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Mix and Max: Designing an Installation for Music Festivals Aiming to Increase Social Sustainability

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Abstract. This paper presents the design of Mix and Match, a music installation intended for music festivals that utilizes the users' musical preference in order to create a collaborative experience that would also present the upcoming artists in the music scene. The design aimed at increasing social sustainability in music festivals, i.e. bridging social capital, while accounting for different user identities. This resulted in an inclusion of music of different genres that would be explored by all audiences. In conjunction with the festival liminoid structures, the collaborative aspect of the installation became a centerpiece of the design, as interaction between people, who have never met before, becomes common at music festivals.

Keywords: Interactive installation · Music festivals · Social sustainability · Interactive sound

1 Introduction

This paper presents the design of Mix and Match, a music installation intended for music festivals that utilizes the users' musical preference in order to create a collaborative experience that would also present the upcoming artists in the music scene. The design aimed at increasing social sustainability in music festivals, i.e. bridging social capital, while accounting for different users' identities. This resulted in an inclusion of music of different genres that could be explored by diverse audiences. In conjunction with the festival's liminoid structures [13], the collaborative aspect of the installation became a centerpiece of the design, as interaction between people, who have never met before, becomes common at music festivals.

In the following sections, we first develop a theoretical framework for exploring and designing interactive installations for music festivals and we review approaches on creating such installations. Then, we present our own design and implementation of such an installation, Mix and Match, which was the result of considering different prototypes. We evaluated Mix and Match by conducting observations and a survey with 24 participants separated in six groups. The evaluation was designed to address

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the effectiveness, efficiency, safety, utility, learnability and memorability of the installation. We conclude this paper with a discussion of the evaluation results and perspectives for future work.

2 Theoretical Framework

Festivals can be difficult environments to design for, as there are special social practices that apply and need to be understood. Moufakkir and Pernecky [8] suggest three practice-based perspectives that are often observed on the festival attendees' value creation. These social practices include:

- Bonding practices: deepening bonds with friends and family as a motivational factor for attending.
- Communing practices: experiencing the festival as "time out of time", that is, a special place with different social constructs and communal experiences, separated from normality.
- Belonging practices: long-lasting communities of interests, where festival attendees identify themselves with particular social worlds and celebrate a shared social identity for example as, "a music fan, rugby follower or opera enthusiast".

Being aware of these practices should have an influence on the way an installation for a festival is designed and the way its users are understood. These three practice-based perspectives can be also used to map out the design space of a festival, and to try to understand the social space of an installation.

2.1 Liminoid environments and communal experiences

According to Moufakkir and Pernecky [8], festivals take place in liminoid environments as defined by Turner [13]. Liminoid environments are "(...) temporal fringe spaces where usual, everyday social conventions may be temporarily suspended or reversed" [8]. This could have consequences for the behavior of the festival attendees, their personal boundaries and, in the end, the barriers for interaction with installations. The "time out of time" liminoid structures, "(…) can help to create very strong, if only temporary, social links among complete strangers, termed "communitas" [8], as well as bring together disparate groups of people through communal consumption experiences. An interactive installation could provide such a communal consumption experience and thereby contribute to social sustainability.

The temporary social links that arise at festivals between complete strangers is an interesting subject of investigation for an installation, where bonding practices between strangers could be in play. The theory mainly describes bonding practices as occurring between friends and families, but perhaps by focusing on the collaborative aspect in an installation, it is possible to create these temporary social links between both groups of friends and strangers and thus assist the bonding practices at the festival site.

In communitas, hierarchies and social class become less important factors in the interaction between people; it is about equality, contact and spontaneity [13]. This is a part of the belonging practices, where attendees get together at the festival to celebrate their shared tastes, regardless of who they are outside of the festival space. In this way, music is able to bring together people, who might not meet otherwise.

2.2 Social capital and social identity

An important trend at festivals is the accumulation of social capital among festivalgoers. Identity and social status is no longer about what you own, instead it is about what you do or seek to do. "It is our accomplishments and talents and wider interests that have become the new form of currency by which degrees of personal success can be measured, (...) and which we mention over dinner or post on our social networks."[15]. According to Yeoman [15], the next decade will be defined strongly by our ability to accumulate social capital. Social capital also plays a role for people attending a festival, as doing so will increase their social capital among peers, who believe that this is a festival worth attending.

There are several definitions of social capital. The theory of social capital defined by Putnam emphasizes "network, norms and social trust with cooperation and collaboration producing mutual benefits for individuals, including a sense of well-being" [11]. This means that social capital is associated with the structure of relationships and the interaction between individuals.

Social capital is therefore an interesting concept when designing installation, because it relates to the negotiation of trust and collaboration between possible diverse groups using the installation simultaneously. We assume that social capital is exchanged when two festival attendees accept each other's music taste, so it is important to understand the various kinds of social capital that could be at play in a collaborative installation at a music festival. Wikis [14] studied social capital at music festivals in general using Putnam's theory about bonding- and bridging social capital. Bonding social capital describes the bond between people with homogenous demographic backgrounds and values, while bridging social capital describes an individual's or group's inclusion of other people or groups with diverse demographic backgrounds and values. Wilks examined three different types of music festivals and the empirical data showed that bonding social capital has a significant importance for the music festival experience. She also found that bridging social capital is not an influential component of a festival, which deviates from the theory about festivals being a liminoid environment.

Social identity is another important aspect that relates to how the festival attendees interact with each other and consequently how the festival community is structured [1]. Social identity is, "(...) the total sum of social identifications used by a person to define him or herself and others" [12], where social identification is the structure of social categorization. Social categorization identifies people by describing who they are and who they are not [12]. When relating this to the festival environment, it can be used to describe the person's preferences and taste, such as which genres of music they like and which genres they do not like.

2.3 Festivals as a setting for new experiences

Music festivals can be the setting for new experiences, since they present "the new" in various ways. It could be for instance the presentation of an upcoming band or artist, a new installation or activity or new information, to name a few. Experiences can be described as transformations of the self. Jantzen and Rasmussen describe a way of understanding experiences in relation to the construction of identity [7]. According to them, an experience consists of: a) an expectation pre-experience, b) the experience, defined as a "break" in the everyday routine, and c) the stories told about the experience, in which the meaning of the experience is constructed. The stories told about experiences become a part of one's identity.

An important part of an experience is the expectations set for the experience. It is important that an experience lives up to the expectations to be satisfactory, that it goes beyond them to be extraordinary, and, most importantly, that it does not fail in terms of the promised experience [7]. In this regard, a product with flaws can trigger a feeling of failure for the user because they may believe that the product's flaws are a result of their own lack of ability in using the product.

Despite the open-minded and playful atmosphere of a festival, it is therefore important to understand that designing an installation for such a space means understanding the expectations of the festival attendees in order to give them a feeling of being competent when using the installation. This also means that a positive experience will create positive stories about it and thus increase the popularity of the installation. It is also important to consider the experience of the interactive installation as part of the festival space and the stories that the participants should tell about it afterwards. Should the story be one of personal capabilities, social negotiations or openness to trying new things? The designer of an interactive installation for a music festival should therefore seek to offer a new experience, which its users will value, and to frame it in such a way, so the users can easily understand it and engage with it.

3 Background

In the field of sound installations, there have been different approaches focusing on bringing audiences together. SwingScape is an installation presented at Roskilde Festival, Denmark in 2010 [3]. The installation comprised of a constantly interactive environment in an urban space, which was socially engaging and motivated people to be physically active in a playful way. The SwingScape consisted of eight swings equipped with accelerometer sensors capturing their motion. In this installation, festival attendees were able to create different sounds, while sitting on a swing. It was also possible for them to interact with other people sitting on their own swings. Each swing controlled different aspects of the total soundscape, so for optimal results constant communication among users was required. When the swings were moving, visual feedback was given that changed according to the user-interaction in order to provide an instant perception of one's effect on the installation.

MidiBall is an interface designed for concert audiences [6]. It has a simple interface in the form of a giant ball, designed to bounce between the audience at large

concerts. As people hit the ball, they trigger sounds and visual effects that are integrated in the concert. This instantly creates a bond between the band and the audience. MidiBall is a nice example of a successfully integrated experience in an event that has no participation barriers.

Illutron designed an interactive art installation consisting of six oil drums with sensors for Skanderborg festival, Denmark in 2015 [5]. By interacting with the drums, visitors had immediate individual feedback via different LED strings mounted on poles. Furthermore, when the participants managed to solve the puzzle of drumming the correct beat, they received collective feedback in the form of a giant fire cannon going off and the drums turning red. This art installation provided visual feedback on many levels and urged visitors to cooperate.

Augmented Groove uses human gestures for moving vinyl disks in order to control the modulation and mixing of music [9]. Users are wearing a virtual reality headset that has a camera and a video display, which overlays animations on the vinyl disks. The purpose of the interface is to create a collaborative DJ interface that bridges the gap between experienced musicians and novices.

Iamascope is another sound installation that has visual effects as part of the experience [2]. Iamascope is actually an interactive kaleidoscope that creates video and audio feedback. The system uses a camera in order to capture the user and creates a kaleidoscopic image. The user's movements control the music and provoke changes to the image displayed. The complex musical process consists of ten active zones in the interaction space mapped to sound like a guitar. The guitar chords change periodically according to pre-composed melodies.

Based on our investigation of the relevant theoretical background and other sound installations, we concluded on a set of design requirements for Mix and Match. The installation should be a communal consumption experience, designed as a tool for connecting different social identities and categorizations that are present at music festivals. It should create temporary social links between strangers (bridging social capital) and encourage collaboration between them. Moreover, it should implement a tool for the negotiation of music taste (social identity) and have a high transparency with a short learning curve for the users to feel competent. Finally, mistakes in the interaction should be easy to recover from and the users should be able to explore the capabilities of the system on their own, without having an overwhelming amount of choices.

4 Methods

During the design and implementation of Mix and Match, we followed the "Research Through Design" approach, in which "…designers produce novel artefacts in an attempt to make the right thing: a product that transforms the world from its current state to a preferred state" [16]. The preferred state for the installation is described by the aforementioned design requirements in the previous section.

According to this approach, design is treated as a research discipline that produces knowledge, rather than being simply a practice of making. This HCI research method proposes a set of four criteria for evaluating a design research contribution [16]:

- Process: the process is thoroughly documented and good rationale is presented for the choice of methods
- Invention: there is a novel contribution that advances the current state of the art
- Relevance: making an impact to change the world to a preferred state
- Extensibility: the ability to build on the resulting outcomes; either employing the process in a future design problem, or understanding and leveraging the knowledge created by the resulting artifacts.

The outcome of the "Research Through Design" approach can be a design artefact, called an exemplar, which can lay the groundwork for discussing future designs, as an exemplar provides concrete embodiments of theory and technical opportunities.

The process of our design was iterative, exploring the possibilities of the technology that could be used to create a collaborative music experience. It also focused on prototyping and testing the usability and technical limitations of different prototypes. Houde and Hill [4] provided an excellent framework for defining, discussing and creating prototypes (Fig. 1).

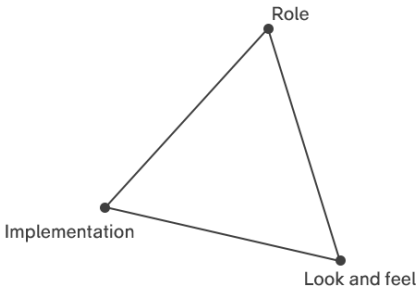

Fig. 1. Prototypes are placed on the model according to their purpose (figure taken from [4])

- Role prototypes are built to investigate questions of what an artifact could do for a user. "They describe the functionality that a user might benefit from, with little attention to how the artifact would look and feel, or how it could be made to actually work." [4]
- Look and feel prototypes "(...) are built primarily to explore and demonstrate options for the experience of an artifact. They simulate what it would be like to look at and interact with (...)". [4]
- Implementation prototypes are built to answer technical questions about how a future artifact might actually be made to work. "They are used to discover methods by which adequate specifications for the final artifact can be achieved" [4]

In the following, we use this framework for presenting the prototypes that we created through the design process.

5 Design and Implementation

The design of Mix and Match evolved around the idea of developing an installation, where users could affect a soundscape through some form of collaboration, preferably by creating sound together. The Mix and Match installation consists of an interactive area where trigger zones containing sound loops with drums, guitars, vocals etc. from different songs can be activated by users. These trigger zones are controlled by a computer and are triggered according to the users' placement in the interactive area, making it possible to create unique remixes of songs. The loops are synced and constantly playing, but are muted when not triggered by a user.

During the design process, we followed an iterative approach for building several prototypes with the purpose of clarifying how users interact with the interface. Initially, we built two prototypes: one focused on the implementation of sound in the installation (referred to as implementation prototype) and the other focused on the look, feel and perception of the overall concept (referred to as the "look and feel" prototype). Fig. 2 shows the purpose of the two prototypes represented on the Houde and Hill's model [4].

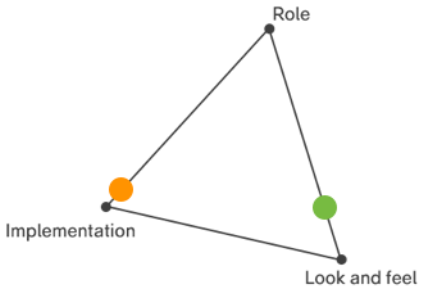

Fig. 2. The purpose of the implementation prototype (orange) and the "look and feel" prototype (green) on the model proposed by Houde and Hill

The "look and feel" prototype was tested with actual users in order to develop a final and improved design. Since this prototype was not fully implemented, we followed the Wizard of Oz method for testing, where a human controls aspects of the system to make it appear functional to the user [10]. A four by four grid made with tape covering approximately four square meters was laid out on the floor and in the test participants were asked to try the installation without any introductory instructions given to them. Whenever a user stepped into one of the trigger zones, one of observers pressed a corresponding button. Six groups of four people participated in this test (one group at a time) and explored the installation while we were observing their behavior. At the end of the observation, we conducted a group interview on the participants' understanding of the installation, their opinion on the overall idea, and their feedback for further development.

The results of this test were predominantly homogeneous. The attitude towards the concept was very positive, the participants found the installation easy to understand

and most of them could see it working well at a music festival. Our observations revealed also the following findings that we used for building the final design.

Some participants tried to step out of the grid or stand on the lines between two tracks to avoid triggering any sounds, while others tried to find complete songs or patterns in the placement of the tracks. Interacting with the prototype was sometimes too challenging for four people, because the feedback of who was triggering which track was not clear enough. Moreover, some participants tried to see if it was possible to trigger several tracks at the same time and others tried to go back and forth between the tracks very quickly, to test the responsiveness of the installation. Many participants looked down at their feet to ensure that they were within the trigger zones, and most of them spent a great deal of time discussing the location of certain tracks trying to memorize where each track was located.

Regarding the social behavior, most groups expressed positive opinions on how participants are required to work as a team to interact with the installation. Moreover, in most of the cases there was at least one person who took a leader role and tried to guide the interaction of the group with the installation. One of the groups explicitly expressed that the installation was “very social”, while another suggested that the installation would be more entertaining to use in larger groups of people. Finally, there was a group, which expressed the desire to build up a dance routine to match their interaction with the installation.

An implementation prototype was built at this stage of the design process to investigate the optimal way of handling the sound loops. Since the main functionality of the installation was decided to be making users capable of mixing many different audio tracks, the slightest latency issues could cause confusion to the users. Therefore, the focus of the prototype was testing whether the game engine Unity could be a reliable software to handle the audio for the installation. For evaluating this, we conducted and thoroughly documented a technical test of the implementation prototype. During this test, one of the authors muted and unmuted tracks randomly while carefully listening to the output using headphones. No bugs or latency issues occurred during the test. This led us to conclude that Unity was a suitable software for mixing several audio channels and could be used as a part of this installation.

The final design was based on the same concept and many of the same ideas used in the initial prototypes. The data gathered from the two prototype tests combined with the aforementioned design requirements have been used in the process of developing an improved design that is depicted in Fig. 3.

For implementing the final design, we used a USB camera, a computer running TSPS (a software for detecting where the users are located in the interactive area) and Unity, and a set of speakers. The camera was set up above the interactive area facing towards the ground while streaming video that is processed by TSPS, which then sent the users’ location to Unity. A plug-in for Unity was used that implements a receiver that translates TSPS data to actual coordinates, and places it in a scene. Within the scene, colliders were placed and each one of them had a different sound loop attached to it. When a detected user is within the area of a collider, the attached loop is played on the speakers. The loop is muted when no users are detected within the collider.

The installation had four different loops (bass, vocals, guitar, drums) from four different songs. All the sound loops were synced to 110 BPM because this worked well as an average tempo, and they were tuned to the key of G#, so nothing would sound misplaced.

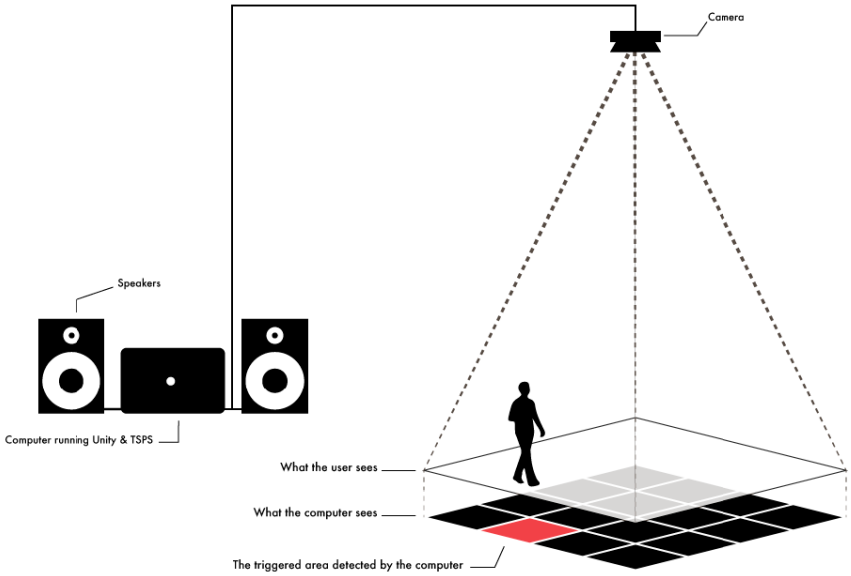

Fig. 3. The final design - illustration of what the computer sees compared to what the users see

6 Evaluation

In order to evaluate the usability of the Mix and Match installation, we conducted observations and a survey with 24 participants separated in six groups. The evaluation was designed to address the effectiveness, efficiency, safety, utility, learnability and memorability of the installation, as defined in [10]. During the evaluation, we tried two different layouts for the music tracks in the interactive area: a structured grid (where each row contains loops from the same song and each column contains loops from the same instrument type) in comparison to a random placement of the different loops in the interactive area.

The observations were conducted as an AB/BA test, where half of the participating groups tested the structured layout first, and then tested the random layout, while the other half first tested the random and then the structured layout. For the usability part, the participants had to complete a series of tasks, which were based on behavior we observed at the initial “look and feel” prototype test. The aim of the tasks was to get the users to move around as much as possible in the installation and to be diverse enough in order to observe as many types of collaborative behavior as possible. The tasks included in the usability test were the following:

1. Firstly, we asked the participants to try the installation without providing any instructions to them. This task aimed at testing the learnability of the installation.
2. Then, we asked them to create a mix, which they thought sounded nice. This task investigated their collaboration and the effectiveness of the installation to facilitate social interaction.
3. Since this installation contained parts of different songs, we asked the participants if they could recreate a song from an artist. This task focused on user understanding of the interface and its learnability.
4. Then, we asked the participants to pick their least favorite sound, because we wanted to explore their way of collaborating and the efficiency of the installation in supporting them to do the task.
5. As the final test before changing the layout of the interface, we asked the participants if they were able to recreate the mix they previously thought sounded nice (task 2). This task tested the memorability of the interface in regards to whether there is sufficient support to help the users remember how to carry out tasks.
6. Finally, we rearranged the tracks on the interactive area and asked the participants to recreate the same song from the same artist as they had done for task 3. This task was included to let the users compare the usability of the two layouts (structured grid vs. random) as well as to observe the learnability of the interface in relation to the change.

After completing these tasks, each participant filled out a questionnaire with 29 questions in total, where they indicated to which degree they agreed to various parameters for each task. These parameters included whether they had a clear understanding of how to interact with the interface, as well as how easy it was to collaborate with the other participants. The questionnaire also asked the participants to compare the two layouts for which was most logical, most fun to explore and easiest to use.

For the utility goal of providing the right kind of functionality, we included the following question in the questionnaire: “In your opinion, does the installation need more functionality? And if so what do you think could improve it?”, as well as a series of questions about how users perceived the two layouts. Finally, for the safety goal, we observed errors occurring in the software during the test, as well as what the users perceived as mistakes while interacting, and how they recovered from them.

In the following, we comment on the most prominent results of the evaluation.

6.1 Preferences regarding the two layouts

As it was previously mentioned, we tested the installation with two different layouts: one where the sounds are placed randomly in the grid and one where the sounds from the same artist are lying on the same line. Half of the groups were exposed to the random layout first, followed by the structured layout – we refer to these groups as the AB groups. The other half of the groups were exposed to the structured layout first, followed by the random layout – these are referred to as the BA groups. We chose this test setting because the participants were asked to carry out more tasks with

the layout they were first exposed to, so this could insert a bias in their layout preference. Before presenting the results on preferences between the two layouts, it is important to note that the first AB group only tried the first layout, as problems occurred with the second layout. Therefore, this group is not included in the results that compare the two layouts.

Most groups reported that the structured layout was the easiest to use, but they found that the random layout was more fun to explore (Fig. 4). This indicates that the random is more exploratory, while the structured makes it easier for the participants accomplish specific tasks in the installation (create something they like). This was actually our hypothesis for this comparison.

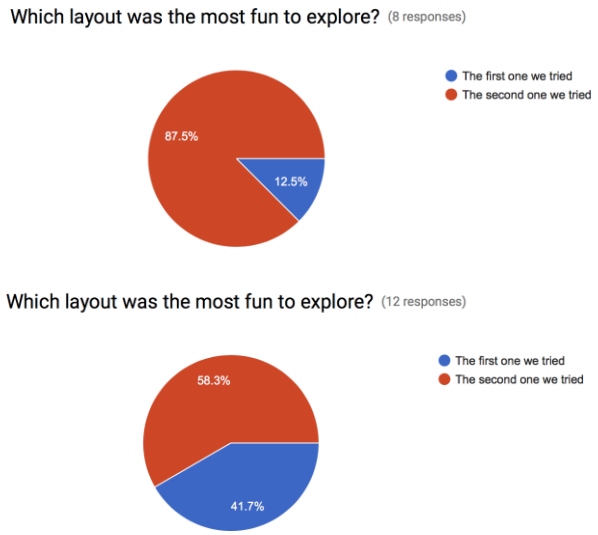

Fig. 4. Answers to the question "Which layout was the most fun to explore". AB groups on top, BA groups below

A possible explanation to why the participants found the random layout more fun, could be that the random placements of the tracks made it more difficult to predict where the different sounds were placed, thus more time was spent exploring the installation. This also means that it required more mental effort to remember the placement of the different tracks, which reminds of a memory game. In the structured layout, participants could faster figure out where the tracks were placed and this could lead to users getting bored quickly. Once we figured out the structure, the fun decreased, as one group explained.

Based on our observations, we concluded that the different layouts support two different kinds of collaborative behavior. While both facilitated a lot of pointing and negotiation about where to stand, only the structured layout made the users move in a coordinated manner. For instance, in the structured layout participants stood in one line and moved collectively through the installation while remaining in line. The interface with the random layout did not dictate such behavior. In the random layout,

the participants mainly walked around and explored the installation. The collaboration thus focused more on remembering the positions of tracks in this case. This observation made us conclude that placing the tracks in different patterns is an interesting point for further explorations for installation, since finding patterns could become an important way of interacting collaboratively.

6.2 Collaboration for recreating the mix that sounded nice

The last task that the participants performed in terms of collaboration was to recreate the mix they thought sounded nice in task 3. It was apparent from the observational data that most groups found this task difficult regardless of the layout in the installation. To solve this task, the participants seemed to recall primarily their own physical location, and secondarily, the position of the others relative to their own. This brought a lot of discussion about who was where, what did not sound right, and what the mix in task 3 sounded like.

When the participants believed they had recreated the mix of task 3, an observer noted their positions in the grid. The positions of the participating groups in task 3 and 5 are shown in Fig. 5. As it is apparent from Fig. 5, only the participants in groups number 2, 4 and 5 recreated the exact same mix as in task 3. We chose not to compare the results between the structured and random layout, since they relate more to the group's individual ways of collaborating on the task and much less on the layout.

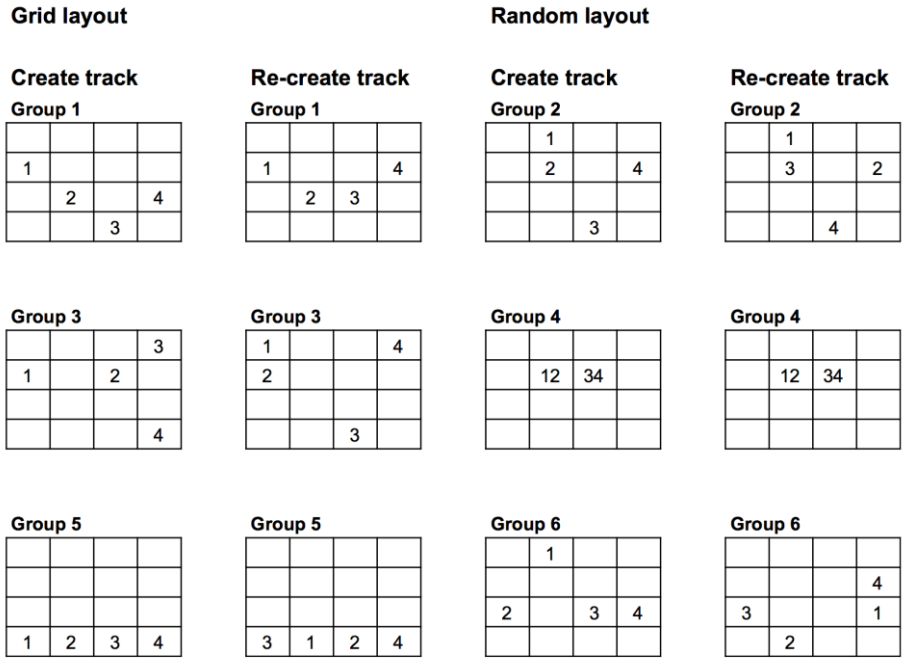

Fig. 5. Positions of the participants in each group during task 3 and task 5.

Group 1 completed the task almost correctly. They mostly relied on how they had placed themselves relative to each other. Therefore, the pattern is similar, but the sounds they were triggering were not the same. The group did not seem to notice that the resulting sound had changed.

Group 2 completed the task without failure. Three of them remembered perfectly where their position had been previously and they knew which individual track was missing from the song, so they easily figured out the last position they had to trigger.

Group 3 got two out of the four positions correct. Two of the group members remembered which sounds they triggered before but they switched their previous positions. These two were trying to help the others finding their previous positions.

Group 4 relied entirely on their placement in relation to the white line around the installation and got the task right.

Group 5 performed the task correctly since they had chosen the sounds of the same artist in task 3. Since they were using the installation with the structured layout, it was easy for them to recreate the same mix.

Group 6 got two out of four positions correct. This group was the most unsure about their previous positions and actually they completely switched around their positions.

6.3 Other observations

During the initial prototype test, a visible grid was present on the floor, while during the final evaluation only the frame of the interactive area was visible. By comparing the observations on the users' collaborative behavior during the initial prototype test and the final usability test, we concluded that the presence of a visible grid on the floor that indicates each interactive zone made users look very often on the floor. When this visible grid was absent, users looked more at each other. We consider this finding important, since our intention was to create an interface, which lets the users bond over their choices and music taste by discussing it collaboratively.

Our observations also suggest that the Mix and Max can be viewed as a communal consumption experience, where participants are trying to create something together. Though the installation was not designed as a game, the manner in which the participants behaved when they used it was playful, and it reminded us of the kind of behavior that may be seen in a liminoid space. Additionally, the participants reported that they enjoyed the experience, and we observed that they were eager to explore the interface of the installation. Because of this focus on playing, we assume that users of this installation may de-emphasize their individual tastes in music when collaborating. This assumption should be explored and validated in a future study.

7 Discussion and Conclusion

This paper presented the design of Mix and Match, a music installation intended for music festivals that utilizes the users' musical preference in order to create a collaborative experience that could also present upcoming artists in the music scene. An

iterative approach towards building different prototypes was taken in order to clarify how users interact with the interface. The results yielded by the tests provided valuable information towards understanding the users - the test subjects immediately familiarized themselves with the interaction and explored the tracks in the installation. Then, they attempted to create new music or recreate existing songs from the loops provided. The users enjoyed the collaborative aspect as they quickly started cooperating in order to succeed in the creative process. When interacting, leaders emerged that started coordinating the participants in order to achieve their own creative goals. This was observed less in the tests where participants were assigned tasks by the evaluators. No explanation was found for this phenomenon, but it should be explored in future tests.

The design process revolved around making the installation a collaborative exploration that would evolve into collective creation when interacting with the installation. This required a focus on lowering the interaction barrier without reducing interaction times, which has been achieved through removing any pre-requisites from the users, they simply had to move around inside the installation in order to interact. Furthermore, the installation rewarded collaborative use, as multiple users activated multiple tracks at the same time with more interesting and complex melodies being composed. Future designs will feature accompanying visual effects to further augment the experience. Care will be taken that the effects do not impair the collaboration, by making users overly focused on the visual effects instead of each other.

The prototype was evaluated by a usability test, which revealed that placing the tracks randomly in the installation makes for a more exploratory experience, whereas structuring the tracks in straight lines makes the installation easier to learn and use. Moreover, track placement also affects the way the participants are able to interact in the installation, since coordinated collective movement happens only in the structured layout. The evaluation proved that Mix and Match has achieved the goal of engaging users in collaborative creation. However, the detection was not accurate enough for the installation to be displayed at a musical festival yet. We conclude this paper with further technical developments in order to improve this installation. The implementation has proven to be riddled with technical difficulties, as the featured detection system was extremely dependent on the environment. This implied the need for controlled lighting conditions, cancelling the shadows and maintaining color contrast between the users and the background. These requirements severely add to the difficulty for an easy integration within a festival space, but despite these, the prototype worked well as a proof of concept and allowed us to examine the design concepts in real scenarios. Due to the small sample size of this evaluation, results and conclusions can not be seen as definitive but merely indications and tendencies. However, these are valid directions that future development of the installation should take into consideration.

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