

TOWARDS IMPROVEMENT OF INTERACTION AESTHETICS OF MOBILE MUSIC LISTENING JOURNEYS

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Abstract

Mobile music listening can be traced back to the introduction of Sony Walkman that upgraded music players both with privacy and portability. With the mobile listening media, our daily journeys in public environment have become more privatized, aestheticized and contented. It is a challenge to perform such a private activity in public environment with many people and audio-visual stimuli around. The journeys with music become additionally challenging with the music players' interfaces confined into tiny buttons and screens that heavily rely on visual modality. This paper discusses if the aesthetic experience of mobile listening can be enhanced through the way users control mobile listening media. It presents the analysis of a tri-partite fieldwork to demonstrate how the use of physicality in interaction can contribute to the beauty of our interactions with mobile listening media while dealing with the challenges in the (use) context. This study points out that context comprises inspiration as well as challenge. The results indicate that controlling mobile listening media becomes sensorially enriched and meaningful when physical context is interpreted as a means of interaction.

Keywords: User experience, Aesthetics of interaction, Embodied interaction, Mobile listening, Research methodologies and methods

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Please cite this paper as:

Surnames, Initials: *Title of paper*. In: Proceedings of the 20th International Conference on Engineering Design (ICED15), Vol. nn: Title of Volume, Milan, Italy, 27.-30.07.2015

1 INTRODUCTION

Mobile listening, in other words, ‘listening on-the-go’ is a daily cultural activity that keeps evolving with the introduction of new technologies. Introduction of Sony Walkman in 1979 can be regarded as a true milestone in carrying the experience of music listening to outside. This constituted the main motivation behind the public use, by upgrading music players with privacy and portability.

Bull (2005) defines mobile listening as the privatization of space and uses the term ‘auditory bubble’ to refer to the creation of a private sonic-world by listening on-the-go. In fact, performing such a private activity in a shared environment is both the essence and the challenge of mobile listening. In public environment, there are a variety of audio and visual stimuli that detract the attention of mobile listeners who have to deal with the mobile listening device at the same time. Furthermore, the activity of mobile listening usually accompanies other public tasks, such as using public transportation or shopping. Therefore, public environment requires mobile listeners’ constant switch between their ‘private mode’ and the ‘public mode’ of listening to music.

This challenge increases with the interfaces confined into tiny buttons and screens that are scaled down for the sake of portability of music players (Sen, 2014). Majority of the interactions of the contemporary mobile listening media are based on graphical user interfaces, touch gesture or button-based controls. They depend on visual modality of users, which cause difficulties in mobile use. There are solutions which make controls more accessible; however, contemporary embodied interactive technologies that combine physicality and computing present opportunities in terms of i)expanding the area of interaction; ii)making interactions more harmonious with the mobility of user; and iii)utilizing the way we interact with daily wearable and portable objects or our bodily movements.

Thanks to the mobile listening media, our daily journeys in public environment becomes more aestheticized and ‘contented’ when we are accompanied by music. This paper discusses if changing the way we control the music with embodied interaction can contribute to this aesthetic experience. It presents the analysis of a tri-partite fieldwork to demonstrate how embodied interaction, in other words, how the use of ‘physicality’ in interaction can contribute to the beauty of our interactions with mobile listening media while dealing with the challenges in the (use) context at the same time.

2 UNDERLYING CONCEPTUAL FRAMEWORKS

This section briefly presents the definitions of terminology and frameworks which are referred in the analysis of mobile listening experience.

Mobile listening is an activity within the scope of user experience design since it includes a product (mobile listening media) and a user (mobile listener). Therefore, discussing how to enhance mobile listening experience in public context requires discussing the relationship between *context* and *user experience*. In this regard, this paper mainly refers to Forlizzi’s (2007) “Product Ecology Framework”, and Sener and Pedgley’s (2014) “Domain of Interaction” model to understand the role of the context in user experience. These frameworks enable the analysis of user-user, product-product and user-product interactions that are occurring while mobile listeners are simultaneously dealing with mobile listening media and public environment.

Product Ecology Framework involves people acting and interacting with a product or products; individually or as a group, within a particular environment. Therefore, it enables the discussion not only on user-product interactions but also social interactions among these people (Forlizzi, 2007). On the other hand, “Domain of Interaction model is helpful to see how variables affecting user-product interactions are grouped within “user context” (e.g. user’s past experiences), “product context” (extrinsic properties or infrastructure affecting the functioning of the product) and “interaction context” (e.g. public vs. private distinction) (Sener & Pedgley, 2014).

This paper approaches to *context* as in Dourish’s (2004) definition, in which context is presented as an “interactional problem”, in other words, “a relational property between objects or activities. It means that context affects a particular activity in a particular way. This point of view necessitates the investigation of the public environment not as it stands; but with its relationship to mobile listening. This way, it allows exploring the potentials embodied within the context for aesthetics of interactions of mobile listening media.

So, what is aesthetics of interaction? Aesthetics, as a term, has largely been associated with the visual appearance of a product. However, when user-product interaction is considered, aesthetics is not only limited to how users visually perceive a product and be pleased with it, but it also implies how users

feel and enjoy a product's audio, kinaesthetic, tactile and olfactory attributes through their senses (Desmet & Hekkert, 2007; Overbeeke & Wensveen, 2003). Peterson et al. (2004) argue that the notion of aesthetics stems from our physical encounter with the world and aesthetic of interaction can be defined as the beauty of our physical relationship with products. This constitutes the main motivation behind exploring the potentials of embodied interaction, in other words, the use of physicality in computing to aestheticize the way users interact with mobile listening media.

Dourish states that embodied interaction exploits our familiarity with physical world (2004). There are diverse forms and levels of embodied interaction which utilize physicality in digital interactive systems in different ways. While tangible user interfaces make use of physical objects to control and represent the digital data (Ullmer & Ishii, 2001), organic user interfaces enables users to control and get feedback from a digital media by altering the physical condition of objects in a more flexible way such as, folding, bending and squeezing (Holman & Vertegaal, 2008). Furthermore, gestural interfaces utilize users' bodily movements as input of interactive systems.

3 EXPLORING POTENTIALS TO AESTHETICIZE THE DAILY JOURNEY OF MOBILE LISTENING

The fieldwork presented here is part of a more comprehensive research (Sen, 2014) which explored the potentials of embodied interactive technologies to enhance mobile listening experience in public environment by aestheticizing the way we control the mobile listening media. The scope of the explored controls was determined with specific controls (play/pause, volume up/down and skip forward/back). The fieldwork consisted of three progressive studies, namely, 'Study 1: Telling about the Journey'; 'Study 2: Living in the Journey'; and, 'Study 3: Dreaming about the Journey'. The term *journey* was used with reference to the daily urban travelling activity accompanied by music, and also with inspiration from the customer/user journey mapping methods (Abbing, 2010). Study 1 and Study 2 uncovered the contextual factors affecting the experience and mobile listeners' concerns related with user-user, product-product and user-product interactions by utilizing different qualitative methods. Study 3, was generative design session that revealed the potentials *embodied* within the context for aesthetics of interaction. First two studies were utilized in the analysis of Study 3 to evaluate the generated ideas with regards to the users' concerns about the context of use. This paper shares the main findings of the first two studies and then largely draws upon the analysis of Study 3 to discuss the role of 'physicality' in aesthetics of interaction.

3.1 Telling about the Journey

'Study 1: Telling about the Journey', appropriated 'customer journey mapping' which is defined as "the process of creating a graphical representation of the steps and stages a customer goes through to experience a product or service" (Abbing, 2010, p.10). Five participants were asked to reflect on their previous mobile listening experiences by filling in a pre-prepared chart, which consisted of different stages of their journey of mobile listening in columns and particular categories to evaluate each stage in rows.

The results of Study 1 showed that mobile listeners' concerns were mostly related with their *mobility* (if the product can be controlled on-the-go), *presence of other people* (e.g. crowdedness, our respectful manners towards other people, concerns for safety of the device), *accessibility of the device and the controls*, *division of attention between listening to music and public environment*, and *portability of the device* (if the way product is carried affects the interactions).

Obviously, these concerns cannot only be explained with reference to user-product interactions. They also constitute examples for user-user interactions (interactions among people directly or indirectly affecting each other by sharing the same public context), product-product interactions and show that all these interactions are highly interconnected with each other. To illustrate, concerns for safety of the product increases in crowded places (user-user interactions), it affects the portability preferences of users such as carrying the product in bags instead of at hands (product-product interactions) and such preference completely alters the way users interact with the product by changing the level of accessibility of controls (user-product interactions). This complexity and interconnections among these different domains of interactions are illustrated in Figure 1 with a diagram building onto Forlizzi's Product Ecology (2007) and Sener and Pedgley's Domain of Interaction (2014) frameworks.

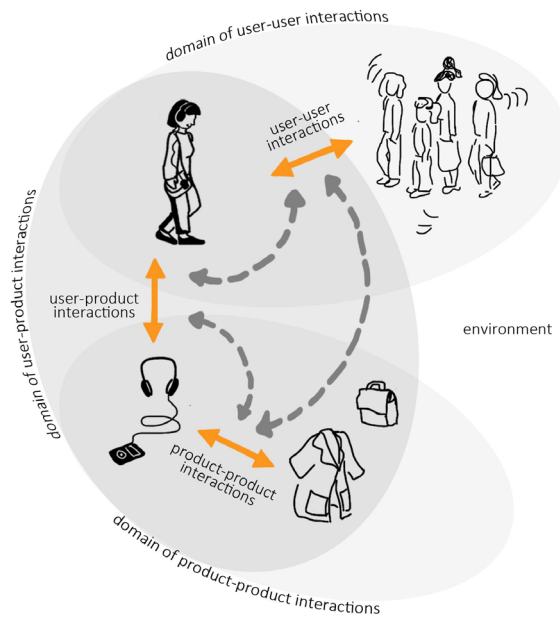


Figure 1. Intersections among the domains of user-user, product-product and user-product interactions (Sen, 2014)

3.2 Living in the Journey

‘Study 2: Living in the Journey’ was conducted as a literal journey to enable users to reflect on their mobile listening experience by performing activities in a real-life context. It was conducted with sixteen participants who are different than the participants of Study 1. The participants were asked to test the selected mobile listening products in a particular journey route while completing several pre-defined public activities/tasks at the same time. They were given a printed map explaining the steps of this forty-five-minute journey accompanied by music. The activities and tasks en route were organized to add challenges to the journey. In other words, they were arranged in a way that participants would have involved in everyday interactions (e.g. social interaction and division of attention). Henceforth, the steps that users went through included using a public transportation, buying a cake from a street buffet, crossing the street by using the overpass, and asking for a specific book at a bookstore.

In the journey, each of the sixteen participants made use of one of the four mobile listening devices selected for the study. The main criterion of selection was to have products offering different types of interfaces with varied controls. Their cost and availability on the market were also concerned in the selection. They included iPod Shuffle MP3 player with button-based controls; iPod Nano MP3 player with a multi-touch screen and graphical user interface (GUI); Sony Wearable MP3 player with eyes-free button-based controls and Rhythmz headphone with touch gesture controls.

At the final destination of their journey, a post-interview was conducted to collect data when the participants’ experiences were fresh. The interview included questions about the music player controls they used (or had to use) regarding the dynamics of each activity; their suggestions about the ideal interactions for each activity; the various aspects of the music players as well as the controls they liked and disliked; and, the differences they experienced between the public-use and home-use. Additionally the participants’ past experiences were also referred within the interview to understand the journey they went through in this study with comparisons.

The following part presents the results of Study 2 that uncovers mobile listeners’ concerns about user-user, product-product, and user-product interactions:

User-user interactions related concerns can be listed as *proximity* (e.g. if there is enough space between users to control the device or not), *appearance* (e.g. if the mobile listening media looks like an accessory or a device, if the typology of the product or the way of interaction is unprecedented to other people), *audio-visual detachment* (e.g. being close to communication through what you hear and also how you look with phones), *alternative ways to communicate* (e.g. use of gestures instead of words not to destroy the auditory bubble with another audio stimuli), and *privacy* (e.g. not wanting others to see/hear what you listen).

Product-product interactions related concerns are mostly related with the portability preferences of users. *Safety of the product*, *accessibility of controls*, *appearance* (e.g. how you look with the product when it is carried in a particular place), *prevention of accidental controls* (e.g. not putting the music player in small pockets to avoid from accidentally pushing a button), *orientation* (e.g. placing the product according to the layout of the controls) can be listed as the main determinants of the way users carry mobile listening media. Beyond portability, the *connection between different means of mobile listening media* (e.g. the quality of Bluetooth connection between a headphone and mobile phone) was also raised as a concern regarding product-product interactions.

User-product interactions related concerns of the participants mainly reflect the particularities of different types of interfaces. It was observed that, if the product has button-based controls, the concerns of users are more related with the *layout of the controls* and *size of the interaction area*. When it comes to the MP3 player with GUI and multi-touch screen, the participants seemed more concerned about *division of attention* (e.g. difficulty of performing controls on the screen on mobile). If the product is a wearable one with eyes-free button-based controls, participants' comments mainly touched upon *getting used to the controls*, *layout/mapping of the controls*, *'feel' & 'hear' of controls* (e.g. need of audio feedbacks and textural cues when visual modality cannot be used) and *wearability* (e.g. freedom of movement by eliminating the need of holding the product in hand). When it comes to the headphone with touch gesture controls, *pressure applied for the touch 'sensitive' surface*, *definition of the gestural interaction area*, *reliance on the physical*, and *users' subjective interpretations of controls* (e.g. turning head with a steady finger instead of swiping finger on headphone surface) appeared to be more significant for the participants.

3.3 Dreaming about the Journey

'Study 3: Dreaming about the Journey' was conducted as a generative session in which four participants from Study 2 were asked to utilize the way they physically interact with daily objects and their bodily movements to propose new listening-related controls. The session consisted of the following four stages:

1. *Overview of non-instrumental interactions and alternative ways of controlling available devices:* It is questioned whether alternative tangible controls could be offered for available mobile listening devices. In this regard, non-instrumental interactions which do not own a functional purpose such as "playing with or caressing the product" (Desmet & Hekkert, 2007, p.58) were expected to be inspirational.
2. *Utilization of daily objects:* The participants were encouraged to dream about making use of the tangible properties of daily products to control music. These products were selected among portable/wearable products that already accompany users while they are listening on-the-go.
3. *Utilization of bodily gestures:* The participants were expected to 'perform' listening related controls through bodily movements/gestures.
4. *Controls beyond the limits of technology:* The participants were encouraged to think beyond the limits of the existing technologies and come up with controls that exploit as various sensory modalities as possible.

3.3.1 Results

The results of Study 3 are now presented in four categories, in keeping with the four stages involved during the generative session.

i) Non-Instrumental Interactions and Alternative Ways of Controlling Available Devices

Controls inspired from non-instrumental interactions. Attribution of a 'volume down' function to bending cables by a participant who made use of deformability of the cables and constructed an analogy between the sound coming through the cables and water coming from a pipe can be given as an example (see Figure 2).

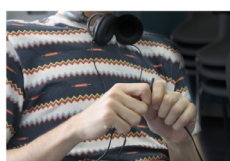


Figure 2. Decreasing volume by bending the cable

Controls performed beyond the designed interface of available mobile listening products. By referring to Study 2, the participants mentioned particular actions that they used as controls instead of the controls offered by the interfaces of available products. This revealed the hidden functions behind the actions performed with mobile listening devices. They can be exemplified with the situations where users take off headphones as a reflex to give a pause to the listening activity when they have to become involved in a conversation or want to direct their attention to something else than music. In the generative session, there were also some alternative controls provided through attribution of particular functions to the alternative physical manipulations of available mobile listening devices. To illustrate, turning over to reveal the back of the music player was defined as a device-based gesture to pause the music (see Figure 3). In another example, a participant offered changing the playlist by changing the bodily location of where the music player is carried (see Figure 3). It was mentioned that a GUI is more advantageous when it comes to playlist or song selection in comparison to eyes-free button based controls, which requires constant advancing of the songs. So, what the participant did can be regarded as enhancing eyes-free controls by creating a physical layout for playlists on wearable/portable products.



Figure 3. Pausing the song by reversing the music player, changing the place of the device to change the playlist

ii) Utilization of Daily Objects

Depiction of potential areas to attach controls. Some participants made use of the daily objects solely to attach the existing controls rather than redefining the way of performing these controls by physically manipulating the objects as shown in Figure 4. Decisions were mainly based on the accessibility of the controls.

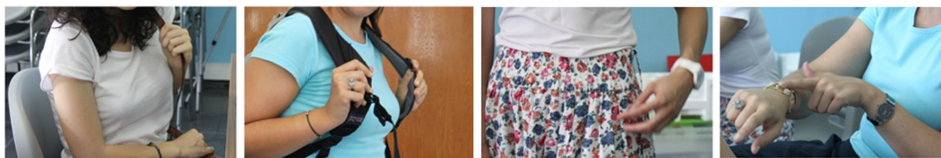


Figure 4. Depiction of potential areas to attach the main controls

Utilization of the objects already involved in accompanying activities (activities affecting mobile listening interactions such as using public transportation, shopping, etc.). The examples grouped under this category helps us to question whether the way users interact with the objects used in/for these activities could directly transform into the controls of mobile listening devices. A participant stated that it would have been useful if the song is paused automatically when the wallet is opened to concentrate on the purchasing activity (See Figure 5).



Figure 5. Pausing the song when the wallet is open

Re-conceptualisation of daily objects as means of controls: Participants reinterpreted affordances and material properties of daily objects to propose new types of controls for listening to music. Selection of examples for play/pause, skip back/forward, volume adjustment, and shuffle functions can be seen in Figures 6 to 9 (captions refer to images from left to right).



Figure 6. Pausing and playing the song by a tap on the flat necklace, a tap on the skirt, pulling the stripe of an umbrella, stretching the elastic bracelet and leaving it back, and turning the elastic bracelets inwards



Figure 7. Skipping to the next or previous song by pulling the fasteners on the right or left side, pulling right or left end of the scarf down, tilting the water bottle towards left and right, turning the hat, turning the brooch in clockwise or counter-clockwise



Figure 8. Increasing or decreasing the volume by sliding the zip, swiping fingers through the edge of the skirt's pocket; by turning the umbrella clockwise or counter-clockwise, and swiping the circular frame of the watch



Figure 9. Shuffling the songs by shaking the bottle; and by creasing the skirt

iii) Utilization of Bodily Movements/Gestures

This category presents the listening-related controls performed with bodily movements. In some gestures participants utilized daily objects. However, it is essential to mention that the main role of objects in gestural interactions is to track bodily movements of users rather than be involved in interaction through physical changes they go through. Examples for the main controls (i.e. play/pause, skip back/forward, volume adjustment) can be seen in Figures 10 to 12.



Figure 10. Playing and pausing songs: Gloves sensing the clapping of the hands; the bracelet sensing the muscular movement specific to the each hand gesture that corresponds to play and pause in order, from left to right

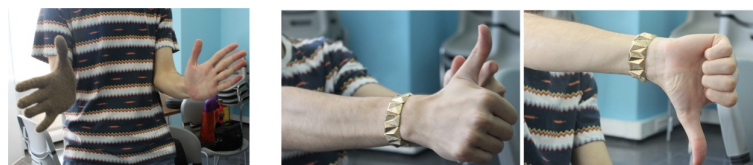


Figure 11. Increasing or decreasing the volume according to the distance between the two hands; thumbs up/down to volume up/down

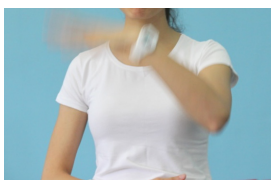


Figure 12. Advancing songs with sliding motion of the hand

There are some examples presented by the participants that do not exactly define how specific types of controls are realized, but underline the potentials of using particular objects or parts of body for controlling music (see Figure 13).



Figure 13. Controls through foot gestures tracked by the clip attached to the pants and controls through proximity of jewellery pieces

iv) Exploration of Different Sensorial Interactions

The categorization undertaken for this section deals with the results of the last stage of the generative session, where participants were encouraged to think beyond the capabilities of current technologies and to include other sensory modalities in interaction. To illustrate, one participant used the sense of taste for controls, by building a scenario in which music albums are sold in the form of a pack of biscuits and a particular song in a particular taste starts playing when the user tastes the biscuit. In terms of sound voice control, commands in the form of whistles are offered to control music. There was also an example exploiting the tactile qualities of daily objects, such as touching on the roughest surface of a necklace to change the songs.

3.3.2 Discussion

Section 3.3.1 presented participants' ideas for controlling mobile listening media that are performed through tangible and gestural interactions. This section presents the analysis of the new types of controls, in terms of i) practical concerns, ii) aesthetics of interaction and iii) experience of meaning. It is necessary to underline that this was an explorative study investigating the potentials of the use of physicality in interactive mobile listening media, rather than follow-up research and development for new interface solutions that can be built on the knowledge founded by this present study.

i) Practical concerns

This section presents limitations and potentials of tangible and gestural controls in terms of their applicability to the context. Tangible and gestural controls will be analysed separately because of their particularities.

* *Re-conceptualisation of daily objects as means of controls.* Participants reinterpreted affordances and material properties of daily objects to propose new types of controls for listening to music.

* *Limitations of tangible controls.* One of the limitations of the proposed tangible controls is the difficulty of differentiation between the function of the objects and listening-related controls. One may question the applicability of the controls such as increasing sound volume by pulling the zip of a jacket upwards, since this action already serves the additional and pre-established function of closing the jacket when the weather is cold. However, such examples should be interpreted in a way that these physical manipulations are not directly applied to new interfaces. Reference to the nature of the control (volume up - upper level of the zip) and their aesthetics of interaction (touching and pulling the zip; the way it moves) should be analysed and applied in a more acceptable way. Furthermore, controls demanding the use of two hands together, such as bending cables to decrease volume can be difficult to perform in particular situations in a public environment such as standing in a moving bus. Another limitation of tangible controls is the risk of user fatigue (as also mentioned by Shaer & Hornecker, 2010) because of their reliance on physical manipulations. It can be overwhelming to constantly perform on the same physical control for repetitive functions. Another limitation of the tangible controls is the risk of user fatigue (Shaer & Hornecker, 2010) because of their reliance on the

physical manipulations. It can be overwhelming to constantly perform the same physical controls for mostly used functions.

* *Potentials of tangible controls.* Use of portable and wearable objects as a means of interaction provides controls ready-at-hand. This advantage also eliminates users' concerns related with accessibility of controls and safety of the 'device'. Embodiment of controls and expansion of the area of interaction somehow erase the need of a specific device to be carried separately for accessing controls. Furthermore, with tangible controls there is less reliance on the visual modality, so there is less need of division of attention between different visual stimuli in the public environment.

* *Limitations of gestural controls.* Gestural controls lack physical affordances and feedback, in other words, as Saffer (2009) underlines that there is neither a physical clue affording users to control the system in a particular way, nor physical trace left after controlling the system to ensure users that their gesture is processed. There can be some social constraints to apply gestural controls. People may associate different meanings to a gesture, especially if it is unprecedented or has not found its place within the collective interactive know-how surrounding mobile listening. To illustrate, waving hands to skip forward can be interpreted by other people (bystanders) in multiple ways. Therefore, selecting more discrete gestures can be a strategy to be able to stay in personal bubble and avoid such misunderstandings. Furthermore, accidental controls can occur with gestural interaction, if some random bodily movements are interpreted as real controls by the motion-tracking system. Proximity constitutes another limitation for gestural controls. It is important to question if there is enough place for the 3d space required for particular bodily movements. For example, it can be hard to clap hands within a large spatial envelope to play songs in a crowded bus/street. Division of 'the body' is another concern for gestural controls since particular controls such as foot gestures are not applicable while walking.

* *Potentials of gestural controls.* 'Elimination of the need of hardware' (Saffer, 2009) also eliminates the concerns related with portability, accessibility of controls and safety of the 'hardware'.

ii) Aesthetics of interaction

Controls presented by the participants of Study 3 showed that physicality provides opportunities for enriching the way we interact with mobile listening media and contributes to the aesthetics of interaction by offering a variety of controls appealing to different sensory modalities. This richness stems from:

- *clear options provided by physical affordances* (e.g. for pulling, stretching, turning)
- *diverse material properties* (e.g. texture, elasticity, and deformability)
- *3D spatial relationships* (e.g. proximity, movements towards up/down, right/left)
- *use of different sensory modalities* (e.g. taste, sound (controls through speaking & whistles), tactility, kinesthesia)

iii) Experience of meaning

All these examples are not only sensorially appealing but also 'meaningful' through use of analogies and new representational relationships.

* *Use of analogies.* An association of physical manipulation of daily objects or gestures with controls was realized through the use of embodied metaphors. Bending a cable, like bending a pipe, was based on analogy construction between water in a pipe and sound in a cable. Increasing sound volume by increasing the level of a zip is an additional example.

* *New representational relationships.* Not only the way users controlled music but also how the music was offered to be represented is also significant for the experience of meaning. Offering a specific type of material for jewellery pieces (which were supposed to be used as a means to sense proximity in a gestural control) - for a specific genre, or association of specific taste with a specific genre illustrate these new representational relationships.

4 CONCLUSIONS

The paper has provided multiple avenues of discussion around *mobile listening* such as privatization of space, and aesthetization of daily travelling activity in a public environment. It then touched upon the challenges of performing this individual activity in a shared environment with a great number of audio-visual stimuli. It was stated that current user interfaces that are confined to small displays and buttons fall short of dealing with these challenges.

The research was based on the question of how the mobile listening experience in a public environment can be enhanced through the way users control mobile listening media. Therefore, it explored the potentials of embodied interactive technologies in mobile listening from aesthetics of interaction point of view. The paper showed how this exploration is realized by a tri-partite fieldwork together with its underlying conceptual frameworks that portrays the relationship between the context and user experience. This was followed by the definitions of aesthetics of interaction and embodied interactions. It was argued that if the notion of aesthetics is formed by users' physical encounters with products through various sensory modalities, then use of embodiment -physicality- in interactive systems can enrich interaction and make multi-modal interactive experiences more desirable.

The tri-partite fieldwork approached *context* as both as a challenge and an inspiration. The analysis of first two studies, *Telling about the Journey* and *Living in the Journey* enabled understanding of the contextual factors and mobile listeners' user-user, product-product, and user-product interactions. *Study 3: Dreaming about the Journey* explored the potentials within the context and showed how use of tangible qualities of objects or bodily movements (e.g. material properties, 3D spatial relationships, etc.) can enrich interactions.

To conclude, embodied interactive technologies can enrich our mobile listening experience by expanding the possible ways of interacting with music players through the use of physicality. However, in any application, such embodied interactions should be handled with the contextual limitations. This research set an example by analyzing proposed interactions in Study 3 with the concerns derived from the first two studies. This way, it facilitated discussion of potentials rather than solely presented inspiring examples.

These contextual analyses and the results of the explorative study also constitute a reference for i) design of mobile devices (by uncovering mobility-related concerns like 'division of *the body*'), ii) design of personal products used in public environment (by listing users' concerns regarding user-user interactions), and iii) the application of embodied interactive technologies (by elaborating users' way of utilizing tangibility and evaluating the proposed tangible and gestural interactions in terms of practical concerns such as 'risk of user fatigue' and 'accessibility of controls').

As mentioned earlier in the paper, experience of (mobile) listening keeps evolving with the introduction of new technologies. This exploration of the potentials of embodied interactive technologies for mobile listening controls shows us there will be new types of *journeys* for users to take and new ways of acting whilst taking those journeys.

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