

Support for Creativity in Musical Collaboration and Creator / Technologist Interaction

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Recent technological changes have altered the structures through which media interactions occur, resulting in new proximities and merging of creative domains in many projects. Whilst technological developments have outpaced theory and understanding, collaboration and creativity support has become an active area of research in HCI. Researchers are combining models developed in psychological and sociological studies with explorations of the support technology provides and could provide to these processes. As we attempt to understand support for creative users, we need to reassess designer / user roles and relationships to make best use of the possibilities computers provide for creativity.

Our research explores the relationship between collaborative creative processes and technological support structures. Currently we are working with musical creativity as an example of these processes. However we aim to develop general understanding and principles for collaborative creativity support design, both by relating our work to creativity research in other domains, and in the future by taking our findings from observational studies and prototype development on to

projects developing support in other domains. Creativity support has domain-specific and domain-general aspects, and interdisciplinary creative projects therefore provide an interesting amalgamation of support needs.

As in other creative domains, musicians have long held an integral relationship with technology, from Neolithic instruments to pervasive computer technology in studios and on stage. Technological developments shape musical genres, and as such many musicians embrace technology early as a basis for innovation. We are however, well past an age where technology merely provided instruments with which new sounds could be made. Recording and networking technologies define structures through which the process of music creation occurs. Due to the affordances of these technologies, the boundaries between existing notions such as composition and performance have become blurred, with newer concepts like sampling and remixing now mainstream. Technological innovations also affect the structures through which collaborations occur, and our research has considered what it means when communication channels, constraints and representations change as computers become the platform for creative collaborations. Musical creativity is a highly social and collaborative process, yet with few exceptions music technology is designed with individual use in mind, and loose forms of cooperation are more often supported (e.g. ccMixer) than tight, synchronous collaboration. Computer support for synchronous musical collaborations is an active area of research within which a variety of prototypes have been developed, identifying issues that are relevant to support for all kinds of creative collaborations (e.g. Daisyphone [1] or the Laptop Orchestra [8]).

To design effective creativity support within a domain it is essential to analyse the forms of idea representation used by practitioners [3]. For example musical creativity support must be developed with the understanding that musicians exchange and evaluate ideas through instrument play and speech, and create artefacts through recording and forms of visual notation in order to retain ideas and develop compositions. A lack of common ground can hinder interdisciplinary idea representation, and even within established domains like music practitioners vary widely in their use of representation methods. Creative work requires support for idea representations that are informal and incomplete. This can be achieved through sketchpad-like interfaces that allow ambiguity [6], though it is difficult for these systems to play any active role in the process, as they are unable to understand user's input.

Technological solutions that aid creative work by formally understanding user input simultaneously constrain creative ideas to those that are possible within the structural language of the environment, and there are commonly breakdowns between the creative user's vision and the support provided [3]. The provision of a fluid means through which to reshape support is therefore an important goal. We can define three existing types of relationship between technology developers and creative users: Firstly there are active collaborative partnerships of the kind studied by Candy & Edmonds, these require investment in the development of common ground to build shared understanding, along with two or more available parties that can work together cohesively [2]. Such opportunities are valuable but currently rare and generally ad-hoc. Secondly developers can provide structures for end-user development or tailoring,

presenting an opportunity for indirect collaboration [5] where creative users apply their own knowledge and understanding to develop personal support solutions with building blocks. Such work could even be fed back to developers in some way [4]. Finally, we have the common situation of developer and creative user as unconnected parties with fixed solutions providing limited scope for innovative use, and much depending on the developer's anticipation of creative user's needs.

Expert creativity requires the understanding and development of novel, challenging constraint structures [7]. Collaboration commonly requires some level of shared constraint development, whether in terms of conceptual goals or implementation choices. Existing ideas also constrain further ideas in a coherent solution, and these interdependencies need to be understood. We are currently exploring means to support individual and collaborative constraint development in the interface.

Collaborating musicians can benefit from the ability to define individual and shared constraints in their instruments. In our current prototype system MusicBuilder, users can for example decide to build instruments based upon a shared set of notes to which they are then constrained. This approach supports collaborative negotiation and representation of constraints, and makes collaborative play easier by formalising a shared structure. Clearly many constraints within or between creative domains cannot be formally represented as easily as the selection of a musical scale, but the ability of creators to develop and share constraints as well as ideas is essential to focused collaborative creativity.

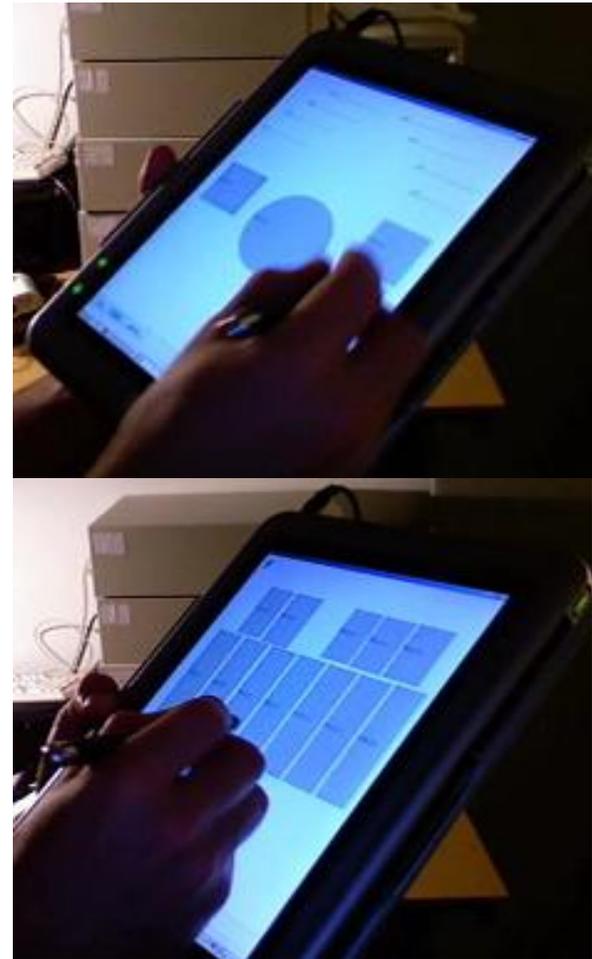


Figure 1: MusicBuilder: Users can develop their own musical instruments played with a pen. An interesting aspect in evaluations of this system has been observing how collaborating musicians negotiate and construct instruments together in order to share a constraining structure.

HCI research points to user-centred design methods as a means to understanding the audience and design suitable platforms, and a dialogue between creative users and developers at design time is essential. However creative user needs evolve continuously as creative work by definition requires novelty. Creative processes also vary from person to person, and one size rarely fits all. Structures for more continuous interaction between creative users and developers, or the facilitation of end-user development through a 'meta-design' approach [4], are both possible moves to improve support to creative projects.

By understanding processes of idea representation and the nature of constraint in creative work, we aim to provide requirements for collaborative creativity support. The nature of creativity requires however that we consider social and temporal dimensions of the support development process, and that new paradigms of interaction between technologists and creators may need to develop for support to evolve in synch with novel ideas.

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