Listeners, we classified music Players and Musicians according to musical activities. These user groups do not focus on consumption aspects or professional bands at the moment. We assume that new unknown and young bands have different needs for rehearsal and promoting than older and well know bands. Also the relationship with record companies can have an impact on how much bands can decide their music activities.

Based on the interviews, we identified 39 groups, which depict a great variation in the way people listen and use music. We identified 14 listeners, 16 musicians and players and 9 stakeholders, which were such as: bar owners, band members, DJs, video producers, artists, record companies, composers, songwriters and light men. Classifying stakeholders in more detail require more studies. This paper describes behavior and use

contexts from the listeners and musicians point of views. The user's role can overlap these groups and a person can belong to several groups or have various roles depending on the certain situation:

- **Radio Program Listener:** Listen to more radio programs, not strongly or at all music.
- **Radio Music Listener:** Listen to music mostly in a car or when doing mechanical work. Listen to music what comes from radio, do not make a strong selection.
- **Mobile Listener:** Listen to everywhere (e.g. jogging, working, commuting). Listen to podcasts, mp3 files, ebooks. Music is a tool and entertainment.
- **Active Listener:** Listen to everywhere with various devices. Strong music selection. Is aware of own taste.
- **Passive Listener:** Listen to everywhere where music is on. Listen what others have chosen. Do not select listening music.
- **Quality Listener:** Sits at sofa and drinks a glass of vine. Listen to certain good quality LPs. Nostalgic experience.
- **Work Listener:** In work situations. Uses music as a tool for concentrating and inspiration.
- **Playlist Listener:** At home and mobile contexts. Likes to create, listen to and share playlists.
- **Mainstream Listener:** Listen to mainstream music. A lots of services for this user group.
- **Indie Listener:** Listen to indie music. Spend more time for searching new music. Effort for searching should be minimum.
- **Melody Listener:** Everywhere. Listen to only melody of song, not lyrics. Selects mainly instrumental music.
- **Live Listener:** Likes to go to gigs, festivals and clubs to listen to live music. Seeing band in a live concert is a special experience.
- **Party Listener:** Listening to music related to social situation especially party activities.
- **Fan Listener:** Everywhere. A fan of band(s) and likes to go to gigs and buy merchandises.
- **Hobbyist Player:** Exercises playing some instrument. May have private lessons.
- **Junior Band Player:** Young, who has rehearsals with the school band.
- **Hobbyist Band Player:** Adult, who has regular rehearsals with the band.
- **Music teachers:** Main activity is teaching. Can be a single musician or band member.
- **Hobbyist DJ:** Being DJ is a hobby and way of life.
- **DJ:** More active DJ. Organizes gigs also for others.
- **Singer:** Singer in a band or chorus.
- **Single Musician:** Performs alone in events. Has contacts with organizers.
- **Junior Band Musician:** Regular rehearsals with a school band. Can have gigs already.
- **Adult Band Musician:** Regular rehearsals and gig activities. Age between around 20- 49 years.
- **Senior band Musician:** Regular rehearsals and gig activities. So called "grandpa rock". Age: 50+
- **Mainstream Musician:** Band musician who plays mainstream music. Maybe easier to get mass audience.
- **Indie Musician:** Band musician who plays independently non-mainstream music. Has different ways and services to produce and distribute music.
- **Electronic Musician:** Musician who produce electronic music. Music creation is different. has certain audience.
- **Cover band:** Band musician who plays only cover music. Need to find good songs for rehearsals and gigs.
- **Create Own Music:** Band musician who produces own music: create, compose, and produce.

We classified these music groups based on our 16 interviews. In future studies, it would be important to evaluate and validate these groups in more detail and identify differences between each group from a design solutions point of views. In this paper, we focus on qualitative information from individual's music activities and needs.

3.2 Music Users' Needs and Activities

Based on the interviews we identified a large amount of different activities that music users can have. At a general level these activities are: listen to music, create and share playlists and music media, sell and buy things, socialize, produce and promote songs and participate to gigs. Next we go through in more detail some key music activities.

3.2.1 Listening to Music

The ways of listening to music varied a lot among the interviewees. They used devices such as: radio, mp3-players, media players, mobile phones, computers and turntables, but did not use CD-players much anymore, only sometimes in a car. Selection of a device depended on the use situation, for instance, according to 'on the move' or static context and one's current activities. One person commented that she never listened to music in a moving context like riding a bike or walking, because music would disturb her ability to notice messages from the living environment.

Services also varied depending on the used devices, interviewees used services such as Spotify, Last.FM, MySpace, Hitlantis, SoundCloud, BandCamp, Winamp, Foobar2000, iTunes and Youtube. Hitlantis was a relatively new service and only one participant knew it and it is meant for both bands and users. The idea of the service is to provide a place for indie music bands to share and sell their music. Spotify was the most used service for listening to streaming music. 14/16 participants used Spotify. MySpace was mainly used by musicians, but also some listeners used it to search for artists. However, all who used it, commented that the service is not very usable, but they have to use it because many bands are still using it. The study indicated also that there are two types of listeners in terms of music location. One musician commented strongly that he never plays streaming music, because he listens to music a lot and wants it to be available immediately. Also, a few other participants commented that they prefer to listen to locally stored music. SoundCloud was not known by listeners.

Interviewees had different ways to listen to music in a mobile situation. This was determined by the mobile phone model they had. Those who had an old mobile phone listened to music using mp3 players or just radio. Those who had new mobile phone models with good music applications preferred to use one device (mobile phone) for listening to music in mobile situations. Some of the users even had separate loudspeakers with their mobile phone. Also the mobile context, such as jogging or driving determine what type of mobile device is selected by the user, e.g. while jogging a ipod is better than a mobile phone because it is lighter..

3.2.2 Sharing and Receiving Music

Sharing songs and lyrics is an important action for band members, especially for those who play their own music, not covers. The bands have to find a common way for all member to share songs. All members are not so experienced or interested in using different online services, so there is still a need to have and to share songs on paper. Musicians also commented: *"It is important to get new lyrics easily with you."* and *"I share new songs to band member via my own server."* Also, two bands who create their own music have the lyrics of their songs in the band's web pages.

Musicians have a need to share their music on different services (band's webpage, MySpace, SoundCloud, Facebook, YouTube, Hitlantis, etc.). They want to share their demos in order to get feedback and promotion. Some bands used only a few media, but active musicians said that they had to promote themselves in several places in order to stand out from the mass. Technically-oriented musicians were able to utilize different media and produce their own promotion material. Bands have a need to share music to their own band members when they have recording sessions. One musician used his own server for sharing recorded tracks.

Attitudes towards receiving music demos varied according to a person's music activities. Those who listen to music a lot in work and leisure activities were more interested in selecting or filtering what they receive. Experiences relating to receiving music are dependent on the used services as well, i.e. in terms of how well this feature is supported in the system.

Creating playlists make listening easier because you do not have to choose what you want to listen to each time. One listener was very interested in creating and sharing playlists. Keeping a record of what he listens to was a requirement to use new music services. Sharing a playlist is a reflection on the user's musical identity. Interviews elicited that if a person is not interested in social media at all, (s)he is not interested in sharing playlist type information to others.

Earlier people sent a lot of spam emails including music video links. Nowadays these music links are shared with social media services, mainly via Facebook. 11 of our 16 participants used Facebook. For the other 5 interviewees, sharing music links was not so important or they used other mediums such as email or chat channels for that. One user made a comment that she is a bit of an outsider, because all news and links are shared via Facebook. However, all these 5 users did not mind at all that they are out of such a social media. This was their conscious choice after using the service for a while.

3.2.3 Creating Songs and Videos

Recording demos and songs was a common activity among musicians and players. They all recorded their rehearsals in order to check the quality of music or getting comments from others. When recording rehearsals the music sound quality is not required to be high. The main requirement is to be able to record easily and while mobile. A mobile virtual environment could provide a virtual space for musicians to make these low level demos for learning purposes. One Hobbyist Player commented that he uses YouTube for learning: "*I often watch videos of when somebody teach how to play a song and then I rehearse"*.

Creating interesting music videos is important for bands. Making videos in mobile contexts has become more important and the effort for doing them should be minimal. All bands may not have time or skills to produce good videos. Camera phones, video cameras and increased use of digital videos and social media have forced musicians to produce videos in order to express their musical identity and be more interesting for listeners. Musicians have different ways to produce their music demos and videos. One band, who rehearse and have gigs during their leisure time, said that because they do not have time and sufficient skills, they made a demo video of their gig photos. This is an easy visual way to create video and present the band's music, but the listener's musical experience is not so strong than with a real video with moving content. A good example of creating interesting music videos is mobile video recording. One musician said that they recorded their gig with camera phones and then edited the video. They had 20 camera phones which they taped on drums and other gears. They got video from mobile phone and audio from recorder. They were rewarded by the YleX radio channel as a best video of demoband category. Another musician who produces music for others commented that they will record the band by mobile phone in different places and make a music video of that. They want to have video from rehearsals, gigs, audience, skating and nature. The third musician commented that they are interested in finding new ways to make videos of the band. He was interested in recording music videos by Ladybug camera and presenting it in a virtual environment. This could enable virtual audience interact with the video by zooming.

3.2.4 Mobile Musician Activities

Often ideas for new songs comes from somewhere else other than in a studio. Musicians have a need to record and refine ideas in mobile contexts. One band musician commented that he uses mobile phone for recording ideas: *"I use mobile phone for restoring my ideas. If I'm at work and suddenly get idea of song, I can go to toilet and shout a song on my mobile phone"*. Touch screen mobile phones enable the use of musical applications like mobile metronomes, tunes, drummer and guitars. These can be used for entertainment like one musician commented: *"I just use these for fun...sometimes I play short times (pocketguitar or Digidrummer). I have been in cafe with my friend and the other played drums and I guitar with our mobile phones. That was nice."* The other musician commented that he plays music with his new mobile phone more than earlier. The new device changed his behavior. Also he said that mobile tune and metronome applications have helped him in music activities. One musician dreamed about mobile notation application: *"It would be nice be able to record own whistle and then a device would make notation of it, and then you could sent it to others and modify your song later"*.

3.2.5 Needs for a Virtual Music Environment

Interviews elicited several ways on how musicians and listeners could utilize and enjoy a virtual music environment. Virtual music

space could be used, for example, for rehearsals, social interaction and as a market place for instruments and merchandises.

Musicians were interested in virtual rehearsals in terms of remote working when training and recording their own tracks. One guitarist commented: *"We often record music separately: I record when drummer plays or when I and bassist plays together and I can record basics".* A virtual rehearsal space could act as a working space for music records. Musicians could record and edit songs there and listen to it whetehr tehy are remote or together. Some bands were interested in getting comments on their demos from friends, colleagues and professionals. The virtual space could include place where others could listen to new demos and leave comments on. Also there could be a communication platform, where members could agree next trainings and other activities. It could also support easy communication with listeners.

One musician was very interested in having virtual gigs. One listener started to use SecondLife for going to a virtual club. She lives in Lapland, so going to real gigs was restricted due to travel issues. Usually she has to travel to bigger cities in the South of Finland. Long distances, travel costs, schedules and weather can have impacts on the wishes to go to a live gig. This person was interested in going to virtual gigs and especially to find new artists, but the atmosphere in the event and audience should be interesting. She was also interested to act as DJ in the virtual environment.

Selling and buying instruments and other gears relating to music listening and creation was an important action among the participants. Muusikoiden.net portal was the most used service for selling and buying second hand instruments. The musicians used this portal also for evaluating products that they are going to acquire. When buying new products from music web shops it is important to be able to trust the supplier and get information on the products. For instance, one hobbyist musician who uses one of Europe's biggest musical web store, said that this service should include user's comments of products. This is important because the musical product's goodness often depends on the user's needs. The same product can be good for a certain purpose but not for all. However, this kind of user feedback features are already existing in several web shops. A key requirements for such a feedback and evaluation features is reliability. Now musical customers have to check others' user experiences from other forums.

Buying merchandise is important to music fans and bands. Basic music listeners do not buy a lot of stuff. Those who have favorite band(s) can buy some t-shirt, books of artists, CD, DVD or LP occasionally. The digital age has changed from CD listeners to mp3, mp4, podcasting and streaming listeners. Buying music from digital stores is growing and users expect music be cheap or free. Buying fan products was seen more youngster activities among the participants.

3.3 Challenges in Music Activities

The most typical challenge for musicians was the difficulty to find time for rehearsal and gigs. This challenge related to the band member's residence and acquiring a rehearsal place. Some bands have trainings in a separate studio, which is used by several bands. The location of the training place also affects the ability of the band to transport their equipment. Interviews indicate that some problems could be solved by virtual environment. If bands could rehearse together in a virtual environment, there would not be problems relating to location of rehearsal and carrying instruments. Virtual rehearsal could be solution in the case when a person is unable to go to a real training place.

Musicians had also challenges relating to song selection and learning. One older experienced guitarist said: *"It is boring to play too easy songs for long time. For our band, it is challenging to find a song that suites for all".* This band plays rock covers and the guitarist has a long experience of playing in the band. This problem indicates that new musical services should provide new songs for rehearsing. The other musician said that his challenge is to learn new song in a very short time. Another senior musician commented that he would be ready to go to a gig, but the other members feel that they are not ready yet. These problems elicited that bands may not know when they are ready for gig or they could need a practice gig first. Having virtual gigs could act as a "test bed" before real gigs.

Three band musicians argued that getting gigs is a big challenge. This related to the time and effort that promotion requires. The virtual environment could help bands to get contact to organizers and thus get gigs with smaller effort. One organizer explained that she get contacts to bands using social media services and certain web forums. She also encouraged bands to contact bar owners and other organizes. However, bands may not know who to contact. The other organizer said that there exists a hierarchy on who to contact. Those persons who organize many events and have a lot of contacts and music business do not want to be available for all new bands. For new bands it can be difficult to promote and stand out of the masses. That is the place where a virtual environment could be helpful.

Music listeners' challenges related to finding new artists. One listener criticized mainstream music streaming services for the reason that they do not support finding new artists. The other listener commented that nowadays she listens to only those bands that she has used to listen to for years, because searching new artists is so labor.

4. CONCLUSION

This papers discusses different music users' needs and activities relating to music listening, musicians' activities and organizing music events. The paper classify 39 different user groups in order to help design new mobile services from the users points of views.

New network virtual environments for music users should provide socializing elements, but also take into account those listeners and musicians who are not interested in the use of social media services. Also, the service should provide functions for all listeners, musicians and organizers in order to help them to interact and support collaboration. A virtual environment should provide some value for each user groups. In order to have a large amount of users, the environment should provide several activities for listening, finding new artists, buying music related items, finding gigs and proving entertainment elements (e.g. videos, movie clips, mini games, competitions, user ranking). Providing virtual training space and events could help musicians in their band activities. Virtual gigs could provide new ways to enhance listeners musical experiences and ability to meet bands.

Providing virtual music events is the issue that should be studied in more detail with several experiments. Can virtual gig provide the similar type musical and entertainment experience than a real gig? What extra or different experiences could a mobile 3D virtual music space provide? For instance, would it be valuable for users

to have a possibility to chat with others while following the gig. How should virtual gigs or 3D music club spaces be designed in order to produce great musical experiences. What kinds of users would be interested? This paper presents music users information to these topics. In the future studies, we need to design different concepts, and then evaluate them with users.

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