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PlayRightNow

Designing a media player experience for PlayNow™ arena

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ABSTRACT

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This paper discusses the process of designing a media player tailored for PlayNow™ arena with the purpose of enhancing the user experience of this media portal. The design process is divided into two main stages, the first consisting on gathering information to inform the design of a media player and the second stage involving a low-fidelity prototype of a media player. In the first stage, three main activities are carried out to inform the design of the interface: a literary review of relevant research and studies related to the way people use digital media and its effect on society; an evaluation of the interfaces and features offered by some of the existing popular media players in the market today from an interaction design point of view; and user observations and interviews on people's relation to digital media. Based on the information and data collected from the first stage, an iterative process of design of interfaces was adapted, whereby potential users and design experts were consulted with their opinions and suggestions that influenced the sketching of various possible interfaces. Finally, a design of a media player for PlayNow™ arena is proposed, which is believed to have the potential of providing its users with a better experience in relation to digital content, as well as attracting new customers and increasing the revenue of this media portal.

Keywords: Digital Media, Music Interfaces, Media Players, Interaction Design, Music Experience

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Chapter 1

Introduction

Music is an inevitable part of our daily lives. Usually it is also a very enjoyable part of our daily lives. Music can have many different rhythms, pitches and melodies to appeal to the likings of all people regardless of their preferences, their ages, their locations, their personalities, etc. For some, music is a way of life; they express themselves and form an identity through music. Music was human's early forms of communication and since then it has been an essential aspect of all cultures (Wikipedia, 2009c). Before, music was expressed mostly by live performances, and started being distributed massively with the invention of the radio. Nowadays, music can be expressed and experienced through different media. The Internet has become the most important medium with which music and other type of digital content has been distributed to the whole world, giving the opportunity for everyone with an internet connection to have instant access to different types of music, videos and other media. Computer and web applications that successfully give the public the opportunity to access and enjoy this variety of digital media have great chances of succeeding, since *'everybody loves music'*.

This thesis will set out to explore some of the aspects of digital media. In particular, it is in our interest to unveil the modern practices of people in relation to digital music. Thus, our research questions become: Why do people appreciate digital music?, how do they use it?, what makes them adopt an application or service as their favorite way to experience digital media?, and how can a media player be designed to provide its users with a satisfying experience and fulfill their digital music needs? The ultimate purpose is to further develop the experiences and services provided to the public by the digital content distribution portal, PlayNow™ arena. One mean to provide users of this media portal with a better experience is by allowing them to organize and reproduce their digital content in a friendly and seamless way, so that it enhances their experience while browsing and reproducing media items without being obtrusive, but instead being supportive of their fundamental tasks.

The plan to accomplish this consists of several steps to be taken in the process of designing a media player using different sources of information. First, this thesis will look into the related literature and relevant research that has explored a similar topic. A variety of exploratory studies have already investigated the way people use digital content, in terms of its organization, its use, its visualization, its impact on society, as well as other important and interesting aspects. The knowledge that they have obtained will be assessed and considered if found significant towards the design of a media player.

Second, an evaluation of existing media players will be carried out from an interaction design point of view. Löwgren & Stolterman (2004), Nielsen & Mack (1994) and Lidwell et al. (2003)

suggest certain qualities of digital artifacts, heuristics and principles of design that would be taken into consideration during this evaluative step.

Third, information from users will be obtained by carrying out a series of interviews and user observations. It is of particular interest for this thesis to discover the motivations behind people's choice of media players and their opinions in relation to digital media.

These three main different sources will help to inform the design of the interface of a media player. A group of suggested sketches and mock-ups will be evaluated with potential users and experts in the field of the design of interactive systems in order to suggest a final design concept that will fit the standards of the PlayNow™ arena media portal.

These efforts will be aimed at providing users of media players and digital media with a unique experience. It is believed that the media players that exist today, such as iTunes, Windows Media Player, Spotify and others, provide their users with an *acceptable* experience which users have gotten accustomed to, though it could be improved with a more seamless interaction that completely satisfies their *personal* digital media wishes. For example, some users might be fond of organizing their music content before using it, some others might like to keep up to date with the newest musical trends; some may brag about their big music collections, while some others might like to share their few musical choices to portray a personal identity; yet, others might wish for a group of their favorite songs to just *play right now*.

1.1 Opportunities for Research

Apple's iTunes has successfully associated their freely distributed digital media player with a profitable business model by embedding the iTunes Store into the media player itself. At the same time, they have made it extremely easy for the users to acquire DRM-free media to a very accessible price. In fact, it has been reported that the sales of digital files through the iTunes Store in 2008 has surpassed the sales of actual physical CDs at retail stores (Koster, 2008). Another example of the impact of digital music in the retail industry is provided by the fact that `www.amazon.com` is slowly replacing the shipments of physical albums by offering digital downloads instead. Moreover, online media stores, such as PlayNow™ arena, are already expanding and trying to attract more customers since they see the potential on supplying the public with digital content through fruitful interactions.

Digital media has also reached social networking ideologies. Social media networks such as `Last.fm` or `imeem.com`, have taken advantage of the public's appeal for sharing their music with others, and for making a statement of their personal identity through their musical preferences. In fact, it has been reported that music is able to portray a person's self-identity to others, and that people who share the same musical taste are more likely to develop stronger, long-term friendships (Brown et al., 2001a).

Other services such as `spotify.com`, `deezer.com` or `listen.grooveshark.com` are becoming popular by providing the public with ways of enjoying music through the internet by streaming it and not necessarily owning it. In this way, people can access and explore a wide variety of music or other content as long as they have a computational device with access to the internet. This concept is changing the way people perceive music and the contexts in which they interact with it. Music enthusiasts have already the possibility to access any song they please at any particular moment in time, by simply having access to the web (which is now possible even via 3G Networks and will become more powerful with the upcoming LTE technologies) and registering to a music streaming service.

1.1.1 Identified Possibilities

As can be observed from the discussion above, there is an evident growing trend in the public's curiosity on digital media and the different ways in which it can be manipulated. New ways of organizing and visualizing music are constantly being investigated, as well as the contexts in which a person might demand for specific types of music or rhythms. Industry groups and research communities are constantly looking for innovative ways to provide the public with the means of enjoying these media.

Most mobile telephone manufactures, whose main products consists of mobile handsets, have been submerging into the world of digital media, claiming that some of their mobiles are specifically made for the user's enjoyment of media content. The media portal, PlayNow™ arena, which belongs to a major mobile manufacturer, is being expanded to attract more customers by trying to provide them with a better user experience. One way to enhance the use of this media portal and to boost its popularity is to allow users to connect their mobile devices and desktop computers seamlessly while at the same time allowing them to reproduce their purchased media either through their desktop computers or mobile phones.

Very recently, one of the larger phone producing companies has released its first attempt to provide its users with a way of playing the media content they acquire and to connect some of their mobile phones to their desktop computers in order to transfer media between them. This new application, which has been named *Media Go™* and which currently can only be obtained with the purchase of one of the mobile phones, has not yet received a lot of neither positive nor negative reviews. One of the observed benefits of distributing Media Go™ is that it makes it possible to access PlayNow™ arena through this media player as well as through the Internet.

Current competing products, such as the iTunes Store or MSN Music can be accessed through their respective media players (i.e. iTunes and Windows Media Player correspondingly), but not by navigating the web. On the other hand, Nokia's media portal can be accessed through their web-site, but not through their limited media player. The disadvantage of the iTunes Store and MSN Music, and now of Media Go™ is that they require an install of a relatively heavy application on a desktop computer (for instance, 65.5 Megabytes for iTunes 8).

With this known drawback from competitors there is a potential opportunity for combining the interface and features of the successful media players with the power of Java WebStart technology to provide customers with a light-weight, user-friendly media player that is able to satisfy their digital media needs and surpass their expectations. This will offer customers of PlayNow™ arena a new media player that will allow them to access and synchronize their media content not only through their own desktop computers, but also through any other computer or appropriate device with an internet browser. In other words, users would be able to manipulate their media content whenever and wherever they might be, thus enhancing the users' mobility and providing competitive advantage to stakeholders.

Specifically, there is an identified opportunity within the music and mobile media market of proposing a conceptual design for a digital media player that is suitable for the PlayNow™ arena media portal, which will be the final purpose of this thesis work. This recognized opportunity carries with it some research problems within the design space of a media player, which consist on the difficulty of exploring people's relation to digital media and the challenge of designing a media player that will be able to fulfill the needs and wishes of such relationship.

1.2 Purpose and Relevance of the Study

Having identified the potential of conceiving a media player and stated the problem area, it is possible and necessary to concretize a purpose for this research study. Thus, the intention of this study will be *provide music listeners and other digital media users with an experience that will fulfill and satisfy their needs*. This will be accomplished by investigating the social processes and practices of people while interacting with existing software that allows them to reproduce media content, having the ultimate objective of designing and evaluating a low-fi prototype for the interface of a media player that fits the corporate standards and ideologies of the PlayNow™ arena media portal.

This study will also have the parallel intention of discerning the interesting features from the various research projects done around the topic of music listening and the design of media players. It will also look at the different media players that are mostly used by the general public today to identify the characteristics that have made them successful.

It is in our hopes that the efforts carried out by this inquiry will end up providing the existing PlayNow™ arena's customers with a unique user experience that will allow them to reproduce music and other media content with ease, considering their most common actions when engaging in the activity of interacting with digital media, in particular listening to music. Users' emotions and contexts will also be considered, since they might impose a strong influence in the user's musical preferences and behaviors. At the same time, it is desirable that the integration of the resulting media player into PlayNow™ arena will attract new customers into this media portal, and ultimately generate greater benefits for stakeholders.

While investigating the aspects just described above, the various imposed constraints and limitations that could arise will also be considered. One constraint, for instance, is that the envisioned media player will have to be designed according to a commercial concept that is already existent, i.e. PlayNow™ arena, meaning that unconventional design concepts or eccentric proposals will not be able to be considered here. At the same time, one of the limitations, for example, might be imposed by the different technologies that will be taken into account to develop the interface and to realize the coupling of music devices. Moreover, there might be a limited knowledge on the use of technological tools to use at the moment of prototyping the design concepts. Finally, there is a time constraint that will dictate the advancement of this work, preventing it to reach its full potential.

It is worth mentioning that the limitations imposed in digital media by the prevalent issue of Digital Right Management will not be considered in this thesis. Plenty of research studies and informative articles have looked into the issue of DRM management and the rights of performing artists for their intellectual property. The reader can refer to the works of Garnett (2001), Vaidhyanathan (2001), Clark (2002), Cohen (2003), Jackson et al. (2005), Waelde (2005), Edström Frejman & Johansson (2008), and many others. However, discussions of DRM management are out of the scope of this thesis work. For most part of the rest of this report, and for the purpose of simplicity, it will be assumed that digital media is free of the constraints of copyright laws, and that consumers obtain their digital content legally and through well established means. It is perhaps also worth mentioning that the launch of the music streaming service Spotify and the lawsuits against the BitTorrent tracker PirateBay, which tighten up the regulations against illegal downloads of digital content, seems to be causing a shift in the preferences of the public from downloading content to their hard-drives into streaming it for free and legally. This newer preferences present in turn with new possibilities when considering the design of upcoming media players. For example, how to offer the user with easy ways of obtaining digital content and to elicit the feeling of ownership of such content. These limitations and opportunities will be

considered throughout the rest of this study.

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Having identified the opportunities for research and defined a purpose for this study, we begin our journey through the topic of digital media by presenting in the next chapter some basic concepts that will be used throughout this thesis, followed in Chapter 3 by the theories and principles to be considered for this inquiry. After that we start by describing the design process of the hereby suggested enhanced media player in Chapter 5 and Chapter 6. Finally, we end with a conclusion and final thoughts in Chapter 7.

But before immersing in deeper discussions on the uses of media players, the design of interfaces, and the implementing technologies, the upcoming chapter will present the necessary background to create the foundations and understandings of the subsequent writings. First, it will give an explanation of the concepts and terms used in this report. Next, it will list some of the relevant research that has been done surrounding the subject of digital media. Finally, it will briefly describe some of the most popular media players used today.

Chapter 2

Related Concepts, Previous Research and Media Players

In the previous chapter, some music technological trends were briefly described and a possibility to build on top of mobile manufacturers' efforts has been identified. This chapter will introduce some concepts related to the industry of digital music and the way people relate to digital media content in general. It will also introduce some of the related research that has been done around this topic and will present a short description of popular media players used by the majority of people these days.

Known media players have gained increased popularity within the last decade, which has encouraged the development of other new players as well. The grow of hard disk space and the standardizing of the legal rights of Digital Media Content, has made it possible for people to own several gigabytes of media, namely music and video, stored in their desktop computers or handheld devices. Also, the increase on internet bandwidth lets people stream digital media content without necessarily owning it, allowing them to enjoy music and videos freely and legally as long as there is access to the web.

This easy accessibility of digital music has resulted in a decrease on sales of physical CDs. In the years between 2000 and 2007 record labels have seen a decrease on sales of about 40 percent (Koster, 2008). However, these new ways of distributing media has also created new ways of generating profit. Successful media players competing in the market right now, such as Windows Media Player, iTunes or Spotify, have identified the public's interest in organizing, visualizing and have control over large amounts of digital content. Other upcoming media players might consider not only people's need to manage their media items, but also their desire to discover popular trends or newest releases, interact with them in different ways, acquire them easily and cheaply, share them with others, and, more importantly, access them freely whenever they feel like it.

2.1 Concepts

The following sections will define some of the terminology that will be used and explain the services or technologies that will be constantly mentioned throughout the rest of this thesis.

2.1.1 Digital media and Media Players

Digital media presents different meanings under different contexts. Wong et al. (2004) define *digital media* for computer science as “the study of image, sound, and video processing; interactive multimedia development; and advanced web programming”. Wikipedia defines the term as the “electronic media that works in digital codes” (Wikipedia, 2009a). In general, it has been recognized that the new type of media was created when the analogue world started being digitalized by transforming the signals into series of bits and bytes (Feldman, 1997).

Through the rest of this document the terms *digital media* or *digital multimedia* will refer, in simple terms, to any file that can be stored in a computerized system which content can be reproduced as either audio, video or still image. The labels *digital media*, *digital content* and *new media* are used interchangeably by many, and so it will be done in this thesis as well.

Accordingly, the name *media player* entails any software application that is able to reproduce digital media content. Successful media players commonly support a variety of media formats and a variety of media files, commonly audio and video. Microsoft provided one of the earliest popular media players in 1991, and since then there has been an increasing growth of media players that aim at providing their users with a better experience than their competitors. The interfaces and capabilities of media players has improved dramatically since the creation of the firsts media players. Some other popular media players that have existed for some years include Apple’s iTunes, RealPlayer, Winamp, BSPlayer, while more recent media players have also arisen in the last years, such as Spotify, Songbird, Media Go™ and other web-based streaming services. A more detail description of some of the most popular media players today will be presented in section 2.3.

For the purposes of this study, the concept of a media player will refer to any desktop or web application that is able to reproduce the different types of digital media. Specifically, we will refer to a *web-based media player* as any media player than resides on the internet and that can be accessed through a web-browser, being capable of playing back media content regardless of its stored location (i.e. either a user’s hard-disk or a remote server). Similarly, the term *media item* will depict an instance of a digital media collection; in other words, a media item will imply, for example, a single musical piece or a particular video file. In turn, a *digital music collection* will imply “A set of musical files stored in different digital formats on hard disks or memory or optical disks, audio CDs are not considered to be digital music collection in this context” (Vignoli, 2004). Finally, a *mobile music device* will refer to any portable computational object that is able to reproduce digital media content, such as an iPod or other mp3-player.

2.1.2 PlayNow™ arena

On February 2004, a service called PlayNow™ was introduced, which objective was to allow its users to preview and purchase polyphonic ringtones directly from their mobile phones. PlayNow™’s success motivated its creators to expand this service into a full media portal, converting PlayNow™ into *PlayNow™ arena* on 2007 (www.playnow-arena.com) (Sony Ericsson, 2008). This portal offers access to large amounts of digital content from the users’ desktops and mobile devices, including music, games, themes, mobile ringtones and backgrounds.



Figure 2.1: The PlayNow™ arena start page

Through the PlayNow™ arena portal users can browse for media items, preview them, purchase them, and be presented with other items that might be of their interest. PlayNow™ arena is under constant development, which keeps a large number of programmers and interaction designers occupied, working on possible improvements and upcoming features. The look of PlayNow™ arena resembles that of other popular media distribution portals, for example the iTunes store. The portal allows its customer to download digital items in different formats in order for it to be reproduced in desktop computers as well as some mobile phones.

As mentioned earlier, one of the intentions of this study in relation to PlayNow™ arena is to enhance its user experience by allowing users to playback the digital content they have purchased from this portal or obtained by other means, which consequentially will hopefully generate more loyal PlayNow™ arena users. A downside of PlayNow™ arena as it is today, is that the general public, and owners of the corresponding handsets do not see this media portal as their *musical homes*. However, PlayNow™ arena has the potential over other similar media portals of appealing to the public by being accessible not only through a computer application but also through the web or handheld devices.

Having PlayNow™ arena as the targeted product to base a media player concept on, presents both opportunities and limitations for a design task. The opportunities are the need of PlayNow™ arena customers to reproduce their digital content, to obtain it in easier ways and to have an overall good user experience. The limitations are imposed by the fact that outlandish concepts or extravagant ideas in the future looks and interactions of innovative media players cannot be considered to a full extent, since the final product has to be fit to the constraints within a realm. In other words, the suggestions for a new media player for PlayNow™ arena have to be coherent enough with the concepts that exist today, so that users are able to understand it quickly and eventually adopt it.

2.1.3 User Experience

The underlying basic motivation for this thesis, as being work done within the field of interaction design, is to provide users and music enthusiasts with a music listening experience unique from any other and appealing to their needs.

To accomplish this, a designer of user experiences has to investigate the fundamental reasoning of users and figure out what is what they ultimately want to really accomplish when interacting with a digital artifact. In this case, simply saying that *users' intentions when interacting with a digital music player is to listen to music* is fundamentally wrong. Users do not just want to *listen to music*, but rather they want to *enjoy a certain feeling*; they want to *be entertained* while performing another activity; they would like to *avoid feeling lonely* by playing a song on the background; they want to *express an identity* by sharing their musical preferences; they would like to *free themselves from existing worries* by dancing to music at a party; etc.

The term *user experience* is in itself hard to define, and a full deliberation of what a good user experience may entail is beyond the scope of this thesis work. The reader can refer to the works of Roto (2006) who gives an extensive account of the concept of user experience and its related topics. However, there are some important factors worth mentioning. For one, it is known that the experience of a user while interacting with a digital product can rarely be studied in isolation, since there are multiple external factors that might contribute to the overall experience (Isomursu et al., 2004). Unfortunately, it is practically impossible to account for all of these possible influencing factors. Also, it is worth considering that the experience of a user is often related to the user's expectations of the results of an activity. Moreover, Roto (2006) claims that in using the word

user in front of *experience* implies that a person is actively using a product or a system rather than just witnessing it as an observer. “When the experience comes from the context itself, we should talk about plain ‘experience’. For instance, viewing a beautiful landscape does not provide a *user experience*,... but it provides an *experience*” (Roto, 2006). Finally, it might be good to recognize that the experience of an individual while interacting with a product can be created, in part, by a wide variety of emotions, but also an experience can in turn provoke emotions in an individual. In other words, emotions are experienced, in the sense that they are elicited from the engagement on an activity or the exposure to an event, but emotions also form part of an experience (Angulo, 2007).

For the purpose of this thesis, the term *user experience* will refer to the quality of the interaction of a user with a specific design of an artifact occurring under a certain context and while the user is engaging in an activity (or number of activities).

In general, capturing these experiences of people while they listen to music is a big challenge. Naturalistic observations might have to be made in order to obtain an idea of how people interact with existing media players and the situations that motivate them to listen to music in the first place. Conventional questionnaires or standard structured interviews might not be sufficient to capture the purity of those instances and their experience of music listening, but they might be useful to complement the information obtained from the ethnographic studies. Isomursu et al. (2004) have acknowledged the challenge of capturing the actual experience of users: “We faced problems in capturing information about the factors affecting the user experience in the field setting. We were especially interested in the feelings, emotions and subjective opinions of the users when they used the applications. With traditional methods this kind of information was hard to get”.

PlayNow™ arena’s UX

The creators of PlayNow™ arena have constantly advocated towards the improvement of user experiences on their mobile products. Rikko Sakaguchi, CVP and Head of Creation and Development, has claimed that they are “committed to providing its customers with rich, open content environment to make their mobile experience more enjoyable and entertaining” (Sony Ericsson, 2007). However, some phone manufacturers still have to match the innovativeness of the Apple Corporation, which has been regarded by many as a leader in creating satisfactory user experiences.

The eventual goal of this thesis is to help the stakeholders involved in the creation of PlayNow™ arena and its partners to realize their vision of providing their customers with a unique user experience through this digital media content portal.

2.2 Related Research

Plenty of research has been done around the concept of digital music and the activity of listening to music, since it is a very practiced and enjoyed activity by people from all cultural backgrounds, ages and genders. Different ways of retrieving music, playing it, visualizing it and manipulating it have been explored by many researchers around the world. Frequent research seminars, workshops and conferences are held by knowledgeable experts to discuss the topic of music and digital media. The following sections will introduce a short overview of some of the research that has been done surrounding this notorious topic. In particular, we will explore relevant research stud-

ies that might contribute to the later stages of the inquiry presented here, such as the social music practices, people’s relations to music and media, the effects of music on emotions and memory, systems that manipulate digital music, explorative media player interfaces and some others.

2.2.1 People’s Music Practices

The way people relate to music and how they actually reproduce it is of crucial importance for this research work. It is in our interest to discover the underlying motivations for people’s preferences in media players and the attributes that make them feel *comfortable* within a digital media environment.



Figure 2.2: Proposed interface based on the requirements found by Vignoli (2004).

Research done at Hewlett-Packard has tried to unveil people’s behaviors towards music and the transition into the use of new digital media (Brown et al., 2001b). Researchers asked themselves questions such as ‘*Where do people listen to music?*’, ‘*With whom?*’, ‘*What other activities take place while a person is listening to music?*’, ‘*How is music acquired?*’, etc., and tried to answer them by carrying out in-depth interviews with 36 music enthusiast. Although their intention of finding people’s behaviors towards music was beneficial, their obtained data carries with it the inherit drawbacks of the *interview* method, since it is very challenging to capture the real practices of people when engaging in the activity of music listening outside its context. Researchers found that their participants discovered new music mostly through their network of physical friends and through radio and television, and that Internet did not play an important

role at discovering music. However, this might have dramatically changed in the recent years, and it could be argued that most people nowadays discover new music by some form of Internet medium.

Perhaps, more interestingly for the purpose of this study are Brown et al. (2001b) findings corresponding to their participant’s music listening habits. They found that the most popular place to listen to music was while traveling by car, followed by hanging out in their living room and being at work. The reason for this was that music listening can be flexibly combined with other routinary tasks. Listening to music then, becomes a secondary endeavor that allows a person to put a stronger focus on a primary activity. Moreover, listening to music played an important role at enhancing or changing people’s moods, as has also been shown by Clynes (1986).

Cunningham et al. (2006) has investigated the ways people create playlists and the motivations behind their choice of songs. They discovered that “a playlist may be created to reflect a particular mood or emotion in the creator, such as depression, angst, or cheerfulness.” They also observed that the length of a created playlist correlates with the activity in which the creator will be engaging in. For example, if a person has to study for an exam, she will tend to choose songs that match the length of her study session. The type of music selected for a playlist is also related to the activity or event for what it is made up. In fact, according to Cunningham et al. (2006), people seem to choose songs for creating a particular playlist based on the *genre*, *style* and *performing artist*, as well as the activity in which it will be heard. Moreover, people are more likely to invest more time and effort on creating a playlist when they expect to reuse it in the future, and when they listen to it they generally set it on shuffle (Cunningham et al., 2006).

Vignoli (2004) has explored the way music listeners organize and access their large personal digital music collections. He emphasizes the importance of using the attributes embedded in digital music files. “Some of these attributes (catalogue metadata), such as *artist-name*, *album-name*, *song-name*, are well known and widely used. Others, less common, are related to intrinsic characteristics of songs such as *tempo*, *rhythm* and *timbre*. Others, such as *listening frequencies* and *preferences* are dependent on users’ behavior” (Vignoli, 2004). His findings indicate that most music listeners tend to structure their music based on *artists name*, *album name*, *song* or *genre*. Participants of this study expressed their interest in album cover art as strong search cues when trying to locate an item within a collection. Vignoli (2004) observed that the attribute of *genre* is frequently used as an organization, retrieval and discovery method; however, it is a very subjective attribute that depends on the judgment of the listener, thus *artist name* becomes a more reliable attribute. For the purpose of browsing and selection of music media items, the researcher found that participants used the attributes of *mood*, *situation* or *activity*, which may have important implications for the future of media players. Vignoli (2004) proposes a set of requirements to incorporate into the design of a media player application, and proposed an interface according to these requirements, shown in Figure 2.2. These include:

- Allowing the selection of music according to *moods* and *periods of time*;
- Presenting music collections according to *Artist-album-song* and then *genre* to a lesser extent;
- Presenting the user with music items similar to the one currently selected;
- Collecting information that enables the user to easily play recently acquired songs, frequently played songs, and last played songs;
- Provide an easy and effective way of creating playlists.

2.2.2 Social Music Practices

Music, in its nature, is a social form of personal expression and human communication. An artist creates a song to share her feelings, opinions and ideas with her audiences. A song is actually capable of influencing the behavior of an individual or of large groups of people (Brown & Volgsten, 2006). Musical preferences can bring people together in friendship or initiate constructive debates. Music has the power of establishing and maintaining social bonds among people (Vaida et al., 2006). In general, people tend to identify themselves with certain musical genres and share that identity with others through musical expressions.

The iTunes’ media player was one of the first to exploit the tendency of people to convey their identities through their preferences in music by allowing a user to share her whole music library or individual playlists with other iTunes users within the same local network. Social media networks such as Last.fm, Pandora.com or imeem.com also allowed people to share their musical preferences as well as their opinions of musical items or categories. Now, with the release of Spotify and its similar capability of sharing a selection of music items with others through web-links, a new way of sharing musical preferences is rapidly emerging.

Vaida et al. (2006) have explored the social practices of people in a corporation when sharing their music libraries through their local network. They observed participants creating their own playlists and browsing through the playlists of others using iTunes, and noticed the desire of participants to be able to create a playlist based on the media items contained in other people’s

playlists. They found that people tend to become consciously aware of the music they choose to share with others, since they want their colleagues to perceive them in a certain way. The researchers conclude that “music sharing is a quickly moving target for research. It is propelled by technical innovations and political, legal, and ethical considerations.” (Volda et al., 2006)

Other researchers have explored the way people create music *mixes* meant to give away as presents (Cunningham et al., 2006). They found that, sometimes when creating a mixed selection of music, usually delivered within a CD, a person’s intention is to convey a meaning for a certain other. For example, a lover might spend hours choosing a collection of romantic songs for the woman he likes hoping that their lyrics will communicate a message of love to this woman. The researchers observed that the activity of creating a playlist or a mix of songs can take considerable lengths of time, and that playlist creators need support for deciding which songs might fit their mix depending on the rhythm of the accompanying songs and the message to be conveyed through the mix.

2.2.3 Music and Emotions

The effect that music has in influencing our emotions and in helping us recall memories has been long recognized and vastly studied, nevertheless still mysterious. Juslin & Sloboda (2001), for example, have studied the way music affects an individual’s emotions with the use of the *Experience Sampling Method*. Vaidya (2004) states that “the tremendous ability that music has to affect and manipulate emotions and the brain is undeniable, and yet largely inexplicable”. She recognizes how pieces of music are very subjective, in the sense that it could elicit the strongest of emotions in one person while having no meaning whatsoever for someone else. She also acknowledges how the emotions created by musical pieces might be connected to past memories and affected by the environment in which it is listened, by the mood and culture of the listener, and by many other uncountable factors.

Other research has tried to study the correlations between types of music and the emotions they might create (Leutwyler, 2001; The Economist, 2000), claiming that fast tempos and high pitches are elicitors of happiness, whereas minor keys and slow tempos are related to sadness; also fast tempos together with dissonances can create feelings of fear.

It has also been shown that music has the power of fortifying our experiences while we are engaging in an activity (Brown & Volgsten, 2006). For example, consider watching an adventure film without the music score. The strength of the film watching experience wouldn’t be as strong, and what the director of the film would like to convey wouldn’t be perceived by the audience in the same way.

Another interesting characteristic of music melodies is their capability of making their listeners to “vividly remember previous relevant episodes of their lives and recall emotionally lived experiences; a previous loved one might be remembered by listening to a certain song, or last year’s summer holidays might be brought to life when a tune from that time is played again” (Angulo, 2007). None known commercial technology has yet taken advantage of this attribute of music, and enhancing a media player with a feature that brings back pleasant memories might be well appreciated by its users. Within the research community, Goto & Goto (2005) recognize that music that we heard at a particular point in time, under a particular context can be emotionally attached to us and bring us back memories at a later time. The researchers took action into prototyping this *time machine* feature into their own media player, claiming that the function records the actions performed by the users so that they can come back to previous enjoyable sessions and to make it easier to create playlists on the present.

Finally, Loviscach & Oswald (2008) have also attempted to develop a system that tags musical media files according to the mood of the user through sensors, user's feedback or from the state of a computer application.

2.2.4 Music Discovery and Recommender Systems

A large amount of recent research has focused on different methods and techniques to present users with options of songs or other media items that might appeal their interests. Many systems and businesses have taken advantage of these techniques to provide users with a better experience while at the same time creating revenue. A good example is *Amazon.com*, which has been successful at recommending its visitor with similar items to the ones they seem to be interested in and luring them into buying more by offering attractive prices.

Some examples of studies done in the technical and commercial aspects of Recommender Systems are given by Burke (2002); Towle & Quinn (2000); Resnick & Varian (1997); Schafer et al. (1999); Herlocker et al. (2004). Some of the research done on music discovery and recommender systems with relation to digital media can be observed in the works done by Knees et al. (2007); Pampalk & Goto (2006, 2007).

The web service *Musiccovery.com* is also a good example of an application that allows the user to discover new music through the different mood that a song might represent. The user does not pick an artist or a particular song, but rather the mood/tempo (Energetic, Dark, Positive or Calm), genres and year range of the type of music that she would like to hear. The service then starts playing a particular song with such characteristics and displays a path of songs that are related and might be of the user's interest.

2.2.5 Musical Visualization and Organization

Some researchers have focused their efforts on proposing new ways for organizing digital media files and let the user visualize them in more practical and effective ways. Examples of this include the works of Leitich & Topf (2007), which propose visualizing music collections with the use of a Geographic Information Systems. They correctly state that in most "commercially available media playback applications, the textual playlist is still the most prominent kind of library representation that the user has to deal with" (Leitich & Topf, 2007). This service was named *Globe of Music* and had the intention of letting users explore large music collections organized through a sphere-like shape. Their user tests showed that users found it easy to locate a specific song by remember the related artwork, and researchers claimed that participants stated their interests in visualizing data in this way.

Another example of music visualization is provided by Yoshii & Goto (2005). They provided a way to create thumbnails with different colors representing a song's rhythm based on mathematical formulas. Their intention was to allow users to guess the contents of an audio file without the need of reproducing it. This way, users can easily organize music collections based on the rhythm of each song without having to hear each song.

Finally, the web-based service *Musiccovery.com* mentioned above, organizes similar songs as a *music path*. The user can see how much a song is related to the next by the link that connects them and their proximity to each other. Also, this services uses colors to represent the genre of a song, and shapes to represents its mood, which provides users with an easy way of identifying the

type of certain pieces of music.

Other examples of suggestions to visualize and organize music are provided by Chen & Butz (2009), Tzanetakis & Cook (2002), van Gulik & Vignoli (2005) and others.

2.2.6 Media Player Interfaces and UX

Vignoli (2004) has noticed that current media player interfaces usually adopt two main browsing concepts: *view-based* or *association-based*. The view-based approach allows users to view and select a particular set of songs according to one or more parameters. The association-based approach is built upon recommender-systems, whereby the player offers similar songs to the one selected initially by the user, thus requiring little effort from the user, but taking away the control.

Most popular media players today concentrate on reproducing a particular media item or a collection of media items in a sequence. Goto & Goto (2005) expressed the existing media players' interfaces in terms of what questions users ask themselves when interacting with these players. For instance, media players today allow users to ask themselves the question "I want to hear this particular musical piece" or "I want to hear this particular musical pieces in a sequential or random order". However they do let the users ask themselves questions like "I want to hear something" or "I want to hear something my way" (Goto & Goto, 2005). Based on this, the researchers from the National Institute of Advanced Industrial Science and Technology (AIST) have prototyped a media player with a variety of innovative features, which they called *Musicream*. According to Goto & Goto (2005), *Musicream* is a novel music-listening environment that allows users to peruse and select music pieces as they flow one after the other, also permits the user attach similar musical pieces together and rearrange musical pieces to try out different playback orders.

Other researchers have proposed more tangible user interfaces for the browsing and playback of digital music, such as Pampalk & Goto (2007) with the concept of *MusicSun*, and Graham & Hull (2008) with *iCandy*.

2.3 Popular Media Players

As shown earlier in this chapter, listening to music has been an activity done daily by almost everyone all around the world during the course of several centuries. It is a topic that is being widely study by researchers and a hobby that people is enjoying in new different ways due to technological advances. Nowadays, listening to music or watching videos with the user of a portable electronic device or through a desktop computer is an activity done by a surprisingly large amount of people.

According to Nielsen NetRatings the three most popular media players in 2006 were iTunes, Windows Media Player and RealPlayer (Nielsen Ratings, 2006). Recently the demand for access to music has made newer media players and web-based music services have come to the market and become relatively competitive. Some worth mentioning modern applications include *Spotify.com*, *Grooveshark* and *Songbird.com*. There are many other media players out there used by a variety of people, each of these having its benefits and drawbacks, and each providing a different user experience through their different interfaces.

The following sections present a brief description of some of the popular media players that are competitive in the market today. The intention is to portray the media players' most general

Despite its substantial progress from its initial versions in 1991, Windows Media Player seems to be not very appealing from a usability point of view. However, it still remains one of the most popular media players out there, perhaps because it is the default media player of the most distributed operating system of our time. In fact, according to Nielsen Ratings (2006), Windows Media Player was the media player with most unique users as of 2006, amounting to 80% of all media player users.



Figure 2.4: Windows Media Player's list view.

Spotify



Figure 2.5: Spotify's home view.

“Spotify is a proprietary peer-to-peer streaming music program that allows instant listening to specific tracks or albums with almost no buffering delay.” (Wikipedia, 2009d). It was conceptualized by a team located in Stockholm, Sweden, with the idea of providing the public with a vast collection of musical content by streaming it through the internet. At least 6 billion musical items can be accessed freely through Spotify, even though some popular music labels and bands (such as Metallica, Pink Floyd, AC/DC, etc.) have so far refused the right to be played by this program

(Wikipedia, 2009d). Spotify's profit is partly based on advertisements that are played in between songs, interfering in a way with the user's musical experience.

Currently, Spotify is available as an application that needs to be installed in a desktop computer, and it will be soon released as a mobile application on popular handsets (Wikipedia, 2009d). It is fairly obvious that its look-and-feel in the desktop computer tries to imitate to some extent the iTunes's interface, although with lesser ways of visualizing the media items and fewer native features. This player offers a *Radio* function that lets the users select musical genres of their taste and the years in which songs were release in order to create an automatic playlist for the users to listen by simply pressing the play button. However, some few trials of this radio function were not very satisfactory and it still needs to be refined. Also, up to now Spotify does not have an advanced recommender system or a practical way to let its user discover new musical pieces.

Despite its few constrains, Spotify has managed to capture the attention of the general public through creative advertisement and wise marketing. Even though, similar streaming services already exist on the internet, such as listen.Grooveshark.com or Dezzer.com they have not received the attention that Spotify has obtained, at least in the country of Sweden. There seems to be a tendency from the general public of moving away from conventional media players into using Spotify because of the ability to access any song from a large musical collection.

Grooveshark

Grooveshark is a web-based media player developed with Adobe's Flash and which interface is not an imitation of most of the other media players out there. Its entry point is an almost blank

page with a noticeable search bar in the middle of the screen, with the assumption that users' primary action when listening to music will be to start searching for songs, artist, albums, genres, etc. It also has a few relevant links at the bottom that could be of interest to the user, such as a section to favorites and popular music as well as recently played songs.

Grooveshark stands out from its closer competitors, such as Pandora.com or Last.fm, by offering its user the possibility to keep a history of played songs, as well as creating and saving playlists and embedding them into external web-pages. Much as its competing services, Grooveshark too has a recommender system which proposes its user songs that might be of their interest and allows them to be tagged to find the user's particular preferences, but it does not allow the creation of *stations* as does Pandora.com. In order to save playlists and review the history of played items, a subscription is needed, but it can be done swiftly and without entering too much personal information. Another advantage of Grooveshark is that it does not have any legal access restrictions, whereas some similar services can only be accessed mostly through the U.S.

Some see Grooveshark as an “interesting alternative to Spotify”, since it has less restrictions, is free of charge, it has no in-between advertisements, and has some extra features such as social networking. Deezer.com and imeem.com are two other music streaming services that offer access to large collection of digital music. However, Grooveshark was seen as a more innovative and competitive alternative and chosen to be studied more in detailed for this inquiry.



Figure 2.6: GrooveShark's home view.

Media Go™

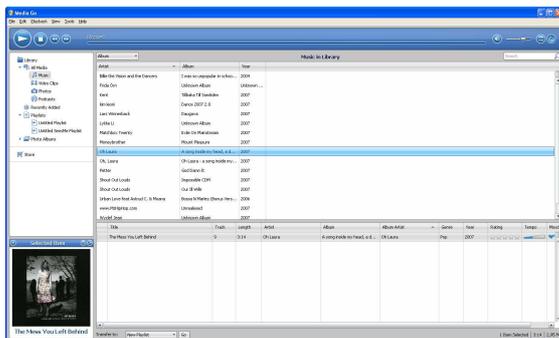


Figure 2.7: Media Go™'s music album view.

Media Go™ is a recently released media player from a major mobile phone manufacturer. Its intention is to be released bundled with the one of their mobile phones (Sony Ericsson, 2009). This first version of the multimedia management software is a first attempt to provide customers with a way of reproducing the media content stored in their computer and to attract them into purchasing digital media from the PlayNow™ arena media store.

Its interface might seem rather uncomplicated at first glance, but some usability issues are revealed after a short time, although some

good features can be also observed. It is noticeable that the design of the main layout had the intention of imitating iTunes' interface to some extent. As in iTunes, a Library panel is found on the left side listing the sections for different kinds of media (Music, Audio Clips, Video Clips, Photos, Podcasts and Other), but contrary to iTunes, Media Go™ has a listing for “All Media” which shows all available media items in a device. Presenting information in this way is more of a burden than a feature, since the view appears cluttered, disorganized, and it is hard to distinguish between the different types of media; besides, it is uncommon that a user will want to browse to a collection of mixed media items.

The media player attempts to synchronize the music in the user's library with the handheld device automatically. Although the intention is novel, it does not work a hundred percent perfectly. It is often the case that the user's library in the desktop is much larger than what a mobile device can store, and thus unreasonable to try to synchronize the whole library with the device. What is worse, the media player won't give up on the first attempt to synchronize all media, and will repeatedly present an error notification that soon becomes annoying. It is not obvious either how such automatic synchronization can be stopped, neither how can it be restarted if it doesn't start automatically. What's more, it takes a considerable amount of time to disconnect the device from the media center, probably more time than a standard user is willing to tolerate.

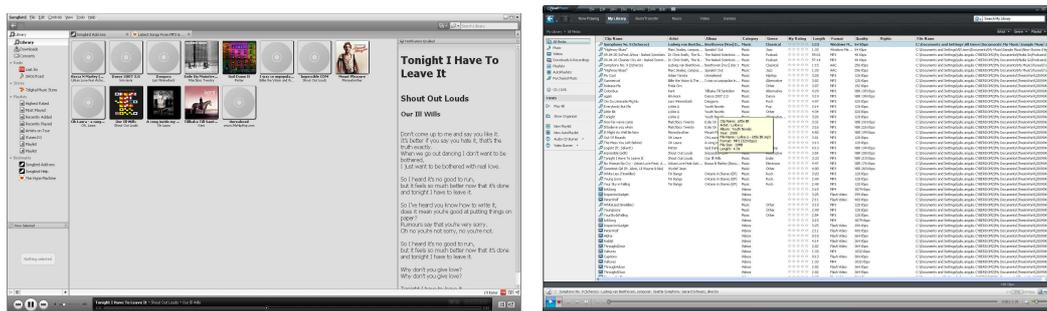
Even though this media player is in its early stages, it still has a long way to go in order to make the product competitive and to achieve their objective of providing its customers with a media environment with which they identify and feel comfortable using.

Other Players

Among the rest of the various media players out in the world today, it could be valuable to mention *RealPlayer* and *Songbird*.

RealPlayer used to be one of the most popular media players until just a couple of years ago. It has a similar appearance to Windows Media Player, but its need for advertising and presenting commercial media often makes it look cluttered and overwhelming. For these and other reasons this player has been suffering a lost of popularity since the release of iTunes in 2001 and it seems to be used very sparsely nowadays.

Songbird, on the other hand, is an open source media player that seems to be enjoying a steady rise in popularity. Although originally intended to work for Linux platforms, it is now also available for Mac OS and Windows. It has a simple web-browser embedded which allows users to navigate to music portals and other web-pages. A big advantage of this player seems to be the capability of integrating add-ons, such as a side-bar to display lyrics or guitar chords for the song been played, or to add support for Last.fm scrobbling. Being open-source lets the community of developers contribute to the project and modify the player to some extent in order to fit their needs or the potential needs and desires of others.



(a) Songbird

(b) RealPlayer

Figure 2.8: Two other media players.

Songbirds' original look-and-feel is also similar to iTunes' interface. However, the ability of navigating through tabs makes it fundamentally different from Apple's media player. Also, although embedded with potentially attractive features, it might not always be completely user friendly, which is a hard balance to accomplish. Nevertheless this media player appears to be on the right track and has the potential of increasing its popularity if steered in the right directions.

Besides Songbird, there are other media players that can be regarded as popular and competitive within the Linux environment, but that will not be discussed within this research study. Some of these include *Amarok*, *Banshee*, *Rhythmbox*, and *Foobar*.

Yet other media players in the market, allow users to choose media items according to the *mood* and the *tempo* (Vignoli, 2004). One of these players bases the *mood* attribute of each media item on information obtained from a community of users. This method for assigning information to media files could bring implication for obtaining a consensus on the other subjective attributes (i.e. metadata) of media items, such as *genre*, *popularity*, and perhaps even *lyrics*, *music chords* or *moods*

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As can be observed, there are plenty of research studies surrounding music or other digital media and the way people use it, share it, interact with it and embrace it. In particular interest for this study, is the work that has been done in the design of innovative media players or the features that can be contained within a media player that the user might find valuable, effective and exciting. However, despite the extensive research that has been done in this domain, very little, or none, seems to actually be applied into the implementation of successful consumer products.

This thesis work presents the opportunity to gather the most relevant pieces of recent research concerning the use of digital media and come up with a concept that might actually be integrated into a real product. In other words, the design of a media player suggested by this thesis might be considered valuable to stakeholders who have the power to make it a reality by associating it to the existing PlayNow™ Arena media portal.

Chapter 3

Theoretical Foundations

The previous chapter clarified the concepts that are used throughout this thesis and presented some of the research done in the fields of digital media and the user interface of different media players. In this chapter we present the theories and approaches that will create the framework for analyzing the results from user observations and the bases for comparison of existing media player's interfaces (presented in Chapter 5).

The following few sections will present two theoretical approaches to research that will be adopted in this thesis work, phenomenology and social constructivism, as well as some of the principles of interaction design that have been proposed by experts on the field and that have been claimed successful in the design of digital systems. These theories and principles will be the bases towards forming an investigative model, which will be the approach to follow during the desing process.

3.1 Social Research Theories

3.1.1 Phenomenology

“ Phenomenology is basically a philosophical stance which recognizes the detachment of the sciences from practical human concerns. Therefore, its goal is to reroute scientific practices in order to provide more practical applications, useful for the real world. Edmund Husserl, a German philosopher recognized as the founder of phenomenology, proposed the term as an attempt to capture the essence of experiences by looking intuitively at phenomena around us, aiming at exploring the way humans experience their context (Wikipedia, 2009b). Phenomenology is also concerned with defining meaning, arguing that we act upon a world filled with it. Paul Dourish is a believer of the role of context in the design of new technologies from a phenomenological perspective. In several of his articles he recognizes the importance of context and proposes concepts and models that might lead to a better understanding of what context actually represents. In his book, Where the action is: The foundations of embodied interaction, Dourish (2004) provides an extensive set of terminology, measures and guidelines to be followed in the course of designing new ways of interacting with new technology by exploring the concept of embodied interactions. His approach is intensely social, concerned mainly with how people act

upon the world and the relevance of the situations and different contexts in which these actions take place. By understanding that technology and social actions can interact in different situations, it is possible to understand how the design of technology and the features of everyday social action are actually related” (Angulo, 2007).

Designing for the activity of music listening should take Dourish’s relevant insights into consideration. Music listening is an action that is done under a variety of different contexts and has a number of different purposes. Technological artifacts that aim at supporting this activity should consider, for example, that people often engage in another primary task while listening to music on the background. Thus, in some occasions the interface of a media player acts just as an entry point for the beginning of the activity, in which the user mainly wants to start playing a set of media items and be able to focus her attention in the other primary task. However, the interface of a media player should not only support the music listening activity, but also some other related activities, such as music browsing or music discovery. In these other activities the user is willing to spend some time interacting with a media interface until her needs are fulfilled or the interest is lost.

Dourish (2004) also explains the concept of *technomethodology*, which is in turn derived from the concept of ethnomethodology. Technomethodology refers to the use of sociological methods to study and understand the practices of individuals within a society. According to Dourish (2004), *Ethnomethodology* takes a step further than the simple practices of observational ethnography and urges the researcher to engage herself in the daily and routinary activities of others, and performing these activities as to become one of them in order to understand their common sense behind the rationale of their everyday behavior. “By performing ethnomethodological studies the researcher might be able to have a better perception of the context of the particular situations in which those certain users are operating; in this way, context can become, in some sense, articulated and explained. Consequently, technomethodology takes the fundamental principles of ethnomethodology to apply them in the general design of interactive systems” (Angulo, 2007). Studying people’s practices under their natural environment while interacting with an application that enables them to browse, discover, visualize and reproduce music is not an easy task because of the intrinsic nature of the activity. It could even be considered in many instances an *intimate* activity, for which Dourish’s proposals of performing ethnomethodological observations might not fully apply, since it becomes hard, and perhaps even unethical, to observe research subjects while they engage in an intimate activity. However, there are many occasions in which this same activity is social, public or unrestricted, for which ethnomethodology can bring fruitful insights in the way people relate to the interface of a media player application and the activities surrounding digital media.

3.1.2 Social Constructivism

In his book “Qualitative Inquiry & Research Design: Choosing among five different approaches” Creswell (1997) suggests different paradigms or lenses from which a researcher could approach a study. Due to the nature of the inquiry presented hereby, the *Social constructivism* paradigm suggested by Creswell might be suitable to obtain valuable information from research participants.

According to Creswell (1997), social constructivism refers to a view of the world in which individuals seek to understand the world in which they evolve. Researchers rely on the participant’s view of the situation to try to find the essential truth. Participants are not simply born with these views of their world, but rather, they are constructed through their past experiences and interaction with other people and artifacts over time. For example, an average person nowadays

who is used to listen to music through a media player in his desktop computer initiated at some point an interaction with this media player. This person might have liked the experience of using this particular application and was able to learn it over time. Her view of digital music is in some way formed through her experience interacting with this and other media players. The goal of a researcher would be to understand how people relate to digital music and media players from the point of view of this person and some others under study.

Creswell (1997) states researchers following the social constructivism paradigm often talk about the *processes* taking place with the multiple interactions constantly occurring in the daily life of an individual. They tried to concentrate on the context in which people evolve in order to understand their background, their way of thinking and their behavior. Under the context of this study, all this factors can help us understand the regular practices of people while listening to music and also the way people identify themselves with particular musical rhythms.

In turn, researchers are aware that their own culture and background could influence their interpretation of the results. In general, researchers try to interpret the meaning of the world from the participants' perspectives.

3.2 Interaction Design Principles

3.2.1 Qualities of Digital Artifacts

When designing for computer interfaces a designer usually looks for certain characteristics that will hopefully endow the interface with a good user experience. Through their years of experience as design theory researchers, Löwgren & Stolterman (2004) have recognized some of these *qualities* contained within digital artifacts that have rendered them successful from a user's point of view. They have formulated a model of 'use qualities' grouped together into different dimensions along a plane, as shown in Figure 3.1.

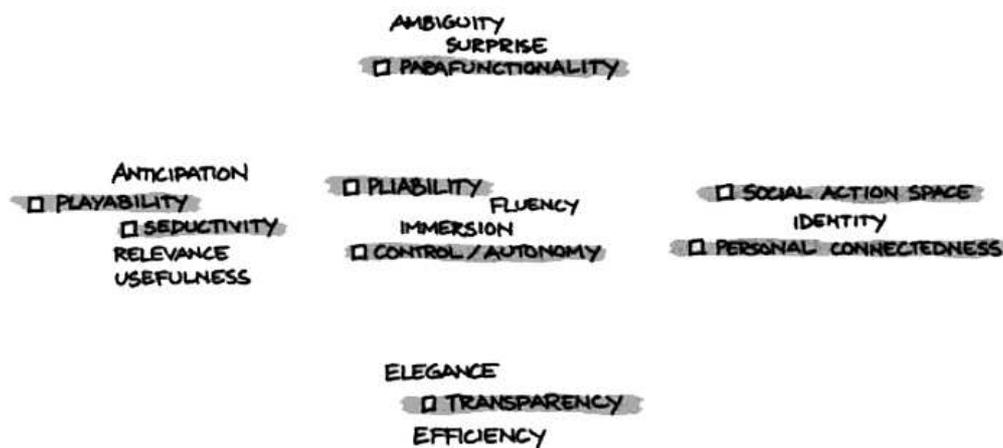


Figure 3.1: A map of the use qualities proposed by Löwgren & Stolterman (2004).

The qualities suggested here are grouped by *motivation* (Playability, Seductivity), *handling and perception of the digital artifact* (Pliability, Control/Autonomy), *user's interactions* (Social Action Space, Personal Connectedness), *structural qualities* (Transparency, Elegance), and *user's creation of meaning* (Ambiguity, Parafunctionality). Some of these suggested qualities taken from

Löwgren & Stolterman (2004) could bring value to the possible design of a media player, and will be summarized briefly in the following paragraphs.

Social Action Space: Every designed product has the intention of affecting the way people act within their environment. Usually, designs are consciously made to facilitate or change people's actions; however, it is often the case when a design is used in different ways than the designer initially intended. The 'future social activities around the new artifact' are hard to predict and control by the designer.

Transparency: A transparent design is a design in which the user can actually see the details of the artifact as it is working. The processes occurring behind the artifact are visible, which leads to a better understanding of the artifact's implications and ways in which it can be changed. "An *opaque* design yields a smaller action space but greater degrees of security and control for the users, whereas a more transparent artifact is more flexible for the users but at higher risks" (Löwgren & Stolterman, 2004).

Personal Connectedness: Humans have an innate need for relating with other human beings, and the demand for technology that permits them to achieve this communication, such as telephones, instant messaging applications and video conferencing tools, is proof of this need for connectedness. Löwgren & Stolterman (2004) claim that "whenever a digital artifact is designed, the designer will affect the degree of connectedness among people as well as between people and artifacts, whether intentionally or unintentionally."

Tight Coupling and Pliability: Some good designs are able to shorten the theoretical distances between users intentions, users actions and the consequences of those actions. Users appreciate interfaces that react as soon as they act on them, and they tend to get easily frustrated if a system makes them wait without giving any indication that their actions have been acknowledged. Löwgren & Stolterman (2004) refer to the quality of pliability to the feeling of being able to manipulate a piece of information in an almost tactile sense, since it is immediately responsive and easily processed.

Control vs. Autonomy: Each design is a tradeoff between the level of control that a user is allowed to have and the autonomy of the system. An autonomous system is an artifact that acts on its own according to some predefined rules accessible to it. On the other hand, a system with high degrees of control, acts more like a tool to aid the user, but not to take over her choices (Löwgren & Stolterman, 2004). High degrees of control are not necessarily beneficial for all digital artifacts, and the designer should consider the level of autonomy and control a user would be allowed to have depending on the situation and the context for interaction. Related to this quality, there are two spectrums that could be considered when designing a digital artifact: *proactive* vs. *reactive* use. A proactive design provides the user with as much information as possible from the moment the interaction starts, and offers ways to manipulate and access such information. A reactive approach is the opposite, where the user is given with little information and the means to explore it on her own.

Playability and Seductivity: Löwgren & Stolterman (2004) acknowledge that not all systems have the purpose of saving time to the user; games, for example, are designed to spend the user's time. The initial motivations for a user to interact with a system that is supposed to provide her with entertainment are basically intrinsic. She interacts with such a system because she wants to, not because she is forced to. Also, a system designed for entertainment should offer the user some degree of novelty and surprise, something that is appealing to her senses. A seductive system is also a system that provokes some kind of emotional response in the users. This emotion does not necessarily have to be always a positive one, but it has to make the user feel, in some sense, *alive*. For instance, an application that displays photos might make the user feel nostalgic or sad over

the memories that those photos generate, which should not be seen by any means as a bad user experience. For this reason, it could be argued that the quality of *emotionality* could be introduced into the model proposed by Löwgren & Stolterman (2004).

3.2.2 Principles and Guidelines of Good Design

Besides the use qualities of digital artifacts just presented above, there are many known *principles* or guidelines that other experts of the field of Human-Computer Interaction have recognized as valuable characteristics of the design of useful technology. A large number of these principles are described by Lidwell et al. (2003) in the book *Universal Principles of Design*, as well as represented in the heuristics for interface design proposed by Nielsen & Mack (1994). While it is impractical and inconvenient to describe all these principles here, a few of these were found particularly relevant for the design of the interface of a media player, since they provide the bases for a cohesive user experience. These include the following five principles listed below:

Visibility: Visibility is an important characteristic of useful interfaces with valuable features. “According to the principle of visibility, systems are more usable when they clearly indicate their status, the possible actions that can be performed and the consequences of the actions once performed” (Lidwell et al., 2003). It does not matter if a program provides the best functions that are able to satisfy all the needs and wishes of the users as long as the program doesn’t make those functions visible. In other words, an interface should have the essential features easily accessible and noticeable in order to be valuable for its users.

However, the principle of visibility is not always easy to apply. A designer might want to make every important aspect of the interface visible at all times, which results in a crowded and overwhelming look, and breaks the principle of visibility itself. Careful planning must be done in order to make visible the features of the interface that allow for most common user actions.

Consistency: Consistency throughout the different displays and elements of an interface is a well recognized design principle. “According to the principle of consistency, systems are more usable and learnable when similar parts are expressed in similar ways. Consistency enables people to efficiently transfer knowledge to new context, learn new things quickly, and focus attention on relevant aspects of the task” (Lidwell et al., 2003). “Users should not have to wonder whether different words, situations, or actions mean the same thing” (Nielsen & Mack, 1994).

It has been shown that consistent interfaces provide an increase of 10 to 25% speed up in user’s performance (Mahajan & Shneiderman, 1997). Richter et al. (2006) have also recognized the importance of spanning consistency not only within an application, but also across the interfaces provided by different devices, since these days users tend to change displays as they move across different contexts. This has particularly important implications for the design of media players that may be accessed from the internet, from a handheld device and/or from a desktop computer.

Accessibility: According to Lidwell et al. (2003), an artifact should be designed to be usable by as many people as possible. Although this might not apply to all design cases, especially when the ultimate goal might be to make profit, it is important that users do not have a feeling of exclusion.

Feedback: In the real world, things and object always react when an action is applied to them. Computer interfaces should behave in similar ways. The idea of providing feedback to the user of computer systems is often related to prompt the user with error messages when something goes wrong. However, feedback in the context of interaction design refers to letting the user know the system’s reactions to a user’s actions whenever appropriate. In the case these reactions are

errors, they “should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution” (Nielsen & Mack, 1994). Feedback can also be in the form of transition effects or other visual indications that let the user know the system has reacted to her input.

Fitts’ Law: Fitts’ Law states that the bigger and closer the target to be selected the easier and faster it will be to point at it (Murata et al., 1999). This concept has been adopted by the field of computing and design when considering the layout of interfaces. Designers of interaction are often advised to make important controls bigger, place related controls nearby and unused controls smaller and far away.

3.3 Conceived Investigation Model

Having looked at the approaches of research proposed by phenomenology and social constructivism, as well as the principles for design and interaction, it is sensible at this point to postulate an investigational framework for basing the user studies and the design concepts that will be carried out in the next stages of this research inquiry.

As has been mentioned earlier, the purpose of this work is to study the practices of people while engaging in some form of interaction with digital media in order to propose a design for an interface of a digital media player that is able to provide visitors to PlayNow™ arena with a gratifying user experience and that makes them want to embrace this portal as their preferred site to acquire and reproduce digital content. Therefore, this thesis work can be seen as being divided into two general processes or stages, as is the case with many other design tasks. These stages can be seen in Figure 3.2.

The first consists on gathering relevant information from different sources that will provide us with sufficient knowledge in order to inform the later stage of proposing design concepts for a digital media player. As shown in Figure 3.2, the different sources include: literary reviews on relevant research related to the topic of digital media, user studies consisting on interviews and ethnography methods, and evaluation of existing media players according to interaction design principles and qualities of digital artifacts. In order to obtain such information, different investigative methods will be used, which will be explained in Chapter 4.

The second stage involves presenting a series of design proposals via sketches and mock-ups of a media player tailored for PlayNow™ arena. The design of these proposals will be grounded on the findings of the first stage. The use of the *Personas* design method, explained in section 4.3, will be employed to support and communicate some of the design decisions. Finally, an iterative approach to design will be followed, requesting the participation and feedback of potential users and design experts in order to continuously improve the initially proposed design concepts.

Figure 3.2 visually describes these two stages, namely the *Data Collection & Analysis* stage and the *Concept Design & Evaluation* stage. Under the first stage, the heading *Literature Review & Related Research* describes the similar investigations that will be taken into account in the fields of people’s musical practices, social aspects of music, music discovery, music visualization, etc. Similarly, the heading *User Studies* represents the methods to be used in the process of obtaining valuable information about the way people interact with digital media and media players. The research methods used in this part of the study will be described in Chapter 4, along with a description of the processes taken during the application of those methods with research participants. Finally, the heading *Media Player Evaluation* implies the review of the media players described in section 2.3 according to the design qualities of digital artifacts proposed by Löwgren & Stolter-

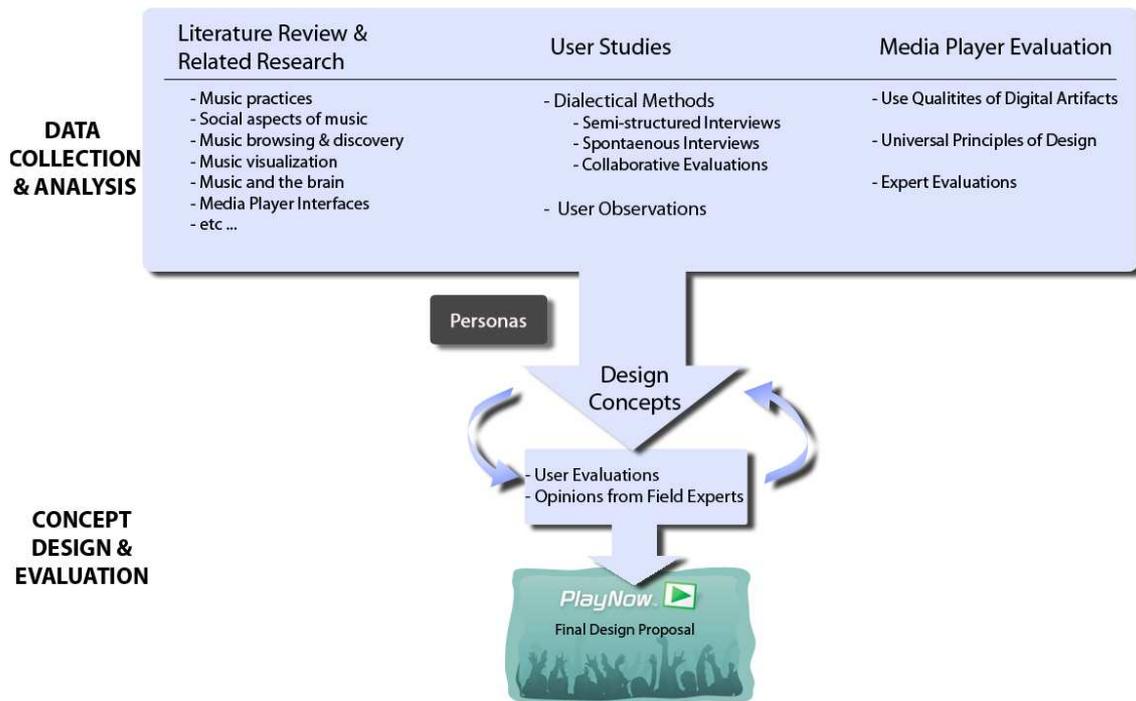


Figure 3.2: The investigative model that will dictate the design process of a digital media player.

man (2004) and the applicable principles of design expressed by Lidwell et al. (2003) and Nielsen & Mack (1994). These three main activities, and the help of the Personas method, depicted by the square to the left of the arrow, will generate ideas for one or more *Design Concepts*, represented by the main arrow, which will be iteratively evaluated with users and field experts, as indicated by the circular arrows pointing between the design concepts and the concept evaluations. Finally, a definitive design will be proposed, which is represented in the figure by the graphic at the bottom.

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This chapter has presented the theoretical foundations of this thesis on the form of theories of social research and principles of interaction design, concluding with a final investigative method that will dictate the subsequent steps to follow in the rest of this inquiry. The next chapter will introduce the research methodologies to be employed in order to acquire valuable information from users and to evaluate the interfaces of existing media players, which will be the bases towards proposing a few media player design concepts.

Chapter 4

Research Methods

The previous section defined a model to be used in the different stages of this study. The sections that follow give a brief description of the methods mentioned in the model and how they could be applied to obtain the information we are searching for.

4.1 Interviews

Kvale (1996) advocates towards the social research practice of obtaining information through *interviews*. Interviewing cannot only tell us about the object or population that we are trying to study, but can also make us have personal insights into our own values and views of the world. It can be also seen as a humane approach which tries to get in touch with people and understand them individually in order to make sense of the overall population. Simple interviews, however, might not be entirely accurate when trying to grasp the essence of an experience, in this case, the experience of interacting directly or indirectly with a media player. If done out of the context of the activity, ordinary interviews might introduce retrospective bias, or the bias induced by memory recollections (Conner, 2004).

Semi-structured interviews, whereby researcher has a set of questions prepared while being able to improvise new questions depending on the answers from the interviewee, is being use in previous research of digital media by, for example, Vignoli (2004) and Cunningham et al. (2006). The semi-structured interview technique “allows not only answers to direct questions, but also to go deeply inside the motivation” of an action (Vignoli, 2004).

The interview method is a research method involving a dialog between two or more persons with the purpose of acquiring knowledge through conversations or to reach a common agreement of the truth of an inquiry (Kvale, 1996). *Contextual inquiry* is an ethnography method that has been used and promoted by practitioners of HCI as a way of gathering user requirements and understanding their context. It “is a technique for examining and understanding users and their workplace, tasks, issues and preferences” (Gaffney, 1999). Contextual inquiries are often very expensive to carry out in terms of resources and time consumed. The researcher must spend hours emerging herself into the worlds of the people under study. Considerable amounts of typed data, as well as video and audio material are the common results from gathering data through a contextual inquiry. Unfortunately, this type of lengthy investigation can rarely be afforded, especially in an industry environment, but if carried out properly it is said to bring prolific results on the development of technology.

In this thesis work we claim that traditional structured interviews are not appropriate to investigate activities that present a certain level of *intimacy* or that are done unplanned and unconsciously. Kjeldskov et al. (2004) states that “studying intimacy is challenging because intimate acts are ephemeral and transient yet ubiquitous and crucial to the ongoing life” of a person. The content of an intimate activity might not be appreciated by an external observer, but it is full of meaning by the person(s) involved in the activity. Listening to music, or interacting with a media player, can be considered, in some instances, as an intimate activity. It can be certainly seen, as an activity that mostly occurs spontaneously without too much previous planning. From the author’s point of view, simply narrating an intimate act outside the context of the activity, yields inappropriate and incomplete results.

For this reason, this thesis will promote an approach guided by a mixture of context-related *semi-structured interviews*, combined with *spontaneous interviewing* and a light-tailored version of the contextual inquiry research method. During spontaneous interviews, conversations will be initiated with people under their natural settings on occasional encounters when they are being involved in some form of interaction with digital media or engaging in an activity related to music. Spontaneous interviews will not serve as concrete data to rely all our findings, but rather they will be used to complement the data obtained from semi-structured interviews and from the co-operative evaluations of media players described in the section to come. Similarly, the light-weight version of contextual inquiries entails a superficial emersion into people’s way of relating to music under their natural context, trying to observe them from the distance, while at the same time engaging in similar activities they might perform.

Procedure

A total of seven *semi-structured* and *spontaneous* interviews were carried out with participants located in Sweden between the ages of 18-29. The location was based on convenience, since researcher and participants could be located in the same area. The age range was representative of the population who interact the most with media players today and who are usually able to afford buying digital media on their own. Interviews ranged from 15-30 minutes depending on whether the interview was arranged previously or if it was a spontaneous encounter with someone engaging in a music related activity. The questions asked, semi-structurally, during the interviewing sessions are presented in Appendix A.1. It is important to note that in the case of *spontaneous interviews* the conversations that participants were engaged in were not completely improvised, but they were based in a similar construction of questions as the semi-structured interviews. The main difference was that in arranged interviews people agreed on a time and place to meet, at all occasions in front of a computer with a media player, whereas spontaneous interviews occurred improvised with people engaging in music related activities often also with a computer as the means to reproduce music.

The people that were encountered spontaneously were briefed about the nature of the study after a set of questions had been asked. They all agreed to contribute with their answers to the results of this study.

With respect to the application of the contextual inquiry method, a total of five social events were attended, where people gathered and music was the essential form of entertainment; therefore, large groups of people were observed under a musical context. Music was an essential component of the gathering and it was not considered as spontaneous, but rather a preplanned activity in which people attended with the purpose of enjoying music together as a way to socialize. Observations were carried out by filming with a small digital camera the actions and interactions of people who were responsible for manipulating the music and providing the entertainment. The

participants were unaware that they were being observed for the purpose of research.

The results obtained from the interviews and context inquiries described here are described in section 5.2.1.

4.2 Co-operative Evaluations

The method of Co-operative Evaluation has been described in detail by Monk et al. (1993). Being a participatory design research method, its basic premise is based on the collaboration of designers and users when evaluating the design of an artifact. In concrete, “co-operative evaluation is a variation of the ‘think-aloud’ verbal protocol, whereby, in addition to concurrently ‘thinking-aloud’ users are encouraged to ask any questions about an evaluation related to the computer-based system, the application, or the task they are required to perform during the evaluation” (Marsh & Wright, 1999).

Co-operative evaluations have been used by a variety of research studies within the fields of sociology and human-computer interaction. For example, Als et al. (2005) evaluated this method when designing technology for children; Marsh & Wright (1999) tested the effectiveness of the co-operative evaluation method on desktop Virtual Reality (VR) systems, claiming that this method aids researchers at finding usability problems that wouldn’t have been discovered otherwise. Also, Oyugi et al. (2008) applied this method in a cross-cultural study between three different continents, concluding that this method might not be fit to apply in other non-western cultures, due to their communication techniques.

It has also been claimed that by involving end-user in the evaluation of a system this method has helped to find the errors that are usually missed by the evaluation of experts in the field of interaction design (Doubleday et al., 1997).

This method has been found useful at verifying and eliciting user requirements. It has the advantage of letting the designers detect problems at an early phase of the design process; also, this method is good at unveiling the users’ thought processes and the reasons for their actions. On the other hand, the data collected from this method can be extensive and its analysis time-consuming.

This method has been chosen for this thesis work as a way to obtain untainted information from users while interacting with the interfaces of the media players of their choice as well as other media interfaces that might be unfamiliar to them. The procedure for applying this method to participant is described below. The results from applying a tailored version of this method are presented in section 5.2.2.

Procedure

Six users participated in this part of the study, consisting of three males and three females, all between the ages of 18 and 35. All of them were also located in Sweden and were representative of a population of interest. One of the participants had little or none previous experience interacting with media players before, two of them were quite familiar with their use but did not consider themselves experts, and the rest claimed to have used one or more media players for a long time and actively use their preferred media player several times per week. Three of them participated actively in some kind of musical expression, like singing or playing an instrument.

A pilot observation was done with another novice user of media players and digital media. It consisted in a think-aloud protocol where the participant expressed her opinions about the easiness of use and look-and-feel of the interfaces of three different music players: Windows Media Player, iTunes and Grooveshark. The session was video-taped and consisted of around one hour of the user exploring these three media players. Her comments and observations were taken into account and turned out to be very useful towards defining a structure of the further user observations and to formulate the questions asked in the interviews that followed, which are also presented in Appendix A.1.

The trials consisted of participants actively interacting with one or more media players (one at a time), and expressing their opinions about the look-and-feel of their interface. The researcher observed their comments and actions as they performed some tasks and was actively involved on the conversation and the evaluation, encouraging participants to state their opinions aloud. All of the sessions were filmed with a digital video camera, resulting in several video files which were later analyzed by watching them and trying to depict the meaning behind the participants' words and actions. The results from analyzing the co-operative evaluations video files are summarized in section 5.2.2. Some of the most relevant conclusions obtained from the pilot study were also included in the final results.

4.3 The *Personas* Method

Personas is a method used within the field of HCI that “provides us with a precise way of thinking and communicating about how users behave, how they think, what they wish to accomplish, and why” (Cooper et al., 2007). An extensive description of the concept of personas is provided by Cooper et al. (2007), who explain the motivations of using this approach in the design process and its advantages. Although this approach to design might not be perfect and has been shown to fail in some instances (see Rönkkö et al., 2004), its purpose within this thesis work will be to define a set of user needs and to cover the different dimensions represented by the studied subjects.

One of the intentions of adapting this approach, for example, is to account for the different levels of expertise that a user might have when interacting with digital content, as well as the different contexts in which these activities may happen.

As suggested by Cooper et al. (2007), a description of not only the personas' contexts should be provided but also their goals that drives their behavior. These goals are obtained from the analysis of user observations, since people are rarely able to articulate them themselves or be perfectly honest when trying. Cooper et al. (2007) advises to delineate three specific types of user goals with the description of each persona: *experience goals*, *end goals* and *life goals*.

It is important to remark that, within this thesis work, the method of personas will be used after carrying out user observations. In other words, personas will be formulated and described based on the actual behavior of studied users, and will serve as the entry point towards sketching a set proposed interfaces of a digital media player.

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Having defined a framework to obtain relevant information on peoples practices with relation to digital media and described interaction design principles and qualities of digital artifacts, Chapter 5 will provide an account of the application of these methods, describing the results inferred from the analysis of the collected information.

Chapter 5

Understanding Users and Media Players

Chapters 3 and 4 presented, respectively, the theoretical background and methodologies to be used in this thesis. In this chapter, the applications of these theories and methodologies are described. First, some of the existing popular media players are assessed against the qualities of digital artifacts proposed by Löwgren & Stolterman (2004) and other known design principles presented by Lidwell et al. (2003) and Nielsen & Mack (1994). Then, a description of the process of collecting data through user studies is presented, followed by a summary of the relevant conclusions. Finally, implications for the development of a media player grounded on the findings are suggested.

5.1 Evaluation of Media Players

Section 2.3 gave a short introduction to the media players that are considered competitive in the market today. In this section these media players are examined more in detailed, evaluating them against some of the known principles of interface design (Nielsen & Mack, 1994; Lidwell et al., 2003) and suggested qualities of digital artifacts (Löwgren & Stolterman, 2004). Naturally, there are a lot of aspects of their interfaces that will be left out of the discussion or that will pass unnoticed by the researcher. However, the point is to recognize some of the general advantages and drawbacks that these media players might contain in order to consider them towards the design of the interface of a new media player.

Visibility

An entry point for the activity of playing music is to locate the music to be played. iTunes and Windows Media Player, as well as most of the other media players considered in this study, provide a Search bar for its users to locate particular music files stored inside their libraries (see Figures 5.1(a) and 5.1(b)) The search bar in these programs is actually pretty efficient at filtering out media as the user enters characters. However, these search bars are not very easy to locate at first glance and therefore they become inefficient for inexperienced users. It can be hypothesized that the reason they might pass unnoticed is their position within the interface; in the later versions of both iTunes and Windows Media Player, the search bar is located on the top-right corner. Studies have shown that people tend to start looking at the screen from the top-left cor-

ner, thus the importance of placing essential components of media player on that position (Outing & Ruel, 2004). Spotify’s mode of interaction relies on the users initiative to search for songs, thus the search bar is an essential part of the interface and is located in the left-top corner (see Figure 5.1(c)).



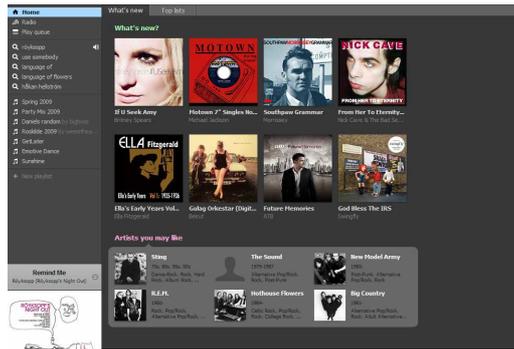
Figure 5.1: Search bars provided by three popular media players. The search bars in the figures have been highlighted in red color.

Consistency

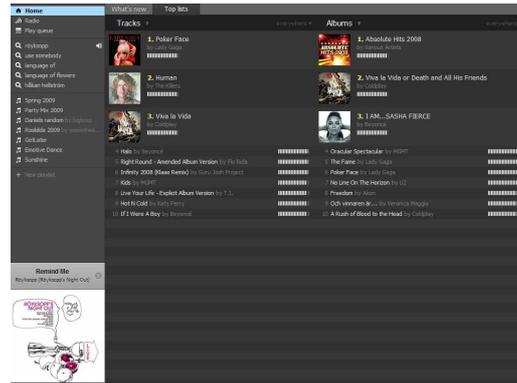
As mentioned in section 3.2.2, consistency allows users of an artifact to learn its use faster, understand it better and focus on the relevant aspects of an activity. Spotify, for example, can be seen as having a consistent interface in relation to iTunes: many people are able to easily understand Spotify because they are familiar with iTunes’ layouts and interaction approach. However, Spotify is not completely consistent on the different views within itself, as it is shown in Figures 5.2(a), 5.2(b), 5.2(c) and 5.2(d) . This might make it harder for users to understand, adapt and use, since they constantly have to reformulate their mental models according to where they are located in the interface. iTunes, on the other hand, presents its media items in a simple, but consistent manner, usually consisting on a list of items in either a List View, a Grid View or a Cover Art view.

Another thing to observe in terms of consistency is how the media players map keyboard buttons to functionalities. In iTunes, for example, pressing the *back* key while something is selected is synonymous to deleting the items in the selection, which is the same action that occurs when pressing the *delete* key. In Windows Media Player this *back* key is in fact not mapped to any action, and deleting items is done explicitly through the *delete* key. Ideally, the mapping of the keys would be consistent with the standards provided by the operating system, so that users feel familiar with the reactions to the actions of pressing a button on their keyboards, and so that they do not have to change their mental models every time they interact with a different interface. For instance, in windows explorer of the Windows operating system, pressing the same *back* key will take the user one level up in the file hierarchy. Also, Internet explorer in the same operating system will take the user back to the previous webpage. It would be convenient for users of an interface with a similar structure to use the same key to perform similar actions (i.e. navigating up/down or back/forth a hierarchical structure to find more general or specific items).

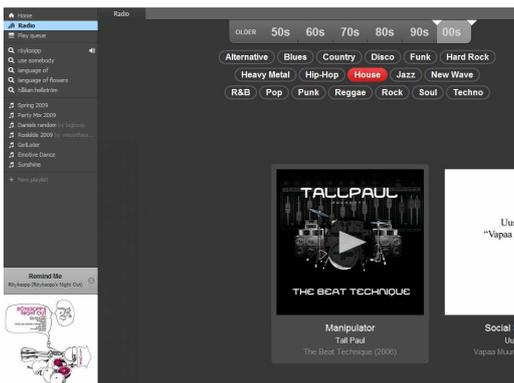
Consistency in a media player interface is a good thing to have in general, in order to avoid user’s confusion and waste of time. Panels that look similar but that move around or change locations depending on selections made by the users are usually not appreciated, misused and eventually abandoned, as well as keyboard shortcuts that behave inconsistently with what the user is familiar.



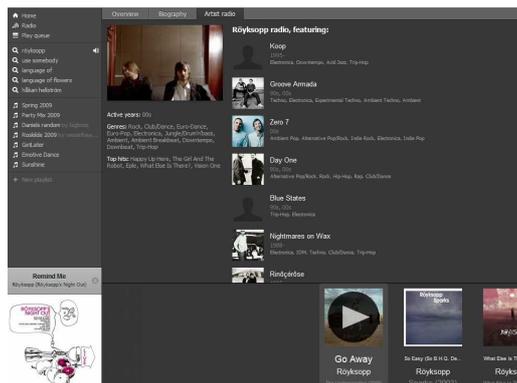
(a) Home view



(b) Top List View



(c) Radio View



(d) Artist Radio View

Figure 5.2: Screenshots from the Spotify media player, showing some of its many different views.

Accessibility

iTunes provides a variety of nice features, however not all of them are readily accessible to all its users. A user might be forced to get an iTunes Store account in order to be able to download *Album Artwork* automatically or to enjoy the privileges of the *Genius Sidebar*. Although Apple might see this as a way of making business by forcing people to subscribing into the iTunes store, user's might actually drop interest in even exploring such services, thus ending in a loss profit for Apple itself. What is more, iTunes doesn't even recognize mp3 players other than Apple's and an iPod cannot be coupled to other standard media players except for iTunes, thus limiting its accessibility.

Similarly, Pandora.com is an example of a service which has lost popularity on many countries due to its inaccessibility. Spotify and Grooveshark, on the other hand, makes digital music content available to a wide variety of people. They have created the opportunity of being able to access any type of music almost anywhere, which is appealing to the general public.

Playability

Löwgrén & Stolterman (2004) identifies the *playability* of an interface as the factor that adds a level of addictiveness to the interface. People will continue to interact with the interface if they don't get bored or annoyed, and if their motivation is intrinsic rather than external.

iTunes, Spotify, Grooveshark and similar music players have, perhaps unintentionally, added a

level of playability to their interfaces. iTunes added the *Genius* service as a way to let the users discover new media content. Spotify has also a recommender system that shows recent or popular songs, plus it lets users sort the results of a search by its degree of popularity, making it easier to find the searched song and discover other popular songs. Grooveshark presents users with several results that match the keywords entered by the user. These described features offered by the programs mentioned can keep users entertained for hours, discovering new music, previewing it, tagging it, organizing it and letting them create playlist with their favorite songs. Moreover, people engage in these activities because they want to and not because they are forced to. They find it pleasurable and joyful to keep discovering music as much as a game enthusiast wants to play a little bit more of an unfinished game.

It is important to recognize that activities that are done for mere pleasure have not necessarily the same interactive structures. For instance, playing video games often requires the user's full voluntary attention, whereas listening to music is an activity in which the listener often (but not always) wants to interact as little as possible with an interface. Instead, a music listener's goal is to start playing a song or a series of songs while engaging in other activities.

Feedback

Media Go™ doesn't give appropriate feedback as to which song is currently playing. The only visual indication that a particular song is being played appears in the top bar (see 2.7) and the sliding bar indicating the position of the song. However, it is difficult to localize which song is actually being played at a particular moment. In other media players, it is easier to identify the song being played within a list of songs: Windows Media Player colors the current playing song blue and places a discrete arrow to its left, similar to Spotify; iTunes and Songbird show a small 'speaker' icon to the left of the song being played. Although it might seem like a small detail, constant visual feedback on the song being played at a particular moment could actually save the user some effort and small annoyances.

On the other hand, one of the nice things about Media Go™ that enhances the user experience is the few discrete uses of smooth transitions effects that take place when the list of media items makes a change. This gives the user subtle feedback that the list has changed. Transitions are also used in Grooveshark, letting the user know that a search has been initiated and that the application is processing the requests of the user.

Seductiveness

Apple is an expert at adding the factor of *seductiveness* to their products. This means that they "offer surprising novelty for their users, go beyond basic user needs and expectations, create emotional responses due to their visual, tactile and interactional beauty and, most importantly, fulfill the users goals." (Löwgren & Stolterman, 2004)

Apple's iTunes software provides small details and features that are able to surprise its users and motivate them to keep using this program. One obvious example is their Cover Art view shown in figure 5.3, which shows a flowing collection of album covers that transitions from album to album in a way similar of flipping pages. Other examples include the way in which the program allows its users to choose the size of the covers in the Grid View, or the way in which the cover art changes when the music library is ordered by artist and the user passes the mouse over an artist with more than one album.



Figure 5.3: iTunes Covert Art is an example of *seductiveness* and *pliability*

It could be argued that it is this level of seductiveness which makes people move from using other products into using Apple's design when they finally discover them. Designers of Media Go™ have also applied a level of seductiveness to their player. For one, they have added gravity effects when scrolling through a list view (i.e. *throwable* lists). Also, as mentioned above, changing some of the views occur with the use of transition effects, making it more behaviorally friendly and visually appealing. Transition effects are also used, and almost overused, by Groove-shark. By observing this, it is important to note that adding seductiveness to an interface must be done with care, since overwhelming seductiveness can easily turn into annoyance.

Pliability

iTunes have two good examples of the concept of pliability. One is its Cover Flow view, which makes the browsing of music collections appear tangible and gives the sensation of being manipulated physically. Another one is its search functionality, which is also adapted by Windows Media Player; it reacts immediately as the user types characters into it, creating the feeling of responsiveness and manipulateness. On the contrary, with Spotify and Groovespark, the user has to explicitly signal the beginning of the search.

Elegance and Functional minimalism

“Elegance of a digital design is a combination of power and simplicity” (Löwgren, 2006). Groove-shark's start page is a good example of providing both, power and simplicity (see 2.3). The user is presented with a single search bar and a few links to sites that might interest her. Spotify provides elegance, not only by being powerful and simple, but also visually appealing with the choice of colors and layouts.

Social Action Space

Löwgren & Stolterman (2004) refers to the concept of *social action spaces* as the degree to which a design of a product is able to facilitate or change the way people act upon the world.

In version 8.1 of iTunes, Apple introduced an innovative feature that depicts perfectly the quality of social action spaces as well as the playability and seductiveness qualities described by

Löwgren & Stolterman (2004). This iTunes feature has been named *iTunes DJ*, it allows the social creation of playlists by letting people pick a set of songs located in a remote iTunes library via their iPhones. This technology enables people to do what they haven't been able to do before, therefore affecting their social space. It is also a feature that allows a new form of social interaction.

iTunes DJ and other remote applications also affect the way people relate to each other, including indirectly to the degree of *personal connectedness* mentioned by Löwgren & Stolterman (2004). The ability to be manipulate remotely desktop computer within a social activity, such as a party or a gathering, alters the extent in which people communicate. In a way, technologies like this enable a person to convey a point of view by voting for certain songs. However, it could be argued that it also hinders face to face interaction, since people could tend to focus their attention in their handheld device and not in other people.

Control vs. Autonomy

Section 3.2.1 explains the differences between a *proactive* and a *reactive* from the point of view of Löwgren & Stolterman (2004). In this sense, iTunes and Windows Media Player present a proactive use, where as much information as possible is presented from the very beginning. A list of all digital media items is presented as soon as the applications are open. Also, the iTunes Store presents the user with big amounts of information as soon as it is accessed, as does Playnow™ arena.

However, iTunes as a media player and the iTunes Store as a web-shop represent two different intentions for the user. Presenting visitors with lots of items and information in the iTunes store is a reasonable choice. The ultimate intention of the user in this case is to acquire a digital media item or to browse through collection of media items in order to discover something that might be desirable to purchase. On the other hand, a user's primary intention when opening iTunes as a media player often is to start reproducing a media item. To do that, the user first has to locate the media item, select it and then play it (by either pressing the play button or double clicking on it). The time it takes to locate the media item could be substantial, or at least more than what the user is sometimes able to endure.

In this sense, this proactive design decision could be improved to become a reactive one instead, in which the user is presented with little or none information, but she has an easy way to access what she is looking for. Following this thought, a reactive design to a media player would present the user with little information at the beginning, providing a way to search for a particular song or set of songs. The user would then get a set of filtered information based on her wishes.

This approach lets the user be more in control of her music listening needs, presenting her with information that she will actually find appealing after expressing her initial desires. A proactive approach, on the other hand, runs the risk of presenting the user with information that might be completely irrelevant or uninteresting to the user under her particular context. Imagine, for example, that the first thing shown when visiting `google.com` is a big list of links to all existing web-pages on the internet, which could then filter down by typing some keywords into a search box. This approach might sound unreasonable, but is analogous in some way to the way iTunes and Windows Media Player proactively present large collections of media to the user as soon as they open.

An example of a reactive approach to a design of a music player is the web-based service provided by GrooveShark. This service promotes a reactive use by providing its visitors with a search bar and a few links to useful places at the beginning. Once the user enters her wishes, a list of relevant songs that fit her search criteria is shown. The user is never presented with

irrelevant content, or content that has nothing to do with her initial musical aspirations or listening intentions.

Similarly, with Spotify the user has to actively search for a song, thus promoting a reactive approach to music listening. When the user finds a song, Spotify does not give plenty of recommendations of similar songs or artist that might interest the user. The user is pretty much in control of her listening desires and in the interaction with the application. It is up to the user to search within her mental models and make the initial effort of recollecting existing songs and search for them, which might not always be optimal either.

As can be observed, there are benefits and drawbacks of proposing proactive or reactive approaches to interaction, and the amount of control vs autonomy provided by an interface has to be carefully thought through, depending on the user's intentions at particular situations.

Fitts' Law

Creators of the MusiCream concept, Goto & Goto (2005), presented in section 2.2, made an interesting observation regarding the interaction taking place with interfaces of existing media players:

“In existing music players zapping (changing from one musical piece to another in a playlist as the urge arises) in music playback requires the user to perform a two-step procedure. First, the user must (double-)click the title of the desired selection in the playlist, and second, the user must click on the desired playback position on the playback position slider located somewhere” (Goto & Goto, 2005).

Although in most media players it is also possible to double-click on a selected song to start reproducing it, it is actually not completely obvious to all users that a song can start playing like this. Novice users in particular, seem to rely on the “Play” button to start reproducing media, making them drag their mouse further and becoming less efficient.

Another application of Fitts' Law can be seen in the lists of media items provided, for example, in iTunes, Spotify and Windows Media player are very close to each other, making it easier for the user to make the wrong selection of items. The list adopted by Grooveshark leaves more space between the items, allowing fewer chances for error.

5.2 Collecting Data from User Studies

Collecting information on the practices of people as they interact with some form of digital media is not a trivial task. This section describes the attempts to find people's relations to music and their behavior while interacting with media players. To accomplish this, two main methods were employed: one consisted in conversations with people while being under a digital music context in the form of semi-structure interviews and spontaneous encounters, and the other one was a co-operative evaluation of the interfaces of existing media players.

5.2.1 Results from Interviews

The procedure followed to obtain information with this method was explained in section 4.1. The main results obtained from the interviews and contextual inquiries can be summarized in the following points:

- Novice users' **preference** of a media player is based mostly on its availability instead of on personal choice. In other words, users who are not too familiar with computers or are not generally interested in technology, use the media player that is available on their computer by default, just 'because it is there'. Windows users will tend to reproduce their digital media with Windows Media Player, and Apple users will normally listen to music through iTunes, instead of searching and installing another media player that might suit their needs better. In fact, one of the participants who received an iPod as a birthday gift kept using Windows Media Player for a long time because she did not want to bother learning how to install and use iTunes.

Computer experts have a more critical choice in their selection of a media player, and are able to add features to it as they become accessible. Their use of a media player is not purely based on availability, but rather on a conscious analysis of which media player is able to fulfill their needs in a better way.

- **Synchronizing** an mp3-player device with a media player was not a completely seamless task, except for synchronizing an iPod via iTunes. Two of the participants, who were frequent listeners of digital music in their computers, did not synchronize their mp3 devices frequently because they thought it was a burdensome task; thus they listened to the same music for long periods of time until they asked more experienced users to synchronize music for them.

In some instances it was noticed that there was no proper feedback when the synchronization of the media player with an mp3 device failed. Participants believed that the music they selected had been transferred to their device, but got disappointed and frustrated when they found out it was not there.

In one of the observations, a novice user constantly wondered what songs to transfer to her mp3 device based on their melodies, but found no obvious way to preview them. The criteria for picking the songs to transfer were mostly based on the artists' names and songs' titles.

- Nowadays a new tendency seems to be emerging, where people prefer to access any type of song they crave for by **streaming** it through the internet without necessarily storing it in their systems. This trend is removing people's guilt of owning digital content illegally and enjoying the pleasure of its accessibility: any time, any song, whenever internet is available. The proprietary Peer-to-Peer streaming music program, Spotify, has exploited the potential of this kind of services and is now growing very rapidly in popularity. So much that people are talking about the dead of iTunes as a music player.

Several of the participants, especially the ones that considered themselves frequent music listeners, have made a transition from their older media player (mostly iTunes) into the use of Spotify. Participants stated that this is due partly because of the copyright management laws that have become tighter in Sweden, which forces them to purchase the digital content that was before accessed for free. Spotify allows them to continue enjoying the music for free, with the drawback that it is no longer stored in their computers. However, with the ubiquitous access to the internet, the difference between owning and streaming digital music becomes smaller. One of the participants, who has almost completely replaced iTunes with Spotify, even stated that "it feels like I own the songs anyways".

- Another tendency was observed to use **unconventional** means of reproducing music at social events. Not too long ago, it was common to playback music via a stereo or a boombox with the use of regular CDs. After that, hosts of social events started using files stored on their computer to form playlists of songs to be heard during their reunions. Nowadays, people are shifting into using streaming services, such as Spotify and YouTube, to access any type of song the guests want to hear. People are now able to find any song even if it is not stored on their computers, and to reproduce it for the satisfaction of everyone. In one instance, the creation of song queues was done collaboratively by various guests at a gathering with the use of Spotify. The hosts asked the invitees to please queue a song if they wanted to hear it, instead of double-clicking on it because that would disrupt the song order of the wishes of others.

- People **discover** music in different ways. The majority of the participants reported that they find out about new music or other digital media through three main channels: the radio, the internet and a network of people. Almost all participants confessed obtaining their digital music either by ripping it from original CDs or by downloading it for free from the internet.

One of the reasons for downloading it from the internet for free, besides its cost, seemed to be its unavailability or high levels of effort. In other words, there seems to be a tradeoff between the effort users make to acquire a media item and the cost it implicates. Right now, participants feel that the effort of buying digital media and the effort of acquiring it for free is almost equivalent; thus their decision is based on cost. However, if their effort of obtaining a media item for free surpasses by far the effort they make when paying for a media item, they might be inclined towards purchasing this media at a reasonable price.

iTunes has managed to provide consumers with low cost and easily accessible digital content. However, four of the participants stated that they do not see the overall benefits of signing-in for an iTunes account when they can obtain the same digital content through other costless means.

- Several of the participants reported their preference over downloading or ripping **full albums** instead of individual songs. They stated that ‘it feels better’ to own the whole album, even when they were interested in just a couple of songs of such album. Although not explicitly uttered, the participants had a more organized digital library when full albums were downloaded. For some participants, downloading full albums based on the judgment of just a couple of songs, helped them discover other songs that they come to like too. This is based on the assumption that if an artist has made a one or more good songs, such artist might have other good songs that are worth discovering.
- It was observed that activities related to digital music can be broadly divided into **three main categories**: *obtaining* new music items, *browsing* through music collections and *listening* to those music items. The interface of a media player is used differently depending on which of these activities a user might be engaging in. If the user is actively browsing through a music collection or music related information, then the media player is on the focus of her attention. When the user is in the process of obtaining music, the interaction with the media player could also be very active. If the user is simply listening to a sequence of songs, the media player is located in the background. Participants often mentioned the need to fast forward a song they didn’t want to hear when a group of songs was playing sequentially, which forces them to return to their computer and interact explicitly with the media player.
- Regardless of which of the three activities mentioned above is going to be performed, people have to always **prepare** for them by interacting to a greater or lesser extent with either a media player, a stereo, a boombox, an mp3-device, etc. A person can either press a button and let the music play sequentially or spend some time setting up a playlist of

songs to listen while doing something else. Eitherway there is always an initial interaction with the artifact reproducing the music. The user initial attention is always focused in the artifact's interface.

- When a person engages into activities related to digital music they can be seen as occurrences of **musical sessions**. Each session can be different from the previous one; for example, the current musical session might consist on exploring new releases and previewing them, whereas this morning's musical session might have consisted on listening to fast paced music, and last night's music session might have been playing party music in the company of other people. Therefore, for each musical session a person might have different needs, and hence different ways of interacting with the interface of a media player.
- A difference between the creation of **playlists** and the **queuing** of songs was identify. Creating playlists is done deliberately and with care, usually they have a purpose and/or are consciously made for tasks that are going to be repeated in the future. On the other hand, creating a queue of songs is done quickly, for the purpose of fulfilling a particular musical session, and is usually discarded when the session ends. However, people sometimes like to save playing queues as playlists for later reuse.
- Listening to music could be considered as an **intimate activity** in some instances (Kjeldskov et al., 2004); however, listening to music is certainly a very personalized and context dependent activity. People relate to music in different ways and they have very individualistic ways of interacting with digital media and media players. People also have different ways of organizing and browsing through their music collections. These differences are sometimes dictated by their choice of media player.
- People like to have their music organized and, even better, they like to have someone or something **organize their music for them**. Some participants did not even know where the music files were stored in their computer; their expectations are to find the music files there ready to be played as soon as they open their media player.

5.2.2 Results from Co-operative Evaluations

The method of *Co-operative Evaluations* and the procedure in which it was applied were explained in section 4.2. This method was mainly used in this thesis as a way to involve users in the evaluation of the usability of some of the most popular media players used today, which are described in section 2.3 and furthered analyzed in section 5.1. Co-operative evaluations were related to the interviews described in section 4.1, but with the difference that the focus of the inquiry was more on the interfaces of existing media players, rather than the music practices of people. The following observations were made in collaboration with the participants about the interfaces and interaction of the different media players:

- The top menu of Windows Media Player presents six different options. The options to *Rip* and to *Burn* a CD might not be as relevant nowadays since it is no longer an extremely common use case. Besides, when one of the participants tried to play the contents of a CD, these options became confusing to her and obtrusive towards achieving her primary action (which was reproducing the media in the CD and not ripping the CD).
- Media players have visualizations that morph shapes while a particular music file is playing. They serve as a useful visual indication that something is actually happening, in other words, that a music item is being reproduced by the player. However, there are sometimes

too obtrusive, unpleasant or have no relation to the rest of the interface. Windows Media Player, for example, presents its visualization in a whole panel by itself, which becomes a big black space when the player is idle. Better, more useful and more entertaining ways of representing this visualization are not hard to conceptualize and would be appreciated by users. Examples of music visualizations are given by Leitich & Topf (2007) and Yoshii & Goto (2005).

- There was a lack of consistency in some of the media players that tended to confuse users. The panels on Windows Media Player, for example, move around or change locations depending on selections made by the users, even though they look similar. On the other hand, iTunes tries to keep its layout consistent, thus making it easier for users to understand.
- It is important that purchased songs are tagged with proper information (meta-data) in order for the player to automatically create a sensible digital library. If the media items are not tagged properly the digital library looks really disorganized, items are harder to find and the user's time is wasted. More importantly, if the user is not willing to spend the time an effort to create a sensible library, as expressed by some of the participants, the media player will soon stopped to be used. Many of the participants claimed having spent a lot of time organizing their music into a descent and usable library. Once organized, they tried to keep it organized when they acquire new digital content. A challenge in this concern, is the issue of tagging media items for *subjective* fields, like mood or genre (see Vignoli, 2004).
- Participants tend to navigate up and down the file system based on the information of a musical item. The means for these navigations were not obvious in all media players; for example, Windows Media Player (version 11) provides navigation arrows in the top left corner which are not entire visible. Participants used other, harder, means to return to the same level of hierarchy they used to be.
- The model of organizing and presenting music sectioned by *Artist-Album-Song* seemed to be easily and intuitively understood by participants.

In one of the observations a user installed and interacted for the first time with *Rhythmbox Music Player*, which is a media player installed by default in the Ubuntu distribution of Linux. The media player immediately recognized the media stored in his hard drive and populated his library quite rapidly (containing 78 different artists with an estimated average of 2 full albums per artists). The subject seemed to understand the interface with certain simplicity and was able to browse through the music collection at ease, even when it was his first time using the program.

Another participant mentioned his appreciation for previous versions of iTunes, where a series of panels was shown on the top representing the artists and albums in the library and served as filters for the list of music items.

These observations confirm the findings from Vignoli (2004) presented in section 2.2.1, which indicated the tendency of people to organize and retrieve music items primary by their artist and albums.

- All music players provide their users with a *search bar*, or an easy way to locate music items in a collection. However, contrary to expectations, not all users take advantage of this powerful feature. Novice users, in particular, tend to scroll down through big collections of music, making it complicated for them to find what they are looking for. Other, more experience, users tend to use the search bar only when looking for a specific item. In general, it seems that the use of the search bar is related to the intentions of the user and the services provided by the media player. For instance, in interfaces like Grooveshark or Spotify (i.e. reactive interfaces), the search bar is the entry point and main control for interaction.

Users need something that triggers their interaction with the media player when they open it. Interfaces that are purely reactive force the users to look into their mental models and recollect pieces of music that they are in the mood for listening. Three frequent Spotify users mentioned that it was sometimes hard to remember or think of songs they wanted to search for when they opened the application, but that it was very convenient to be able to listen to others' playlists, since it gave them the opportunity to discover music that they haven't heard before.

5.3 Implications for the Design of a Media Player

The previous sections have yielded substantial results to be considered in the design of a media player. The data collected from interviews, and observations, as well as the evaluation of other media players and the literature review have given us sufficient knowledge to formulate the suggestions for the design of a media player. In the following points a set of requirements are listed describing a media player which aims at supporting the activities surrounding digital media and enhancing the user experience.

Embracing the Media Player

- For users to start adapting a media player, it has to be able to **seamlessly couple with an mobile music device**. Users desire of accessing their music collections anywhere at any time is very related to their capability of easily transfer their music among devices. Nowadays, a media player that does not allow the user to effortlessly access her owned media content as she pleases wherever she pleases is doomed to fail.
- Interaction with a media player differs almost from person to person. The interface of a media player should be **adaptable** to the needs and wishes of the individual users. The interface should be flexible enough or customizable by the user to support her primary activities depending on her individual manner of relating to digital music and media. If the media player doesn't fulfill the basic user needs, it is soon going to be abandoned. In particular, the differences in needs between novice users and expert users must be considered.
- Provide a way to **trigger user interaction** as soon as the media player is opened. The media player should not force the user to *think* what she wants to hear at that instance, but should present her with choices that help her find in her mental models possible media that she would like to reproduce. Giving the user choices helps her remember and triggers her initiative to look for more media items. At the same time, presenting the user with large quantities of information could be seen as inconvenient. Therefore, a balance between a proactive and reactive use is encouraged, whereby the user is presented with only the sufficient amount of relevant items to easily start the interaction while not being overwhelmed by large amounts of insignificant information.
- As mentioned earlier, there seems to be three broad activities that people do in relation to digital media: browse/discover it, obtain it and reproduce it. A media player that is able to support these three main activities in a subtle, unobtrusive and friendly manner has greater probabilities of being successful. The iTunes media player actually provides support for these three activities, combining iTunes capabilities of reproducing digital media, the iTunes Store to obtain it at low costs, and the Genius sidebar to discover new media. However, it is believed that the same support, and more, can be provided in more user friendly ways.

Using the Media Player

- Useful and pleasant visualizations can be in place while a music item is being reproduced. This visualization has to serve as an unobtrusive indication that the application is performing an action, while at the same time giving the user information if possible. One idea is to have a simple water ripples animation on the Album Cover Art while something is being played. Another idea, based on Leitich & Topf (2007) work, is to display geographical information about the music item being reproduced, or some other kind of information that involves an animation.
- A media player based on a hierarchical system, whereby the user can ‘dig down’ to the information of the media item (e.g. going from the general list down into an artist and down into an artist’s album) has to provide its users with an **easy way of navigating** up and down (back and forward).
- A fast way to **change songs** without necessarily being interrupted by the task they are engaging in would be appreciated by the users.
- An easy and obvious way of **searching for media items** at all times must be provided. Even though searching for digital music is mostly done when users already have an idea of what they are looking for, it is essential that this functionality works well and fast, giving a sense of *pliability*. iTunes searching mechanisms are a good example of an efficient way of finding or filtering digital items that responds at the same time as the user types keywords.
- Provide the user with constant and easy methods to **acquire digital media**. This has to be an effortless procedure, whereby the users feel the value of obtaining digital content even when it involves a monetary cost. iTunes’ *1-Click* is a good example of providing the users with the opportunity of acquiring digital content easily at a reasonable cost.
- The user of a media player should be readily able to **manipulate the subjective information** of a media item or a group of media items in order to tailor her own needs. In other words, the interface should provide an easy way for the user to change the media items’ metadata (ID3Tags) especially for fields that are subjective, such as *genre, mood, etc.*

Design Principles of a Media Player

- The interface of a media player must be as **consistent** as possible. Consistency should be considered not only across the different views of the application itself but also conform to other similar products that have molded the users mental models. For example, digital media players have unintentionally adopted a series of buttons and icons representing their controls and which are now understood by most users, such as the *shuffle* button or the *repeat* button. A new media player would benefit from adapting a similar set of controls that would be seen by users as being consistent with other media players.
- Based on the discussion of section 5.1, it is suggested to provide a **proactive** approach to a media player when the user’s *primary* intentions are to discover new media or actively browse through media collections, as well as when the user’s *secondary* intentions is to listen to music, whereas a **reactive** approach should be promoted when the user’s intentions involve reproducing specific media items or mentally predefined pieces of media. In other words, when a user wants to discover new music or browse aimlessly through music collections, the interface could present the user with large amounts of information; on the other hand, if the user has a song in mind that she would like to listen, and it dictates her initial interaction with a media player, the interface should present the user with the means to locate that particular song without overwhelming her with information at first.

- The interface of a media player should consider the location of its different components and controls in order for the user not only to visualize them better, but also to become more effective and efficient. For example, following **Fitts' Law**, it would be convenient to put the volume bar close by the playback buttons. This way the user would be able to locate and adjust the volume bar easily as desired, since it is often the case when someone starts playing a song and the volume bar is extremely loud, making the person jump out of her chair and try to get to the volume bar as soon as possible to lower it down. Also, it is critical that the interface supports the easy dragging of files from the user's library into a mobile music device; therefore the location of where the device is shown has to be very strategic.
- Appropriate **feedback** is always important. Feedback not only refers to giving users information when something goes wrong or the application fails, but also showing users in a seamless way that the application is responding to their actions, or that it is currently active.

Behind the Scenes of the Media Player

- **Collecting information and statistics** on the user's preference and behaviors is certainly beneficial. A media player can provide the user with a personalized set of options and preferences based on the individual's previous choices or actions. Moreover, not only information from the user can be collected, but also from a community of users that are willing to share their opinions on their use of a media player or individual media items. For example, subjective attributes of media items, such as *genre* or *mood*, could be assigned based on the statistics collected from a number of distributed users; the media player could then get this information from a server and present it in a useful way. Imagine also being able to provide the user with information on the popularity of songs based on the listening behaviors of others, and create playlists based on this information.
- It would be important and innovative if a media player is designed to **support the user's situations**. As have been mentioned before, listening to music is an activity that is often secondary: people often listen to music while doing something else at the same time. A media player, for example, could give suggestions of songs or media items when a user is about to clean her house, study for an exam or start a big journey by car. These suggestions should be based on previous preferences or other criteria. The purpose is to make it possible for users to create, as easily as possible, a collection of music that they might enjoy based on what they are about to do, making them able to place their focus in a primary, more relevant, activity sooner.
- The **colors and themes** of this particular media player to be suggested here should be adapted to fit those of the PlayNow™ arena media portal. Mainly green, white, black and different shades of gray should be used. Note, however, that green has been regarded as not an optimal color to use due to the inability of color-blinded people to distinguish this color.
- A media player has to have support the most basic wishes and needs of the user. Some identified use cases, in no particular order, include:
 - Playback a media item.
 - Stop the playback of a media item.
 - Easily create a queue of media items and play them.
 - Easily forward to the next media item.
 - Preview a song before transferring to an mp3 device.
 - Synchronize an mp3 device with a library of songs.

Having addressed the implications or set of requirements for a media player, it is time to describe the steps of coming up with conceptual designs. The next chapter will explain the process of sketching the possible interfaces based on all the grounding foundations presented up to this point.

Chapter 6

Designing a Media Player

This chapter will describe the process of design for the media player that has been discussed thus far. The design decisions, which are communicated through the development of sketches and mock-ups, are grounded in the implications listed in the previous chapter, as well as the literary reviews presented in Chapter 2. First of all, the method of Personas is used to describe the potential users of a media player and their identified goals while engaging in some form of interaction with digital media. Thereafter, a few design concepts are proposed and evaluated with users and experts on the field of design and common users of media players to arrive to a final design proposal for a media player.

6.1 Personas

The Persona approach to design of interactive systems was described in section 4.3. Here, a group of personas are described, representing the different characteristics that typical potential users of media players might have. The personas portrayed here are based on the user observations carried out in the previous chapter and were obtained following the guidelines given by Cooper et al. (2007).

John: John is a 19 year old guy who has a passion for music. He knows how to read music notes and plays the piano and the guitar. John owns an iPod which he updates at least twice a week by synchronizing it with the digital collection in his iTunes Library. He has become an expert at transferring music from his desktop computer into his iPod device. John is against downloading music illegally from the internet, so he likes to buy CDs and then transform them into digital format, however he does not find it practical to download music from the iTunes Store or other places on the internet. He is very happy about being able to carry his music with him in his iPod and listen to it whenever he feels like it. The selection of songs he transfers into his iPod is usually based on the mood he is in; however, it takes him time to put together a group of songs, since there is no way of collecting them by mood.

Maria: Maria is a 25 year old student of medicine and takes French courses at night. She has become interested in French music and likes to discover new French artists. She also likes to search for the lyrics of songs because she thinks it is good way to learn the language. She likes to share her preferred songs with others and often expresses her musical tastes through different ways via the internet. Maria is very picky about the songs she likes to listen in her mp3-player, she usually spends a lot of time selecting the songs that she wants to transfer from her computer

to her device. This selection often depends on the activity she is planning to do and on the seasons of the year.

Sandra: Sandra is a 23 year old University student living in a one-room apartment. She likes waking up listening to music and often listens to music while she showers, studies, cooks, reads and does other things. She is often in a hurry, so she often just presses play and listens to whatever is available. She has a relatively small CD collection with music that she really enjoys uses mostly her stereo when she listen to music. Sometimes she borrows CDs from friends and rips them with Windows Media Player. She is not a computer expert, and uses this particular media player because it is the one that *pops-up* when she inserts a CD into her computer. When she wants to reproduce the song that she rips she uses this same player. Sandra has an mp3 device that she carries around when she goes for long trips; however, she rarely updates it with new songs because she believes it is too difficult.

Fred: Fred is a 35 year old man who works for a big company as a graphical designer. His work sometimes requires certain amount of concentration, so he listens to music to avoid being distracted by the noises around the office. In these situations he usually uses services like Last . fm, where he just selects an initial song and continues to listen to the rest of songs from similar artists. Sometimes there are songs he doesn't really enjoy, but does not bother to forward it because he does not want to change the focus of attention from his work. Some other times there are songs that he hasn't heard before but that he likes; he tries to remember the names of the songs or artists so that he can get the music , but he often forgets them.

6.2 Conceptualizing a Digital Media Player

Having all the grounding principles for conceptualizing a media player, a few design concepts were proposed and sketched, to be later reviewed from the point of view of a professional in the field of interaction design, which happens to also be the supervisor for this work. Her comments and opinions served as valuable input with respect to the positioning of elements, intentions of the user, focus of the work, and build up of additional ideas for the possible features that a media player might include. The sketches were redefined to fit the expert's feedback and the opinions of other media player users, being reevaluated once more to reinforce an iterative process of design.

Some of the ideas shown by these sketches were furthered developed into three main design concepts that portray the look and layout of a interface at a conceptual level with the use of *Axure RP* (Rapid Prototyper) and Adobe Photoshop CS4. Several other developing tools were considered for developing a low-fi, quick-and-dirty interactive prototype, but it was decided that the implementing phase of a media player would consume considerable amounts of time and learning efforts. Axure proved to be a good tool for conceptualizing design ideas by including graphics and basic interactions; enough to make users understand the intentions and rationale behind the interface of a media player and to express its desired characteristics.

6.2.1 Three Design Concepts

This section will describe the three main design ideas that were conceptualized with the use of *Axure RP*. The design decisions for each of these concepts will also be described, since they are the foundations that gave life to these designs. It is important to remark that the concepts proposed here were created with the intention of fulfilling the needs of media player users, which

were *identified* from the literature reviews, the user studies and the evaluations of other media players, and which were *described* with the use of the Personas method.

Design Concept One: *Music Filterer*

The first design concept, sketched in Figure 6.1, was inspired by the fact that users tend to organize their music collections based mainly on the attributes of *Artists/Album/Song*, as was also shown by Vignoli (2004). Therefore, there is a logical filtering going from the general attribute of *Artists* to the most specific attribute of a *Song*, which is always performed by a certain artist.

Previously, it was mentioned that three main activities related to digital media were identified: browsing, obtaining and reproducing. This media player would mostly support the activity of browsing through a collection of music with the ultimate purpose of selecting a set of music items to be reproduced or transferred into a mobile device. It is hypothesized that this concept would match the user's mental models when browsing through a collection, first, by going from the general to the specific (from *Artists* to *Songs*), second, by presenting lists of Cover Artwork as default, which serves as good visual indication to locate particular items, and third by locating the search bar on the top left corner where is more visible. At the same time, this concept is presented with a number of features, trying to make the user actions more accessible; unfortunately this might also make it look cluttered and overwhelming. This concept would fit the needs of the *Maria* persona, by providing her with plenty of features, like musical lyrics, and allowing her to easily filter out music that she might want to carry in her mobile device.

Figure 6.1 shows one of the initial sketches of this proposal. A brief description of the aspects of the interface presented in the list below, which is numbered according to the colored numbers and sections on the figure. This design proposal was further developed into a more interactive prototype with the use of Axure. A screenshot of this prototype can be observed in Figure B.1 of Appendix B, and can be also accessed through the web-link <http://danceafterlife.mine.nu/Concept1/Home.html>

1. The main idea for this concept is the division of the user's music collection into three main *filters*: the leftmost panel containing *Artists* (represented by the Cover Art of one of their albums), the middle panel containing the *Albums* and the rightmost panel having the list of *Songs*. The user should be free to select any number of artists from the *Artists* panel, which would be reflected on the *Albums* panel and the *Songs* by showing only those music items belonging to the selected artists. Similarly, choosing any number of albums from the *Albums* panel should filter out the songs presented in the *Songs* panel. Additionally, the intention is that browsing through music by other means (i.e. through the search bar, playlists, etc.) will also show filtered results in these three main central panels. The locations of these main panels and the space between them are intentionally made so that it captures the attention of the user, thus becoming the main source of interaction.

The Album Cover Art should be shown as the default view since, according to Vignoli (2004), it provides the user with strong search cues when trying to locate an artist or album within a collection. The user, however should have the possibility to display the media content in forms of lists or other visualizations. The user should also be given the possibility to select media items to be transferred to a mobile music device from these three main panels.

2. The Search bar is positioned in the top-right corner, since it is the first place users concentrate their attention when scanning through a computer screen (Outing & Ruel, 2004). In

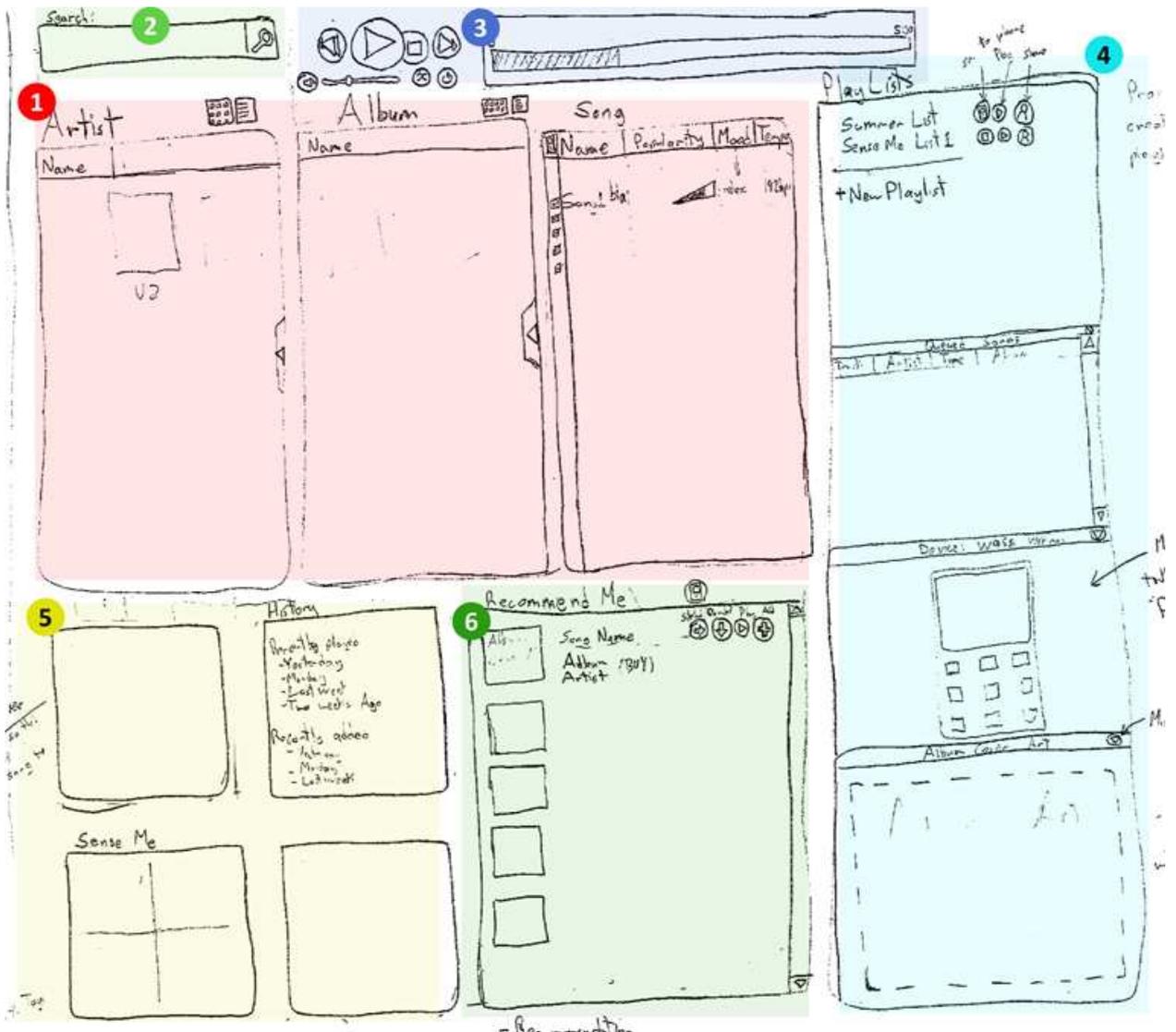


Figure 6.1: First Design Concept - Music Filterer

this way the user can easily start searching for music items if that is her primary purpose for that session, and ignore the search bar if her intentions are to browse or obtain music.

The results from using the search bar are presented in the main panels. It is important that the search bar presents a sense of pliability, so that the results are shown as soon as the user starts typing key-letters. Similar to iTunes and Windows Media Player, the search bar acts more like a filter of the music collection.

3. The playback controls and progress bar are shown in the middle part of the screen. The controls are big enough for visibility and accessibility, but they are not in the center of attention. The volume bar is placed near the play button controls in accordance to Fitts' Law, and as elicited by the implications of section 5.3. The progress bar changes considerably when a song starts playing, giving the user strong visual cues that the media player is acting (not idle). Cover Art work in the search bar serves as an indication of 'what' is actually being played. It was considered that Cover Art, although is useful and nice to have, its big size, as it is done in iTunes and Spotify, does not add any value to the interaction. Hence, providing a small size Cover Art placed strategically might be more beneficial.

4. A part of this panel should be divided into two sections for what are considered two mutually exclusive activities. One is the creation, browsing and reproduction of playlists, and the second representing the queue of songs that are played for a particular musical session. The user should be given the option to create, delete and manipulate playlists. The music items that are included in a playlist would be displayed in the *filtering* panel (i.e. panel number 1). The user should also be able to easily create a queue of songs to be played during a musical session, and she should be able to save such queue as a playlists if desired.

Another part of this panel represents the connectivity with the mobile music device. If no device is connected at the time this part of the panel is subtly hidden. Information from the device can be obtained and presented here, and the user can synchronize libraries with the click of a button. From this section the user should also be able to enter some kind of *phone mode* from which items stored on the phone can be manipulated.

5. This section represents the multiple features that can be added to a media players. These features could be divided with the use of tabs, as shown in the concept image of Figure B.1. By using tabs, a wide variety of different features can be included. Features can include, for example, the display of information about currently playing artists and songs, the creating of playlist according to mood or other factors, the different visualizations of media items, the access to radio stations, a history of previous played songs, etc.
6. This last section is dedicated to the access of PlayNow™ arena. Within this panel the user's need for acquiring music could be fulfilled. This panel would be also divided into tabs representing the most common or useful sections of PlayNow™ arena, such as the *Top Lists*, *Most Recent* and *TrackID*. A recommender system could also be included as a tab on this panel which gives the users the possibility to obtain music based on the contents of its library.

Design Concept Two: *The Facilitator*

The name for this concept, which sketch is shown in Figure 6.2, is given to this proposal because it aims at *facilitating* user's actions when visualizing and accessing elements on the screen. The main idea is to provide big click areas for easier selection, noticeable sections like the search bar for better visualization, easy ways of accessing digital item's information and transferring items to a coupled mobile device. This design proposal is aimed for novice users or users who are not very familiar with computers, hence it will satisfy the needs of the *Sandra* personas, who is a novice user, not fond of computers and just wants an easy way to find and play certain songs for a musical session. Also it would fulfill the needs of the *John* persona of obtaining music legally and easily through the PlayNow™ arena portal. The layout for this concept is consistent with the interfaces of other media players, such as iTunes, Spotify or SongBird, again facilitating the users' learnability across different applications, as suggested by Richter et al. (2006). This is an important characteristic of this design, since it promotes the learnability and acceptance of this media player because of the familiarity the users already have with the use of other similar interfaces.

The listed points that follow explain the characteristics of the main areas of this proposed interface. The numbers on the list correspond to the colored numbers on the sketch of this proposal, which can be seen in Figure 6.2. A screenshot of the concept developed with Axure RP is shown in Figure B.2 of Appendix B, and the interactive prototype can be previewed on the web at <http://danceafterlife.mine.nu/Concept2/Home.html>.

1. As with the previous concept, the playback controls are clustered together since their func-

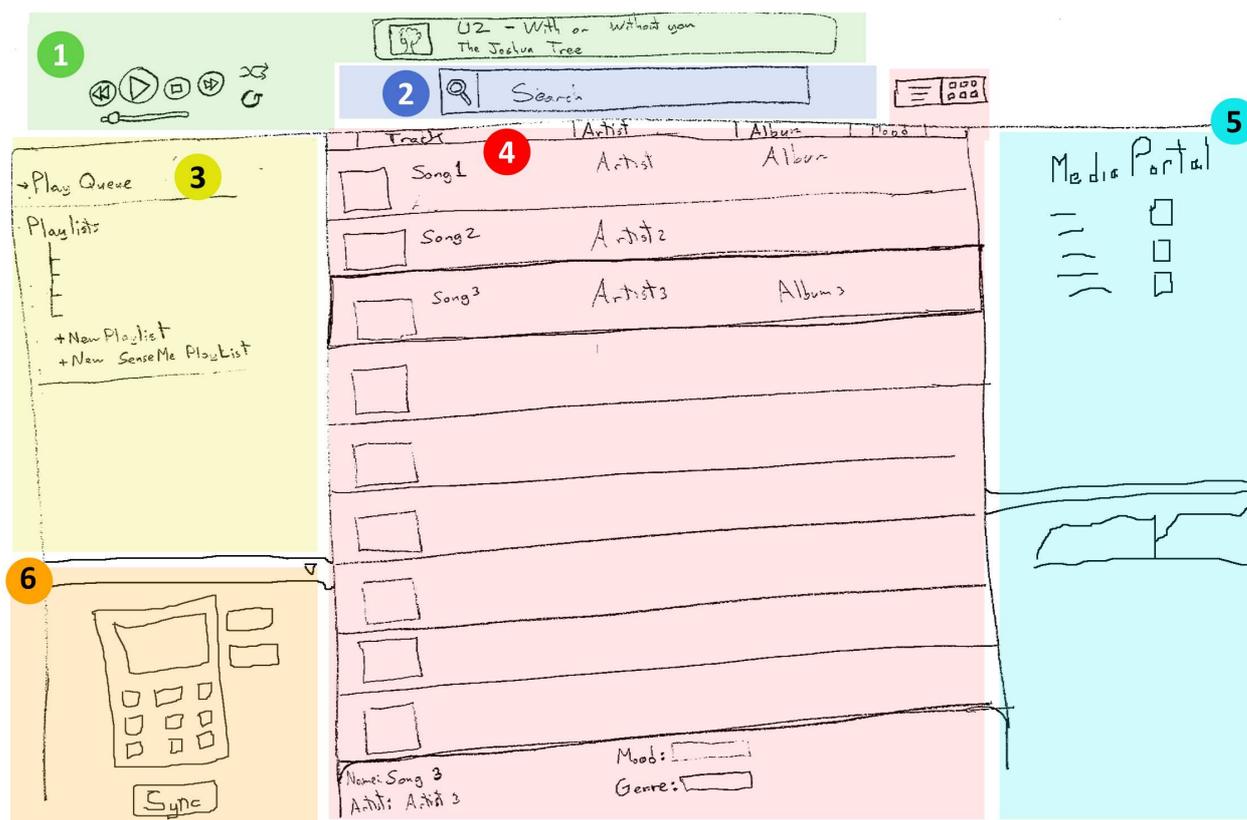


Figure 6.2: Design Concept Two - Facilitating Interaction

tionality is related. This allows the user to locate and manipulate the reproduction of music in one central place, which is contrary to other existing players that place the volume controls away from the playback controls which are far from the shuffle and repeat buttons. For this concept, these controls would be placed in the top-right corner, allowing for greater visibility. The progress bar would appear in the middle, being noticeable.

2. The search bar would be located in the middle of the screen just above the listing of songs. Hence, there would be a bigger sense of connectedness between the search bar and the list view (represented by number 4), since typing characters in the searching field would act only on the list that is below it. Other interfaces place their search bar far away from the actual element in which it acts upon. The search bar should be big and with a contrasting color, so that it is not visually lost or confused with the progress bar.
3. This segment is dedicated to the creation and access of playlists and the current playing queue. As explained before, a playing queue refers to the sequence of songs the user has chosen to play for a particular music session, whereas a playlist represents the list of songs that a user will tend to build and reuse over time. When the user selects either the *Playing Queue* option or the contents of a certain *Playlists*, such lists of songs are presented inside the main List view (i.e. panel number 4). The location of this panel within the screen is consistent with other media player interfaces. Within this panel a section for browsing music sessions by date would also be provided, given that it was found a useful feature by Goto & Goto (2005) and that it provides the user with the opportunity of revive experiences from previous times, since music can trigger the feelings elicited by past memories (Vaidya, 2004).

4. This panel represents the list of songs contained within the user's music library. At times, this panel would display filtered results depending on the selections of the user. For example, the queue of songs for a particular session, the contents of a playlist or the results from doing a search.

One of the main ideas for this concept is the easy access to each of the songs in the list. Therefore a big row sizes are provided, which not only lets the user select a desired item more accurately, but it could also allow the integration of more options within a row, similarly to how it is done by Grooveshark (see <http://listen.grooveshark.com>). Using thick rows to list items can become particularly useful with the coming trend of touch-screen interfaces. Besides, the use of thick rows for this concept was made to investigate the user's opinions of this idea at the time of the evaluation.

The columns would represent the main attributes for the media items, such as song name, artist name, album and genre. Keeping it to a minimum would lower the user's need to scroll horizontally. At the bottom, there would be a panel that is always present from where the user could change the most subjective attributes of a song or a group of selected songs, such as the songs' genre as well as other metadata that has been found relevant, such as mood, listening season, listening activity, etc.

5. This panel would be used for displaying relevant contents of PlayNow™ arena. From this panel the user would directly be able to download digital content into her own library. The panel would initially present the user with the appropriate sections from the music portal, such as Top and Recommended lists. However, a dedicated search bar is provided for finding contents within PlayNow™ arena, which would be placed within this panel, so that the user is not presented only with items recommended to her, but is also able to search for her desired music; hence giving the user more control. By providing a dedicated search bar, the users' need of obtaining music is fulfilled to a greater extent. This would make the *Sara* persona obtain music easier, and the *John* persona get music legally. Perhaps, it would also encourage other type of users to obtain their music directly from PlayNow™ arena, instead of looking for it illegally or at other portals.
6. This final section would represent the connectivity with an external mobile music device, from where the user can have control of her device's contents. The user would be able to drag and drop content from the list of items as well as from previously created playlists, and perhaps even directly from the PlayNow™ arena store.

Design Concept Three: 'Just Push Play'

This concept focuses on facilitating the playback of music. The user's attention is immediately directed towards the slightly bigger *Playback* button in the middle of the application and the interface supports mainly the simple reproduction, forwarding and backtracking of musical tracks. In this case, reproducing music is seen as the primary objective, which might soon after be replaced by another more important activity that the user might engage in. The primary intentions of this concept would fit, for example, the needs of the *Fred* and *Sandra* personas described earlier, since it gives them the opportunity to start reproducing an item quickly and let the media player take control afterwards. However, an important aspect of this concept is its division into four different panels, each supporting the main activities concerning the use of digital media interchangeably: obtaining media, browsing through media and reproducing media, as well as coupling an external music device. In theory, a user will be engaged into one of the activities at the time, therefore focusing her attention in only one of these sections or panels. Hence, the user should be able to drag the edges of a panel to make the section of interest bigger, while the playback control buttons would always follow the intersection of the four panels.

The initial sketch of this concept is shown in Figure 6.3, and a more detailed conceptual design is given by the screenshot on Figure B.3 of Appendix B, which represents the interactive proposal designed with Axure RP, and which can also be accessed through the web at <http://danceafterlife.mine.nu/Concept3/Home.html>. Note that the final proposal in Appendix B and the initial sketches presented here differ in the order in which the panels are shown. The reason is that the initial assessments of the sketches showed that the music library is considered as a more important aspect, thus placing it in the top-left corner is more appropriate. The explanations listed below, which describe some of interactive attributes provided by this concept are based on the sketches shown by Figure 6.3. As with the previous sketches, the colors and numbers on the figure correspond to the numbered list of explanations.

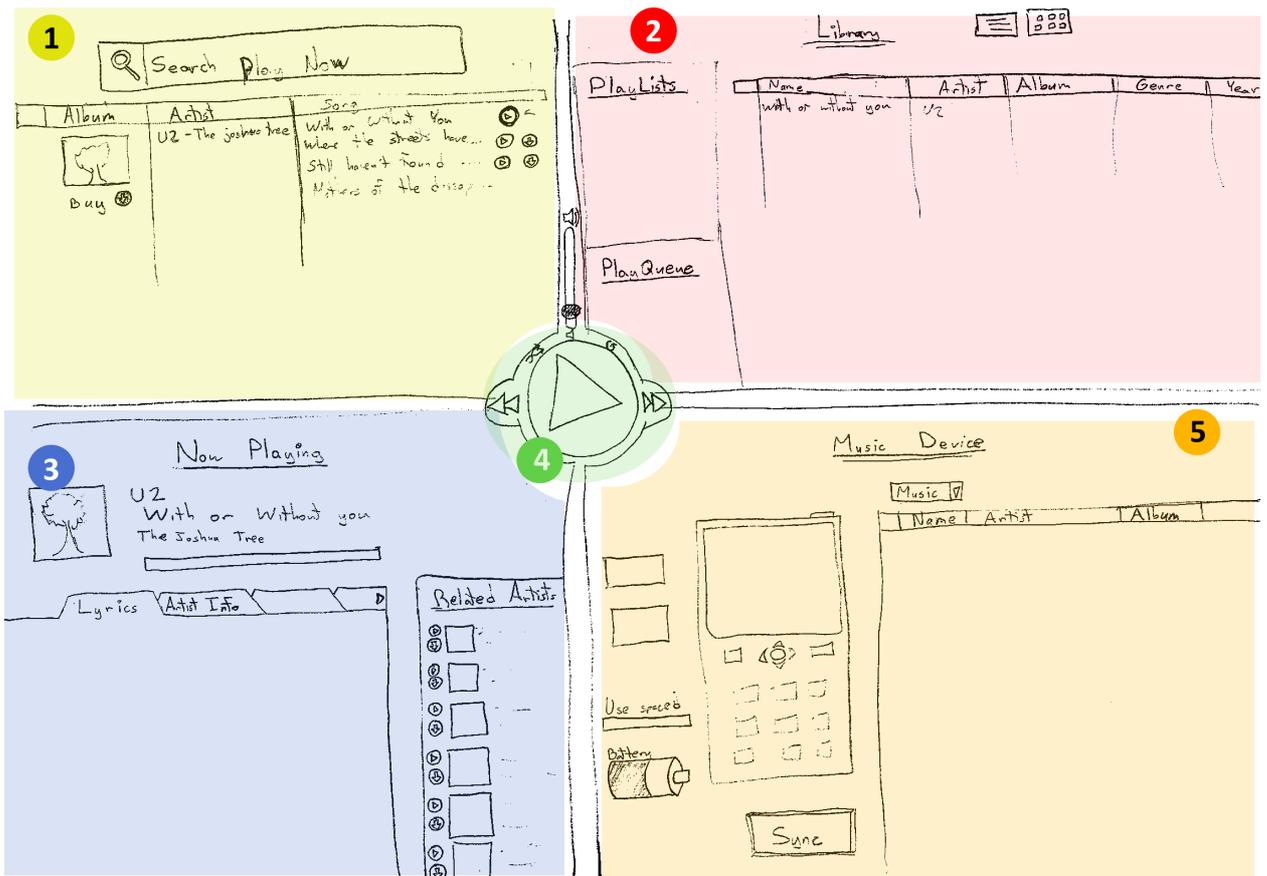


Figure 6.3: Design Concept Three - 'Just Push Play'

1. This first panel, which in the actual implemented proposal ended up in the right top section as shown in Figure B.3, would be the place dedicated to PlayNow™ arena where users could download digital music items into their computers or mobile devices by searching for it explicitly or by discovering new songs by browsing through the media portal. This section could display only the appealing features of PlayNow™ arena, such as hit lists, recommended songs, etc., and also provide a link to the complete media portal, thus considering the design principle of accessibility and supporting the activity of acquiring music.
2. This other panel would be dedicated to the user's music library, which is an important aspect of any media player from where the user can access her media items. The creation and access of playlists should be accessed through this panel as well. However, they would

be presented as vertical tabs or some other interactive control in order to save screen space, so that the area to display the library is not compromised.

This panel would support the activity of browsing through a media collection. The user would be able to visualize her library in different ways and to search for particular elements within the collection. From this panel the user should be able to access and change the information of an item or a group of items.

3. This section would present information related to the music that is currently being played or has been played recently by the user. Such information could include the artists' biographies, songs' lyrics and artists' discography, as well as recommended items related to the music being played. The user should be given the possibility to obtain those recommended items if she does not own them yet.

In this proposal the concept of displaying an artist's *Discography* is introduced. Such information would be gathered from the internet and would present the user with all the albums made by the currently playing or last played artists, making it possible for the user to download such albums effortlessly into her library. This design idea is based on the observations made which indicated the interest of people to acquire full albums of the artists they passionately like, or of other artists they might enjoy.

This design concept also presents a way to influence the aspects of *personal connectedness* and *social action space* by suggesting the sharing of music items as gifts. This is demonstrated by the gift icon under each album of the *Related Albums* tab of Figure B.3. A user might not only download an album or a song to her own library, but also buy it for someone else's library as a gift; thus, increasing the intimate connectivity between people and letting them communicate a meaning among them.

4. As with the previous concepts, there would be a section devoted to the connectivity of a mobile device. The difference with this concept is that the items located in the device would be shown. The user would be able to reproduce these contents if she wishes so. When the device is disconnected that area could still be dedicated to information related to the connectivity of the phone and the synchronization of devices.
5. This section refers to the playback and volume controls which are grouped together, as discussed previously with the other two concepts. The difference is that the playback controls should be more noticeable, so that they capture the attention of the user right away. This will support the activity of listening to music by letting the user open the media player and just push play right away without too much thinking. Considerations of *what* to start playing would have to be made at the time of the implementation. In *Spotify*, for example, opening the application and pushing play before doing anything else does nothing. The user would expect to start listening to something if the button is available, such as the most recent searched music or the most played playlists.

6.2.2 General Traits

Despite the visual look of the different interfaces there are some other traits that should apply to all of them and that must be included in the media player to account for its user friendly interactivity and effective functionality. Some of these general traits that were taken into account for all the design concepts described above are listed in the following sections:

The Interface:

- Considering Fitts' Law, the connected handheld device its intended to be nearby the location of the media items collection, so that the user can easily drag them into the mobile

music device. Also, other related interface components are located close to each other, for example, making the playback controls be grouped together lets the user have control of the volume, the style of playing and changing songs easily.

- The Search bar is made visible in all of the proposals. Even though it was observed that people make use of the search bar sparingly, when they actually use it, they expect it to work flawlessly and to locate it easily. At the same time, the search bar should react immediately as soon as the user interacts with it, creating a sense of what Löwgren (2006) call the quality of *pliability*.
- Users should be able to visualize a digital library in different ways. Other media players have identified this need and provide their users with different options. All of the proposed designs should let the users view a music collection at least by its Cover Art and as a sequential List of items. Other visualizations of the same collection of data should be made possible too, if they provide value for the user.

Navigations:

- One interactive characteristic of Apple's iPhone success is due to its *accessibility* (inUse, 2008). In other words, there is no deep menu system, and a few touches are enough to accomplish the user's goals. Following this model, all the designs proposed earlier do not have deep navigational structures. Where the user can navigate down into a hierarchy, the way to navigate back up should be visible and straightforward.
- The user of all of the suggested designs should be able to navigate back and forth between the regular media player interface and a similar interface dedicated to manipulating the items stored in a coupled mobile music device. In other words, a way to navigate to *device mode* should be provided. This mode will resemble the normal interface but will handle the elements of the connected device.

Features

- Letting the users browse through unexplored music items, through the means of PlayNow™ arena or some other feature of the interface, provides a sense of *playability*. Users can spend hours exploring music as a voluntary hobby and not because they are forced to. At the same time, providing information about artists, songs or alike, could motivate the users to engage in interaction with the media player for longer periods of time.
- At the same time, allowing the users to explore queues of songs that were listened at a previous place in time, or while being somewhere or doing something that they were emotionally attached to, provides a quality of *emotionality*. Music has the power of eliciting strong emotions on people and of making them remember strong emotional episodes of their life. Letting them revive those emotions or help them remember previous time can be an important feature of a digital artifact.
- All of the proposed designs suggest a recommender system that presents the user with music items that might be of her interest. This is an important aspect to include, since it would benefit both, the user, by allowing her to discover new music, and PlayNow™ arena, by increasing their sales and attracting more customers.
- Mobile manufacturers and research groups have developed other features which are incorporated into some mobile devices and media players, such as the creation of playlists according to intrinsic factors, the identification of *mood* and *tempos* for each music item, the access to services like *TrackID*. A new media player should take advantage of all these features that already exist and make them available to the users in better ways.

Functional Requirements

A list of some of the identified functional requirements is presented here. These requirements include aspects of a media player that have been recognized as important or essential to make it function as expected, but that is difficult to demonstrate with the use of simple sketches or a low-fi prototypes. Some examples of functional requirements include the following points:

- Music playing while in shuffle mode, should not be completely random musical selections, since the different changes in tempos and rhythms are usually abrupt and unpleasant for the listeners. The user should be provided with the option of having a shuffle selection of songs based on some musical parameter, so that the music listening session carries on *smoothly*.
- The control showing the progress of the song being reproduced should visually indicate that the media player is acting. One way to accomplish this visual indication is making the progress fill up with color as the song played progresses. Another alternative is to make the album artwork move as a water ripple while something is playing, and make it static while nothing is playing.
- There should always be a seamless connectivity to a mobile music device. Information should be gathered from the device and made visually available to the user, such as battery life, space available on internal memory, etc. The user should have the capability of manipulating phone items through the media player and to easily synchronize media items between the computer and the device.

As of now, the existent technology makes it possible to embed web-applets in web pages that recognize a connected device and are able to transfer files between the computer and the device. Also, tools exist to couple devices with computers seamlessly, and in the recent future, the synchronization of digital libraries with mobile devices could be done wirelessly over Bluetooth or similar technologies.

6.3 Evaluating the Design Concepts

After conceptualizing the three presented design proposals, they were evaluated with three regular users, two of whom were participants in the first phase of the study and one who had not heard anything about the purpose of this research before. Also, an evaluation was also done from the point of view of an expert in the field of interaction design, who have more suggestions and comments based on her design knowledge and experience in usability. Moreover, the three design proposals were published on the internet, which gave us the opportunity to receive feedback from people in remote locations. Four people were interviewed through the phone or instant messaging about their opinion on the three designs. Although the reactions of these participants could not be completely assessed, their input was also valuable towards the design decisions taken on the final design concept.

While evaluating the proposals, the participants were encouraged to use their imagination when thinking on the possibilities for the different functions presented by each of the designs. In fact, some of the interfaces' characteristics were purposely left incomplete, ambiguous or interactionally unaesthetic in order to confirm that the users' way of thinking would match the way of thinking of the designer. In other words, if the users would mention something about the difficulty to accomplish a task or the trouble when trying to understand what something would do or mean, and the designer was not aware of such difficulty, a possible redesign would be needed. On the other hand, if those difficulties were already known by the designer, it was seen as a reinforcement that the user and the designer were thinking alike, and the designer would give his opinion

on how that particular aspect of the interface should actually work in reality. Moreover, some other aspects of the proposals' interfaces were made intentionally ugly or obviously contrasting in order for the users to focus on those aspects and express their opinions on how they thought things should look or react.

The main idea of the evaluative phase was to capture the ways in which the users would like the interface to work or the way they expected it to work. To accomplish this, participants were asked to try to perform some of the basic identified tasks, such as playing back music, browsing through music collections and obtaining music files, whenever applicable. Some of the general questions asked to participants are listed in section A.2 of Appendix A. Their responses led towards fruitful feedback and were used to inform the final design proposal presented on section 6.4.

Results from Evaluations

Some of the main results from the evaluations that took place after conceptualizing the three design proposals are listed in this section. As mention earlier, feedback was obtained from professionals on the field of interaction design, and from regular media player users located remotely and also in situ.

Participants that evaluated the concepts through the phone or the internet did not completely get the purpose of the design phase at the beginning. They expected to be presented with a fully functional media player and kept commenting that they could not hear any sound when they pressed play. After a brief explanation they understood the intentions of the evaluations and responded to the questions that they were asked. The participants that were observed on-location were shortly briefed about the intentions of the evaluation and were presented with the different concepts as they were filmed with a digital video camera. The sessions with these participants were relatively short, lasting approximately 20 to 30 minutes. The main findings are listed below, and their characteristics are graphically shown in the final proposal presented in Figure C.2 of Appendix C.

- For the first design concept (*The Filterer*) it was emphasized that the panel representing Artists should be presented as a list of items, instead of Album Cover Art, since one artist can have many albums and one album is not representative of the whole artist.
- The participants did not appreciate the look of the wide rows in concept number two, *The facilitator*, claiming that it looked 'claustrophobic' or that it lets them see less content than they would like too. However, they appreciated the options that the wide rows provided when selected, such as tagging a song, getting its information or sharing it with others. Therefore, introducing a *fish-eye* concept is suggested, whereby only the selected row expands over two rows or more providing the user with more options for that song as she navigates up or down through a list of songs. If several songs are selected, the fish-eye would not appear.
- Participants appreciated the possibility of changing or setting songs' attributes through a panel at the bottom of the list, as shown in *The Facilitator* concept and similarly to how it is done in the file explorer of Windows Vista, instead of having to open a pop-out window, like it is done in iTunes. This suggests that this aspect of the design concept should be considered towards the final design.
- Participants were enthusiastic at the possibility of tagging songs with moods according

to their own criteria. As of now, the media player MediaGo™ tags songs with mood according to the tempo of the song, without letting the user edit this parameter.

- It was not clear to all participants what was meant by placing a calendar with the label ‘History’ in one of the panels of the different concepts. It had to be explained to them that this suggestion would make it possible to browse queues of music that were heard at a particular period of time in the past. The intention was to take advantage of the power of music to bring previous lived experiences to mind. After understanding this concept, some of the participants discussed the possibility of connecting songs not only to a date in the past, but also to what was happening on that date which made that musical session significant. The idea of being able to associate a song or group of songs with pictures of an activity or a date was also suggested. A media player could then show a small panel with related pictures to the song that would be currently playing, enhancing the user’s affect and eliciting her emotions; thus, providing an even greater quality of *emotionality*. One of the participants mentioned that she did not think she would ever use this feature because it appeared to be too complicated.
- Participants also suggested to make a greater emphasis on the difference between a selected song and a playing song. Making a selected song more prominently visible becomes important when browsing through music files.
- The use of a big progress bar was seen as a useful visual affordance that the media player was acting. The participants agreed with the idea of providing some other kind of appealing and joyful visual indication. Thus the proposal of water ripples around a Cover Artwork of the artist being played was encouraged.
- As predicted, the Search field was easily located by participants when placed on the top-left corner. However, one of the participants suggested that this field could be made more obvious by making the color of Search field text into a more contrasting color. All participants understood the purpose of the search bar and made use of it immediately when they were asked to show the process they would follow to locate a particular item within a location.
- In some of the design proposals the excessive use of Tabs, like done in the *Facilitator* concept which uses vertical and horizontal tabs, becomes pointless since users often did not realized they were there. The use of tabs embedded inside other tabbed panels is not recommended. However, sometimes it is a good way to separate the information.
- The first and third concepts, the *Music Filterer* and ‘*Just push play*’, were seen as visually overwhelming by some users who prefer simplicity. The reason was the use of multiple panels that presented too much information, although the information was considered useful and appreciated. Therefore, a media player that divides its contents into panels, would need to be more careful about the information it presents in order to be more visually appealing to its users. Simplicity and clean designs are encouraged.
- The participants expressed the usefulness and importance of visualizing the data in different ways. They intuitively understood the icons representing the changes in different views and gave suggestions of other ways of presenting the music library. It is important that the buttons to change the view are located near the view panel that changes, so that users understand the connection between the buttons and the library.
- Regarding the panels representing the connectivity of a mobile music device, which was included in all design proposals, the users seem to understand its purpose fairly well, as the design intended. They clearly stated their thoughts of what that panel could do and the information it showed. They understood that music could be transferred to the mobile

device through this panel. However, it was confusing for some of them to understand what a 'Phone Mode' button would do.

- The participants viewed value on the feature suggested by the '*Just push play*' concept, in which users could buy music as a gift for someone else's digital library. However, most of them mentioned that they would prefer to buy whole albums as a gift for someone else and not individual songs, since that would look 'cheap'.

From the three proposed designs, 'Just push play' was the least preferred. This was perhaps due to its unconventionality regarding the placement of the controls and the cluttered look shown by four panels all filled with plenty of information. However, the users were able to understand the interaction relatively easily. As predicted, the participants' initial focus was on the reproduction of music, and they could accomplish this task with simplicity. Some stated, however, that they would be uncertain of which item from all of the four panels would be actually played when clicking in the playback button on the middle of the screen.

6.4 Final Design Proposal

All the work carried out throughout this thesis and presented in this report has led us to this concluding point, which was the initial objective of the inquiry. In this section we present the final design proposal of a media player that can be associated with the PlayNow™ arena media portal, having the intention of letting users reproduce their digital music stored on their computers, to acquire and discover new musical material, to browse through digital media libraries and to manipulate the contents of a coupled mobile device. Most of all, users would be able to *enjoy* the activities that surround the leisure interest of music listening, such as cooking, studying, exercising, or whatever users want to accomplish by reproducing digital media. These reasons, combined with the idea of making it easy for users to start the playback of music and the intention of promoting the services provided by PlayNow™ arena, have given this final design proposal the name of *The PlayRightNow Media Player*.

A graphical representation of the main view of this final proposal can be seen here in Figure 6.4. A bigger image of the same concept is given in Appendix C, along with an alternative views representing glimpses of the possible interactions when a mobile music device is connected. The sections that follow present the final proposal for the PlayRightNow media player. The different sections of the interface of the media player are referred here as *panels*, and are divided into *Top Panel*, *Library Panel*, *Home/Phone Panel*, and the *PlayNow™ arena Panel*.

Top Panel

The Top panel comprises the playback controls, the volume controls, the sequence controls (shuffle and repeat) as well as the elements of the progress bar.

As was identified earlier in the design proposals, the playback controls should be clustered together for easy recognition and accessibility. It was considered of particular importance to place the volume control near the playback button.

The progress bar is made obvious and rich with information. As found in the evaluation of the design proposals, a noticeable progress bar was encouraged. The Cover Art has been rippled,

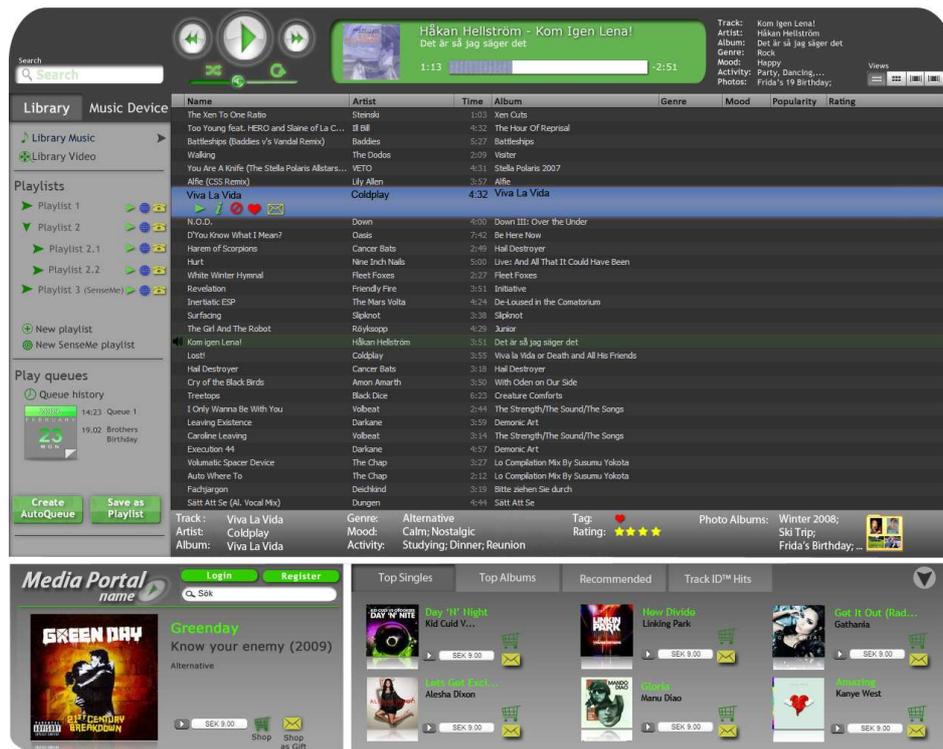


Figure 6.4: A smaller image representing the final design concept. A slightly larger image of the same concept can be seen in Figure C.2 of Appendix C

representing a song being played, which serves as visual indication that something is happening. To the right of the progress bar, more detail information about the song being played is shown, and the user would be able to edit the songs attributes from this section directly.

Library Panel

The Library panel refers to the section in the middle showing the list media items contained in the library. This is the main panel where the user would browse for the contents of the media collection and where her attention ultimately lies. This panel would be able to display different views, such as a list view, a grid view, and others, as it is commonly done in other media players today. Based on the conclusions from the evaluations, the users would appreciate the easy access to features related to the selected song. Therefore, the selected songs expands over two rows, where the second row shows small icons which gives the possibility to start playing a song, get more information, tag a song with affect, and send the song to someone else as a gift. The selected song is prominently highlighted so that the user always knows the position within the list. Similarly, the currently playing song is more discretely highlighted, showing an icon indicating that it is being played. The columns represent the different attributes of each media song. It is proposed to add the attributes of not only mood, but also activities related to a song or seasons in which a song would be more appropriate to be heard. Also, it is important to let the user be able to set these attributes according to her own preferences, and initially set those attributes to a default value obtained from statistical information of a big population of other users. The bar at the bottom of the list would show the information of the selected song, from where the user can easily change it. Of particular interest is the possibility to link a song to a photo album, shown in the top right corner of this bottom bar. This way, the media player would give the user the opportunity to display photos as a visualization that, for her, are connected to the song being

played.

Home/Phone Panel

The left side panel, referred here as the 'Home/Phone' is divided into two sections with the use of tabs. The first section, and probably the main one, contains the elements corresponding to the user's digital library, and the second shows the connectivity and contents of a mobile music device. In this section, the user would be able to access all her digital media, and also filter it by creating playlists, and access queues of songs for particular music sessions. By clicking on the headings, 'Playlist' and 'Play queues' the user would be able to see the contents of all play list or all played queues.

- **Playlists:** The user would be able to create subcategories of playlists, allowing her to organize music with greater flexibility. For example, the *Maria* persona mentioned at the beginning of this chapter would be able to create a playlist containing all French songs, which she can then subdivide into French songs with French lyrics and French songs with English lyrics. Creating a new playlist could be done directly on this panel by selecting either the 'New playlist' or 'New SenseMe playlist'. The former would let the user drag songs from the library into the new playlist, while the latter would present the user with a coordinate of moods where she can choose an area of songs.

Each playlist shows three small icons to its right. The first icon would allow the user to reproduce the whole playlist directly; the second is meant to offer users the possibility to share their playlist through the internet; the third icon would give users the opportunity to send the contents of the playlist directly to their mobile device. Other icons could be included to, for instance, queue whole playlists for the current music session.

- **Play queues:** Play queues are different from playlist in that they are list of sequential songs that are played in one music session and that are not intended for later reuse. However, the user is given the possibility of saving a queue into a playlist if she enjoys it or things she might want to hear it again later. This design proposes to offer the user the possibility to access queues of songs that were created on previous occasions, since these queues of songs are often connected to an activity or emotionally attach the listener to a past lived moment. Besides, offering a *time machine* as a feature of a media player has been strongly suggested by Goto & Goto (2005). The calendar shown in this area, represents the dates when a previous queue was created, and the times listed beside it are tagged with the event that was taking place.

On the 'Media Device' tab of this panel, the user would be able to access the information related to the media store on a mobile music device as well as related information of the device, such as battery levels, memory space available, etc., as presented in the initial design concepts. The user would then be able to transfer group of songs by dragging them into a section of this panel, also create list within the device, and manipulate the contents of the phone via the media player. This tab would be disabled if no device is connected.

The Library panel, described above, would display the selections made from the Home/Phone panel. An arrow to the right shows which playlist, folder or library is currently showing in the Library panel.

PlayNow™ arena Panel

This panel is dedicated to the easy access of the most relevant sections of PlayNow™ arena, supporting the activity of acquiring and discovering new music. The user would be able to search the contents of the media portal directly from this panel, as well as login with her account or register as a new customer. This section could suggest, for instance, the most recent music releases, the most popular songs, and the TrackID top lists. It could also show more information about the artist and the song being played by the media player, and some other useful features. The PlayNow™ arena logo would serve as a web link that can redirect the user to the real page of the portal, showing its full contents and options.

§

It is believed that the interface outlined here would be able to provide users with a more complete and holistic user experience than what other popular players currently offer. In general, it is optimistically expected that this final design concept will make customers of PlayNow™ arena feel more *at home* in terms of their digital music collections. It is also hoped that learning to use a player like this would just make its users want to enjoy other music even more, and explore the multiples possibilities that are becoming available with the attributes of digital media.

Chapter 7

Conclusions

7.1 Summary

This thesis has explore some aspects of the broad topic of digital media and media players. We started by describing the opportunities for research that were identified within a design space. That is, the need for PlayNow™ arena to provide its users with a better experience and to attract more customers to generate greater benefits. The proposal to accomplish this augmentation of PlayNow™ arena was to design a media player that integrates this media portal with the capability of reproducing the media owned by the user as well as incorporating other features and characteristics that offer users a better or different experience to what exists today in current media players. It was noted that the design work performed in this research inquiry could not afford for the kind of creativity that has been presented in other similar investigations, such as the ones done by Goto & Goto (2005) or Leitich & Topf (2007). Their objectives were concerned with new, futuristic approaches of offering the public different ways of experiencing music. The thesis presented here was constrained to an existing industry and to the expectations of generating a predictably usable product. Therefore, this thesis didn't allow for the proposal of completely radical new ideas of innovative media player interfaces, since it was meant to be kept within a design space that the users would be able to understand easily and adopt quickly.

After identifying the potential opportunity to create a solution to PlayNow™ arena's challenge, a structure for the advancement of the study was suggested. It consisted on gathering information from three main different sources that would provide us with the necessary information to wisely apply it to the design of a media player that would fit the needs of the users of PlayNow™ arena and attract others into using this player and accessing this media portal more often. One of the sources of information was the vast number of previous research studies that have explored topics related to digital media and music, such as the way people browse for media items, the way they discover new music, innovative ways of presenting or visualizing digital libraries, the technologies that connect people through the use of music, and others. Plenty of research and literary information was found concerning these topics; perhaps even too much information, which made it difficult to organize and to consider all the possible studies that could have contributed valuable input to this work.

The second source of data that served to inform the design of the interface of a new media player came from an objective analysis of popular media players in the market today. Their interfaces were evaluated against the qualities of digital artifacts proposed by Löwgren & Stolterman (2004) and the principles of design exhibited by Lidwell et al. (2003). The factor of *emotionality*

was suggested as a supplement to Löwgren (2006) model of digital artifacts, since many upcoming computational devices have the power and the intention of affecting the internal emotions of individuals. In the context of this work, supporting the activity of listening to music carries with it an unavoidable connection to people's affect, because of the intrinsic characteristic of music to impact human emotions and memory.

The third source of information came from carrying out usability studies on the way people relate to digital media and, in particular, digital music. Two main methods were considered to accomplish the gathering of data from users. The first consisted on a combination of semi-structured interviews and spontaneous interviews with a light version of contextual inquiries. The interviews were carried out with people that had different experiences interacting with media players and used media content to a greater or lesser degree. The contextual inquiries were mostly carried out during social events, with the purpose of analyzing the way groups of people interact and react to digital music and the technologies that are emerging which are affecting their social practices. The second method was a co-operative evaluation of the interfaces of existing and popular media players. During this method, observation sessions were recorded with a video camera while users and the researcher interacted and commented on these other media player's interfaces, with the intention of discerning their worthy characteristics and traits that were found useful or appealing to regular users. At the same time, some main activities were identify concerning people's relation to digital media and the way they commonly employ particular media players.

By attempting to apply these methods to the collection of user data, it was discovered that capturing the moments of people while they interact with music or digital media is not always an easy task. In this study, it is argued that obtaining information from people that are voluntarily engaging in music related activities (such as listening, browsing or discovering music) returns more accurate results than planning a meeting and asking them direct questions. It is believed that the blend of planned semi-structure interviews combined with exploratory spontaneous conversations with people involved in a digital music related activity yielded a more accountable and reliable set of results. Researchers trying to capture the experience of people when engaging in individualistic, intimate or spontaneous activities are encouraged to practice this combination of dialectical methods.

With the information collected from the three main sources explained above, the process of creating different design concepts based on such information was begun. Some sketches were initially created, which resulted into three main design concepts, guilelessly named the *Music Filterer*, *The Facilitator* and *'Just Push Play'*. These concepts were brought to life with the use of Axure RP version 5.5 (found at <http://www.axure.com/>) and Adobe Photoshop CS4. Unfortunately, fully working interactive prototypes could not be developed due mainly to time constrains. However, Axure RP proved to be a good tool for low-fi prototyping providing uncomplicated interactions and easy learnability. Interaction designers and researchers are encouraged to use similar wire-framing tools to bring their concepts to life. However, there were also some things to consider when using Axture RP. For one, the program still at an early stage of software life and its functionality is still limited. At the same time, it has powerful features, thus it could be easy for a designer of interaction to lose the focus of using this prototyping tool and paying attention of the little details and graphics surrounding a design concept. Researchers and professionals using similar wire-framing tools are advised to constantly rethink their priorities and keep their attention on the actual interactions of the conceptual design, instead of drawing away in the graphical details or the creation of very complicated interactions that might not add too much value to the concept.

The three design concepts were constantly reevaluated and modified after receiving comments from a professional in the field of interaction design, as well as from regular media player users, some of whom also took part in the co-operative evaluations done earlier. The three interactive

conceptual designs were also made available on the internet in order to obtain the feedback from people who were remotely located. At the same time, a few other people were asked for their opinion on the look-and-feel of the proposed interfaces and their interactions while being observed and their actions recorded with a digital video camera. The valuable comments from these multiple sources were taken into account to inform a final design proposal, presented at the end of chapter 6 and bringing the thesis work to an end by accomplishing its objective: to suggest a media player for PlayNow™ arena that allows its users to reproduce, browse and obtain digital content, and that provides them with a good overall user experience that might make them adopt this player and its services as their *media home*. This final proposed design concept has been tentatively, and playfully, named *PlayRightNow Media Player*.

7.2 Opportunities for Further Research

One could envision the endless possibilities that can arise with the combination of advanced attributes of digital media and newer technologies, such as the Long-Term Evolution (LTE) networks, more powerful mobile devices and futuristic embedded systems. With the technologies that are existent today, it would be already possible to access personal music connections remotely, giving users the possibility to enjoy their favorite music anywhere as long as they carry a computational device and an internet connection. With the upcoming trends of ubiquitous computing and the seamless access to internet people will soon have the possibility to access not only any song in the world, but also videos and other digital content whenever they please. We foresee applications coming up based on similar services like Spotify but providing the public free access of video clips, TV episodes and complete movies on demand. It could be advantageous for researchers to pick up from the work presented hereby to consider the possibility of a media player that is able to manipulate and stream video formats. Even when the term *digital media* entails the concept of digital video, this thesis kept its focus on digital music. The relationship of media players' users with digital video is still unexplored, and increasingly interesting.

At the same time, the services offered by Spotify are relatively recent. Exploring the effect of music streaming services in society and their impact on other corporations or industries would be of interest. In particular, researchers could investigate the possibilities of enabling Spotify's services on mobile devices and the effect it would have on the iTunes store.

On a different note, in this thesis it was not possible to implement a fully working interactive prototype of the final design concept, which was the initial wish of carrying out this inquiry. The main limitation for this was the timeframe provided to conclude and deliver the work. It is now up to the hands of future talented researchers to implement the concepts proposed here and evaluate them with users under more realistic settings, considering the details behind the interface that were left out of the concepts developed with Axure RP, such as menu options, window sizes, internet connectivity, device coupling, graphics, navigations, etc.

Having a fully working application would also allow another researcher to apply the Technology Acceptance Model (TAM) suggested by Davis (1985) to explore the degree in which users embrace this new suggested interface of a media player and the technologies surrounding it. At the same time, an evaluation of the final design proposal presented in section 6.4 could not be carried out. It would be interesting to see the reaction of people towards this design concept, and the elements from the three initial design proposals that can still be incorporated.

Also, the fact that popular songs tend to become jaded after being repeatedly played for some period of time has not been considered in this thesis. In other words, people can become tired of

listening to the same song(s) over and over again. An investigation could be done on the reasons behind this process of music boredom, and consider this towards the development of future media players. As an example, a media player could keep track of the songs that have been repeated several times and skip those tracks during a shuffled music session.

More importantly, it would be exciting to see the existent technologies be put in place through the look of the interface proposed here. A more technically oriented researcher could carry out the implementation of the functionalities of a media player, and more importantly, incorporate the technology that allows the connectivity of mobile devices with a computer. Stakeholders are known to have the technology in place that can accomplish these tasks, but an interface was needed. Now that an interface has been suggested in this thesis, it can be incorporated with these technologies to fulfill the implementation of a media player.

On a more visionary remark, in the future it would be ideal if people would be able to interact with media players remotely by hand gestures. As mentioned in section 5.3, the observations found that users have a desire to be able to manipulate the playback of their music without having to be disrupted from the primary activity they are engaging in. With the technology available today it would be possible to manufacture a device filled with sensors that recognizes some kind of body gestures and that is wirelessly connected to an interface in a nearby computer. When the user is engaged in another activity, she would just need to flip her hand, shake her head or perhaps tap her feet and the media player would start playing the next song. Therefore, it is proposed that future investigations look into the ways that the different aspects of ubiquitous computing will affect the way people relate to music and media players.

7.3 Final Words

As mentioned above, but worth remarking, through this thesis work a vast number of research and interests concerning the use of digital music were encountered. It was very difficult to keep track and account for all this extensive material that was found related to this colossus topic. Numerous worthy investigations of the highest quality could not be taken into account within the scope of this thesis, either because they were not discovered promptly enough or because they would lead to deeper discussions that could not be argued here for the sake of simplicity. In general, the topic of digital music is very broad and continuously growing, not to mention becoming more intriguing and interesting. This thesis perhaps captured just a fragment of this enormous subject, but it is in our hopes that the readers and interested researchers could catch a glimpse into the world of digital media and gained some insights into the design process of digital media players. Expectantly, this work will at least serve as the bases for the design of future media players and the considerations that need to be done when designing for the experiences related to music listening. Optimistically, manufacturers of mobile devices and other industry sectors will consider the ideas proposed here in order to develop them further into the full implementation of a usable media player that will bring benefit to both their corporations and put PlayNow™ arena in the spotlight. Hopefully, users of a media player with the characteristics suggested hereby will be willing to embrace it because of the unique user experience that it might offer.

Note, however, that it is not the intention of this work to claim that the design of the media player here suggested will provide the absolutely ultimate digital media experience for its users. It is, in fact, acknowledged that it is not at all a perfect design and that a lot of details are still need to be worked out. However, it is in our hopes that the work presented in terms of research theories and the methods employed to study users' behaviors in relation to digital media, become of value for future explorations of similar topics. In particular, it is worth mentioning that studying users

under intimate activities should be approached with ingenuity and caution, as well as obtaining data for activities that occur spontaneously or are encountered without previous planning.

Overall, the author would have a humbly fulfilling feeling if this thesis work was able to trigger thoughts of interest in the reader, making her more motivated to learn about the topic of digital media, and inspired her to take further the ideas proposed in this report. It is in the author's hope, that the learning process that he undertook will be also transferred to the reader, and that the work here done is transcendent into more evolved or interesting pieces or research. But above all, it is wished that the future works cultivated from this thesis will lead towards the benefit of users of upcoming digital products and the progress of the field of usability in general, since it is the satisfaction of people what we are ultimately aiming for.

Appendix A

Data Collection

A.1 Contextual Inquiries and Interviews

The questions presented here led the discussions of the semi-structured and spontaneous interviews which were discussed in section 5.2.1, and they were also used as the bases for the cooperative evaluations described in section 5.2.2. These questions are based on an initial pilot observation that helped to discover the aspects of a media player that users might look for and their relation to digital media. It is important to note that the questions were asked while the participants interacted with one or more media players and were never completely out of the context of music related activities.

1. What is one of your favorite bands/song(s)?
 - Do you have that song as a file in your computer?
 - Can you play it for me?
 - What do you do when you usually feel like listening to this band/song?
2. How do you usually get songs into your computer? How do you obtain them?
 - Why do you prefer this way of getting songs?
3. Do you usually use this program for listening to songs?
 - Why did you choose this program?
 - Is there something in particular that you like about it?
4. Did you use another media player before using this one?
 - If yes, why did you change?
 - Was it hard to make a transition?
5. How would you create a playlist of songs that you like?
6. Do you have an MP3 player?
 - How do you transfer songs into your MP3?
 - When do you use it the most? Under which situations?

A.2 Design Evaluation Questions

1. How would you start playing a song?
 - Was it easy to locate the play button?
 - How did you know that something actually started playing?
 - How would you stop playing the song?
2. How would you find a song from a given artist?
 - Can you think of a way that this could be done in an easier or more effective way?
 - How would you change the information (metadata) of this song?
3. Imagine you are about to study/exercise/cook and you would like to listen to music while doing it. How would you go about it with this media player?
4. What information in this area is most valuable for you?
5. How would you create a playlist of songs that you like?
 - How would you find the playlist again?
 - Would you reuse it?
 - Do you understand the difference between having *playlists* and having a queue of songs?
 - How would you go back to the main list of songs (Library)?
6. How would you transfer songs to your mobile phone or music device?
 - How would you look at the contents of your mobile phone?

Appendix B

Design Concepts Images

B.1 *Music Filterer*

B.2 *The Facilitator*

B.3 *'Just Push Play'*

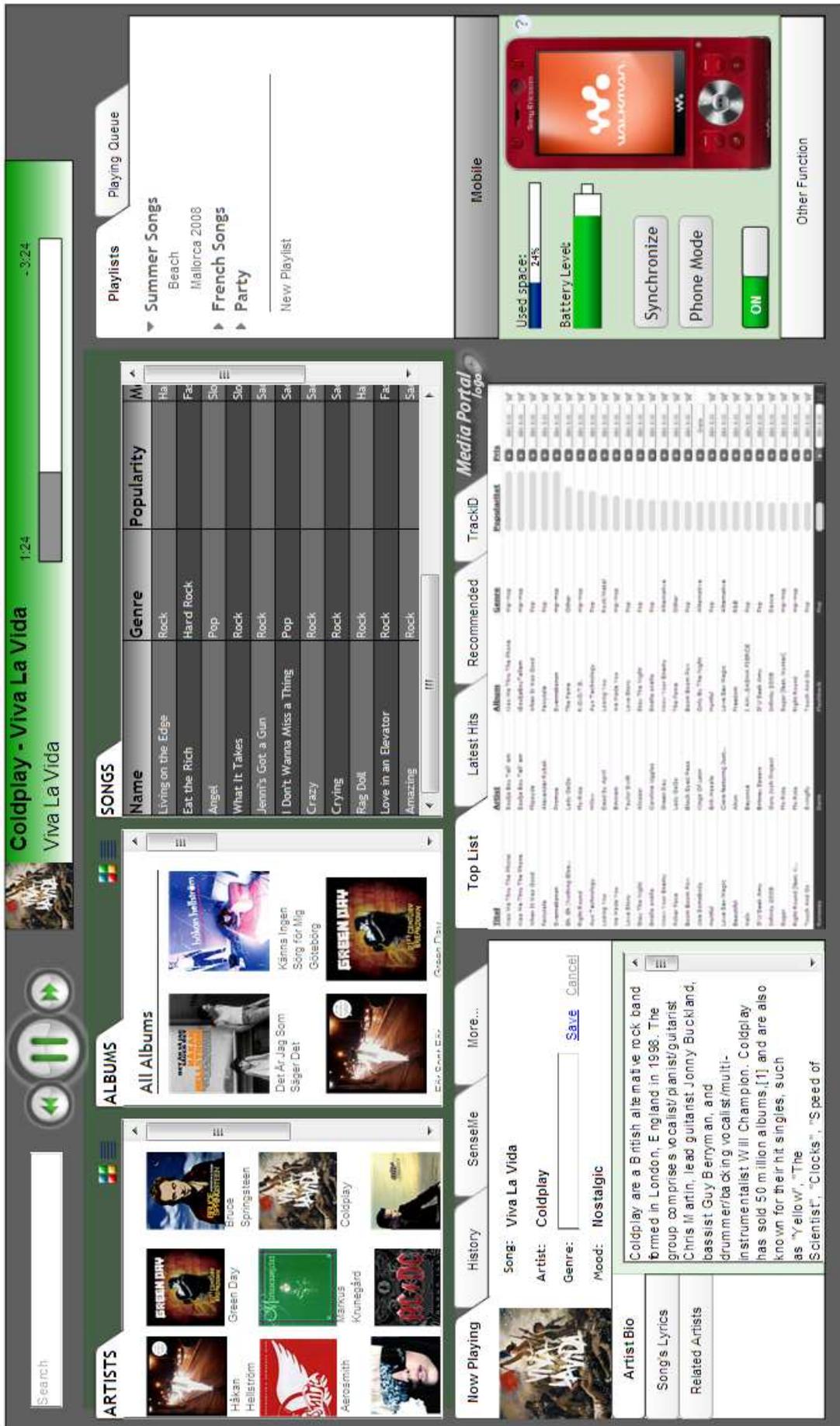


Figure B.1: Design Concept Three: Media Filterer

Coldplay - Viva La Vida
Viva La Vida

1:10 - 3:24

Media Portal logo

Search PlayNow arena...

Views

Name	Artists	Album	Time	Genre	Year
I Dont Wanna Miss a Thing	Aerosmith	Armageddon	4:04	Pop	199
Death Of Laakso	Laakso	Mother, Am I Good...	4:04	Indie	200
A Beautiful Night in Oslo	Billie the Vision & The Dan...	Where The Ocean...	4:05	Indie	200
Snypah	Takida	Bury The Lies	4:05	Alternative	200
Viva La Vida	Coldplay	Viva La Vida	4:05	Alternative	200
När Du Rör Dig	Bo Kaspers Orkester	Hund	4:05	Acoustic/Folk	200
Shoo be doo	Macy Gray	Big	4:05	R&B	200
Children 2000 (Trance ...)	Robert Miles	Trance Singles	4:05	Trance	200
Yesterdays	Switchfoot	Oh! Gravity	4:05	Alternative	200
Råda Signaler	Plusgrader	Antigen är Här	4:05	Indie	200
Don't Wait	Dashboard Confessional	Dusk and Summer	4:05	Alternative	200
The Good Times Are Killin...	Modest Mouse	Good News for ...	4:05	Indie	200
le havre	Sällskapet	Sällskapet	4:05	Alternative	200
Forgiven	Relient K	Five Score And ...	4:05	Punk	200
Like My Very Own Blood	Tiger Lou	The Loyal	4:05	Indie	200
Want To Cannot Help But...	Billie the Vision & The Dan...	I was so unpopula ...	4:05	Indie	200

Topplistor

Musik

Top singlar Top album

1. Eh, Eh (Nothing Else) Lady Gaga
2. When It Was Good Flipsyde
3. Know Your Enemy Green Day
4. We Made You Eminem
5. Svennebanan Promoe
6. Right Round Flo Rida
7. Love Sex Magic Ciara featuring Justin Timberlake
8. Love Story Taylor Swift
9. Snälla snälla Caroline Ugglas
10. Stay The Night Alcazar

Spel Ringsignaler Bakgrunder

Playing Queue

Playlist

- Summer Songs Beach Mallorca 2008
- French Songs In French In English Old
- Party
- New Playlist

Now Playing

Mobile Music Device

Used space: 24%

Battery Level:

Phone Mode

Synchronize

ON

Genre: Alternative

Mood: 😊

Activities: Studying; Exercising; Sleeping;

Season: Spring

Figure B.2: Design Concept One: The Facilitator

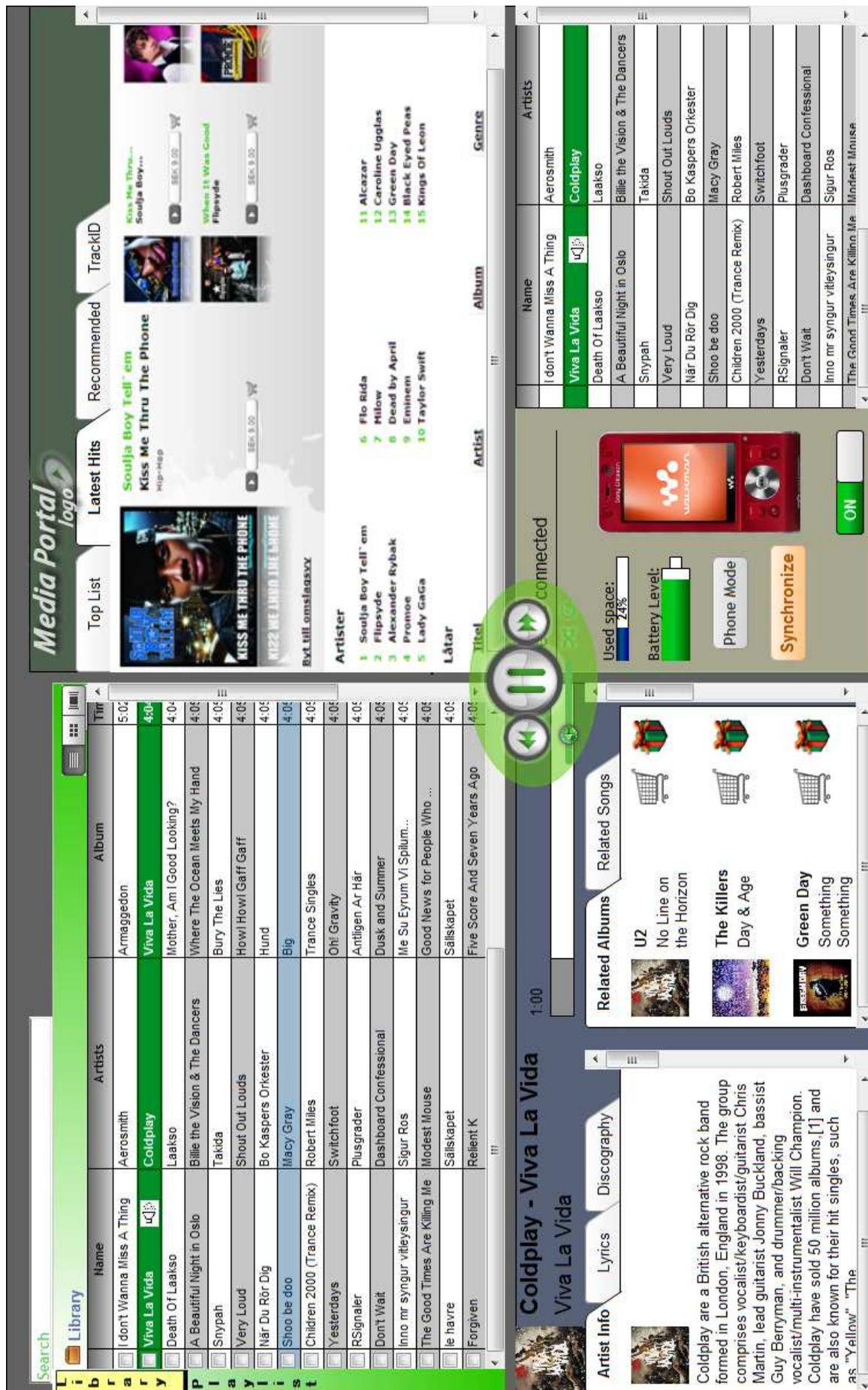


Figure B.3: Design Concept Three: 'Just Push Play'

Appendix C

Finalized Design Concept

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