

Alleviating Communication Challenges in Film Scoring: An Interaction Design Approach

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ABSTRACT

Film Scoring is a creative and collaborative activity that involves several practitioners, in particular music specialists (film composers) and non specialists (filmmakers). These practitioners face recurrent challenges in communication primarily because they do not share the same musical language. In this paper we present the results of research undertaken into the communication process between filmmakers and composers, with particular focus on the challenges experienced by the two parties. We then propose and discuss an interaction design approach to progress towards appropriate computer-based solutions.

Categories and Subject Descriptors

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

Keywords

Film Scoring, Interaction Design, Human Computer Interaction, Collaboration, Communication.

1. INTRODUCTION

Film scoring is a creative, multidisciplinary practice that involves two key parties: composers and filmmakers (film/television directors and producers). In the position of clients, filmmakers start by hiring the composer and provide an oral or written brief describing how they would like the music to support their film. Then, musical ideas are discussed and developed through a creative collaboration between the two parties, until the score is completed and released with the picture to television or theatre.

During the creative collaboration, especially in the early stages of a project, communication is truly critical, conditioning the success of the project. On one side clients need to make their expectations clear to the composer, supervising the work throughout the process. On the other side the composer wants to be sure s/he has

understood what these expectations are. *Comprehending a director's intent is the most important task of being a film composer* [28]. Even if the composer writes a very fine piece of music, if in the end it does not conform to the filmmakers' tastes and expectations then the project will either be delayed or simply fail. Yet, compelled by tight budgets and time-frames imposed by the film and television industries, practitioners face recurrent misunderstandings and frustration while collaborating on film score productions. This situation is aggravated by composers and filmmakers not sharing the same musical language. The subsequent difficulties in communicating mean they often fail to convey information accurately.

In this paper we present the results of research undertaken by the authors into the communication process between filmmakers and composers. In particular we focus on the challenges experienced by the two parties, our aim being to design appropriate solutions for these challenges. The notion of computer-based tools is then proposed. Aided by the recent evolution of rich media solutions delivered across distributed communication networks, we argue that computer-based tools can be employed to support the creative communication which takes place between composers and filmmakers. We see that interaction design is an important consideration in the development of tools that respond to real and specific needs. By bridging the gap in the communication between practitioners these tools would favour the establishment of a better shared understanding, consequently delivering multiple benefits, such as:

- For the composer: an increased chance of delivering music that fits the filmmaker's requirements and a reduction of effort wasted on composition of ideas erroneously thought to be adequate.
- For the filmmaker: a greater visibility of the scoring process and a greater opportunity to have a creative impact on the score.

For both: reduced frustration in collaboration and a greater ratio of time spent on building and discussing ideas (rather than trying to explain them) therefore allowing for more creative outcomes.

2. BACKGROUND AND MOTIVATION

There has been relatively little research in the particular communicative aspects of film scoring, although significant inspiration can be found in endeavours that concern communication support in design. Film scoring can be considered

a form of design in that it is also creative, collaborative, and often based on client-commissioner relationships. Notable examples are Sonnenwald [26], who has investigated communication roles that appear to support knowledge exploration and collaboration during the design process; or Eckert & Boujut [8] who argued that communicating with and through various kinds of physical and electronic artifacts enables designers to avoid misunderstandings and recover from communication breakdowns.

As far as creativity support is concerned, computer systems –if rigorously conceived– have been proven to be truly valuable [24; 25], in particular in the domain of the arts [3] and in collaborative activities [14].

The market currently offers a number of tools that are dedicated to film music production such as *Auricle*¹, which allows the effective syncing of music to picture; or *CineScore*², which generates soundtracks for movies in an ingenious –but arguably uncreative– way. Efforts to improve these tools exist in academia. Works by Farwood et al. [9] and Miletto et al. [15] have respectively led to the design of prototypes *Hyperscore* and *CODES* to allow musicians and users with limited or no musical training to cooperatively sketch pieces of music. Works by Jordà & Barbosa [11] focused on Internet collaborative virtual environments for music applications, putting a special emphasis on performance, composition and production of music by groups of geographically dispersed communities of users, both in synchronous and asynchronous modes.

Research endeavours by Abrams et al. [1] have taken a higher perspective to investigate film composers’ cognitive process, resulting in the development of a prototype: *QSketcher*. It offers a flexible workspace to assist composers in their creative workflow by capturing, organising and manipulating musical ideas. Similarly, Coughlan & Johnson [6] have designed *Sonic Sketchpad*, which explores computer support for sketching and representing ideas in the context of collaborative music composition.

Our own research, although closely related to all works previously cited, differentiates by focusing on assisting music specialists (film composers) and non specialists (film makers) in building and accurately communicating conceptual musical ideas. Members of the collaboration are all creative people in their own right; and we do not intend to help either film composers compose music, or filmmakers make films. Our motivation is rather in designing support for an accurate and ambiguity-free communication between practitioners; as Stacey and Eckert [27] argued that while communicating imprecise, uncertain and provisional ideas is a vital part of creative teamwork, what is uncertain and provisional needs to be expressed as clearly as possible.

3. EXPLORATIVE STUDY

We conducted an explorative study with 13 film composers and 14 filmmakers based in France, Italy, the United States and Australia to get a deep insight into the film scoring practice and

catalogue specific issues that practitioners encounter in communication. Profiles of the surveyed composers were varied and covered altogether a wide range of the industry: TV series, documentaries, IMAX movies, music libraries, public or corporate events, TV commercials, and short and feature films. Some of them were semi-professional; others worked fulltime. Some were established in their respective local industry; others were internationally renowned and had worked on movies seen by hundreds of thousands of viewers.

Data collection occurred in different forms: questionnaires, video- and sound-recorded interviews, observations in the subjects’ work environment (as in Figure 1) –following the principles of Contextual Inquiry [2]–, and oral and email discussions. This qualitative approach allowed us to identify specific challenges faced by practitioners in the film scoring process.



Figure 1. A film composer observed at work.

In the following section we report on the communication challenges identified in our research.

4. IDENTIFIED COMMUNICATION CHALLENGES

A major hurdle in communication is that composers and filmmakers do not have a common specific language. Composers have a deep and thorough understanding of music, which they do not necessarily share with directors and producers. For example, the latter usually think about music in terms of feelings, emotions or moods (e.g. ‘I want something scary’); while the former think about music more precisely in terms of melodies, instruments or notes (e.g. ‘I’ll write a part for the cello to play long tremolos punctuated by dynamic staccatos’). Our explorative study uncovered specific cases where the lack of common language leads to communication breakdowns, in particular because of the exchange of ambiguous, incomplete, or inaccurate information.

4.1 Ambiguous Information

Stacey & Eckert [27] have demonstrated that ambiguity in communication can have disastrous impact on the effectiveness of collaborative work. Yet, ambiguity occurs at many levels in the communication between composers and filmmakers, especially when they exchange verbal information –whether it is oral or written.

As most filmmakers do not understand specific musical terms, composers have to address them by using layman’s terms, even in an approximate manner –e.g. speaking about the *sound* or *quality* of an instrument rather than its *timbre*–. Composers can suffer from an induced ambiguity because it becomes more difficult for them to defend their musical ideas, especially in early stages of a project when the music is discussed conceptually. If composers

¹ Auricle: <http://www.auricle.com>

² Sony CineScore:
<http://www.sonymediasoftware.com/products/showproduct.asp?pid=1013>

are unable to clearly communicate their creative ideas, filmmakers may discard these ideas, not understanding their true value.

Moreover, briefs that are given to composers by filmmakers often take the form of a verbal narrative or an enumeration of words to describe the emotions to be carried by the music. The problem is that some of these words can be interpreted differently by each individual. Indeed, a word may have several different meanings – homonyms –, can be made up by its author or unknown or unclear to the person to which it is destined. This can lead to serious misunderstandings, as shown by the following anecdote that a composer relates:

“One day a director said to me that he wanted something ‘spacey’ for the music. I was not sure what he meant by that so I asked him, ‘Is it spacey like in Star Wars?’ He said, ‘-No’. ‘-Like in Star Trek then?’ ‘-No.’ So then I asked, ‘Spacey like when you had drugs and you feel spacey?’ ‘-No, not at all’. And it took us half an hour of discussion to understand that he actually wanted something ‘spacious’, where the audience would feel like they had a large empty room around them.”

Furthermore, perception of music is utterly subjective and therefore people –it does not matter if music experts or not– have different ways of describing it [7] [13]. To illustrate this point, we ran a small experiment asking 10 people with various musical backgrounds to describe the same short music piece. Collected descriptions were as varied as: “Joyful”, “Playful”, “At times intense, at other times perky”, “It’s not sad but not happy either”, or “I don’t think it is joyful, it’s more mysterious and intriguing”. Now, let’s imagine a director asking for some joyful music for his/her film; if the composer is not careful enough in understanding what the director actually intended by ‘joyful’ and only relied on his/her own interpretation of that word, s/he might then turn it into something that in fact sounds mysterious and intriguing to the director.

In summary, as argued by Karlin et al. [12], words are rarely completely reliable when you want to be absolutely specific in discussing musical ideas.

4.2 Incomplete Information

Many composers lament the fact that they are sometimes given little or incomplete information by filmmakers. One aspect of this problem manifests when filmmakers do not really know what type of music they want or at least are not able to express it, as one director tells us:

“I know that I struggle with communicating what I want. I recall briefing this one composer; I said ‘I want it to sound, you know, like this...[waves arms above head in a circular motion]’”

In this type of situation the challenge for the composer is to extract as much relevant information from the filmmaker to shape and narrow down their true expectations for the music.

Another aspect of this issue occurs when the filmmaker does not communicate all the information that is of value to the composer, as in this prime example of bad communication reported by a composer:

“I told him [the producer of an independent film] to send me all the details and material they have, like the script and a raw edit of the film. Here starts problem one, they sent me

only the scenes (8 of them) they needed music for, on a DVD with no setup, and no details. I told him, ‘Look, I can’t really start working until I know more about the film’. I asked for some more information, and he sent me a synopsis, one page with the basic story (which I already knew).”

Here the filmmaker reprised the common mistake of presuming that the composer can work without a complete understanding of the story that the film aims to tell. As in the above-mentioned example, the filmmaker may assume that only a subset of the available information is of value to the composer. In other examples the composer may not even know that a piece of information is relevant until it is presented to him. It should be clear to both parties exactly how much information is relevant in order for each one to fulfil their role successfully.

4.3 Inaccurate Information

Sometimes filmmakers give precise instructions that do not accurately translate their original intentions. They may have a clear idea of what music they want, but give an inexact description of that idea to the composer. This can happen particularly when filmmakers’ musical knowledge is limited. For example, we received a report where a director asked a composer to write a piece’s main melody for the clarinet, while he actually meant the oboe, or where the director had incorrectly identified a style of music he wanted, as one composer tells us:

“The director was very specific in that he wanted a blues piece. When I asked him what exactly he meant by that, he said ‘like 12-bar blues’. Well, the first sketch I made was rejected because he said it was ‘too regular and structured’. A few iterations later it became clear that he was looking for a medium paced rock piece, quite different.”

If composers take filmmakers’ specific requests too literally, without checking their accuracy, they might produce some music that will eventually be rejected by the filmmakers. If this type of issue is not handled properly in the early stages of a project it can then be complicated and costly in time and money to recover.

4.4 Remote Communication

Through our explorative study we observed that a growing number of collaborations between filmmakers and composers are conducted remotely, a situation which can aggravate the communication challenges previously mentioned.

Due to the advent of internet and fast bandwidths facilitating the exchange of heavy media such as video and music, it is now common for film composers to work with filmmakers who are located in different cities or even countries. Although this greatly opens the market and brings new opportunities for collaboration, communication now faces unpredicted challenges. In some instances telephone, regular mail, or email are sufficient to facilitate the exchange of music and video footage. However, due to the absence of face-to-face interaction and the inability of current accessible technology to compensate for this absence [22], if problems occur, these problems can be amplified because interactions between people are drastically limited. The following anecdote related by composer André Previn [17] gives an idea of the problems that remote communication can create. During a chance encounter with a director whose film Previn was about to score, the director requested that the music have lots of French horns in it. Puzzled by such specific request, Previn asked,

“French horns?” “Yeah! You know! French horns!” the director replied, all the while pumping his arm furiously like a slide-trumpet player. Had the requirement been conveyed over the telephone, the absence of crucial visual explanation may have caused an unpleasant surprise on the recording stage.

4.5 Summary

Through our explorative study we identified specific cases of communication breakdowns between filmmakers and composers. This first and necessary, step greatly informed us on the issues that have to be considered. In the next section we present the approach that we adopted to progress towards the design of appropriate solutions for these issues.

5. INTERACTION DESIGN APPROACH

5.1 Favourable Climate for Computer Support

An important observation that we made during our study is that most of today’s composers and filmmakers are already familiar with technology. They have long used electronic and digital tools to facilitate technical tasks such as editing, applying sound and video effects or making mock-ups. Most composers use tools like samplers, sequencers, synthesizers and virtual instruments in a creative way, as these tools can extend their composition opportunities and capabilities. Even if many of them still partly use traditional music instruments and ‘the good old’ pen and paper to compose, ‘You can’t do without technology’, says an interviewee. Also, the advent of Internet, coupled with the affordability of new technologies, is drastically changing the landscape of the film scoring industry. The practice is being democratised, as many amateur or aspiring composers are now building their own home studios and are offering their service. Fast bandwidths also allow composers to work with filmmakers that are remotely located, even in different countries. Many subjects of our study stated that they regularly make use of online collaboration tools as a part of their work. Examples include email for communicating briefs and reviews, FTP sites for posting finished products or works in progress, and online resumes and portfolios.

Therefore, although computers do not yet offer satisfactory solutions to all challenges encountered by practitioners in the communication, the current climate is favourable for introducing computer-based tools to support the communication. Practitioners’ growing familiarity with technology lets one conclude that technology awareness is not a significant barrier to the adoption of such tools.

5.2 Rationale for Interaction Design

While the benefits of user-centered design and interaction design are well documented [5; 21; 23] and apply entirely in this situation, the particular arrangement around the film scoring process imposes specific requirements on the interaction design approach.

The challenges identified in our research are concerned with the effectiveness of communication between parties involved in an iterative and creative collaboration. In exploring a computer-based system to support and facilitate this communication, careful consideration must be given to the means through which the system and the user communicate – the user interface. The interaction design approach must ensure that no further

ambiguities, inaccuracies or omissions are introduced through the user’s interaction with the system. This consideration is vital to the success of a solution, so as not to undermine the entire premise of improving communication.

In the following section we present the specific approach that we adopted and the positive results that we obtained.

5.3 Our Design Approach

5.3.1 Presentation

The interaction design approach that we followed principally draws from *goal-directed design* [5] and has a simple premise: If we design and construct solutions in such a way that the people who use them achieve their goals, then they will be satisfied and will see value in using the solutions. As summarised in Figure 2, this approach relies on the following key elements:

- A successful solution is a usable assembly of the right set of functions and features.
- Functions and features exist only to allow certain tasks to be performed.
- Tasks are the mechanism through which users’ goals are achieved and motivations realised.
- Goals and motivations must be drawn from real people who will use the system in a particular context.



Figure 2. Interaction Design approach showing progression towards a successful solution.

5.3.2 Application

The first steps of our design approach consisted of identifying in detail the profile of the people we were designing for, and the true goals and motivations that those people held. Aided by the data captured through our explorative study we sought to develop a set of *personas*, fictitious but realistic characters that represented the key participants in the film scoring process. This was done with two objectives in mind:

1. To provide focus and direction to subsequent downstream design activities –such as scenario development– when considering potential users of a solution.
2. To validate with research subjects that we had an accurate understanding of the main participants and concerns in the film scoring process.

Personas are used to give a detailed and individual identity to a group of potential users of the system. By referencing a specific –yet representative– persona, designers are better able to conceive appropriate and effective interaction with the system than if they were designing for a broad group of comparatively intangible “users” [18]. For example, if designers are assessing the suitability of a design feature, it is more helpful for them to assess whether that feature would suit *Frank* –a persona whose profile and motivations were previously well defined– rather than a generic “user”.

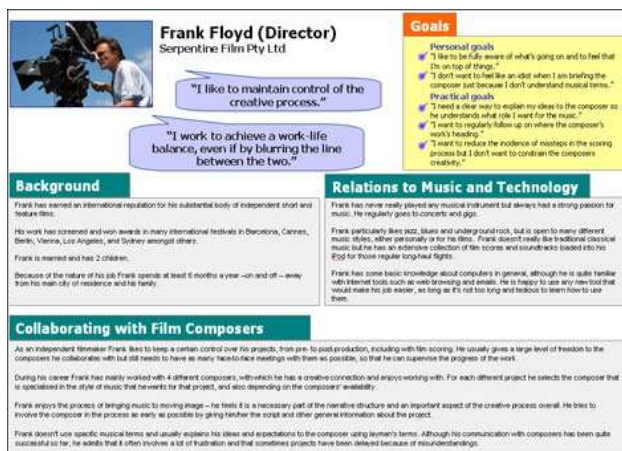


Figure 3. One of four personas assembled as part of research activities

We disseminated early versions of persona descriptions (see example in Figure 3) to practitioners who then provided written feedback. The collected feedback was then incorporated to refine the personas. This process led us to assemble four distinct personas (two composers and two filmmakers), richly rendered archetypes of potential users of the computer tools we sought to design. Overall these personas represented all the needs and concerns that real-life practitioners had expressed. Each persona was given a name, a face, a background and history, quotes in the persona's own words and goals to achieve through his/her work. We now present each of these four personas in more detail.

Between the two composer personas, we discovered significant variation in behaviour, attitude and goals. One persona embodied a traditional and classically trained composer having studied and lectured at the conservatorium of music. Consequently she had a very formal understanding of the structure and operation of music as a dramatic and thematic device. The other persona, representing the large amount of self-taught film composers, had a more on-the-job experience, initially playing with a successful touring rock band. Through contacts developed in the industry, he extended his skills by working as a record producer with other musicians before finally writing music for film and television. This second composer had a less formal musical background and worked based on spontaneity and intuition. These two personas engaged with filmmakers in different ways. The former, through a conscious and learned method, was very interested in maintaining the artistic integrity of the pieces she wrote. The latter was less methodical, primarily working in direct reaction to the filmmaker's stated requirements.

The two filmmaker personas were also different from each other. Representing the large group of semi-professional and professional writers/directors and producers, one was an independent filmmaker whose passion for his work flowed over into his personal life. This filmmaker was passionate about the story he was telling and was prepared to compromise commercial success in order to tell the right story, the right way. This filmmaker would usually choose from the same small number of trusted composers. The second filmmaker, characterising the important majority of producers in small to medium sized production and post-production companies, was much more commercially focussed than the first, working mostly in television. He worked within tight time-frames for busy clients

who expected value for money from his organisation. This second filmmaker often used library (pre-recorded and licensed) music, fearing the potential risks and expenses inherent in employing a composer to write an original piece.

Goals, clearly articulated for each individual, were key to the success of our personas. An example of the goals identified for one of our personas is included in Table 1.

Table 1. Identified goals for one of our personas.

Frank Floyd – Independent Filmmaker	
Personal Goals	Practical Goals
<ul style="list-style-type: none"> – “I like to be fully aware of what’s going on and to feel that I’m on top of things.” – “I don’t want to feel like an idiot when I am briefing the composer just because I don’t understand musical terms.” 	<ul style="list-style-type: none"> – “I need a clear way to explain my ideas to the composer so he understands what role I want for the music.” – “I want to regularly follow up on where the composer’s work is heading.” – “I want to reduce the incidence of missteps in the scoring process but I don’t want to constrain the composer’s creativity.”

The goals that we identified for the composers reflected the important need to receive a comprehensive and unambiguous brief of what was required. Understanding their clients’ background and tastes was seen as important. Furthermore the composers needed to communicate musical ideas clearly and efficiently in response to the brief. Composers were also motivated by a desire to receive meaningful feedback as their musical ideas developed.

Not surprisingly, the goals of the filmmakers were concerned with providing a clear indication of what was required of the composer, then seeking to determine that the brief was understood. Both filmmakers needed to keep a close eye on the progress of the project and reduce the risk of missteps in the creative process. The more commercially focused filmmaker was also driven by a need to maintain strict cost and time control.

Through the articulation of personas we identified the distinguishing aspects of the main participants in the film scoring process. We determined high-level needs based on the goals of filmmakers and composers. In the course of the next stage of our work the personas and goals will inform a set of task-based scenarios representative of the film scoring process, enabling us to subsequently define detailed requirements for effective interaction with potential computer-based solutions.

6. DISCUSSION

Our findings suggest that there are distinct and widespread communication issues recurrently arising between participants in the film scoring process. These issues are largely due to the ambiguous, incomplete and inaccurate nature of the conveyed information. In this section we examine the benefits of the design approach and suggest refinements. We also discuss the limitations and guidelines that should be observed in the conception of computer support.

6.1 Benefits of the Approach and Suggested Refinements

As the research progressed we were able to identify benefits of the adopted interaction design approach.

First, that approach provided us with a detailed description of practitioners' profiles and concerns. The development of personas and goals helped us validate early hypotheses about our audience and the film scoring process, and helped us structure our research priorities around the specific needs of a well defined set of users. This improves the chances of a genuine application of the research into the service of people who need it.

Also, we were able to show that personas worked as an effective means of communicating and validating the characteristics of practitioners. The use of face-to-face interviewing techniques, dissemination of personas to the community for feedback and iterative refinements helped us engage our subjects deeply in the research. "The power of fiction to engage" described by Pruitt & Grudin [18] was confirmed, as we observed that:

- Subjects embraced the identity of the personas, referring to them by name – "I feel Frank wants to be successful and known for his vision".
- Subjects were able to identify with and relate to the personas – "He's a sweetheart. I totally relate to him.", "I know about 50 of these guys".
- Subjects empathised with the personas to the point of offering them advice – "He shouldn't worry about appearing like an idiot. That will hurt communication".

Having subjects review personas representing members of the practitioner group on the other side of the collaboration (i.e. composers reviewing filmmaker personas and vice versa) allowed us to balance the different comments and to reach a more objective vision of reality.

We also learned some lessons through the research process which suggest some refinements to the approach.

The goals that we articulated for our personas were identified purely in the context of the film scoring process. However, we became aware that with the filmmaker personas, one of the key differentiators between the two of them was the significance of story-telling as a personal motivator. One of the personas was more concerned with bringing his stories to the world than about achieving financial success. While this was a key professional characteristic, it was not explicitly spelled out in the persona; largely due to us not seeing this as a primary motivator for him in the context of film scoring communication. Interestingly, one of the survey subjects had difficulty distinguishing the two personas until this crucial characteristic was ascribed to the relevant persona. This highlights the point that when developing personas, it is important to achieve a balance between finely targeted contextual goals and broader holistic motivators. It would have been more valuable to note this defining characteristic clearly in this persona's goals.

The feedback that we sought on the personas was extensive, asking for comments against every aspect of all four personas. Consequently some of our subjects struggled to respond within the one week we allowed them. We recommend reducing the amount of feedback requested rather than allowing a longer

response time. Asking for explicit feedback against the goals only with a general response for the rest of the persona would have optimised compliance.

6.2 Limitations of Computer Support

Composers and filmmakers unanimously recognized that face-to-face meetings were fundamental in building propitious conditions for a successful collaboration. As a composer from our study said, 'It is really helpful to capture all the non-verbal communication elements'. These meetings are particularly useful at early stages of a project or even before it actually starts, as another composer said, 'They're the meetings where you develop your loyalty to the project, where you become part of the effort and the team'. Face-to-face meetings are also essential in building trust between collaborators. Trust is a crucial element of the collaboration and has a decisive impact on creative communication: *Film composers have to establish the director's trust and be able to influence him/her on taking the film to another level* [28].

Regrettably, Nathan et al. [16] have shown that current technologies like instant messaging or video/audio conferencing cannot compete with face-to-face on trust development. Yet, this concern is mitigated somewhat by Rocco [19] who argued that what technology lacks in trust aspects of communication can be repaired by some initial face-to-face contact. Survey subjects validated this view with one suggesting that "face-to-face, phone, email meetings are always best to begin with, this allows maximum benefit. Once composing is underway, phone and computer allow revision and refinement." In any case, development and preservation of trust between members of the film scoring collaboration must be at the heart of concerns when designing computer support. To that regard, studies by Jones & Marsh [10] and Rocco et al. [20] provide inspiring information on understanding trust aspects and human-human interactions within the context of collaborative computer frameworks. At this stage, it is too early to claim that any computer system could remove necessity for practitioners to meet in person. As a result, the first step in conceiving an effective system should be to assist –not replace– rich interpersonal relations. A system should not claim to replace all the techniques and media practitioners already use to collaborate but rather to complement their collaborative process and assist them through it.

6.3 Guidelines for Effective Computer Support

While more research is required to realise technology that is able to maintain interpersonal trust, computer support can now be envisaged to alleviate the communication challenges evoked earlier. Our interaction design approach will lead to the conception of computer-based tools that respond to specific needs in film scoring. We are now in a position to present a number of guidelines on how computers should behave to enable a better shared understanding between composers and filmmakers. These guidelines particularly concern the support for disambiguation, comprehensiveness and accuracy of the information that these practitioners exchange.

First, as a rule, computers should help reduce any divergence that exists between what is meant and what is understood and therefore allow any user (composer or filmmaker):

- To express one's ideas accurately to other collaborators: "I say what I think and I think what I say".

- To provide proper feedback so one is sure that others have understood one's ideas: "I know that others know what I think".

In the case where filmmakers do not really know what music they want, computers should:

- Give them the ability to shape and illustrate their thoughts by allowing fast collection of rich media information.
- Support them in describing what they do *not* want instead, therefore eliminating inappropriate alternatives.

In the case where filmmakers have a clear and precise idea of what they want (e.g. 'I want the French horn to play the melody'), the tools should prompt them to validate that they have accurately expressed that idea (e.g. by prompting with images or sound samples of a French horn).

In the case where composers are not certain they understand filmmakers' requirements, computers should help in prompting filmmakers with appropriate questions or musical sketches to check and confirm those requirements.

Finally, computers should allow an iterative process of refinement where both composers and filmmakers could follow the evolution of the work throughout the project.

7. CONCLUSION

In this paper we presented the results of an explorative study regarding the communication breakdowns that occur between filmmakers and film composers. The identification of specific cases where ambiguous, incomplete or inaccurate information is conveyed by these practitioners uncovered the issues that have to be considered. We then presented and discussed the positive outcomes of an interaction design approach that we adopted to conceive appropriate solutions, arguing that effective interaction with computer-based tools can alleviate the challenges faced in the communication.

8. FUTURE WORK

With a set of unique personas and goals drafted and validated, the majority of the formative research work is now behind us. The next step in our research is to prepare scenarios [4], narrative descriptions of the execution of tasks related to the process of film scoring. Our personas will adopt the roles of composers and filmmakers in these scenarios. Motivated by the goals we have identified for them, they will help us produce detailed user requirements of computer-based solutions. Subsequently we will develop a working prototype as part of the proposed solutions. Several iterations of heuristic and empirical evaluations will be conducted to validate and refine this prototype, as a number of composers and filmmakers have already offered to test it on real-world film score projects. Finally, over the longer-term, we envisage the possibility of extending our research and adapting our findings to other creative and collaborative industries that are similar to film scoring, like dance, dramatic arts and graphic design.

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