

Persistence in Web Based Collaborations

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ABSTRACT

We outline work on web based support for group creativity. We focus on a study of the effect persistence of participants' musical contributions has on their mutual engagement.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces; H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces

General Terms

Design, Human Factors

Keywords

Collaboration, Creativity, HCI, Music, User interfaces

1. INTRODUCTION

Creativity occurs between us in everyday activities [5], yet we have little understanding of group creativity nor how to design to support it. We focus on *mutual engagement* between participants - highly focused points of activities pushing at the boundaries of shared experience and expectation, and take group music improvisation as fundamental form of group creativity which has many parallels to normal verbal conversation and which has important social and cultural meaning [4].

Whilst people have embraced new forms of communication such as text messaging (e.g. monthly traffic of mobile phone text messages increased from around 5,000 in Jan 2001 to 30,000 in Dec 2002¹), and our use of music has increasingly involved mobile phones (e.g. UK performing rights societies collected £3 million for rights to ring tones in 2003 compared to £2.5m for 1999-2002), for many of us, informal group music interaction has lost its place as an everyday social activity. The rest of the paper explores this problem by considering a key design attribute of collaborative systems - the persistence of participants' contributions.

1.1 Daisyphone

We have developed a web based applet referred to as Daisyphone [1] which allows people to create music together

¹GSM Association. www.gsmworld.com

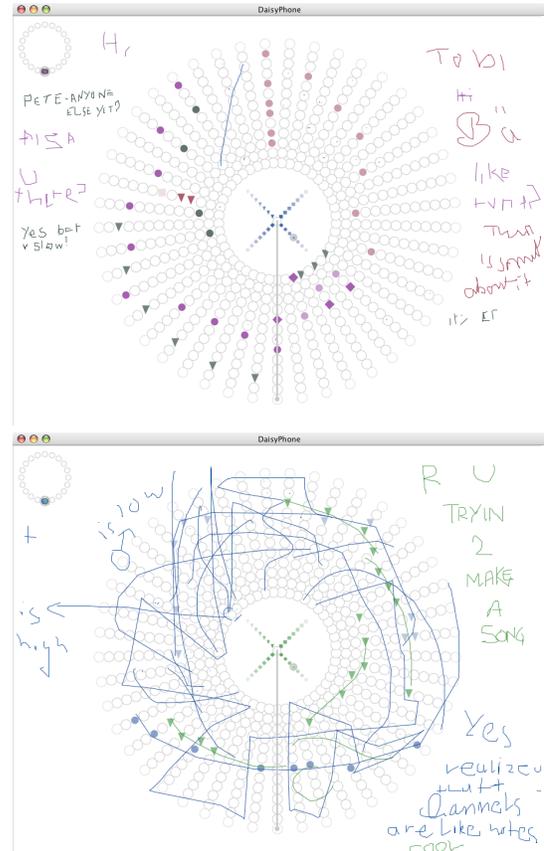


Figure 1: Daisyphone: a) Persistence, b) Decay

remotely via the web. The visual design of the applet focuses on novel representations of music and support for human interaction whilst taking into account a range of devices from mobile phones to PCs as illustrated in the two screenshots of figure 1. The circular representation of the musical loop itself takes most of the screen real estate and is designed for novice use. Players click on the small circles to set and unset notes which are played as the rotating grey arm passes over them. Whenever a player clicks, a graphical annotation is produced creating a *messy* interface for playful interaction.

The player selects their current instrument (indicated by a shape) and volume (indicated by the saturation of color) for composition from the central 4 spokes. Each user is assigned

a unique hue for identity when they join a session. Currently 20 sessions and 10 users are supported; the session selector is in the top left hand corner of the interface.

Daisyphone uses a client-server configuration similar to that used by WebDrum [2]. Messages are sent from clients to the server and broadcast to other clients as appropriate. This provides semi-synchronous collaboration with low-bandwidth requirements making it ideal for a range of devices.

2. STUDY

In order to better understand the nature of web based group creative interaction we undertook a study with ten post graduate students who used 2 versions of Daisyphone remotely over a period of 3 weeks in order to create a musical piece for performance to the group as a whole. The students grouped themselves into 3 groups and had a wide range of musical ability. None had ever used a tool like Daisyphone before. In the *persistent* version of Daisyphone notes remained until they were explicitly deleted; in the *decay* version they slowly disappeared over a period of 3 loops.

Participants were asked to report on whether, and how, they experienced flow as a group cf. [5]. These reports and ensuing discussions are used in the rest of this paper to help make sense of the observed behavior. Additionally, logs of all actions in Daisyphone were stored for later re-play and analysis. Initial analysis of logs are presented in this paper - detailed analysis is currently being undertaken. An average of 8 sessions with the persistent version and 3 sessions with the decay version were recorded for each group. Each session lasted on average 16 minutes for the persistent version and 12 minutes for the decay version.

2.1 Patterns of Use

As with our ongoing analysis of the use of Daisyphone [1], in both versions the participants tended to spend the first parts of their sessions exploring Daisyphone on their own. Once participants were able to understand Daisyphone's interface they then moved on to develop longer tunes or contribute to other participants' work.

An informal role assignment developed when using the persistent version with participants tending to stick to one instrument. Moreover, a *leader* tended to emerge during the sessions who constructed the main melody which was not the case with the decay version where it was more egalitarian. As such we suggest that such role assignment emerges naturally and does not need to be explicitly built in to such interfaces.

When looking back over the logs of the interactions it is clear that in the version with decay participants tended to make musical *gestures* rather than placing individual notes as they had on the persistent version. This is illustrated by the amount of annotation in figure 1b which reflects the creation of music through gesture rather than placing of notes as in figure 1a. These gestures tended to be quickly drawn lines which could easily be replicated to keep the tune going. It was also clear that the decay version required more focus on the music, and much less discussion of pieces, with participants having to keep musical motifs in their head in order to keep a tune going. In some ways this makes the decay version more akin to group musical improvisation than composition.

Anecdotally, there were more reports of experimentation

with compositions with the decay version as the space did not require cleaning up. Also, there was more convergence of tunes between participants with the decay version i.e. they started to make similar tunes within a group more quickly than they did with the persistent version. This indicates that decay may encourage quicker convergence of musical patterns after a period of experimentation. However, participants felt that they experienced flow as a group far less when the notes decayed as they felt anxious about making enough contributions, and felt that they had lost some control of the situation.

3. IMPLICATIONS FOR DESIGN

The key implication with respect to the decay of contributions is that contributions should only start disappearing once people have learnt how to usefully make them. We had expected the converse to be true - that when contributions decay it would be easier to learn the effects of the interaction through experimentation. We can usefully relate this to Csikszentmihalyi's analysis of flow and its relation to skills and challenges [3]. In the case of Daisyphone we believe that with persistence people became bored of the interaction as the challenge was no longer sufficient for their skills, whereas with decay participants were initially anxious, but some did increase their skills enough to experience flow. So, in general, we suggest that by keeping the collaboration support constant and increasing the amount of decay as skill increases the participants will become more engaged with each other as well as the product at hand. We would expect to see more convergence of music, and hopefully more reliance on others' contributions in the joint production. Furthermore, we suggest that some mechanism for varying levels of involvement needs to be developed to allow people to explore ideas without feeling socially constrained, much as musicians in free improvisation move away from the group to play quietly and try ideas out.

4. CONCLUSIONS

In this paper we outlined a web based group music interaction environment. We examined the role of persistence of contribution and suggested that future remote group creativity tools should only introduce decay once participants have acquired enough skill. We will explore this area further through deployment in a wider range of settings and devices.

5. ACKNOWLEDGMENTS

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6. REFERENCES

- [1] N. Bryan-Kinns. Daisyphone: The design and impact of a novel environment for remote group music improvisation. In *Proc. DIS 2004*. ACM, 2004.
- [2] P. Burk. Jammin' on the web - a new client/server architecture for multi-user musical performance. In *Proc. ICMC 2000*, 2000.
- [3] M. Csikszentmihalyi. *Flow: The Psychology of Optimal Experience*. Harper Collins, UK, 1991.
- [4] T. Leeuwen. *Speech, Music, Sound*. MacMillan, 1999.
- [5] K. Sawyer. *Group creativity: Music, theater, collaboration*. LEA, USA, 2003.