SCREENFACTION:
Supporting Creative Remote Communication in Film Scoring

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Preface

Before jumping right in, I shall briefly introduce my background and the original motivations that led me to start this journey in postgraduate research. This may, I hope, help the readers and examiners of this thesis understand the orientation that I have taken throughout this PhD.

I was born in Reunion Island, a tropical little piece of France in the Indian Ocean, and spent the first 18 years of my life there until I received my high school diploma. Then, I moved to Toulouse in the South-West of France, my parents' native region, to undertake a Bachelors degree for four years in Mathematics and Software Engineering at the Paul Sabatier University. I then spent one year at the National School of Civilian Aviation (ENAC), where I eventually graduated with a Masters degree in Human-Computer Interaction (HCI). As part of this degree I was required to carry out an internship, which I was fortunate to be able to do in Sydney at the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia's national science agency, under the supervision of Dr Cecile Paris. At the end of this internship I was hired by the CSIRO on a one-year contract to work in the field of Natural Language Processing. This fantastic experience enticed me to remain in academia seeking opportunities for PhD research. This is when I met Professor Ernest Edmonds, Director of the Creativity and Cognition Studios (CCS) at the University of Technology, Sydney (UTS), who was to become my supervisor. As a trained musician (I had studied clarinet and classical music at the Conservatorium and had played in symphonic and brass & wind orchestras), I was instantly attracted by the research undertaken at CCS as it tackled fascinating aspects of art practices. A few months later, at the beginning of 2006, I was privileged to be awarded scholarships by the Australasian CRC for Interaction Design (ACID) and the Regional Council of Reunion Island, starting my PhD in a domain that is a passion of mine: film music. Three and a half years passed. Now, here I am, honoured to be writing this snapshot in the life of a student researcher.

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Mia, you took care of me and made this journey seem so easy. Your presence is such a blessing for me.

I'll switch to French now, as I can't seem to get used to speaking in English to my family. Maman, Papa, Etienne et Mamie Reine, merci à vous tous pour vos encouragements continus, pour m'avoir rendu visite si souvent et pour m'avoir soutenu tout au long de cette aventure. Je vous serai éternellement reconnaissant.

Abstract

The research in this PhD thesis is concerned with the development of design principles and of computer tools to facilitate remote communication between stakeholders in the film scoring process.

Film scoring is a creative, multidisciplinary practice that involves two key parties: filmmakers (film or television directors and producers) and composers. In the position of clients, filmmakers start by hiring a composer and provide an oral or written brief describing how the music should support their vision. Then, musical ideas are discussed and developed through creative collaboration between the two parties until the score is completed and released with the picture to television or theatre. In this context of collaboration between music specialists (composers) and non specialists (filmmakers), certain problems repeatedly emerge primarily due to practitioners not sharing the same musical language. In fact, previous ethnographic records and trade literature have shown that this creative collaboration can face large levels of misunderstanding and frustration, and that little has been done to help practitioners communicate accurately and efficiently. With the advent of the Internet and fast bandwidths facilitating the exchange of heavy media such as video and music, it has also become commonplace for composers to work with filmmakers located in different cities or even countries. Although this situation greatly opens the market and brings new opportunities for collaboration, communication now faces new obstacles. In the absence of face-to-face, challenges can be aggravated as interactions between people are drastically limited.

Considering advances in recent technology and related academic endeavours, the research in this PhD concentrates on alleviating communication issues in remote settings through the use of computers. The research methodology was inspired from several domains and approaches, namely Human-Computer Interaction (HCI), Computer-Supported Cooperative Work (CSCW), ethnography in design, evolutionary prototyping, interaction design and goal-directed design. An

exploration phase included a longitudinal study with 31 practitioners and a 5-month long case study with 2 practitioners. The exploration identified communication challenges recurrently faced by practitioners while collaborating on film score productions. Based on the observation of habits articulated by practitioners to address the challenges, a set of guidelines for best practice were also developed. For clarity and ease of comprehension, challenges and guidelines were classified into four main levels of concern: organisational, interpretive, emotional and indexical.

A design phase comprised of two studies was then conducted to progress towards appropriate solutions for these communication issues. The first study led to the assembly of personas to facilitate the understanding of the main roles involved in the film scoring process. The second study showcased the design of a low-fidelity, paper-based, prototype to assist the remote discussion of music and video artefacts.

A high-fidelity version of the prototype, named *Screenfaction*, was later implemented as an interactive Web-based platform. This version was then evaluated over a four-week period with two practitioners in real-world conditions. Outcomes from the evaluation have stressed a need for establishing a clear scope in creative discussions and for resolving the ambiguity that occurs in remote collaboration. Feedback from participants also revealed the complex nature of the composer-filmmaker relationship and highlighted some interpersonal, technical and coordination issues that should be addressed when designing systems for distant communication.

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PART 1

PRELIMINARIES

CHAPTER I

Introduction

This thesis is concerned with the collaborative making of film music and with facilitating remote communication between music experts (composers) and non experts (filmmakers) through the use of computer tools. In this introduction chapter, I will first present the context (processes and roles involved) of the studied domain, film scoring. I will then describe the specific problems that will be addressed in this thesis. Lastly, after exposing the principal aims, objectives and scope of the PhD work, I will provide an overview of each of the subsequent chapters.

1. Context

1.1. DEFINITION OF TERMS

> Needless controversy is sometimes produced and perpetuated by an unacknowledged ambiguity in the application of key terms. — (Kemerling, 2001)

Following philosopher Garth Kemerling's recommendation, I shall start by defining the terms that I will use throughout this thesis: "film", "film music", "film scoring", "film composer", "filmmaker" and "practitioner"[1].

First of all, by "film" I will refer to any product made primarily of moving images that is destined to be shown on television or in cinema theatres. As they will be considered in this thesis, films may be of varying types (e.g., animations or live action) and varying formats and lengths (e.g., feature films, documentaries, TV commercials, or TV series). I will refer to "film music" broadly

[1] Definitions for other technical terms can also be found in the glossary at the end of this thesis

as music accompanying films. The term "film score" will designate more precisely the actual musical product as eventually heard by the film's audience. The film score is also commonly spoken of as the "soundtrack" but I will avoid that term so as to prevent confusion with other potential sound components of a film, namely dialogue or sound effects. Existing and already published music may be used to partially accompany a film. However, in this thesis, particular focus will be placed on original music written by professional film composers and specifically tailored to certain films. "Film scoring" will be referred to as the whole process of making the film score, from early conceptual discussions to the actual writing of musical notes and the recording and mixing in the studio.

As far as people and roles are concerned, I will refer to the "composer" as the music expert responsible for writing the film's music. For the term "filmmaker", I will use the definition found in the Macquarie Library's Dictionary (2005), that is, "*1. a person who initiates the production of a film, especially by arranging the financial backing, and who supervises its production; producer. 2. a film director*". A composer I once interviewed argues that every person contributing, to a small or large extent, to the *making* of films (i.e., including the director, producer, composer, actor or even the catering crew) could be called a filmmaker, or a *maker* of films. However, for the purpose of this thesis and for clarity's sake, I will arbitrarily restrain the term "filmmakers" to designate the individual or group of directors and producers responsible for the overall production of the film and, in particular, for commissioning the composer. Finally, the term "practitioner" will be used broadly to designate any person involved in the creative process, for example, the director, producer, composer, sound designer, film editor, music editor, music supervisor or orchestrator.

1.2. OVERVIEW OF THE FILM SCORING PROCESS

Film scoring, as described by Tyson-Chew (2003) and Rosar (2002), is both an art and a craft. It requires both the presence of individual creative talents and the application of rigorous working methods. The film score is also the fruit of a collective effort between several practitioners. A number of people playing important roles, such as the writer, film editor, music supervisor, music executive or music editor may have an impact on the composer's score outcome; but as Karlin & Wright (2004) say, "*the two who have the greatest influence on the musical style, tone and attitude of the film —crucial factors of concern to the composer— are the director and the producer*". As this point will be emphasised throughout this thesis, the film scoring process involves two key parties: the composer and the filmmakers (director and/or producer).

As in most collaborative activities, especially creative ones, there are no definite rules or standard protocols in film scoring for running this collaborative process. Circumstances may vary greatly depending on the nature and conditions of the project and on the personality and habits of the practitioners involved. For example, in a cinematic feature film project, the

composer tends to deal creatively mainly with the director and the producer(s), playing a supervising role at a higher level. Whereas in a TV series, the composer may only discuss the music with the producer, as the director is generally busy shooting the subsequent episodes. Also, as it will be discussed in Chapter VII, some composers appreciate (provided the filmmakers allow it) being involved early in the process, for example by attending the film's scripting or shooting sessions. This way the composers can start immersing themselves in the atmosphere of the film long before envisioning the music and writing the first notes. Other composers prefer to be involved later, when the picture's edition is complete and the film is ready to be scored; this way they can start from a fresh base with no prejudice or no prior influence. However, this choice is rarely left to composers and is more often dictated by tight budgets and timeframes which are pervasive in the film industry. Hence, in most cases, the composer tends to be involved and the score to be produced in the very last stages of the process, only a few weeks before the film's release.

Generally, after the composer is chosen and hired, filmmakers supply the rough cut. This is understood to be the final and locked version of the picture, which potentially also includes sound effects and dialogue. The two parties then engage in collaboration. At the start, musical ideas are discussed at a conceptual level. Then, the composer regularly suggests drafts or works in progress to the filmmakers who, in return, provide feedback either to validate the work or to ask for alterations. Finally, when all the music is refined and approved, it is merged with the picture and mixed with other sound elements, and the film can be distributed to cinema theatres or television broadcasters. This collaborative process or "two-way" exchange of ideas usually is appreciated by all parties as it is a source of creative stimulation. Implementing it ensures that the work remains concordant with the clients' will and expectations. However, in some instances the collaboration can prove to be difficult and frustrating. This leads to the problems that this PhD addresses.

2. The Problems

Amongst multidisciplinary and creative disciplines, film scoring is a complex case that combines significant collaborative characteristics. First, it is based on a client-commissionee relationship; filmmakers, in their role as clients, commission a composer to write the music for their film. Second, the clients themselves may actively contribute to the creation of the work. Whether or not they are musically literate, filmmakers often give specifications or a set of constraints to the composer so that the music eventually serves their vision. Third, although they have to trust the composer, filmmakers follow the progress of the work to ensure that it is of quality and that it will be delivered on time for the film's release. In this context of collaboration between music specialists (composers) and non specialists (filmmakers), certain problems may emerge. In this section I enumerate the specific observations and issues that will be developed in this thesis.

2.1. COMMUNICATION IS CRUCIAL

During the creative collaboration, especially in early stages, communication is truly crucial and shapes the course of the project. On one side, filmmakers need to make their expectations clear to the composer. On the other side, the composer needs to be sure s/he understands those expectations correctly. *Comprehending a director's intent is the most important task of being a film composer* (Tyson-Chew, 2003). In fact, even if the composer writes the most exquisite piece of music, if it does not ultimately conform to the filmmakers' tastes and expectations then the project may either be delayed or simply fail. Effective communication is also essential for bringing reassurance in working conditions which often are quite pressuring in the film industry (Karlin & Wright, 2004). Conversely, poor communication may render certain situations stressful, and misunderstandings may induce frustration amongst practitioners. Broken communication may also constitute a barrier to creativity. Practitioners are creative persons at heart, but if they are not able to communicate their creative ideas efficiently to their collaborators, those ideas may be discarded and eventually be lost. Hence, communication is one core component of the film scoring collaboration that needs to be given the highest attention.

2.2. COMMUNICATION FACES CHALLENGES

Fifty years after the end of the silent movies era and the emergence of the film scoring practice, ethnographic records by Faulkner (1978, 1983) already depicted the confrontational aspects of the collaboration between film composers and filmmakers. Compelled by tight budgets and time-frames imposed by the film and television industries, practitioners were facing large levels of misunderstanding and frustration while collaborating on film score productions. It is striking to observe the strong and numerous similarities between Faulkner's records and the current situation described in more recent literature (Davis, 2000; Jay, 2005; Karlin & Wright, 2004; Rona, 2000). These case histories show that practitioners are still facing recurrent and severe challenges in their creative communication. In particular, the absence of a common musical language causes difficulties while conveying musical and emotional visions to collaborators from different disciplines. The fact that the same types of communication issues have continued through the decades means that they are independent from musical trends and styles; these issues find their roots deeper in participants' capacities for handling interpersonal communication.

2.3. PRACTITIONERS ARE NOT TRAINED TO HANDLE COMMUNICATION CHALLENGES

Film scoring requires a wide set of skills. It requires not only understanding music, the moving image, and the correlations between the two; it also requires being open-minded and developing collaborative skills to handle creative communication with people from diverse backgrounds. As stressed by American musicologist and composer Fred Steiner, there is no

school or institution teaching these theoretical and collaborative skills. He states that practitioners are rarely initially trained and “the ropes” can only be learned through years of experience in the industry:

> The present proliferation of university courses in film music, and the few available film-composing manuals can impart little more than the most basic technical information on a subject in which true mastery can be acquired only from hard, day-to-day, practical experience. Furthermore, opportunities to turn to experienced co-workers for advice and guidance are very rare. The members of today’s freelance composing community do not interact or associate with each other as formerly. They work independently, at home or in their own studios, and there is little occasion to exchange information of share ideas. Most topflight composers are too busy and their work schedules too irregular to enable them – even if they are so inclined– to spend time imparting knowledge or sharing their musical expertise with young aspiring novices. — Fred Steiner in the foreword of (Faulkner, 1983).

It is true for both composers and filmmakers that there is no universal standard yet on how to handle creative communication. Most practitioners, even those with strong musical education, are self-taught in the particular practice of film scoring. Without prior preparation they learn on the job and elaborate personal habits to address communication issues faced in collaboration.

2.4. REMOTE CONTEXTS AGGRAVATE CHALLENGES

With the advent of the Internet and fast bandwidths facilitating the exchange of heavy media such as video and music, it has become commonplace for film composers to work with filmmakers who are located in different cities or even countries, or who are unable to meet face-to-face because of schedule incompatibilities. Although this greatly opens the market and brings new opportunities for collaboration, communication now faces new obstacles.

In remote contexts, one cannot always benefit from the richness of non-verbal cues such as body gestures or facial expressions. In the absence of face-to-face communication, challenges can be aggravated as more time and effort is required to maintain the flow of creative discussions and as further misjudgements can be induced. The following anecdote related by composer André Previn (1991, p. 102) illustrates one sort of misunderstanding that would be difficult to handle in remote contexts. During a meeting with the director of a film Previn was hired to score, the director asked for “*lots of French horns*”, emphasising his wish by pumping out the unmistakable gestures of a slide trombone. Intrigued by such specific request, Previn asked, “*You mean that you want a lot of brass instruments?*”, “*No no no! French horns, lots of them*”, again the director replied, still furiously imitating a trombonist. Had the requirement been conveyed over the phone, the absence of crucial visual explanation may have later caused an unpleasant surprise at the recording stage.

In most instances telephone, regular mail or email communications are sufficient to assist the exchange of music and video footage. However, when problems occur, those problems can be amplified and have dramatic consequences on the collaboration's outcomes because interactions between people are drastically limited.

3. PhD Work

My PhD work is concerned with the investigation of computer solutions to support remote communication between collaborators of the film scoring process. In this section I describe the current climate regarding computer support and then present in more details the aims, objectives and scope of my research work.

3.1. FAVOURABLE CLIMATE FOR COMPUTER SUPPORT

As it will be described at length in Chapter II, for the past two decades the themes of creative collaboration and multidisciplinary collaboration have generated a growing interest within academia and industry, particularly in the fields of Human-Computer Interaction (HCI), Computer-Supported Cooperative Work (CSCW) and Computer Mediated Communication (CMC). Substantial efforts have particularly been undertaken to support creativity and collaboration in music-making. In parallel, extensive technology advances have led most of today's composers and filmmakers to include electronic and digital tools in their daily practice. In fact, these tools have now long been used to facilitate technical tasks such as editing, applying sound and video effects or making mock-ups. Most composers use samplers, sequencers, synthesizers and virtual instruments in a creative way, as these tools can extend their composition opportunities and capabilities. Even if many practitioners still partly use traditional musical instruments and "the good old" pen and paper to compose, "*You can't do without technology*", says an experienced composer whom I interviewed. Also, the advent of Internet, coupled with the affordability of new technologies, drastically changes the landscape of the film scoring industry. The practice becomes democratised, as many amateur or aspiring composers now build their own home studios and offer their services. As pointed out earlier, fast Internet bandwidths also allow composers to work with filmmakers that are remotely located, sometimes even across different countries. Many practitioners regularly make use of online collaboration tools such as email for communicating briefs and reviews, FTP (File Transfer Protocol) sites for posting finished products or works in progress, and websites for showcasing resumes and portfolios.

According to Schober (2006), so far mainstream technology has still been unable to provide solutions that fully compensate for the lack of face-to-face communication. For Adamczyk & Twidale (2007), multidisciplinary teamwork also has an intricate set of needs, assumptions and requirements that have not been readily met by existing tools. However, although computers do not yet offer satisfactory solutions to all communication challenges encountered by practitioners,

the current climate appears to be favourable for introducing computer-based tools to support the communication. While computer support for music has already received considerable attention (e.g., in music education, performance or composition) there have still been relatively few tools and research endeavours specifically addressing the aspects of film music. This is precisely where my research fits in.

3.2. RESEARCH AIMS, OBJECTIVES AND SCOPE

The two broad aims of my research are to enhance creativity in film scoring and to favour an enjoyable working experience for practitioners. To reach these aims, I primarily intend to facilitate communication between practitioners, based on the hypothesis that effective communication can both prevent frustration and maximise chances for creative ideas to emerge and be carried out. Also, remote collaborations being increasingly common in today's practice and communication issues being greatly aggravated in remote situations, I choose to pay particular attention to film score projects taking place over a distance. Based on the fertile ground originated by practitioners' growing familiarity with technology and by the increasing potential for computers to enable the exchange of rich information via online networks, my prime objective is to build a software-based environment to provide support and relief for remote collaboration. As it is envisioned, this environment should let practitioners freely express their creativity while communicating their ideas clearly and accurately to each other. It should let practitioners retain full control over their working processes while establishing favourable conditions to help remove counter-productive constraints and barriers to creativity. This prime objective implies that intermediary objectives also need to be fulfilled. In particular, for my PhD work I intend to survey the field of film scoring to identify what important issues are faced in communication and how practitioners deal with those issues. I will also explore opportunities to design, implement and evaluate working prototypes so as to study the benefits of computer support for creative remote communication. Therefore, the questions guiding the research presented in this thesis can be summarised as follows:

- Precisely what are the communication challenges faced by filmmakers and composers and what are the ways to alleviate them?
- Which challenges should be addressed in priority when collaboration is conducted remotely?
- What viable computer-based solutions could be developed?

Finally, it is important in a research context to clearly define a scope and set limits for what will be investigated. Therefore, as indicated earlier, particular focus will be placed on the communication between filmmakers and composers. The fact that other types of roles (e.g., sound designer, film editor or music editor) may have an impact on the film score outcome will

not be ignored, but will remain as a secondary concern in this thesis. Similarly, the actual composition of music will not be the concern of this research; I will not elaborate on how composers *write* music but on how filmmakers and composers *discuss* music. Furthermore, as it will be described in Chapter II, most of the available literature about film music and the film scoring industry primarily paid attention to practitioners in Hollywood. In my work, I will study the film scoring practice more broadly by considering a wide range of projects (e.g., feature films, short films, advertising or documentaries). Also, because of my geographical situation, most of the surveyed practitioners are residents of Australia. Importantly, the work presented in this thesis will *not* concern the general public, students or hobbyist practitioners. Instead, participants of the studies organised as part of this research will all be professionals, though with varying levels of experience, from novices to highly experienced specialists.

4. Structure of the Thesis

This thesis is divided into three main parts. Part 1 (*Preliminaries*), which includes this introduction chapter, lays the foundations for the PhD work with the review of academic and trade literature in relevant areas of research (Chapter II) and with the description of methodological approaches selected to conduct this research (Chapter III). Part 2 (*Exploration*) first delineates the context and objectives of two exploratory studies: a 5-month long case study with a Sydney-based composer and a Melbourne-based director (Chapter IV) and a 2-year long longitudinal study with 31 practitioners (Chapter V). The remainder of Part 2 describes the outcomes of these two studies, namely the identification of communication challenges commonly faced in the film scoring practice (Chapter VI) and the elaboration of guidelines to alleviate these challenges (Chapter VII). Part 3 (*Solution Making*) is concerned with the design (Chapter VIII), implementation (Chapter IX) and evaluation in real-use contexts (Chapter X) of *Screenfaction*, the computer system I developed to progress towards appropriate solutions for the research problems. Lastly, the conclusion chapter recapitulates the main contributions of this thesis and exposes the future directions envisaged beyond this PhD.

CHAPTER II

State of the Art Review

The work described in this thesis is wholly multidisciplinary in that it tackles issues linked to domains as varied as music composition, human communication and computer science. No published work has been specifically concerned with the design of computer tools to support remote creative communication between composers and filmmakers yet. Much can be learned, however, from broadening the research into the concepts and paradigms established in related areas of enquiry. Therefore, in this chapter I will review the state of the arts in four areas core to my research. First, I will review literature covering the theories relevant to film music and the film scoring industry. Second, I will look at concepts surrounding creativity, in particular those that are concerned with creativity support tools, collaborative creativity and stimulants and barriers to creativity. Third, I will discuss themes about collaboration and communication, more specifically about ways for establishing a common ground regarding how film scoring communication may benefit from principles of design communication. Fourth and last, I will review a series of computer tools that support collaborative music-making and the composition of film music.

1. Film Scoring

To date there has not been any extensive and published research carried out specifically on the relationship and communication between filmmakers and film composers. Nonetheless, there is abundant literature delineating the theories of film music and the film scoring industry currently available to professionals, amateurs and film music enthusiasts. An excellent starting point is with Robynn J. Stilwell's critical review of literature (Stilwell, 2002). In this remarkable and comprehensive article published in the *Journal of Film Music*, Stilwell covers many aspects of film scoring including biographies, theories, pedagogy, sociology and cultural studies. In this section, I will review two domains of the literature on film scoring: the theories and aesthetics of film music; and the film scoring industry. All the concepts presented here will assist in a clearer understanding of the needs and problems at stake in the later chapters.

1.1. THEORIES AND AESTHETICS OF FILM MUSIC

Within the varying communities of film music enthusiasts, practitioners and cognitive scientists, there have been several attempts at theoretically delineating film music: What is its role and function in the film? How is it perceived by the audience? These questions originate from a vivid fascination perpetuated by generations of film-goers since music was first used in films early in the 20th century. Film music has widely been recognised as an aesthetic, integral and vital component of films. As a result, the audience's expectations have rapidly been rising as already pointed out by Muir Mathieson, a British conductor, in 1944:

> Most people go to the cinema, and they have one thing in common […] They all insist on the best stars, directors, producers and cameramen, the best stories. And now, because universal taste has been raised by the composers themselves, they begin to demand good music. — (Mathieson, 1944)

Beyond the recognition of the importance of film music, its value as an applied or fine art has been debated. Marian Hannah Winter (Winter, 1941), an American dance historian, clearly valued film music and envisaged it as an art-form in its own right: *"The possibilities of sound film are beyond anything that has yet been accomplished. Its exacting technical requirements, and the humility required of composers whose music become merely a component of a sound track, are compensated for by the excitement of creating in a new art-form"*. More recently, Australian composer Nerida Tyson-Chew (2003), presented the film scoring practice as a complex mixture of art and craft: *"A film composer often needs to control inspiration and make the music work within the restraints of the images. This is the craft of the art. […] is it an arty craft or a crafty art? I think it is both".*

The quality of music produced for films has occasionally been criticized, especially during the first half of the 20th century. For example, Winter (1941) provided a thorough review of the use of music in European cinema. She argued that European studios, although with less capital and less resources than Hollywood studios, better understood the true potential of sound and music in films. Conversely, she vehemently fustigated American productions, claiming that producers were more concerned with quantity than quality. She rejected the idea of using music merely as underscore[2], an idea that was prominent in the modern era. Indeed, the Hollywood composers' preferred mode of composition was the *parallelism* between sound and image (Gallez, 1970). This mode simply consisted of mirroring the drama on-screen with music and sound only to

[2] Underscore is some simple music generally made of chord progressions and without distinct melody. It is primarily used to enhance mood and accompany a situation, to make transitions between scenes and, arguably, to cover the flaws of the film's production

illustrate and emphasise emotions. Russian director Vsevolod Pudovkin (1960) promoted a radically different aesthetic view. He firmly believed that sound and music ought to play a more preponderant role in the making of films:

> It would be entirely false to consider sound merely as a mechanical device enabling us to enhance the naturalness of the image. […] The role which sound is to play in film is much more significant than a slavish imitation of naturalism on these lines; the first function of sound is to augment the potential expressiveness of the film's content. — (Pudovkin, 1960, pp. 183-184)

Pudovkin defended the principle of *asynchronism*, often also referred to as *counterpoint*. As he wrote, "*music in sound film must never be the accompaniment. It must retain its own line*" (Pudovkin, 1960, p. 190). For him, adding asynchronous sounds and music breaking away from the reality of the image, allowed an introduction to a richer and more complex dimension of the film:

> It will be appreciated that this instance, where the sound plays the subjective part in the film, and the image the objective, is only one of many diverse ways in which the medium of sound film allows us to build a counterpoint, and I maintain that only by such counterpoint can primitive naturalism be surpassed and the rich deeps of meaning potential in sound film creatively handled be discovered and plumbed. — (Pudovkin, 1960, p. 193)

Yet, Pudovkin's radical approach was not universally praised. Siegfried Kracauer (1965), a German writer and film theorist, particularly criticised Pudovkin's first sound-film, *The Deserter* (1933); he claimed that the music was inappropriate and that it in fact carried the wrong message:

> He used [music] as the carrier of a message entirely unrelated to the actual situation. Gloomy pictures of a demonstration of defeated workers are there synchronized with an uplifting music which he inserted in the firm conviction that it would drive home the unbroken fighting spirit of the defeated and moreover make the audience anticipate their ultimate triumph. […] The Deserter music misses its purpose. — (Kracauer, 1965, p. 142)

Film critic Paolo Milano (1941) saw the aesthetic relationship between sound and visuals to be of three kinds: (A) *dominant visuals*, to which the musical matter depends, as comment or auxiliary; (B) *dominant aurals*, in converse relation; or (C) *an equal collaboration* of the two to unite in a composite and interdependent relation. Milano also proposed a morphology approach to describe the intermediary levels of subordination of the musical contribution to the visual expression. This morphology, represented in Figure 1, was comprised of five levels:

1. *Neutral Music*: Music whose function is not aesthetic but practical, that is, the music is not functioning *within* the film and is used in the background to fill the gaps that would have been caused by a silent projection.

2. *Casual Music*: Music which seems to be accidental and which does not necessarily contribute to the drama, for example: a clock chiming or a person whistling a tune.

3. *Music as rhythm comment*: Music which mirrors some rhythmic visual patterns in the film, for example: a simple musical pattern accompanying the walking of a character.

4. *Illustrative music*: Music which follows dramatic actions in the film (e.g., energetic music during a chase) or which harmonises camera movements (e.g., music accompanying the fade-in of a wide landscape).

5. *Music as psychological comment*: Music which *characterises* the visuals, either by underlining the dramatic situation or by expressing the feelings of a character.

Milano also defined the notion of counterpoint as the ultimate situation where images and music interplay with an equal aesthetic importance, wherein neither dominates. He represented counterpoint as an apex and introduced five other levels of morphology (directly corresponding to the ones enumerated above) with an increasing subordination of the visuals to the music: from *images as psychological comment* (e.g., showing faces of listeners to reflect the emotions of the music) to *neutral images* (e.g., meaningless shots of orchestral players in a filmed concert). This balance may change from scene to scene, depending on whether the filmmaker wants the music to take precedence over the image or vice versa.

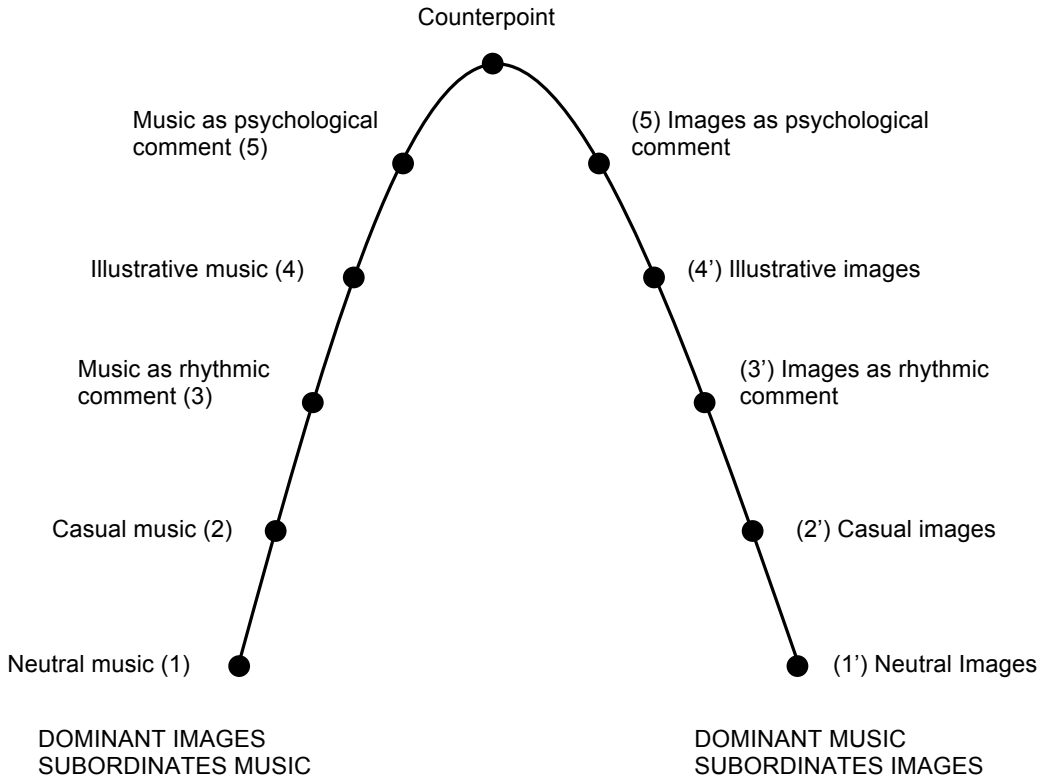

Figure 1. Relationship between music and images in film (Milano, 1941)

Siegfried Kracauer believed that counterpoint occurs when the picture and the music convey different meanings that meet in a montage effect: *"Imagine the close-up of a sleeping face which appears to the rhythms of nightmarish music: it is all but inevitable that the intriguing discrepancy between these sounds and so peaceful a picture should puzzle us."* (Kracauer, 1965, p. 141). Douglas Gallez (1970) later proposed a functional taxonomy of film music (Table 1) primarily based on Kracauer's theory. Gallez admitted that film music did not easily lend itself to categorisation, but he argued that taxonomy may help provide a basis for production decisions and critical judgments: "*As the possibilities for both film and music multiply, as cross-media approaches enable us to realize total experiences incomprehensible a short while ago, perhaps it is futile for us even to try to establish limits. But even as we peer over the new threshold, we must continue to see where we have been and where we now stand.*" (Gallez, 1970). Gallez's taxonomy divided film music in six different categories:

Table 1. A functional taxonomy of film music (Gallez, 1970)

I. Introductory and descriptive music

A. Psychologically adjusts audiences by establishing general moods.

B. Provides information as to initial and succeeding settings: period and location.

II. Mood (background) music

A. Intensifies apparent mood of sequence by synchronous: imitation (Mickey-Mousing) or evocation (overall treatment).

B. Provides ironic contrast of sequence mood by asynchronous counterpoint.

III. Realistic (source) music

Provides musical realism by:

A. Using justified incidental music.

B. Integrating production number(s) in the film story.

IV. Dynamic music

A. Emphasizes cutting rhythm.

B. Provides continuity by connecting dialogue sections with neutral filler or carrying on development of thought.

C. Psychologically advances action by providing transitions or building climaxes and preparing further action.

V. Imitative (onomatopoeic) music

A. Imitates mechanical or natural sounds other than human.

B. Imitates human speech or utterances (screams, sighs, moans, etc.)

VI. Suspensory and terminal music

A. Suspends action.

B. Terminates film.

Claudia Gorbman (1987), a Professor of film studies at the University of Washington, criticised Kracauer's views and those of most scholars, claiming they were too restrictive and primitive. For her, the number of possible film/music relationships was not limited merely to the concepts of parallelism and counterpoint. Instead, she pointed out the synergetic quality of music in films and argued that music played an essential role in the cinematic *narrative*:

> The point is that image, sound effects, dialogue, and music-track are absolutely inseparable during the viewing experience, and they form a combinatoire of expression. […] Ultimately it is the narrative context, the interrelations between music and the rest of the film's system, that determine the effectiveness of film music. — (Gorbman, 1980)

Gorbman also gave particular attention to the notions of *diegetic* and *nondiegetic* music[3]. She recognised music as the only element of filmic discourse that appeared extensively in nondiegetic as well as diegetic contexts, and often freely crossed the boundary in between. The flexibility that music has with respect to the film diegesis[4] implies it could have many different functions: temporal, spatial, dramatic, structural, denotative or connotative (Gorbman, 1980).

Furthermore, film music has drawn a certain interest within the field of cognitive science research. Although this area is still largely unexplored, some pioneering examples are particularly worth noting. One good example is the work of Annabel Cohen (2002), who tried to understand the movie spectator's mental processes (both as listener and viewer). Cohen particularly highlighted some analogies between film and music with respect to three musical structures:

- *Central reference*: By the end of a film, the viewer usually has a general feel of the "central reference", which can be the main character, theme, or message carried by the film. Similarly, in Western European music as well as in music from other cultures, the listener instinctively senses the *tonality* by the end of a musical piece. That tonality may be defined in different ways, for example by the key signature or by the first and last chord of the piece.

- *Large-scale form*: A film-viewer may recognise consistent patterns within films, for example: introduction, building of action, climax, or epilogue. Structural patterns can

[3] Diegetic music (sometimes also referred to as "source music") is music that apparently issues from a source within the narrative (e.g. a band or jukebox playing in a restaurant scene, or a character singing on-screen). Conversely, nondiegetic music is music that is heard by the spectators, not by the characters of the film

[4] Diegesis is both the world in which the events narrated occur, and the story told by the narrator

also be found in music, for example in the form of *rondo* or *sonata*. Cohen argued that the aesthetic pleasure derived from musical forms would involve the same cognitive processes than in the perception of film structures.

- *Small-scale form*: A common technique used in both music and films is to have multiple occurrences of the same small elements (or *motifs*), whether they are characters, objects or landscapes in film, or combinations of notes in music. This convention of using recurrent motifs aims to prepare the viewer (and listener) for the dramatic restatements at the end.

Lipscomb & Tolchinksy (2005) also investigated the role of film music from a cognitive science standpoint and attempted to explain how music subconsciously impacted the film spectator. According to them, music influenced not only the general mood of the film, but also its scope (e.g., epic drama or a story that exists on a more personal scale) and its energy. Also, music could give a different meaning to the events on-screen (e.g., spaceships can be portrayed as elegant and beautiful (2001: A Space Odyssey, 1968) or threatening machines of war (Star Wars, 1977)). Music could also readily convey pace by giving the impression that the action is slowing down or speeding up. It could also be used as a focusing device to affect the narrative, drawing the audience's attention to certain parts of the frame.

Lastly, as pointed out by Stilwell, the relationships between music and film are highly intricate, and theory itself is not sufficient to comprehend all the related concepts: "*We have become so deeply ingrained in the culture of cinema that an objective theory of film music is patently impossible. […] Music surely exists in film for many reasons, and theories that try to pin down just one reason are of necessity doomed to failure*" (Stilwell, 2002). Hence, while it is important for me to consider some of the influential theories surrounding film music, I have chosen to take a more pragmatic approach in my research: How is film scoring concretely practiced? Who are the practitioners involved and how do they collaborate?

In the following section I will review some of the key literature concerning film scoring practice and industry.

1.2. FILM SCORING INDUSTRY

The film industry is arguably one creative industry that catalyses high fascination amongst people. This is probably due to the presence that film has in contemporary society. Thus, the elevated buzz surrounding the making of films has led to the emergence of a wide palette of books and essays, for example: (Sherman, 1988) (Wilkinson, 2005) (Travis, 2002) (Dannenbaum et al., 2003), to cite only a few. If film music generally does not stir up the same level of passion as the moving image does, the film scoring industry still is a source of strong interest amongst communities of film music enthusiasts and aspirant composers. To respond to

the increasing demand for knowledge, a class of pedagogic books and articles have been written by professionals from the film scoring industry to explain its inner workings.

The best place to start is Karlin & Wright's (2004) guide to contemporary film scoring, which constitutes the most comprehensive and up-to-date source of information on the matter. Primarily directed at composers, this textbook describes, with an effective down-to-earth tone and in great detail, every aspect of the film scoring industry, including the people and roles involved and the various constraints faced by them, the technologies used, and the different tasks and phases accomplished during film score projects. It contains numerous anecdotes given by established Hollywood composers and personnel, and features a large number of music examples. It also provides valuable advice on compositional aspects (e.g., how to use harmony and orchestration) and on business matters (e.g., how to set up contracts and organise royalties). Another remarkable textbook, less voluminous but equally comprehensive, is Richard Davis' *Complete Guide to Film Scoring* (2000), which gives the Berkeley College of Music approach to film scoring. With thorough practical information and transcribed interviews with 19 award-winning composers such as Alf Clausen, Alan Silvestri, or Danny Elfman, it provides a valuable insight of the film scoring industry and of the life of Hollywood composers.

Beside these two successful books, many compelling works can be found in trade or sociological literature. I will now review some of these works based on themes that are particularly relevant to the research presented in this thesis. Those themes are: the duality art-business, the composer-filmmaker relationship, the filmmaker's perspective, and the technology involved in the film scoring process.

1.2.1. Duality Art-Business

In the foreword of Faulkner's book (2005, p. 1), American composer Fred Steiner clearly stressed the duality that resides within the film industry: "*Motion pictures, as has been frequently noted by writers on that unique twentieth-century medium of popular culture, are an odd mixture of art and business*". Indeed, the film industry generates colossal revenue and the resulting pressure often prevails over (or at least dictates) creative aspects of film production. This aspect also applies to film scoring, where it can be difficult to draw the line between artistic and commercial sides of the practice. Specifically, the way revenue is redistributed between all the collaborators and crew (producers, music/film editors, actors, composers, musicians, set managers, caterers, etc.) can be very complex and confusing. Richard Jay, a music producer and supervisor, argues that some composers may be overwhelmed by this situation and that, as a result, they may not consider business questions appropriately. Hence, he warns composers: "*The mistake many people make when trying to find their way through the music business, is to concentrate on the former (music) to the detriment of the latter (business)*". (Jay, 2005, p. 25). Jay goes on by providing advice on how to deal with signing contracts with record labels and film production companies. Davis (2000) also supplies valuable information on royalties,

publishing rights and copyright, guiding relevant parties through the various ways composers may earn money from their composition work. Finally, Karlin & Wright (2004) give comprehensive information on how to estimate budgets, book recording sessions, negotiate fees with attorneys and agents, instrument rentals, and so forth.

1.2.2. Composer-Filmmaker Relationship

Film making is undeniably a collaborative effort. The composer does not work in isolation but in conjunction with a team of creative partners such as the filmmakers (producers and directors), music and film editors, music supervisors, musicians, conductors, copyists, and orchestrators. In a compelling article about her own experience, Australian composer Nerida Tyson-Chew (2003) highlights the most critical relationship of the creative process, the one between composers and filmmakers. For her, "c*omprehending a director's intent is the most important task of being a composer*". Yet, as will be developed throughout this thesis, the composer-filmmaker relationship potentially carries conflicts of all sorts. In an autobiography, a very enjoyable read about his years as a composer in the Golden Age of Hollywood[5], Andre Previn wittily recalls the lack of musical knowledge of directors and producers and the consequences this may have on the work. More recently, through numerous interviews with Hollywood composers, Karlin & Wright (2004) and Davis (2000) unveil some difficulties that are commonly faced when collaborating with filmmakers. For Karlin, filmmakers often have problems expressing what they want and do not always provide clear briefs to composers. Jay (2005) also emphasizes the frustrating situations that may arise between the customer (filmmakers) and the service-provider (composer):

> There can be few composers who, at one time or another, have not faced the most frustrating of scenarios where a customer pressures him into providing something the composer advised against; only to have the customer turn around and agree the composer was right to advise against the idea in the first place. — (Jay, 2005, p. 26)

No author, though, tackles the composer-filmmaker relationship as thoroughly as social scientist Robert Faulkner does. In an article entitled "*Swimming with Sharks: Occupational Mandate and the Film Composer in Hollywood*" (1978) Faulkner presents the results of interviews he conducted with fifty Hollywood composers (a third of which are Academy Awards nominees or winners). Through this study, he clearly highlights the hierarchy that exists in the relationship. For him, "*Producers and directors have in their favour the balance of power symmetry*". A few years later Faulkner writes "*Music On Demand: Composers and Careers in the Hollywood Film*

[5] The so-called Golden Age of Hollywood lasted from the end of the silent era in American cinema in the late 1920s to the late 1950s

Industry" (Faulkner, 1983) (re-edited in 2005), a book that is arguably the most comprehensive study to date on this subject. Faulkner's major contribution is to show the interactions and conflicts that occur between employers (filmmakers) and employees (composers). Through statistical analysis and qualitative data collected via interviews and observations, he identifies some recurring patterns, in particular concerning the pressure that composers receive from filmmakers, and the frustration (and sometimes even anger) composers can experience throughout the collaboration. Faulkner's sociological approach provides an inspirational starting point for my own research. Yet, his works, and those of major authors like Karlin & Wright or Davis, are primarily concerned with the Hollywood industry (Film and TV). In my research, I look at a wider range of practitioners, from the novices to the most experienced ones.

1.2.3. Literature for Filmmakers

Most of the literature focusing on the film scoring industry is primarily aimed at composers. This seems logical since composers are the ones who are most likely to seek information on the subject. However, it is unfortunate that so few books about film scoring actually target the filmmakers. The abundant literature about filmmaking does mention film music, but it generally consists of a small section or chapter and only contains basic material. This situation could be explained by the film music only constituting a small part of the filmmaker's work, which ranges from pre-production (story-boarding or actor casting), to production (shooting the film) and post-production (editing the film or dealing with composers and sound-designers).

Nonetheless, some rare exceptions are worth noting, all of which have been written by authors with a background in music, but which target filmmakers as their main audience. First, there is the example of music editor Dan Carlin (1991), who provides his experience as music supervisor and music editor to guide filmmakers through the film scoring process, focusing both on creative and business/legal aspects. Also, musician and music teacher Roseanne Soifer (1991) gives practical advice on how to, for example, use pre-existing music, estimate budget for music or organise the recording sessions. Finally, in a book entitled "*Getting the Best Score for your Film: A Filmmaker's Guide to Music Scoring*" (Bell, 1994), composer David Bell provides filmmakers with valuable information on choosing a composer and communicating with him/her, or on running spotting sessions.

Despite the quality of the few books specified above, the amount of literature to educate and inform filmmakers about the film scoring process is clearly lacking. More documentation specifically tackling the relationship with composers (how to deal and communicate with them) would greatly benefit filmmakers in their approach to film music.

1.2.4. Technology in Film Scoring

During the past two decades, the development and affordability of technologies (such as sequencers, synthesizers, virtual instruments and sound banks) has democratised the process

of making music. Indeed, a growing number of amateur and aspiring composers are now building their own home studios and are offering their service (Jay, 2005). A wide range of literature covers computer music in general, but only a few books specifically concern film scoring. Karlin (2004), for example, presents both traditional film-scoring methods and current practice with modern technology like MIDI[6] and electronic music. Arranger and orchestrator Sonny Kompanek (2004) also describes in great detail how to compose MIDI mockups and to use libraries of virtual instruments. A similar technical approach is given by Jeff Rona's manual "*Synchronization: From Reel to Reel"* (1990), which explains the tools and techniques required to efficiently synchronise music to picture. Lastly, in his later book "*The Reel World"* (2000), Rona also offers solid and practical advice on setting up a studio for writing, synchronizing and recording music using computer tools.

2. Creativity

Creativity resides at the heart of the film scoring process. Practitioners involved in this process need to make use of their creative capacities and judgement to produce music of the best standards. In the quest to support creativity, one needs to comprehend the foundations of creative practice and of creativity itself. Therefore, in this section, after reviewing multiple definitions for the concept of creativity, I will investigate domains of creativity support research that are particularly relevant to my work: dealing with constraints (stimulants and barriers), creativity-support tools, and collaborative creativity.

2.1. WHAT IS CREATIVITY?

Creativity is a concept that is difficult to grasp. While there is no authoritative and universal definition, numerous interpretations have been given by authors from various disciplines like psychology, philosophy, sociology or cognitive science. Those interpretations can also strongly vary depending on the domain from which one stands, whether it is art, design, education, engineering, or business for example. The ardour surrounding this concept could be explained by the fact that creative people are commonly seen as happier and more successful (Boden, 2003). Understanding creative thinking and creative processes would supposedly help individuals reach happiness and success, and would serve society as a whole.

The notion of creativity spans across a wide range of concerns and therefore a number of questions ought to be explored in creativity research, for example: Can everybody be creative or does creativity only belong to elite thinkers? How do social and cultural contexts influence

[6] MIDI (Musical Instrument Digital Interface) is a standard to allow electronic musical instruments and computers to communicate and synchronise with each other

creativity? Can creativity be measured, and if so, how? What are the cognitive processes behind creative thinking? Is creativity innate or acquired from experience? Is creativity a common or rare event? What helps or hinders creativity?

Again, answers to these questions may vary depending on the authors' background and perspective. Nonetheless, the general concept emanating from academic literature tends to define creativity around the dichotomy of *novelty* and *usefulness*. In the *Handbook of Creativity*, Sternberg (1999) particularly describes creativity as the ability to produce work that is both *novel* and *appropriate*, the word "appropriate" itself referring to being both useful and adaptive concerning task constraints. Hence, for an idea to be recognised as creative, it not only has to be original, new, inventive, and innovative but it also has to be useful, significant, purposeful, and valuable.

It is commonly argued that everyone is creative in some way. Howard Gardner precisely defines *multiple intelligences* (Gardner, 1993b), as different kinds of intelligence manifested by individuals to constitute unique "cognitive profiles". Gardner also distinguishes two types of creativity: Creativity with a "big C" and creativity with a "little c" (Gardner, 1993a). Big C creativity designates the kind of extraordinary breakthroughs made by people like Albert Einstein, Pablo Picasso or Johann Sebastian Bach which profoundly influence their culture and shape new standards of thought. Little c creativity, on the other hand, refers to the more common kind of ideas which solve small, daily life, problems.

In the same vein, Margaret Boden makes the distinction between P-creativity and H-creativity (P and H being short for psychological and historical creativity):

> P-creativity involves coming up with a surprising, valuable idea that's new to the person who comes up with it. It doesn't matter how many people have had that idea before. But if a new idea is H-creative, that means that (so far as we know) no one else has had it before: it has arisen for the first time in human history. — (Boden, 2003)

This suggests that creativity is inherently anchored in a social context, which in turn poses the question of relevance: What situations make creativity individually- or socially-relevant? Gardner contends that creativity has to be somewhat validated by a third-party to be recognized. As he puts it, *"Creativity is best described as the human capacity regularly to solve problems or to fashion products in a domain, in a way that is initially novel but ultimately acceptable in a culture." (Gardner, 1989)*. Similarly, Csikszentmihalyi (1996) defines creativity as an intrinsically social phenomenon, arguing that creativity may occur only at the intersection of three systems: the individual, the domain and the field (see Figure 2). In this model, the domain consists of a set of rules and practices; the individual is the one who brings a novel variation inside the domain; and the field is the pool of experts who decide which novel variation is worth including in the domain.

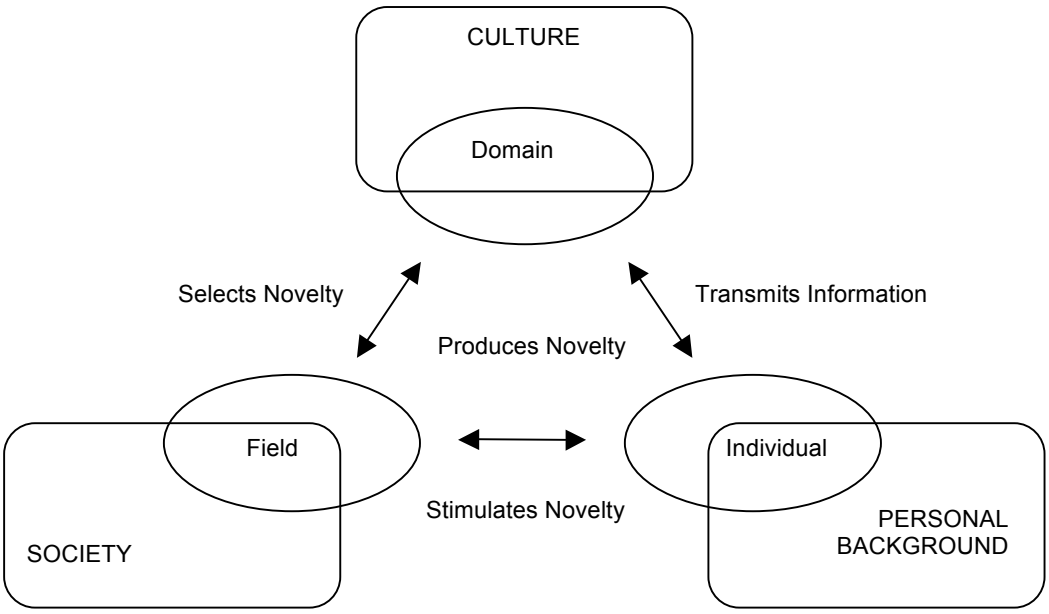

Figure 2. Systems model of creativity (Csikszentmihályi, 1999)

In the context of film scoring, creativity may be filtered at many levels. In the first place, the composer's musical ideas are assessed by the filmmakers; some ideas might be rejected and others might be accepted or modified before being included into the film. Eventually, it is the audience who renders a final judgement on the product, deciding whether or not the film (and its music) should be successful and labelled as a creative piece of work. Subjectivity is involved throughout the process. Trying to analyse how creativity actually works is highly challenging and goes beyond the scope of this thesis. I deliberately choose to leave creative decisions in the hands of the practitioners. My work instead aims to design an environment which supports favourable conditions for creativity to emerge. In the next section, I will review approaches which have been proposed in literature regarding the design of creativity support.

2.2. SUPPORTING CREATIVITY

2.2.1. Dealing with Constraints (Stimulants and Barriers)

One might think of constraints in a pejorative way and assume that they always restrict creativity. Yet, in cognitive science constraints are generally seen as positive factors. As Boden writes, *"Constraints —far from being opposed to creativity— make creativity possible. To throw away all constraints would be to destroy the capacity for creative thinking"* (Boden, 1994, p. 79). In film scoring, many constraints are faced throughout the creative process. Those constraints have various origins and may be imposed by the geographical and temporal dimensions of the scenario, by the filmmaker's vision, or by the budget or schedule limitations. The existence of all these constraints is what often appeals to film composers. Indeed, some composers find

inspiration more easily when writing music for films than when writing, for example, concert music.

Conversely, the absence of constraints can result in too much freedom, producing a mental block that inhibits creativity, the result being the canonical example of the blank page syndrome. To circumvent this inhibition and foster creativity, Boden argues that one should explore and push the boundaries of *conceptual spaces.* She describes the dimensions of a conceptual space as *"the organising principles that unify and give structure to a given domain of thinking"* (Boden, 1994, p. 79). In other words, a conceptual space represents the range of constraints and possibilities that exist within a certain domain (for example, how the pieces can move on a chess board, the ways of writing poetry or the combinations of jazz music patterns). Exploring and transforming conceptual spaces may lead to surprising discoveries and unveil new ways of contemplating the world.

Nonetheless, when considering constraints to creativity, a line may be drawn between *stimulants* and *barriers*. Stimulants could be defined as "positive" constraints which enable creative thinking. Barriers would then be "negative" constraints which hamper the emergence of creative ideas. To support creativity one may choose to focus either on providing new stimulants or on removing existing barriers.

In the stimulants' category several approaches have been proposed to catalyse creativity, in particular in the situations of problem-solving and decision-making. An example is with Mind Mapping. Burzan (1996) defines Mind Maps as a way to represent how the brain naturally works, developing ideas and categorising thoughts into keys concepts. Those concepts are ranked into a hierarchy and the connections between them are graphically represented onto a diagram. The aim is to foster an unorthodox brainstorming approach that can generate more creative ideas than with linear forms of note making.

To address the problem of barriers to creativity, Edward De Bono (1970) introduces *lateral thinking*. The techniques promoted by lateral thinking are particularly influential in the domains of business or advertising. These techniques are more concerned with practice than with theory, and are also more concerned with generating new ideas than with selecting them. One of the barriers that lateral thinking specifically tackles is the issue of assumed boundaries. That issue is well illustrated by the nine-dot problem (Figure 3). The goal is to connect all nine dots with four straight lines, without lifting the pencil from paper. The solution requires drawing outside the area defined by the nine dots. Yet, this problem is difficult to solve for most people as it is assumed the lines should be kept within that area.

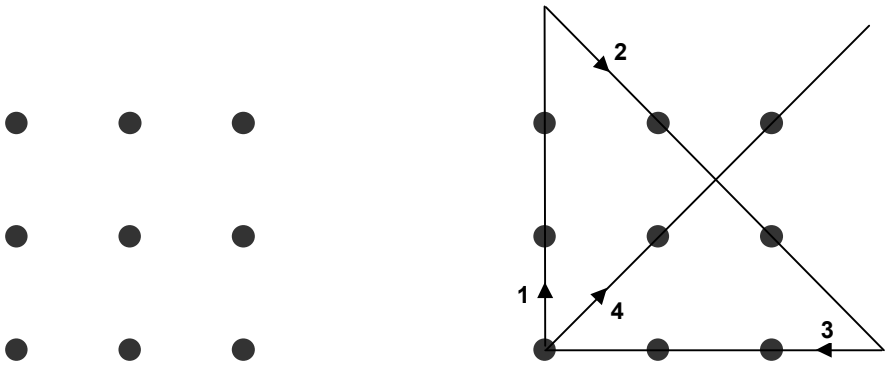

Figure 3. The nine-dot problem and its solution

Having boundaries usually helps narrow down the area in which a problem takes place, making it easier to solve that problem. As a consequence, one may take those boundaries for granted or even assume boundaries which do not exist. This renders the problem impossible to solve as one's mind easily gets imprisoned by those assumptions. The key is to get around the barriers inherently introduced by traditional step-to-step logic and to encourage the shifting of thinking patterns, as De Bono puts it:

> In challenging assumptions one challenges the necessity of boundaries and limits and one challenges the validity of individual concepts. As in lateral thinking in general there is no question of attacking the assumptions as wrong. Nor is there any question of offering better alternatives. It is simply a matter of trying to restructure patterns. And by definition assumptions are patterns which usually escape the restructuring process. — (De Bono, 1970, p. 84)

Like De Bono, Davis (1999) argues that to support creativity one should be aware of the barriers to creativity and challenge them. Davis separates these barriers into six categories:

- *Learning and habit*: All the patterns that we acquire from experience and learning are both a blessing and a curse. While they help in survival types of situation they may also hamper innovation, as one may think: "We did alright without it", or "It's been done that way for twenty years, so it must be good".

- *Rules and traditions*: Social groups (whether it is family, corporation, association) come with rules, policies and traditions to organise individual and group behaviour. The implied sense of hierarchy, formalisation and procedures may unfortunately squelch the emergence of new ideas: "That's not our job", or "This doesn't fall under the new regulations".

- *Perceptual barriers*: The way one perceives a problem may interfere with the ability to find the appropriate solution. This is often the result of an accustomed way of thinking and leads to doing a wrong analysis of the situation.

- *Cultural barriers*: Often people are afraid to break away from the conformity imposed by the culture they belong to. The pressure resulting from norms and accepted ways of thinking may inhibit creative reflection.

- *Emotional barriers*: Whether they find their source in tensions with other people, or in chronic states of anxiety or insecurity, emotions may result in a lack of confidence and a fear of failure which in turn may restrict creativity.

- *Resource barriers*: Innovative ideas may be rejected simply because of the mere fact that they do not fit into the time schedules, budget constraints, or human resources originally set.

Davis suggests that one should cultivate the belief that everything can be improved. To foster creativity, one should keep an open mind, reconsider pre-established ideas, see the problem from different angles, and not be afraid of violating the norms and taking risks.

2.2.2. Creativity Support Tools

The rising interest in creativity and in creative industries means there is also a demand for tools and methods that foster creative practice. Specifically, with the extensive technological advances over the past decade, computers are now seen as promising candidates for the development of creativity support tools. As a guide to designers wanting to build such computer tools, Ben Shneiderman (2000) introduced the *genex* (Generator of Excellence). This framework, inspired from Csikszentmihalyi's social model of creativity, is comprised of four phases: *Collect* (learn from previous works stored in libraries, the Web, and other sources), *Relate* (consult with peers and mentors at early, middle, and late stages), *Create* (explore, compose, and evaluate possible solutions) and *Donate* (disseminate the results and contribute to libraries, the Web, and other sources). Shneiderman claims that these phases are not a linear path and that creative work may require returning to earlier phases and iterating the process. Nonetheless, he does concede some potential downsides to the genex:

- *Collect*: Will knowledge of previous work limit imagination?

- *Relate*: Could mentors discourage exotic ideas? Could peers steal your innovation?

- *Create*: Will using standard tools limit creativity?

- *Donate*: Could the desire for intellectual property protection limit dissemination?

Shneiderman also argues that genex's integrated creativity support tools should offer at least the eight activities presented in Figure 4.

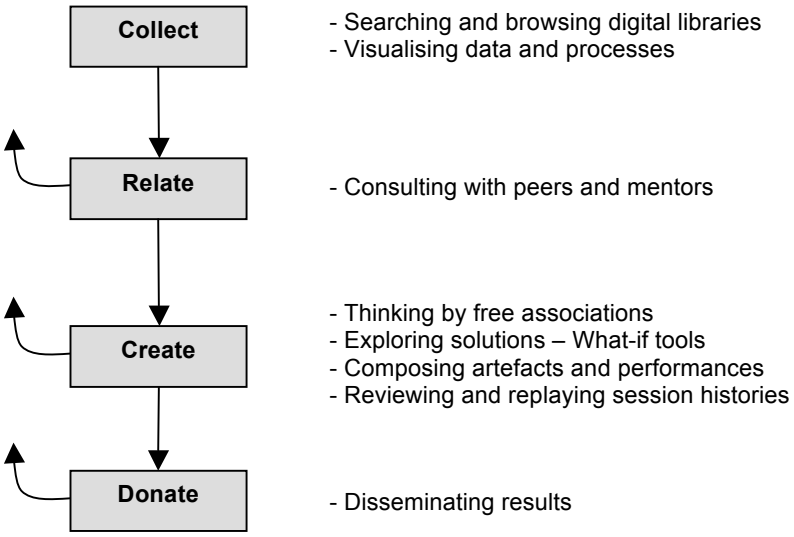

Figure 4. Shneiderman's Genex phases and their related primary activities (Shneiderman, 2000)

Resnick et al. (2005) have also proposed a set of twelve design principles for computer tools to support creative thinking. The aim is to guide designers through the development of enhanced user interfaces that facilitate the composition of novel artefacts (e.g., computer programs, scientific papers, engineering diagrams, symphonies, and artwork). These design principles are listed below:

1. *Support exploration*: Users should be encouraged to explore the work space, and many different alternatives should be available.

2. *Low threshold, high ceilings, and wide walls*: Low threshold to enable easy access for novices, high ceilings to enable expert users to work on sophisticated solutions, and wide walls to suggest a wide range of possible explorations.

3. *Support many paths and many styles*: There should be a high priority on supporting learners of all different styles and approaches. Designers should keep in mind that users may work in unpredictable ways that differ from what was originally anticipated.

4. *Support collaboration*: In the "real world", most creative work is done in teams; therefore creativity support tools should foster sharing of creations and of creative processes amongst a community of users.

5. *Support open interchange*: Since creative process often involves the use of several different tools, communication and exchange of data between those tools should be facilitated.

6. *Make it as simple as possible and maybe even simpler*: Avoid needless complications or "gadget" features and promote a clean, simple, user interface.

7. *Choose black boxes carefully*: A "black box" is a primitive building block, of which the internal mechanisms are hidden to the user. This is closely related to design principle number 2 above. A fine balance should be reached between low-level primitives (more powerful but harder to use) and high-level ones (easier to use, but with restrained capabilities and flexibility).

8. *Invent things that you would want to use yourself*: Designers should promote tools that would potentially be helpful in their own practice, so as to maximise the chances for those tools to be helpful to a wider range of users.

9. *Balance user suggestions, with observation and participatory processes*: Designers should be attentive to users' suggestions (what they want and do not want), should observe the users using the tools to detect potential flaws of the interface, and should invite the users themselves to participate in the design process.

10. *Iterate, iterate, then iterate again*: Creative work is an iterative process, and so should be the design process for building creativity support tools. It is impossible to get things right on the first try. Therefore designers should not be afraid to create intermediary prototypes, critique them, and improve them all along until reaching satisfactory solutions.

11. *Design for designers*: Designing creativity support tools means designing tools that enable others to design, create and invent.

12. *Evaluation of tools*: Designers should evaluate the tools to assess whether they are actually useful and whether they should be improved. However, measuring the usefulness of creativity support tools is challenging, for the same reasons that it is challenging to measure creativity itself. While evaluation is widely recognized as necessary in the design process, it remains a field with open questions and deserves to be explored further.

Similarly as in design principle number 6 ("Make it simple") above, Yamamoto and Nakakoji (2005) urge designers to build user interfaces that spare users' cognitive resources. They write, "*The more cognitive resources the use of tools asks for, the fewer cognitive resources designers can spend on their creative thinking*". Therefore, when designing creativity support tools it is crucial to come up with simple and intuitive user interfaces that reduce users' cognitive overhead during their interaction with the tools.

Finally, Candy and Edmonds (1997) and Terry and Mynatt (2002) tend to agree that creativity support tools should focus on three levels of the user's experience:

- *Exploration of variations*: The tools should allow users to modify the knowledge base by generating several variations of existing rules and by adding new rules to the base. Also, channels of exploration should not be linear (too restrictive) but parallel.

- *Evaluation of one's progress*: The tools should allow users to follow the evolution of their creative work's progress, both in the short- and long-term. The evolution of the work should also be presented in domain-specific terms to the users.

- *Comparison*: The tools should allow users to do comparisons between previous versions of their work and between works by other users. They should also provide the ability both to preview the effects of their actions and to reverse changes if necessary.

In the following section, I review research endeavours that specifically concern the collaborative aspects of creativity support.

2.2.3. Collaborative Creativity

One point of consensus that exists in creativity research is that creativity takes place in a social context, and that collaboration between individuals plays an important role in the generation of innovative ideas. For example, Fischer et al. write:

> The power of the unaided individual mind is highly overrated. Although society often thinks of creative individuals as working in isolation, intelligence and creativity result in large part from interaction and collaboration with other individuals. Much human creativity is social, arising from activities that take place in a context in which interaction with other people and the artifacts that embody collective knowledge are essential contributors. — (Fischer et al., 2005)

Collaborative creativity, or "social creativity" as Fischer labels it, should therefore be at the heart of concern in the design of creativity support tools. Resnick et al. (2005) confirm by stating that *"Creativity support tools cannot succeed in a vacuum: they work best within communities where people share their expertise and experiences with one another"*. Hence, supporting creativity means seeing beyond the reflective practitioner towards the design of reflective communities (Fischer, 2005). Creativity support tools should entice users to not just be passive observers but also active participants in the creative community.

In fact, particularly since the advent of the Internet, creative and multidisciplinary collaboration are themes of increasing interest across industrial and academic milieus. For example, Bødker et al. (2000) focus on ways and means of stimulating idea generation in cooperative, iterative design, and advocate for supporting the meeting of perspectives through cooperation of people in workshops. Another example is with Bennett and Dziekan (2005) who explore the concepts of Online Creative Collaboration (OCC) through the Omnium Project, a framework allowing distanced partners to engage in active and reflective modes of creative dialogue. So far, this

framework is mostly applied in design practice and education, and it implements five main stages: gathering, identifying, distilling, abstracting and resolving. The stages reflect both the need for each individual to feel a part of an online community (or team) and the need to progress from loose conceptual ideas to more formalised design solutions (Bennett, 2003). The five stages are presented below:

1. *Gathering*: Personal, emotional and conceptual visual responses and investigation are produced by individual participants.

2. *Identifying*: After having gathered and reviewed primitive ideas, the team collegially decide initial directions to take.

3. *Distilling*: Ideas produced in the earlier two stages are broken down, so one can critically assess their own process. Ideas a triaged by the participants themselves. Some of the ideas are eventually discarded for the good of the collective.

4. *Abstracting*: Participants further select elements from earlier works. Ideas are simplified to attain their essence and to ensure they can be communicated clearly. Works are passed between team members.

5. *Resolving*: The team resolves all contributions into one refined final product.

Bennett stresses the importance for each participant to have the opportunity to contribute, arguing that the experience of collaborating is an outcome that is just as important as the final product itself.

Furthermore, Candy and Edmonds (2002) explore one particularly challenging type of collaboration, that of artists and technologists in the co-creation of digital art. Through a set of case studies, they show that creative collaboration is more than just the technologist providing technical know-how to serve the artist's vision. Indeed, their work depicts the intricate mechanisms that underpin the creative process, collaborators and even the computers themselves all playing an active role. Also, Candy and Edmonds highlight the fact that creativity is difficult to measure, even more so in collaborative contexts. Thus, they recommend the use of empirical, long-term, qualitative studies to be able to understand how collaborative creativity works and how it could be enhanced.

Lastly, Mamykina et al. (2002) acknowledge the vast potential of computational technology to support interdisciplinary collaboration. Through computers they see the ability to build environments where groups of creative professionals can share knowledge and resources and where creativity can thrive. They also warn against some of the challenges which are inherent to interdisciplinary collaboration. There is an especially crucial need for supporting the articulation of creative ideas and for allowing a better exchange between disciplines. Creative collaboration

can drastically be impaired by ineffective communication and the absence of a shared language.

In the next section, I review some important theories and applications that surround the concepts of collaboration and communication in the context of interdisciplinary creative practice.

3. Communication and Collaboration

As enunciated previously, creative work is most fertile and most rewarding when it is performed in a social context; that is, when two or more individuals collaborate and are able to contribute to the work (Csikszentmihályi, 1996; Fischer et al., 2005; Resnick et al., 2005). It is also commonly argued that collaboration is vital in the making of art (Candy & Edmonds, 2002; John-Steiner, 2000; Mamykina et al., 2002), and that the composer-filmmaker relationship has a major impact on the film scoring practice (Karlin & Wright, 2004; Tyson-Chew, 2003). That said, an important distinction ought to be made between two themes that are intimately connected: communication and collaboration. On the one hand, collaboration refers to the process where several individuals work together towards the realisation of a shared goal. On the other hand, communication refers to the specific process of sharing and transferring information, ideas and knowledge. Communication is a critical component that conditions the outcomes of collaboration, and therefore it requires particular attention in the design of collaborative tools. In this section, I review some key studies and concepts that concern communication and collaboration at a theoretical level. I especially focus on the roles that communication plays in the establishment of common ground and mutual knowledge, and on the ways collaboration takes place within the world of design.

3.1. COMMUNICATION IN COLLABORATION

3.1.1. Mutual Knowledge and Common Ground

Communication can at times be ambiguous and people may have difficulties understanding each other. Some words that are used by one person may be unfamiliar or unknown to another person. Some words may also carry different meanings and be interpreted differently depending on the context or situation in which they are used. Yet, some studies have shown that establishing mutual knowledge and common ground between collaborative partners can help clarify communication.

Challenges faced in communication can vary whether the collaboration occurs within a Community of Practice (CoP) (Wenger, 1998) or a Community of Interest (CoI) (Fischer & Ostwald, 2003). In a CoP, people who work together come from a similar background; for example, a group of architects drawing a building plan. Conversely, a CoI involves a process of multi-disciplinary collaboration between people who, while sharing a similar aim or interest, come from different practices and have different expertise, skills and knowledge. In the context

of film scoring, composers and filmmakers form a good example of CoI. Even if they work in the same industry (i.e., the film industry) they have a different background and expertise: composers are music experts while filmmakers often have a limited knowledge of music. Communication is arguably easier to handle in CoPs because practitioners develop a *shared history of learning*, that is, a set of abstract concepts which have been reified over time into concrete jargon, tools or symbols (Wenger, 1998). In CoIs, the asymmetry of knowledge that exists between collaborators may have a dual effect. On the one hand, this asymmetry constitutes a great opportunity for creativity as the combination of different viewpoints potentially favours the exploration of alternatives and the discovery of hidden aspects of a problem (Fischer, 1999). On the other hand, if the asymmetry is too accentuated and no proper support for channelling communication is supplied, there is a risk of some crucial pieces of information not being conveyed appropriately where needed. Candy (2000) notes that one needs to share knowledge to facilitate creative collaboration. Having contextual information about the project and knowing about the people involved makes it easier to bring shared understanding and to foster creativity. This poses the question of how knowledge should be shared to make communication more efficient and to optimise outcomes in creative collaboration.

From a purely discursive perspective, philosopher David Lewis (1969) introduces *mutual knowledge* (also known as "common knowledge") as a powerful way to consider the sharing of knowledge. As Lewis describes it, there is mutual knowledge of a fact *F* within a group of persons *G*, when every person in *G* knows both the fact *F* and the fact that everyone knows *F* as well. By way of illustration, logician Jon Barwise (1989) provides an example of mutual knowledge:

> Suppose you have two poker players, Claire and Max, and each is dealt some cards. Suppose, in particular, that each of them gets an ace. Thus, each of them knows that the following is a fact: 'either Claire or Max has an ace'. Now suppose Dana were to come along and ask them both whether they knew whether the other one had an ace. They would answer 'no', of course. And if Dana asked again (and again…), they would still answer 'no'. But now suppose Dana said to them, 'Look, at least one of you has an ace. Now do you know whether the other on has an ace?' They would again both answer 'no.' But now something happens. Upon hearing Max answer 'no' Claire would reason as follows (assuming Max and Claire know each other to be honest and intelligent): 'If Max does not know I have an ace, having heard that one of us does, then it can only be because he has an ace.' Max would reason in the same way. So they both figure out that the other has an ace. — (Barwise, 1989, p. 201)

In the example above, Dana tells a fact that is already known individually by Claire and Max. But as soon as Dana announces it out loud, it becomes mutual knowledge and it somehow adds some new information. This stresses the importance of the way information is actually

delivered to communicants. More specifically, communication can truly benefit from situations where the information delivery favours the emergence of mutual knowledge.

Clark's theoretical explorations of mutual knowledge (1996) push this premise further by arguing that communication is made possible only by the pre-existence of *common ground* between interlocutors. For Clark, common ground requires not only mutual knowledge but also mutual beliefs and mutual assumptions that allow interlocutors to coordinate on the conversation's content and process; as illustrated in the following example:

> When Alan speaks to Barbara, he must do more than merely plan and issue utterances, and she must do more than just listen and understand. They have to coordinate on content. When Alan refers to 'my dogs', the two of them must reach the mutual belief that he is referring to his feet[7]. They must also coordinate on process. Speech is evanescent, and so Alan must try to speak only when he thinks Barbara is attending to, hearing, and trying to understand what he is saying, and she must guide him by giving him evidence that she is doing just this. Accomplishing this, once again, requires the two of them to keep track of their common ground and its moment-by-moment changes. — (Clark & Brennan, 1991, p. 128)

This example shows that, to build common ground, interlocutors must not only send off messages but also ensure that those messages have been understood as they were intended. To conduct effective communication, interlocutors have to mutually believe that they have understood well enough what was meant. This moment-by-moment accumulation of knowledge, beliefs and assumptions is a process called *grounding* (Clark & Brennan, 1991), and that process is crucial for coordinating action and speech between participants.

Therefore, the grounding theory suggests that common ground can be augmented as the collaboration unfolds and that it can, as a result, improve communication. By supporting the establishment of common ground within a community of interest, one may hope to equal the efficiency in communication that communities of practice benefit from their shared history. This has to be my goal in designing communication support for film scoring. In the following sections I will discuss how common ground may be established with language and other means of conveying information like music.

3.1.2. Communicating with Language

As one could expect, the main way composers and filmmakers communicate is with natural language, whether it is spoken (e.g., in face-to-face situation or via telephone) or written (e.g.,

[7] In English, 'dogs' is a common slang term for 'feet'. On a side note, feet are said to be barking if they hurt. Obviously, to understand this, one has to have prior knowledge of this particular use of English slang

via email). As I argued previously, film scoring collaboration occurs within the context of a community of interest; and the resulting absence of specific jargon and shared history between participants can potentially lead to ambiguities that alter what is meant and understood.

To support language communication one may choose to apply theories from linguistics (the study of language), in particular *semantics*, which focuses on the meaning of words. Yet, in a social context the meaning of words and expressions can go beyond what is literally stated. This phenomenon is tackled by another branch of linguistics called *pragmatics*. Suppose, for example, that the person working at the desk next to yours is listening to some loud music and that it prevents you from concentrating on your work. You could say: "Please turn the volume down. It is too loud and I can't concentrate", which is direct and has a clear semantic meaning. Alternately, you could say "Could you use your headphones?", which implies a similar meaning but is less direct and needs pragmatic deduction to understand the intended meaning.

One of the most influential linguistic theorists from the second half of the twentieth century is philosopher Paul Grice, who revolutionised the study of language by clarifying the boundary between semantics and pragmatics. In particular, Grice coined the term "*implicature*" (Grice, 1975) to refer to what is meant, suggested or implied by a given utterance. This can be illustrated with the following example:

— Alan: Are you coming to the concert?

— Barbara: I have to work.

In this example, Barbara means that she is not going to the concert. By uttering 'I have to work', Barbara is saying only that she has to work. The rest of what Barbara means is, in Grice's terminology, *implicated*; that she is not going is her *implicature*. Grice distinguishes two types of implicatures: conventional and non-conversational (also called "conversational"). On the one hand, *conventional* implicatures derive from conventions and pre-agreed meanings of particular expressions and thus are more likely to emerge within communities of practice. Even so, conventions are not entirely reliable as the meaning carried by conventional implicatures may be altered by the context of a conversation, for example by a sarcastic tone of voice. On the other hand, *conversational* implicatures derive from circumstances in which the conversation takes place. Since composers and filmmakers operate as a community of interest and lack conventions of language, I shall be primarily concerned with conversational implicatures.

As seen with Clark's theory, it is crucial for interlocutors to coordinate on the content of conversation. Conversation is not just a succession of disconnected utterances; it is conducted cooperatively by the interlocutors who mutually accept, conscientiously or not, its direction and purpose. To optimise this conversational coordination, Grice formulates the *cooperative principle* to which participants of the conversation are expected to adhere (1975). He presents

this general principle in the form of maxims divided in four categories: quantity, quality, relation and manner (Table 2).

Table 2. Gricean maxims of conversation (Grice, 1975)

1. Maxim of Quantity: Informativeness
    - Make your contribution as informative as is required for the current purposes of the exchange.
    - Do not make your contribution more informative than is required.
2. Maxim of Quality: Truthfulness
    - Do not say what you believe to be false.
    - Do not say that for which you lack adequate evidence.
3. Maxim of Relation: Relevance
    - Be relevant.
4. Maxim of Manner: Clarity
    - Avoid obscurity of expression.
    - Avoid ambiguity.
    - Be brief (avoid unnecessary prolixity).
    - Be orderly.

Although these maxims are written in the prescriptive form, Grice's intent is only to describe the way participants naturally engage in conversation and predict implicatures. Yet, Grice does not assume everyone should constantly follow these maxims. He concedes that ignoring or "violating" one or more maxims could, for example, lead to some interesting figures of speech. However, when one is concerned with efficiency in communication, it is recommended to prevent the violation of the maxims so as to minimise the negative impact which implicatures may have if they are not properly understood. In the context of film scoring, one could imagine how each of these maxims could be violated: the maxim of quantity, if not enough information about the film is shared between participants; the maxim of quality, if filmmakers unintentionally give wrong instructions to the composers because of their limited knowledge of specific musical terms; the maxim of relation, if they cannot precisely refer to specific parts of the film or of the music; the maxim of manner, if ambiguities are introduced due the absence of a common language.

Nevertheless, despite its strong influence in the field of pragmatics, Grice's theory also faces some criticisms. Sperber and Wilson (1986) provide an alternative approach called *Relevance Theory*, claiming that Grice's maxim of relation provides a base that is insufficient to model the way meanings are implied and understood. Relevance theorists thus believe that utterances automatically create expectations which guide the hearer towards the speaker's meaning, and that these expectations are precise and predictable enough. Frederking (1996) also contends that Grice's cooperative principle and its maxims are too vague and too general to be implemented in computational natural language systems. He goes on to suggest that, under all circumstances, it may be too early in the history of computational linguistics to expect to find such broad principles.

Notwithstanding these criticisms, Grice's cooperative principle remains a useful framework for assessing, at a high level, the efficiency of language communication between composers and filmmakers. I believe that by ensuring the maxims are respected throughout the collaboration, one would also ensure implied meanings are properly understood and would facilitate the establishment of common ground between participants. Thus, Grice's maxims will be further discussed in Chapter VI.

3.1.3. Communicating with Action, Visuals and Music

As I previously noted, composers and filmmakers primarily communicate via spoken or written language. However, as American composer Fred Karlin observes, "*[w]hen you want to be absolutely specific in describing a musical idea, words are rarely completely reliable*". (Karlin & Wright, 2004, p. 21). While Mamykina et al. (2002) suggest that a shared language is a crucial asset in developing common understanding between creative partners, they also argue that the language does not have to be verbal. Indeed, communication often goes beyond mere words to overcome linguistic limitations and, as Bly (2003) puts it, "*the ability to point, gesture, and use deictic references is intimately entwined with the conversation and the task process*".

Sperber (1995) explains that humans, even without speaking the same language, are able to basically communicate and that it is possible to share thoughts through action. As intelligent beings, we naturally carry intentions through our behaviour and also recognise other's intentions and beliefs through their own behaviour. As way of illustration, Sperber points out that our ancestors, long before the emergence of any proper language, could teach their offspring and peers which berries were edible only by using gestures.

Another way to reduce ambiguity or fill the gaps in speech communication can be through the use of visuals. Indeed, it is often said that a picture is worth a thousand words. This is because, as Card et al. explain, visual artefacts can "*have profound effects on people's abilities to assimilate information, to compute with it, to understand it, to create new knowledge*" (Card et al., 1999, p. 5). Obviously, the use of visuals is naturally preponderant in the film industry. From

pre-production (e.g., story-boarding[8]) to production (actual shooting) and post-production (e.g., editing or special effects) stages, visuals are the main point of reference for collaborators to assess and discuss the progress of the work. As a result, filmmakers become expert at understanding and sharing their ideas with images.

In the film scoring stage, however, music also plays an important role in the communication between filmmakers and composers, for example via the exchange of musical drafts and models (Davis, 2000; Karlin & Wright, 2004). Hargreaves et al. (2005) argue that music is a fundamental channel of communication as it allows people to share emotions, intentions and meanings: "*Music can exert powerful physical and behavioural effects, can produce deep and profound emotions within us, and can be used to generate infinitely subtle variations of expressiveness by skilled composers and performers, such that highly complex informational structures and contents can be communicated extremely rapidly between people*" (Hargreaves et al., 2005). Yet, Hargreaves et al. also concede that it can be challenging to come to grips with the power of musical communication. The interpretation of music is utterly subjective and few people are able to communicate efficiently with it. Further to that, Ian Cross, a musician and cognitive scientist, discerns that music is inherently ambiguous, far more than language can be:

> [M]usic does appear to have an efficacy that is different from that of language by virtue of the specific features that differentiate it from language. […] In the limit, language can express semantically decomposable propositions; it can refer unambiguously to complex states of affairs in the world. Music, however, seems to embody an essential ambiguity, and in this respect it can be suggested that language and music are at the opposite poles of a communicative continuum, almost meeting in the middle somewhere near poetry. […] Music's attributes of embodying, entraining, and transposably intentionalizing time in sound and action enable it to be efficacious in contexts where language may be unproductive or impotent precisely because of its capacity to be interpreted unambiguously. […] Music's inexplicitness, its ambiguity, or floating intentionality may thus be regarded as a highly advantageous characteristic of its function for groups; music, then, might serve as a medium for the maintenance of human social flexibility. — (Cross, 2005, pp. 35-36)

Therefore, the viewpoints listed above highlight both the positive complementarity between music and language, and the potential challenges communication faces due to the inherent ambiguity of music. They also urge for more support in channelling musical communication so that it positively serves the collaboration.

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[8] Story-boarding is an early stage of the film making process where a series of illustrations and images are used to pre-visualise a film's sequence

In the following section I will discuss how communication is used in the context of creative collaborative work, in particular in design.

3.2. COLLABORATION IN DESIGN

While there has been relatively little research in the particular communicative aspects of film scoring, significant inspiration can be found in endeavours that concern communication support in design. I argue, indeed, that film scoring can be considered a form of design and, therefore, that my work can benefit from the long history of research carried out in the design domain. Design is often described broadly as the process of forming a plan to conceive a solution to a problem. It is also common to say that, at the outset, designers treat design problems as ill-structured and design goals as poorly defined: "*Design is a type of problem solving in which the problem solver views the problem or acts as though there is some ill-definedness in the goals, initial conditions or allowable transformations*" (Thomas & Carroll, 1979). Hence, design is a creative process that involves not only the development of a solution but also the definition of the problem itself (Schön, 1983). In film scoring, the main problem is to compose some music that will best serve the filmmaker's artistic vision for the film. Yet, at the outset, the filmmaker does not necessarily know precisely what the music should achieve and nobody can really predict what it will sound like once completed. Thus, the process for the composer and the filmmaker is first to define with more precision what kind of music would be appropriate, before the composer can actually start writing.

Another point of similarity between design and film scoring is that both activities are often collaborative and based on client-commissionee relationships. Indeed, it is argued that most design problems can rarely be tackled alone and that one often has to seek expert advice from others (either by delegating to, or collaborating with them) to complement one's knowledge and skills (Fischer, 1999). In the case of film scoring, while filmmakers rely on composers' musical expertise, they also collaborate with them through creative discussions or at least supervise the work to ensure it takes the right direction.

As I mentioned earlier, when collaboration is conducted across different disciplines a certain degree of ambiguity can be introduced in the communication. There are different viewpoints as to whether or not ambiguity can benefit the design practice. On the one hand, Gaver et al. (2003) see ambiguity as a virtue which designers should embrace. They claim that ambiguity is used with great effect in many forms of artworks and thus they encourage designers to apply the same principles in the conception of commercial products. For Gaver et al., products which provide little context, evoke unfamiliar objects, distort information, have uncertain purpose, or blur lines between reality and virtuality, are more likely to be appealing and engaging because consumers can appropriate them through their own interpretation of their meaning. Yet, they also concede that ambiguity "*should not be used as an excuse for poor design*" and that it

"*should not, of course, be allowed to interfere with the accomplishment of well-defined tasks, particularly in safety-critical environments*". (Gaver et al., 2003)

On the other hand, Stacey & Eckert (2003) refute the "myth of beneficial ambiguity" in design communication; as they put it, "*[c]ommunicating imprecise, uncertain and provisional ideas is a vital part of design teamwork, but what is uncertain and provisional needs to be expressed as clearly as possible*". Indeed, while they admit ambiguity can sometimes lead to unexpected and useful discoveries, they also argue that, in practice, ambiguity in design conversations much more frequently causes useless and counterproductive misunderstandings. When collaborators do not share the same codes and representations, multiple distinct interpretations can be made of the same words, symbols or gestures, and that situation can disrupt communication because meanings and intentions are not properly conveyed (Eckert et al., 2003). Ambiguity therefore can be harmful if too much time and effort is spent on clarifying or on recovering from disrupted communication: "*Ambiguity can be beneficial when the gain from actively clarifying shared understanding is greater than the cost of exploring unacceptable paths*" (Stacey & Eckert, 2003). Film scoring likely contains a high artistic component, and so one could follow on Gaver et al.'s (2003) viewpoint to argue that ambiguity would favour the emergence of original and unexpected musical ideas. However, the other major component of film scoring, that is business, often prevails over artistic considerations (Faulkner, 1983). The tight budget and time constraints imposed in the industry unfortunately allow very little room for equivocation, hesitancy and second choices. This is why in my research I choose to subscribe to Stacey & Eckert's viewpoint, which advocates reducing or eliminating ambiguity in communication.

Eckert & Boujut (2003) argue that communicating with and through various kinds of physical and electronic artefacts enables designers to avoid ambiguous situations and recover from communication breakdowns. Indeed, it is widely recognised that one way to prevent misunderstandings and cross the boundary between knowledge domains is to use and develop *boundary objects* (Star, 1989). Wenger (1998) defines boundary objects as "*artefacts, documents, terms, concepts, and other forms of reification around which communities of practice can organize their interconnections*", where 'reification' means shaping abstract concepts into a more concrete form. Typically, boundary objects may take the form of sketches, which can play two different roles in the design process. Firstly, sketches allow the designer to have a two-way conversation with herself: the designer starts by externalising her ideas onto the sketch, and then the sketch naturally 'talks back' to the designer, thus informing design (Card et al., 1999). More generally, this empirical and iterative process is what Schön (1983) describes as 'reflection in action'. As described by Bryan Lawson, an architect and Professor in design, *"[t]he whole purpose of doodles, sketches or models is to act as a kind of additional memory to freeze and store spatial ideas which can then be evaluated and manipulated"* (Lawson, 1990). Lawson also believes that the same principle would apply in music composition: "*I am sure a musical composer must go through a similar process of writing,*

listening and revising" (Lawson, 2006, p. 278). Secondly, sketches can be used to impart knowledge from one designer to another, which is particularly crucial in communities of interest (Fischer & Ostwald, 2003). In fact, Fischer & Ostwald (2003) contend that, when the collaborating designers come from different backgrounds, sketches (and all kinds of boundary objects in general) should be primarily used as a communication device to help them build common ground and learn from each other: "*boundary objects should be conceptualized as reminders that trigger knowledge, or as conversation pieces that ground shared understanding, rather than as containers of knowledge. The interaction around a boundary object is what creates and communicates knowledge, not the object itself*" (Fischer & Ostwald, 2003). Therefore, one way to facilitate communication between composers and filmmakers would be to use and develop boundary objects. Those objects, likely musical or visual sketches, would help share musical ideas that could be understood by all parties.

Finally, Kleinsmann & Valkenburg (2008) make a distinction between *barriers* and *enablers* in design collaboration. Enablers are objects, facts, behaviours or situations which foster the creation of shared understanding, while barriers actually work against it. This is in line with the barriers and stimulants that I have described in the section on creativity theory earlier in this chapter. For Kleinsmann & Valkenburg, it is important to identify both enablers and barriers because they directly influence the effectiveness and quality of the design process. During a case study conducted in the automotive industry, they itemised the barriers and enablers that were encountered in the interaction between crew members (engineers, market researchers, suppliers, software developers and project leaders) (Kleinsmann & Valkenburg, 2008). They found that, in this particular case, barriers and enablers were rooted both in the design content and in the organisational structures of the company. This shows that a holistic approach is required. The inquiry should not be limited to the pure communicative aspects of the collaboration but it should also consider the nature of interpersonal relationships and the contextual constraints in which the collaboration takes place.

4. Computer Support for Collaborative Music-Making and Film Music

For the past two decades the themes of creative collaboration and multidisciplinary collaboration have generated a growing interest within academia and the industry, particularly in the fields of Human-Computer Interaction (HCI), Computer-Supported Cooperative Work (CSCW) and Computer Mediated Communication (CMC). Following recent extensive technological advancements, a large number of research endeavours have concerned the design of computer tools to provide relief and support in such complex collaborative situations. According to Adamczyk & Twidale (2007), multidisciplinary teamwork has an intricate set of needs, assumptions and requirements that have not been readily met by existing tools. This is particularly true within creative practice because creativity is difficult to measure and so

designing support for collaborative creativity is a challenging enterprise (Candy & Edmonds, 2002). However, as discussed earlier, computers are still believed to offer great potential for creative multidisciplinary collaboration (Candy & Edmonds, 2002; Fischer et al., 2005; Resnick et al., 2005; Shneiderman, 2000).

Providing a shared environment and shared space for collaboration is widely recognised as a necessity for computer tools (Fussell et al., 2000; Luff et al., 2003; Mamykina et al., 2002; Soliman et al., 2005). Luff et al., who have focused on remote synchronous collaboration via video-conference systems, also contended that computers should not only allow collaborators to see each other and communicate verbally, but they should also facilitate a shared access to objects and artefacts: "*Limited access to the furnished world undermines the remote individual's ability to make relevant sense of the conduct of the co-participant*" (Luff et al., 2003).

While the area of computer support is already large and ever-expanding, I choose to narrow down the focus to two specific sub-areas which are directly relevant to my work: computer support for collaborative music-making and film music.

4.1.1. Supporting Collaborative Music-Making

Notable efforts have been undertaken to support creativity and collaboration in music-making. For example, Jordà & Barbosa (Jordà & Barbosa, 2001) have developed Internet-based collaborative virtual environments for music applications. Their application puts a special emphasis on the performance, composition and production of music by groups of geographically dispersed communities of users, both in synchronous and asynchronous modes. Barbosa also later implemented a proof-of-concept application entitled Public Sound Objects (PSOs) (Barbosa, 2006). PSOs constituted a Web-based environment to experiment with new approaches and concepts for online music communication. Through this system, users could collectively perform music pieces from any part of the world by controlling a synthesizer in a Web browser, either on a desktop, touch screen or PDA (Figure 5).

Figure 5. Desktop, Touch Screen and PDA interfaces for Public Sound Objects (Barbosa, 2006)

Similarly, Guverich (2006) introduced Jamspace (Figure 6), an interactive music environment to support real-time jamming by novices and amateur musicians. One major difference Jamspace

had with Barbosa's PSOs was that it was not implemented for the Internet but for a local area network (LAN). This was because a LAN offered a much lower latency while still allowing people to jam from isolated locations, for example in different rooms of a hotel, office building or university campus. Another particularity of Jamspace resided in spatial metaphors: a *private space*, where the user makes music on their own without the other users being able to access it; a *personal space*, which is visible to others but where no interaction between users can occur; a *shared space*, where users can form groups of common interests and jam together; and a *public space*, where creations can be broadcasted to all users. These metaphors provided a flexible and configurable way for users to control the levels of privacy and interactivity.

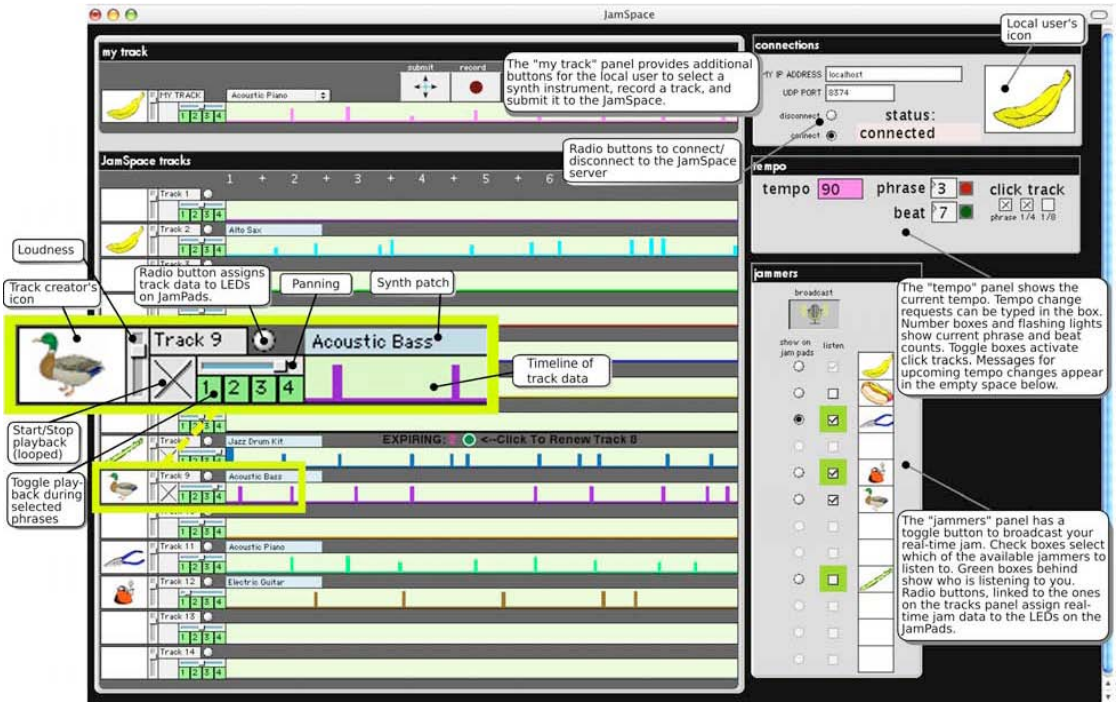

Figure 6. JamSpace client graphical user interface

Bryan-Kinns & Healey (2004) and Bryan-Kinns & Hamilton (2009) have produced *Daisyphone*, a tool to support semi-synchronous remote collaborative music-making, and their research on mutual engagement is specifically concerned with supporting communication. Miletto et al. (2005) also developed *CODES* (standing for "Cooperative Sound Design"), a Web-based environment for cooperative music prototyping. Their rationale was that as composers did not have established ways to share their musical ideas, they would introduce the cyclic process of prototyping to music making; a process which already commonly existed in the industry, i.e. in the creation of successive and increasingly refined versions of a product until it reached satisfying conditions. In *CODES*, users could select and play sonic patterns and could manipulate pre-defined musical elements such as rhythm, tempo, melody, harmony and timbre. Users could cooperatively work on the same music prototypes from a distance in an asynchronous way. They could also track changes made by other users and write comments.

One important aspect of the program is that it does not require its users to know conventional music notations, which allows both experienced musicians and novices to interact with it. Likewise, Farbood et al. (2004) have built *Hyperscore* (Figure 7), a music sketchpad for novice composers. It offered users with limited or no musical training a simple graphical representation that facilitated musical education and the exploration of musical creativity.

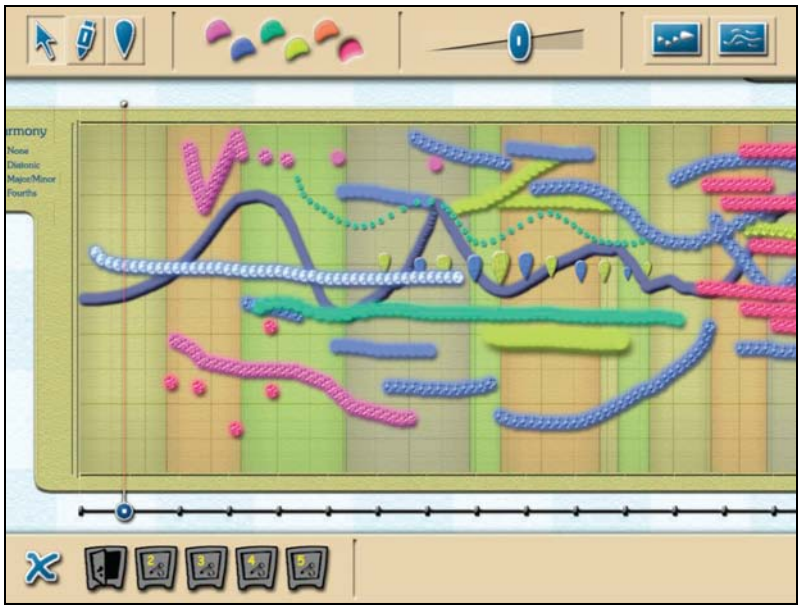

Figure 7. Screenshot of Hyperscore (Farbood et al., 2004)

Coughlan & Johnson (2006) observed the process of creative musical collaboration using two software composition tools, *Fruity Loops*[9] and *Hyperscore* (Farbood et al., 2004). The initial aim was to analyse the users' creative process, particularly in regard to the interaction with external representations of their musical ideas. Then, based on their observations and on Shneiderman's (2000) *genex* framework[10], they developed a model for the ideation and evaluation cycle and for the use of representations within the creative process, arguing that this cyclic model was repeated throughout the collaboration. One instance of that cycle is presented in Figure 8: Collaborator 1 starts by externalising a new idea (e.g., represented through a musical sketch), then the idea is discussed collegially and evaluated individually by each collaborator until it is accepted, modified or discarded. This model also served to build a prototype named *Sonic Sketchpad* (Figure 9), which explored computer support for sketching

[9] Fruity Loops is a sequencing program developed by Image-Line and is now branded as FL Studio: http://www.fruityloops.com/

[10] The genex framework, which contains four main phases (collect, relate, create and donate), was introduced by Shneiderman to assist the design of creativity support tools. It is described in more detail in section 2 of this chapter

and sharing ideas in the context of collaborative music composition. *Sonic Sketchpad* was intentionally simplistic, flexible and open-ended to favour the burgeoning of new ideas and to let users decide which representational constraints to use.

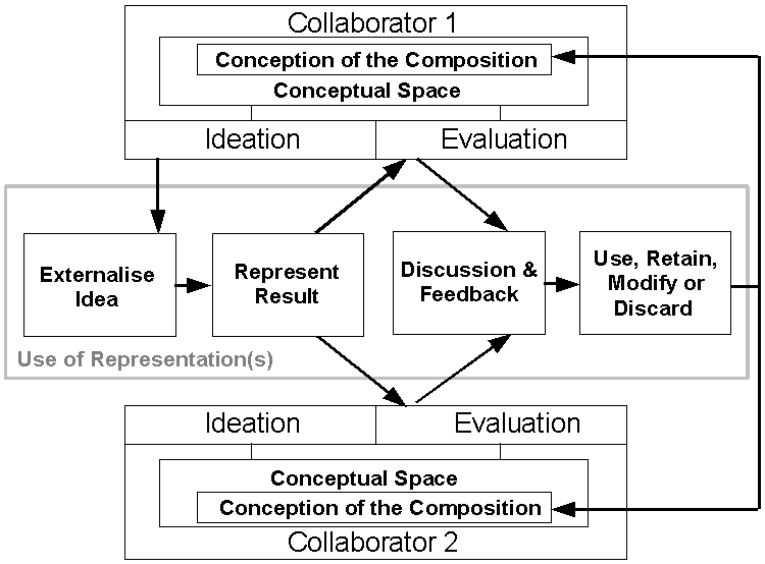

Figure 8. Model of representation use in a composition process (Coughlan & Johnson, 2006)

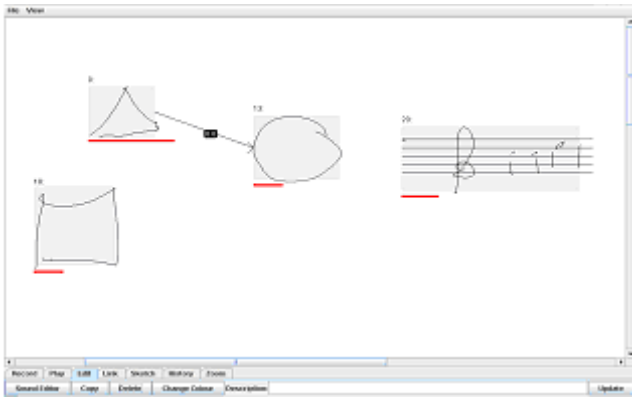

Figure 9. Screenshot of Sonic Sketchpad (Coughlan & Johnson, 2006)

Finally, a set of Web-based tools dedicated to collaborative music-making recently emerged. Some of the best examples are IndabaMusic.com (Figure 10), Jamglue.com or SpliceMusic.com, through which users could exchange music samples and execute multiple editing tasks in a sequencer to compose new pieces. These tools were made possible by the increasingly fast Internet connections allowing large media files to be transferred and manipulated online. This showed that advanced and powerful tools could realistically be envisaged to support remote collaborative music composition.

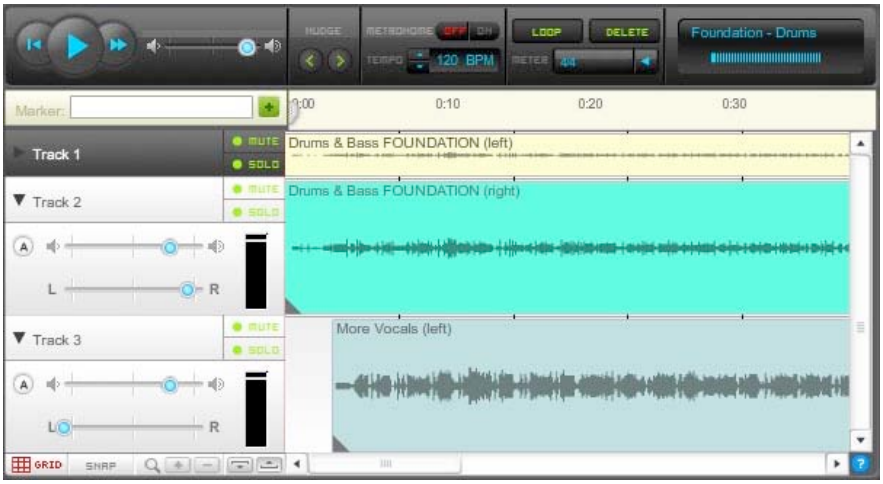

Figure 10. Example of an online sequencer at Indabamusic.com

4.1.2. Supporting Film Music

While computer support for music has generally received considerable attention (for example in music education, performance or composition) there has been relatively few tools and research endeavours that specifically addressed the aspects of film music. The market offered a limited number of products dedicated to film music production such as Auricle[11], which allowed the effective syncing of music to picture, or CineScore[12], which generated soundtracks for movies in an ingenious, but arguably uncreative, way.

Efforts to improve those tools have been provided in academia. A good example is with Jewel (2007), who have developed a State-Based Sequencer (SBS) to automate film soundtrack generation. The SBS model, illustrated in Figure 11, was in three parts. First, a labelling process was executed to annotate the film and to form an ontology of the director's musical intentions by deciding which instruments, rhythm or keys to use depending on the characters and locations appearing on screen. This annotation could be done manually or automatically by the system through colour and motion detection algorithms. Second, the ontological form was translated into musical form through a mapping process between annotations and pre-defined musical modifiers. These modifiers formed what Jewel called the 'composer representation', and each of them contained a collection of parameters that could modify the musical input. Third and last, a specification 'landmark' file was issued and passed to some computer agents. Each agent would control one specific part of the music (e.g., key, chord, pulse, tempo) and would communicate in a ruled network and would compose the music together based on various generative algorithms.

[11] Auricle: http://www.auricle.com

[12] Sony CineScore: http://www.sonycreativesoftware.com/cinescore

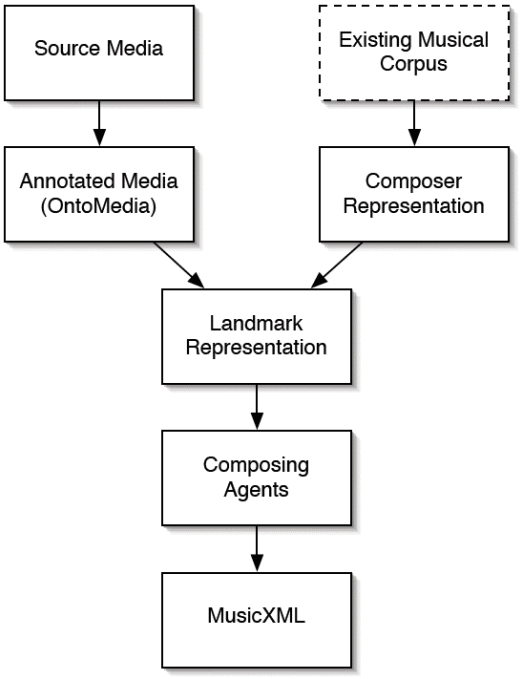

Figure 11. Structure of Jewel's State-Based Sequencer (Jewel, 2007)

Lastly, Abrams et al. (2002) have taken a different approach to investigating film composers' cognitive process. Specifically, they recognised the need for more support in three main areas: "*the ability to quickly capture musical ideas, organize those ideas in a useful manner, and manipulate them in musically meaningful ways*" (Abrams et al., 2002). This observation led to the development of a model for the early stages of the composer's creative workflow (Figure 12), which was then implemented in a prototype named *QSketcher* (Figure 13). *QSketcher* offered a flexible workspace that allowed users to move fluidly between dichotomous modes (inspiration/perspiration, capture/manipulation and macro/micro editing levels). This flexibility and simplicity of use was provided with the belief that composers should retain full creative control over their work, and that the system should assist them, not constrain them.

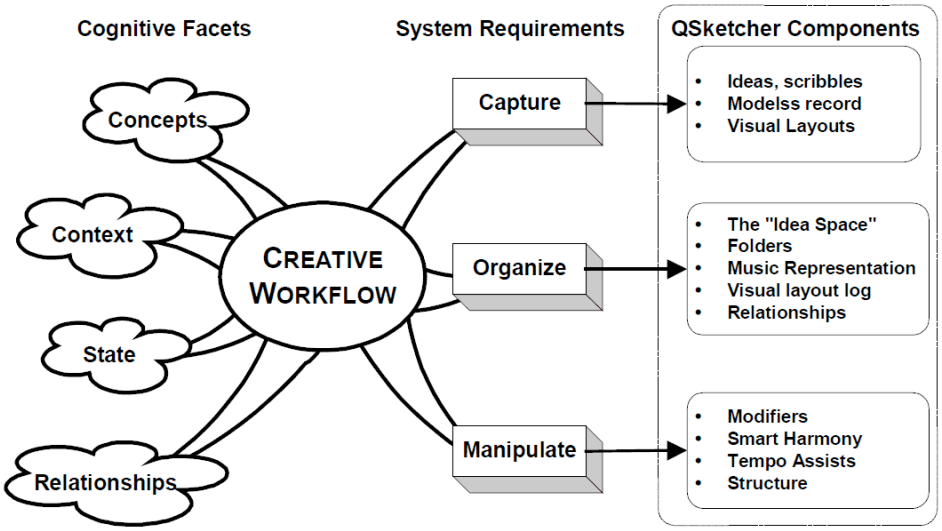

Figure 12. Overall cognitive aspects and system requirements, and related QSketcher components (Abrams et al., 2002)

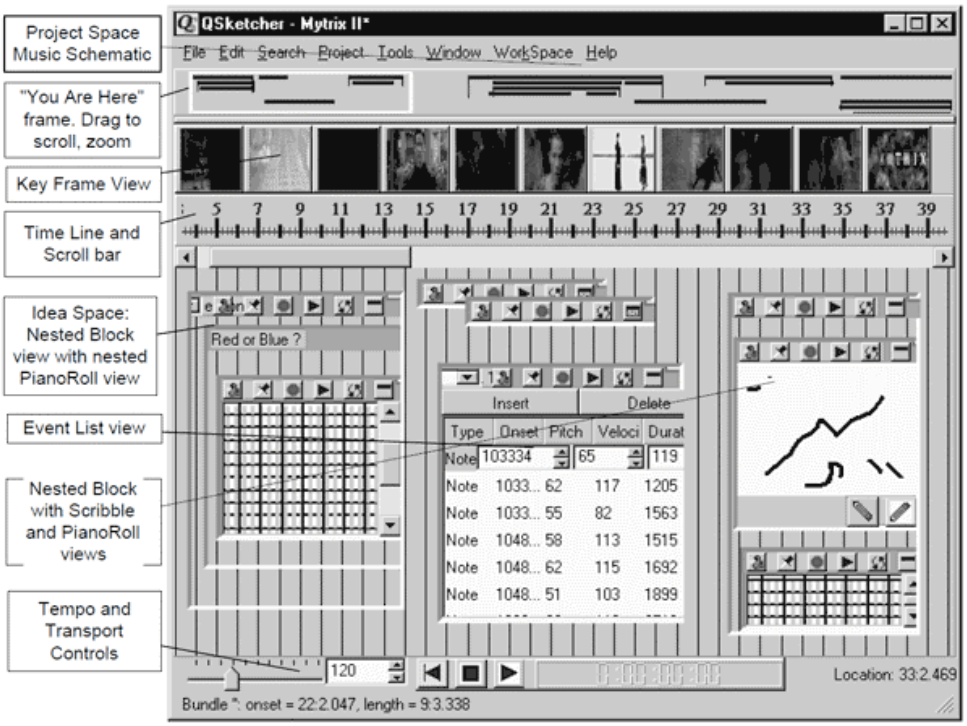

Figure 13. Screenshot of QSketcher (Abrams et al., 2002)

The four themes reviewed in this chapter (film music, creativity, communication in collaboration, and computer support for collaborative music-making and film music) offer a useful background for the research. Different theories and aesthetics of film music give an idea of how practitioners may conceptually reflect upon their work, whereas first-hand accounts of the film scoring industry help better understand practical aspects of the targeted domain. Fundamental and

applied theories of creativity inform on the necessity of providing assistance in social and collaborative contexts. They also articulate the need to develop creativity support tools to either stimulate creative flow or remove barriers to creativity. The general concepts for handling human communication and principles of collaborative design provide helpful insight for establishing mutual knowledge and common ground in multidisciplinary creative practice. Existing prototypes and computer tools demonstrate the great potential of interactive software design to conceive solutions for collaborative music creation and interpersonal communication. These concepts, theories and applications will serve in all the stages of the research described in this thesis. While this chapter allowed me to situate my research amongst related areas of interest, the next chapter will focus purely on methodological questions.

CHAPTER III

Methodology

In this chapter, I describe the methodology used throughout this PhD. I first present the domains and approaches which are sources of inspiration for the research. Secondly, I provide the reasons for using qualitative methods to address the issues this thesis is concerned with. I then conclude with a brief overview of the processes followed in the research.

1. The Guiding Domains and Approaches

As described earlier, my work is principally 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 interact. To design this interface one must ensure that no further ambiguities 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. The particular arrangement around the film scoring practice imposes specific requisites in the research and design processes. Below, I describe the domains and approaches which guided and inspired my research: HCI, CSCW, ethnography in design, interaction design and goal-directed design.

1.1. HCI AND CSCW

My work can be considered to be at the junction of two related fields of research: Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW). Both fields are vast and receive contributions from a wide spectrum of practitioners and scientists such as engineers, designers, cognitive scientists, social psychologists and anthropologists. These two fields are also constantly evolving and thus are hard to define precisely. The often cited definition of HCI by the ACM SIGCHI Curriculum states that "*Human-computer interaction is a*

discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them" (Hewett et al., 1992). Since the mid-eighties, several trends of thought have led HCI. One is *human factors* (in particular the sub-branch of *software ergonomics*) which concerns the humans' physical and mental performance and safety in their working environment. Another is *cognitive science* which concerns the development of mental models to understand how users comprehend the user interface. Therefore, HCI is focused primarily on the user and aims at developing paradigms and theories for building intuitive and usable interfaces. CSCW is also focused on the user but in a broader context. As Suchman (1989) puts it, CSCW is "*the design of computer-based technologies with explicit concern for the socially organized practices of their intended users*". It places an emphasis on collaborative work arrangements: people from similar or different disciplines, who share goals and concerns and who come to work together and discuss ideas. The broad aim of CSCW is to study how technology can fit and support cooperative work in groups and organisations.

There are opposing viewpoints for distinguishing the two fields. Some argue that the latter is simply an extension of the former while others argue that CSCW embodies a more profound shift by bringing new conceptual frameworks, approaches and methodologies to address certain issues that emerged in the HCI field (Bannon, 1992). Advocates of CSCW particularly criticise HCI for its excessively analytical approach and for considering the user-computer interaction in isolation from its surrounding cultural and organisational environments. However, the gap between the two fields has lessened in recent years, especially due to the increasing presence of computers in people's personal and working lives and to the socialisation of computer usage. Thus, a new trend of thought in HCI recently developed, taking a *situated perspective* in encompassing the broader contexts in which users evolve. This new perspective considerably blurred the line between CSCW and HCI. Therefore, I consider my PhD work relevant and contributing to both CSCW and HCI, and the methodologies I employ (and describe in more detail in the rest of this chapter) are borrowed from both fields.

1.2. ETHNOGRAPHY IN DESIGN

In order to design appropriate technological solutions to human issues, one needs to respond to the crucial problem of defining the requirements: what is to be built? But, as eloquently put by Brooks (1987), there is "no silver bullet" to solve this problem:

> The hardest single part of building a software system is deciding precisely what to build. No other part of the conceptual work is as difficult as establishing the detailed technical requirements, including all the interfaces to people, to machines, and to other software systems. No other part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later. — (Brooks, 1987)

To address the requirement problem, well-established methodologies from social sciences have increasingly been used in software design. In particular, ethnography is put forward as a useful strategy for understanding cultural and sociological aspects of targeted users' work and practices. Andy Crabtree et al. (Crabtree, 2003; Crabtree & Rodden, 2002; Crabtree et al., 2009) are vehement advocates of the use of ethnography in the design of collaborative systems, suggesting that it can benefit the whole design process:

> We suggest that there is a need for a foundational change in the configuration of the practical relationship between ethnography and design if the approach is to be of lasting utility: from the traditional product-oriented configuration where ethnography attempts to inform requirements specification, to one where ethnography supports the broader research endeavour, the development of abstract design concepts, and the exploration of the social application of new technologies. — (Crabtree & Rodden, 2002)

Ethnography is a rigorous exploration of the real world and real time characteristics of human work practice. It employs empirical methods allowing the researcher to develop first-hand knowledge of the work's essential components through immersion in the work. The key principle is that the researcher *sees* people *do* work and reports on *how* it is done. According to Crabtree (2003), there are multiple motivations for using an ethnographical methodology. First, it allows one to understand the *design space* of the work in question, that is what Crabtree defines as the "*Organization of Work: the institution, company, factory, department, office, etc. or family of collaborative activities which a system is being designed for*" (Crabtree, 2003, p. 3). Second, it facilitates the identification of what actually happens in the work environment: what people do, how they organise what they do and how they reason about what they do. Third, it informs design as the designer understands how to better address the users' needs. The use of ethnography is particularly relevant in collaborative contexts for it gives the opportunity to comprehend how practitioners construct and coordinate their activities together. Thus, Crabtree et al.'s recommendations are strongly influential to the orientations taken in my own methodology and will be implemented throughout the exploration phase of the research (Part 2 of this thesis).

1.3. INTERACTION DESIGN AND GOAL-DIRECTED DESIGN

Over the past decade CSCW and HCI research accentuated their focus towards themes surrounding interaction design (Preece et al., 2002). Interaction design, as with other design disciplines, refers to the process of imagining and planning for new products. It differentiates as it concentrates on the design of behaviour, more specifically the reciprocal behaviour between a digital artefact or system and its users, humans. Compared to well-established disciplines such as engineering or architecture, interaction design is relatively new. Its name was coined by Moggridge in the late 1980's, and it is only in recent years that the profession of "interaction designer" has emerged and started to be considered (Cooper, 1999; Cooper et al., 2007). The

software, computer game, and telecommunication industries are now increasingly concerned with the user's experience and effective user interfaces.

However, this field is still largely unexplored. It lacks widespread standards and effective methods for designing digital products that are usable, that is, that users *can* use and *enjoy* using. To fill this gap, different approaches to interaction design have been proposed. A notable example is Human-Centered Design (HCD), also referred to as User-Centered Design (UCD) (Schuler & Namioka, 1993), which is mainly concerned with the users' cognitive processes and with the design of tailored solutions suited to those processes. This philosophy is criticised by the advocates of Activity-Oriented Design (AOD), such as Bødker (1990), Nardi (1995) or Norman (2005), who argue that good design primarily requires an understanding of the users' practice, in their natural environment. By analysing *what* the users have to perform —the activities—, designers are more likely to find how to help them perform those activities. Cooper et al. (2007) take this theory further with Goal-Directed Design (GDD), focusing on *why* the users have to perform certain activities. Understanding the users' motivations and aspirations —the goals— allows designers to understand the meaning of activities, and therefore provide more appropriate and satisfactory solutions.

The interaction design approach followed here, in this research, draws from *Goal-Directed design* (Cooper et al., 2007). It has a simple premise: If one designs and constructs 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 14, 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 14. Interaction Design approach showing progression towards a successful solution.

To model users' goals, Cooper et al. promote the use of personas, that is, "*detailed, composite user archetypes that represent distinct groupings of behaviors, attitudes, aptitudes, goals, and*

motivations observed and identified during the research phase" (Cooper et al., 2007, p. 21). Personas then serve as the main characters in a narrative, scenario-based approach that iteratively generates and refines design concepts. This approach enforces design coherence and appropriateness and helps prioritise features based on real user needs. Research methods and techniques prescribed by this approach will be developed in Chapter VIII.

1.4. EVOLUTIONARY PROTOTYPING

Past a certain point in the design process, after the users' needs have been clearly defined and the requirements for the problem have been identified, the designer inevitably has to make a guess at creating a solution. If the ethnographic work and user study have been done properly, then the guess is an informed one. However, the guess still stands in need of elaboration and validation, and it might be "*amended and/or refined by consulting end-users, and built upon in light of users hands-on experiences in an evolutionary process of development*" (Crabtree, 2003, p. 129). This evolutionary prototyping methodology is largely commonplace in industrial design. But it has strongly been put forward only recently in software design by influential authors such as Buxton (2007) or Crabtree (2003). The evolutionary process in question implies that design guesses need be embodied in prototypes that are intentionally incomplete. Prototypes then evolve, generally with increasing levels of fidelity, and are regularly tested with end-users to ensure they constitute realistic design solutions. The incompleteness of a prototype also ensures quick turnover and rapid feedback before one goes too far in potentially wrong directions.

Crabtree suggests that, in software design, the prototyping methodology is made of four discrete steps:

> 1. *Functional selection*, which refers to the range of work activities and software functionality that the prototype should support and exhibit.
>
> 2. *Construction*, which refers to the production of the prototype and its availability for demonstration.
>
> 3. *Evaluation*, which provides feedback from the use practice. Evaluation is the decisive step in prototyping as feedback shapes subsequent development work.
>
> 4. *Iteration*, which refers to the development of the prototype in light of the evaluation exercise. — (Crabtree, 2003, p. 130)

The design process therefore consists of an iterative cycle of refinements, where functionalities are specified, conceived, implemented and evaluated. Crabtree (2003, p. 131) then puts

forward three possible interrelated forms a prototype may take, each form being useful at a specific stage of the design process:

1. *Exploration*. Basic and rough prototypes are produced early in the design process to catalyse cooperation between designers and end-users. The expected outcome is for designers to develop an understanding of the task domain, to elicit appropriate ideas for design and to start drafting some feature specifications.

2. *Experimentation*. Slightly improved prototypes, including more features but still looking fairly rough, are produced to refine exploratory specifications. End-users participate in experimental work with the prototypes to demonstrate the usefulness of the envisioned design concepts. Importantly, the word "experimental" does not refer to lab-based experiments. Instead, it refers to a pragmatic exercise "*in the sense of trying out ideas, building on and stabilizing the good ones and throwing the bad ones away*".

3. *Evolution*: A stable prototype with the capacity to support work activities in the target domain is developed. In Crabtree's terms, "*this stage of the design process marks the evolution of the prototype into a concrete product situated in the use practice*". Once the features are validated and refined in detail, the prototype can be sent to implementation teams to create a production version.

As it will be described in more detail later in this thesis, the principles of evolutionary prototyping will be applied in my work to produce a low-fidelity paper-based prototype (Chapter VIII) and a high-fidelity working prototype (Chapter IX). Following this evolutionary prototyping methodology, users will be actively involved at every key stage of the design process. Prototypes will serve as a medium to articulate ideas and problems, and users' feedback and suggestions will be rigorously collected to improve and refine the design principles.

2. The Reasons for Using Qualitative Research

In ethnography, both qualitative and quantitative methods can be employed, yet at different phases of the research: qualitative methods are generally preferred for generating hypotheses about human activities and quantitative methods are most useful for testing those hypotheses. In software design, both Crabtree and Cooper primarily advocate the use of a qualitative approach. Cooper et al. (2007, p. 50) particularly reject quantitative analysis arguing that *"[a]ny attempt to reduce human behavior to statistics is likely to overlook important nuances, which can make an enormous difference to the design of products. Quantitative research can only answer questions about 'how much' or 'how many' along a few reductive axes*". Cooper et al. then pursue by saying that "*[q]ualitative research can tell you about what, how and why in rich detail that is reflective of the actual complexities of real human situations*". Cooper et al. also argue that qualitative research helps understand several key design aspects, all of which are

relevant to my own research: Behaviours, attitudes and aptitudes of potential product users; technical, business and environmental contexts (i.e., the domain) of the product to be designed; vocabulary and other social aspects of the domain in question; and how existing products are used (Cooper et al., 2007, p. 50).

As presented in Chapter I, my research questions are open-ended and fundamentally qualitative with the focus placed on intensive theory building rather than extensive theory testing. As also described in Chapter I, practitioners in film scoring are mostly self-taught; they learn on the job and elaborate personal habits to address communication issues faced in collaboration. In this context, practitioners may not necessarily be able to express, or may not even be conscious of, certain problems arising in communication. They may not necessarily know how to precisely describe their work processes and may not even realise that there are problems or that things could be improved. To gather proper understanding of the practice, to find out what works and what does not work, and to collect specific anecdotes and quotes illustrating the problems, one needs to conduct deep, contextual and qualitative investigations.

The use of a qualitative approach is also dictated by practical and material constraints. The targeted users are expert and professional practitioners of the film and television industries. Those practitioners generally evolve in pressuring conditions and have busy schedules, so it is difficult to find large numbers of participants willing to engage in intensive studies over a long period of time. As a researcher, I need to go through a lengthy cooperative process with participants so that I can gain their trust and so that they consent to provide detailed and personal accounts of their practice and day-to-day working activities. As I fulfil both the roles of ethnographer and designer in this PhD, there is not sufficient time or resource to conduct large-scale studies and experiments. However, as asserted by Cooper et al. (2007, p. 51), qualitative methods tend to be faster and less expensive. This has allowed me to circumvent most practical constraints to produce the compelling results articulated later in this thesis.

Therefore, for all the reasons enumerated above, and following on Crabtree's and Cooper's recommendations, the research undertaken in my PhD will essentially be qualitative and empirical. Participants of the various studies will be representative of the targeted users (i.e., expert and professional practitioners) and will be involved at every key stage of the design process.

3. The Overview of the Research Process

In this section, an overview of the process followed during the PhD research is provided. This process is illustrated in Figure 15, where studies or research activities (rounded corners) and outcomes (ovals) are represented in chronological order (from top to bottom following the arrows). The figure also indicates in which chapters the studies, activities and outcomes will be described in more detail.

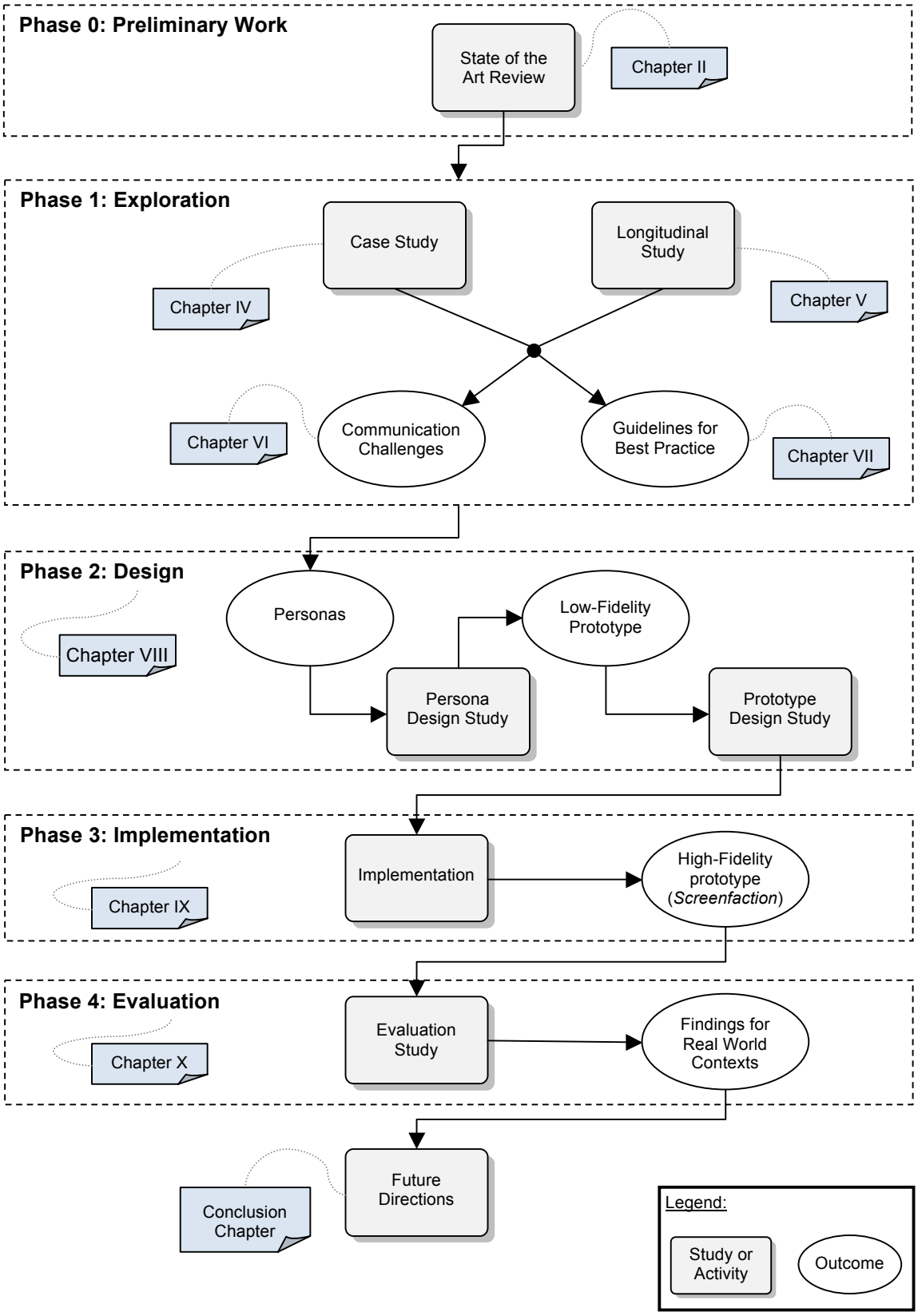

Figure 15. Overview of the research process

As shown in the figure above, the research process was divided into five consecutive phases. Phase 0 (*Preliminary Work*) consisted mainly of the state of the art review presented in Chapter II. Phase 1 (*Exploration*) included two studies (case study and longitudinal study) and two groups of outcomes, namely communication challenges and guidelines for best practice. Phase 2 (*Design*) included two design studies leading to the construction of a low-fidelity, paper-based, prototype. Phase 3 (*Implementation*) consisted of the construction of a high-fidelity prototype. Finally, Phase 4 (*Evaluation*) was concerned with the evaluation of the high-fidelity prototype in real conditions of use. Phases 1, 2, 3 and 4 are now briefly summarised.

3.1. PHASE 1: EXPLORATION

The first active phase of the research, described in Part 2 of this thesis, consisted of the *exploration* of the film scoring practice. During this exploration two qualitative studies were conducted: a case study and a longitudinal study. There were multiple objectives for conducting these studies: 1) to understand the different creative processes in the film scoring collaboration; 2) to obtain an overview of current habits and techniques; 3) to highlight some problems encountered by practitioners in collaboration and communication; 4) to identify potential users' needs; and 5) to generate ideas for improving the practice.

The case study, which will be described in more detail in Chapter IV, was an essential and influential part of the research process. Robert K. Yin defines a case study as "*an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin, 2003b, p. 13). It is a rigorous approach for gathering rich, in-depth and contextual data. Yin (2003a, 2003b) particularly advocates the use of exploratory case studies in social science and ethnography when the research is concerned with open-ended questions, which is in alignment with the research questions articulated in Chapter I. Therefore, following on Yin's recommendations I sought to organise a case study and had the great opportunity to follow a film score project in its entirety. This project consisted of the collaboration between a Sydney-based composer and a Melbourne-based director in making the music for a documentary. Over the five-month duration of the study, I used various data collection methods: email and phone logging, regular in-person meetings and interviews, written questionnaires and direct observations. This case study allowed me, as the researcher, to witness the sequence of interactions between practitioners in real-life situations. It also provided a detailed account of a composer-director relationship and allowed me to follow the same collaboration from two different points of view (the composer's and the director's). Despite the in-depth quality of the study, findings could not be fully generalised; a larger study was required to obtain more meaningful results. This was achieved with the longitudinal study.

The longitudinal study, described in Chapter V, spanned a two-year period and involved 31 expert practitioners (14 composers, 15 filmmakers, one film editor and one sound designer).

Several qualitative methods were used in this study: semi-structured interviews, written questionnaires, online surveys and contextual observations. All the collected data was refined by selecting the most relevant quotes from research participants. Quotes were then stored in a database, coded and categorised to enable the identification of common patterns.

The two studies (case and longitudinal) were complementary and contributed to the generation of two groups of results: communication challenges and guidelines for best practice. The former, described in Chapter VI, consists of a classification of challenges and issues that practitioners recurrently face in communication. The latter, described in Chapter VII, consists of recommendations based on the observation of personal habits for improving the current practice of film scoring. Those results were elaborated on and structured in a readily digestible way so as to transfer newly acquired knowledge to the next research phase: *Design*.

3.2. PHASE 2: DESIGN

A design phase, presented in Chapter VIII, was conducted to progress towards appropriate solutions for the communication challenges. This phase was comprised of two studies. The first study followed the principles of goal-directed design (Cooper et al., 2007). It concerned the elaboration of personas, fictitious but realistic characters representing the key stakeholders in the film scoring process. Early versions of the persona descriptions were disseminated to eight professional practitioners (composers, directors and producers). Participants then filled out a questionnaire assessing the validity and plausibility of the concepts embedded in the personas. Collected feedback allowed for the refinements of personas, which provided a rich account of potential users for a computer solution.

This led to the second study, which applied the principles of evolutionary prototyping (Crabtree, 2003). A low-fidelity, paper-based, prototype was designed to assist the remote discussion of music and video artefacts. Sessions were organised with two composers and a filmmaker to verify that the prototype was addressing real issues and providing appropriate solutions. Feedback received from participants validated the prototype's design concepts, which were then implemented in the next phase: *Implementation*.

3.3. PHASE 3: IMPLEMENTATION

Following the design study, a high-fidelity version of the prototype was implemented to give more concrete expression to the design assumptions. This version, named *Screenfaction*, was developed as a highly interactive Web platform. Chapter IX showcases *Screenfaction*'s features with numerous screenshots and brief textual descriptions.

3.4. PHASE 4: EVALUATION

The last phase of this research, described in Chapter X, consisted of the *evaluation* of the high-fidelity prototype. The evaluation was an integral part of the evolutionary prototyping process. As recommended by Crabtree, it was *situated*, i.e. it occurred in a real-use context, in order to further assess the design principles:

> Situated evaluation of the work of prototyping sessions supports this ongoing process of analysis by identifying practical possibilities and constraints encountered and elaborated in the unfolding flow of the session's collaborative work. Paying close and careful attention to the collaborative work that is involved in putting the technology to work in prototyping sessions demonstrably serves to elaborate proposed design solutions. — (Crabtree, 2003, p. 167).

Thus, an evaluation study was conducted with a Sydney-based composer and a Perth-based director. It lasted four weeks and followed the two participants' use of *Screenfaction* to communicate and produce the score for a real documentary. Participants carbon-copied me to all their email conversations and maintained a phone log. As the researcher, I also had access to all the work executed on *Screenfaction*. This evaluation generated new findings relevant to real-world contexts, which opened the door to future directions presented in this thesis' conclusion chapter.

4. Ethics

At the beginning of my PhD I obtained approval for a full ethics application for the entirety of my research. This application is covered under the umbrella ethics applications granted to researchers of the Creativity and Cognition Studios (CCS). CCS has been approved to conduct any number of research projects that are performed using a specific set of methods provided that each project is approved internally at a CCS meeting. Generic clearance for these methods has been given so CCS researchers do not have to submit separate applications to the UTS Human Research Ethics Committee. This approval began in February 2004 and was then renewed in 2007 for a further three years.

The particular ethics approval attached to the research presented in this thesis can be referred to with the details given in Table 3.

Table 3. Ethics application details

Approval Number: UTS HREC 2006-0601
Title: Computer Support for Creativity in Film Music Composition.
Researcher: Julien Phalip
Date approved: 9/05/2006

Contact details and collected data were stored securely in a locked cabinet at CCS. Participants of the formal interviews, case study, design study and evaluation study were invited to fill out a consent form (see example in Appendix A). Anonymity of all research participants was preserved except for those in the case study (Chapter IV) and the evaluation study (Chapter X), whom agreed in writing to have their names published in this thesis.

This chapter outlined the methodological aspects of the PhD. In particular, it presented the domains and approaches that guided the research process, namely Human-Computer Interaction (HCI), Computer-Supported Cooperative Work (CSCW), ethnography in design, interaction design and goal-directed design. The specific methods used will be described, in detail and in context, in Chapters IV, V, VIII and X. The next chapter marks the start of Phase 1 of the research (also Part 2 of this thesis: *Exploration*) and features a case study following a real-world instance of remote collaboration between a composer and a filmmaker.

PART 2:

EXPLORATION

CHAPTER IV

Case Study

In this chapter, I describe a case study conducted as part of the exploratory phase of the research. This study followed a film score project between a Sydney-based composer and a Melbourne-based director. It lasted for 5 months between January and May 2008[13]. The motivation for using case study methods was to gather rich and detailed information about a real-world film scoring collaboration. I was also interested in observing *in situ* how practitioners overcome potential hurdles arising in their work. Due to the participants' open-mindedness and cooperation, this study has been a highly rewarding research experience and has profoundly influenced the rest of my work. In the following sections, I will start by presenting the participants and the context of the project. Then, I will describe the various methods used for collecting data. After recounting the chronology of the collaboration, I will conclude by summarising the main findings which were compiled after the study.

1. Context

First of all, I shall present the context in which the case study occurred. In December 2007, I met Felicity Fox (a Sydney-based composer whom I had known for a year through my research) and happened to mention that I was prospecting for a film score project to conduct a case study. Felicity then suggested one of her upcoming projects: a film score for a documentary directed by Sally Ingleton, a director based in Melbourne. I then followed up on this initial face-

[13] This case study took place about half-way through my PhD. It is not to be confused with another broader longitudinal study which occurred over the entirety of my PhD involving a large number of practitioners and which I will describe later in Chapter V

to-face meeting, contacting Sally by email to further introduce myself and to present my plans for the study. She then kindly accepted that I follow their project.

Felicity Fox[14] (Figure 16) is an award-winning composer with twenty years experience in the cinema, television and theatre industries. She was particularly sought after by independent documentary makers and she had contributed to many high profile documentary films.

Figure 16. Composer Felicity Fox (source: http://felicityfox.com.au)

Sally Ingleton[15] (Figure 17) is a writer, director and producer specialising in documentaries about science, arts, history and social issues. Throughout her twenty-year career she had received numerous awards and her work had been widely distributed through TV channels in Europe, America and Australasia.

[14] http://felicityfox.com.au

[15] http://www.360degreefilms.com.au/about/sallyingleton.html and http://www.singingnomads.com

Figure 17. Director Sally Ingleton during the production of "Seed Hunter" (Source: http://www.seedhunter.com/sally-ingleton.html)

Felicity and Sally had already worked together on two different documentaries more than 10 years before, in 1994 and 1996. The two projects had been mostly conducted remotely and conversations held over the phone, although for each project Sally had travelled to Sydney two or three times and Felicity to Melbourne twice. Felicity had worked on the music composition by herself for long periods of time. The few face-to-face meetings that were organised were thorough and allowed Felicity to better gauge Sally's response. Those previous projects had been successful and both Sally and Felicity had enjoyed collaborating. They appreciated each other's work and, although they had not met again until this third and new project, each kept informed about the other's achievements throughout the years. Therefore there were amicable and positive foundations in their relationship, which comforted Sally in offering this new job to Felicity.

Another determinant reason in Sally's choice of composer was Felicity's style of composition. She liked her ability to blend ethnic music with electronic sounds in original ways. Also, she thought that the style of music Felicity had composed for a recent film entitled "The President Versus David Hicks" (Levy & Dean, 2004), a documentary partially set in the Middle East, corresponded to what she was looking for in her new documentary.

This new project was entitled "Seed Hunter" (Ingleton, 2008). It related the journey of Ken Street and his team of scientists in the Caucasus to find locally grown and wild plants. The objective of

Ken's mission was to collect seeds with resilient genes that could help farmers grow food plants in other parts of the world being ravaged by drought and changing climate conditions. Below is the official synopsis[16]:

> You'd have to have been hiding under a mushroom to miss that climate change is now a key issue for Australians. Whilst its effects are only just emerging, one of the fundamental questions keeping scientists on their toes is: what to do when it seriously starts to affect the crops that feed us?
>
> As Australia and much of the world wrestles with hotter weather and a dwindling water supply, mass starvation at a global scale is on the cards if we can't find ways to improve crop resilience. Scientists are exploring many solutions to adapt our food supply, including going back to mother nature herself to locate the genes that can withstand our changing climate; genes that, thanks to a high yielding monoculture, have almost disappeared.
>
> Australian scientist, Dr Ken Street, aka the 'Seed Hunter', spends his life searching for the tiny seeds that could play a role in helping food producers around the world. This film follows Dr Ken, the Indiana Jones of agriculture, on a journey from the drought-ravaged farms of Australia, to the heart of the Middle East, to the mountains of Tajikistan. It is in the former Soviet republic of Tajikistan that he and his team of 'gene detectives' are most likely to find seeds like the elusive wild chickpea that can survive in temperatures of 40 degrees above and below zero. Sounds simple enough until you realise that land clearing, urbanisation and modern farming systems have all but wiped out these ancient food sources. So the chances are slim, but well worth taking.
>
> While Ken urgently hunts for genetic secrets in Central Asia, we meet wheat farmer Ian McClelland in Australia who is struggling to grow crops in a climate that's gone haywire and scientists at CSIRO Canberra who are on the front line of discovering tomorrow's food.
>
> Young postgraduate student, Caitlin Byrt is part of a team at CSIRO that's found two genes that code for salt tolerance in pasta wheat – in an ancient wheat collected by the likes of Ken Street. They are attempting to get the genes into modern day wheat so that future crops can be grown on salt affected land.
>
> But the prize for "Seed Hunter" Ken Street is the rare wild chickpea whose tough resilient genes could help transform modern chickpea enabling it to be grown by more people. His quest to locate the wild plant consumes much of his adventure on the road.

---

[16] More information about the "Seed Hunter" documentary can be found on the dedicated website: http://www.seedhunter.com

At journey's end, Ken travels deep into the Arctic to deliver his precious bounty of seed to the impenetrable 'doomsday vault', built as a back up for the world's seed supply of every food type known to human kind.

Figure 18. Snapshots from "Seed Hunter" (Source: http://www.seedhunter.com)
(a) Dr. Ken Street in Tajikistan (b) Collecting Seeds in Tajikistan
(c) Farmer in Syria (d) Svalbard Global Seed Vault in Norway

The documentary project effectively started in early 2006 when Sally heard a radio interview about Ken Street. She was confounded by the fact that climate change was threatening the world production of basic crops and that solutions could be found in ancient and wild varieties of plants. She was fascinated by Ken's work and she found it was the perfect subject for a compelling documentary on climate change and food production. After gathering funds from several broadcasters and scientific organisations in five different countries, the actual production started in 2007. Sally, with the help of a cameraman and a sound recordist, embarked on Ken's journey and followed him and his team through Russia, Syria and Tajikistan. The journey lasted for five weeks and some extra scenes were later shot in Australia, New York and the Arctic.

Composer Felicity Fox was first contacted by Sally in March 2007 and the contract was signed in November 2007. At that time, most of the production had already been completed and the documentary's editing phase was underway. Shortly before Christmas 2007, Felicity received by

post mail a DVD containing a first rough-cut[17] of the documentary. The collaborative making of the film score could then effectively start.

Overall, the "Seed Hunter" project lasted for nearly three years from the beginning of 2006, when Sally had the original idea, through to the end of 2008, when the documentary was first screened on Australian television. The case study I conducted principally focused on the film score sub-project. More specifically, it followed the creative collaboration between Sally and Felicity, and it spanned over five months between December 2007 and April 2008. In the following section I present the methods that were used during the study.

2. Methods

The main parameters for conducting the study were to not interfere with Felicity's and Sally's creative process. I aimed to remain as unobtrusive as possible while doing the research. Hence, data was collected in the following ways:

- *Email carbon copying* (CC): Over four months Felicity and Sally CC'ed me in 45 of their email conversations, each conversation containing up to 12 replies. I specifically asked them to copy or forward me emails which only concerned the creation of the music, and to keep other matters (e.g., contract-related issues) private. This greatly facilitated the process of following the creative discussions and of keeping track of the work's progress. Not only was this medium the less obtrusive one (as I did not intervene in any of the discussions) but it was also by far the one that provided the largest amounts of useful data.

- *Phone conversation log*: Felicity kindly accepted to regularly fill out a log for some of the conversations she had with Sally and other collaborators of the project. Felicity was originally averse to the idea as she feared it would be too constraining, especially under potential situations of stress and fatigue. Thus, I had to adjust the initial plan for logging and come up with a simplified format. Not all phone calls were logged (and therefore the total number of calls is unknown), either because of lack of time or because some calls were judged private or irrelevant by Felicity. Felicity did, however, log entries for ten phone conversations. After each of those conversations she recorded the date, time, name of the initiator of the call (four calls from Felicity herself, five calls from Sally and one call from the film editor) and a brief summary (between 50 and 260 words) of the conversation's content. The log, which Felicity returned me at the end of the study, was

[17] A rough cut is an unfinished, unpolished, version of a film which is starting to resemble the final product but which may still undergo modifications

a useful medium to capture conversations that I would not have been able to witness directly. Some perspective needs to be taken on this data as it only reflects Felicity's vision.

- *Regular meetings*: I regularly met Felicity in a casual setting, either at her studio or in a café (every two or three weeks). The objectives of these meetings were to have a regular debriefing of the work in progress and to understand Felicity's perception of the collaboration along the various stages of the project. Those casual meetings also gave me the opportunity to clarify some points and discussions which I had missed or misunderstood when following her email conversations with Sally.

- *Written questionnaires*: The distance separating Sally and myself (I lived in Sydney and Sally lived in Melbourne) meant I could not often meet her in person. To compensate for this situation, I drafted three short questionnaires spread out over the course of the project to gather her personal impressions on the work's advancements.

- *Direct observations*: I was given consent to attend the two in-person meetings between Sally and Felicity, once in Melbourne (in Sally's studio) for the spotting session[18], and once in Sydney (in Felicity's studio) towards the end of the project for the final editing modifications. During each of these meetings I was simply sitting in a corner of the room, quietly observing and taking notes. During those observations I could directly witness the participant's oral discussions and gestures (e.g., tapping on the table or pointing at the computer's screen).

The different techniques enumerated above allowed me to collect a significant amount of rich and contextual data. Obviously, because of the geographical situation I had many more interactions with Felicity than with Sally. Also, Sally was extremely busy at the time as she was still involved in the film editing, in the shooting of some remaining scenes, and in negotiations and promoting with several broadcasters across the world. However, this difficult setting was well compensated by all the emails I received from Sally and by the two direct observations that were organised. I hope, as a result, that the results of the study provided a balanced vision of the collaboration between the two practitioners.

Finally, in order to preserve the participants' privacy, all the raw data (phone conversation log, forwarded emails, questionnaires and hand-written notes) were kept private and were securely locked away. Only myself, as the researcher, had access to the data and none of it has been, or will be, shared with any third party. However, some fragments will be quoted with the

[18] The spotting session is when the director, the composer (and often also the film editor and music editor) meet to decide when there should be music in the film and what it should sound like

participants' consent in the following sections to illustrate the course of events. For ethical reasons and to guarantee objectivity and correctness of the reported facts, the option to review this chapter was made available to both Sally and Felicity. They both provided minor amendments, all of which were integrated.

3. Chronology of the Collaboration

In this section, I relate the process followed in the making of the music for the "Seed Hunter" to provide the readers with a detailed account of a real instance of collaboration in film scoring. I present in a chronological and linear order all the significant events that occurred during the collaboration between Felicity and Sally. For clarity, this chronology is divided into multiple sections, each one corresponding to a logical group of successive events. For example, each section entitled "Remote Discussions" describes a series of conversations held by the participants via email or telephone. In this account, I provide multiple quotes extracted from direct observations, email conversations, interviews or questionnaires to give a better understanding of the participants' points of view. However, only the quotes that I subjectively judged relevant, for their quality in illustrating the creative process and the interpersonal relationships, are considered here. Other quotes judged less relevant have intentionally been left out of this account. In this chronology, the present tense is used to offer a more engaging way of relating how the project unfolded over a five-month period. Below is the story of the creation of the film score for the "Seed Hunter".

3.1. REMOTE DISCUSSIONS #1

LATE OCTOBER. Felicity and Sally sign the contract. The score project will start in a few weeks, so Felicity takes the chance to go on holiday over Christmas with her family.

JAN 15. Felicity recently came back from holiday and she now emails Sally to get in touch again. She reports that she has seen, and likes, the rough-cut Sally sent her before Christmas. She also likes the temp music[19], which Sally selected for being from the countries travelled through in the film, as it corresponds to what she herself had in mind:

> I also liked the temp music you have laid in particularly the violin, oud[20], percussion combo. I am thinking I may lean towards that kind of instrumentation in my own score, a. because I

[19] Temp music is some already-published music that is used by filmmakers in the editing stage as a guideline for the mood and atmosphere. Directors also use temp tracks to communicate to the composers what they are looking for a scene. Temp music is described in more detail in Chapter VII

[20] Stringed instrument commonly used in Middle-Eastern music

> have already sourced those players and b. because it probably leaves the most scope for any original element from me as opposed to just recreating a purely traditional sound.

Felicity also warns Sally about the technical aspects which need to be taken into account, especially regarding the software compatibilities and file compression formats:

> The best file type for me is a single Quicktime file with Sorensen 3 compression. If this is a problem, just try sending me a normal Quicktime. Please make sure it is not a Final Cut Pro file as I cannot open them in the software I use[21]. It needs to be Quicktime. The file may end up being several gig worth so rather than email it, it would be better to send it either on DVD or maybe a message stick drive? The other solution might be to cut the film into two halves that just butt up top to tail so they could that way fit on two DVDs.

JAN 21. Felicity receives, by post, a new QuickTime version of the rough-cut. This format is much easier to integrate and use with her compositional tools.

JAN 26. Felicity emails Sally to say that she is now working on the spotting notes[22]. Based on the temp tracks previously laid in by Sally, she is starting to identify the parts of the film that should, and should not, contain some music. Sally is eager to listen to Felicity's first drafts, as she replies:

> The cut is changing everyday but at least there is solid material there that you can work off. We'd love to get some of your music in soon. We will also need lots of little bits of incidental music that can help bridge or emphasise moments.

3.2. MEETING FELICITY IN HER STUDIO

JAN 29. I am meeting Felicity in her studio to debrief the first weeks of work. Importantly, Felicity is satisfied with the budget. She considers that she is well paid for this job and she appreciates the trust Sally puts in her. Particularly, Sally has allocated a further $1,000 for her to record live musicians. According to Felicity, this is not common practice in Australia, as composers usually sub-contract musicians and pay them out of their own money.

Concerning the temp tracks sent by Sally, Felicity has a number of reservations. She likes some but not all of the tracks. She also thinks that the temp tracks' style range is too broad. As she remarks, the tracks altogether contain musical themes with oud, violin, saxophone, vocals,

---

[21] Felicity principally uses Cubase to compose and edit her music

[22] Spotting notes, generally taking the form of a spreadsheet, list precisely where the music should be, and what it should do, in the film

tabla[23], various other percussions, and some epic music from "The Last Temptation of Christ"[24]. To keep some consistency in the film, she would like to convince Sally to narrow it down and only use the violin, oud, tabla and maybe a few other percussions. Also, Felicity describes her style as experimental mixing traditional instruments with contemporary sounds, and she assumes that Sally hired her because she thought that style was appropriate for the film. However, the temp music provided by Sally is mostly traditional and so Felicity wonders exactly what style Sally is after.

Concerning her short-term plans, Felicity wants to work hard for two weeks writing a few rough sketches to show Sally what direction she is taking with the composition. That approach had previously been agreed both by Felicity and Sally. Indeed, Felicity usually prefers to get the director's approval of the sketches before going further with the recording of real musicians. Recording is costly in time and money so she prefers to get the composition right early on. She thinks another possibility for building sketches is to write short musical themes and let musicians improvise around them. Felicity is also planning to submit, via email, a written document to describe her ideas cue by cue[25]. She would normally communicate these ideas orally in a face-to-face context, but considering the current remote situation she believes written notes would be easier. If the notes are unclear, then they will be able to elaborate over the phone. Felicity admits that this is not an ideal situation and that, although email is generally useful, phone conversations or face-to-face meetings are better to avoid or to resolve conflicts.

The day after meeting Felicity, I send an email to Sally asking about her own perception of the work's progress so far. In her reply, Sally writes that she trusts Felicity and that she knows her well enough to wait for a few weeks before hearing her first drafts. She also describes how she foresees the project will unfold in the coming weeks:

> I hope to get some music roughs from Felicity by mid-February that we can play with. We will keep sending her cuts and she will send us roughs. As the work gets closer to fine cut then it's easier for her to know what she should do. At this stage she needs to be thinking about 1-3 main thematic pieces. The small incidental stings will flow from there.

3.3. REMOTE DISCUSSIONS #2

JAN 30. After seeing the film in more detail, Felicity emails Sally asking her more specific questions. In particular, she would like to know more about the geographical locations presented in the documentary:

[23] Indian percussion instrument

[24] Film by Martin Scorcese in 1988, music composed by Peter Gabriel

[25] A cue is an individual piece of music. All cues combined constitute the film score

> Could you please list the countries you visit during the film? Re the music you have included on the temp tracks, where is each artist from? I particularly love the Anuar Brahem tracks that you have used over Tajikistan, is he from there? In any case the blend of middle eastern and eastern european flavour in this music is perfect for our Tajikistan theme.

Felicity then recommends two very good musicians (an oud player and a percussionist) who she knows and who are both interested and available for recording the music. She also suggests that she starts composing a few sketches, and then she will seek Sally's approval before going too far and perhaps taking the wrong path:

> Rather than rough the whole of the film, how about I rough around ten cues that are important and representative of all major themes and then I come to Melbourne to discuss? It seems pointless to me to draft every single cue before getting early feedback from you.

Felicity also warns Sally that the sketches will not sound as good as the final result:

> As far as delivery of roughs goes, what I propose is that I rough a version of each theme with samples[26]. This will not really do the oud and violin tracks justice, but I feel it is better to get the music right between us first and then get the musicians in to record. It will just require a bit of faith and imagination from you as the digital versions of what is essentially very organic acoustic music will be limited.

FEB 1. Felicity calls Sally to discuss three main themes. They do not discuss every cue as the cut is still undergoing important modifications in Sally's editing room. They clarify a few questions and start planning for a face-to-face meeting in Melbourne at the end of February.

FEB 5. Sally tells Felicity that she is trying to buy the rights for a temp track she has been using in several scenes of the film:

> I am enquiring about being able to use the Anouar Brahem track in the doco. It is so good that we think it's worth it. What do you think? Do you mind? Do you think you can do better? We won't settle anything until we have some of your temp tracks but just thought I'd run it past you.

Also, speaking about another temp track that she would like to keep, Sally says:

> We'll wait to we hear your music but just so you know that's our thinking. We may also enquire about the Peter Gabriel piece too.

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[26] Digital recordings of sounds or instruments which can be played back by the computer

Felicity replies that she is okay to keep one of the temp tracks in the final score but she also reassures Sally that she can compose something entirely original:

> Re the Anouar Brahem track, it's totally up to you. It does work well, and I know you are attached to it. Yesterday I knocked together a sketch modelled on it, but also different, less traditional sounding but with earthy elements, destined for oud, percussion and violin. If you were to secure rights to that track, it may work well with mine and reduce the repetitiveness of that piece, which at this stage is being used quite a lot in the temps. On the other hand, they may sound funny up against each other because they are close but obviously different. Hard to tell until we get there. But why don't you go ahead and make enquiries, it can't hurt and I am open to that. As you said we will be better placed to resolve these kinds of questions when you hear my new tracks and we can chat face to face.

Felicity also tries to reassure Sally about the progress, as Sally still has not heard any of her sketches yet:

> The music is coming along. I have a Tajik theme roughed out and am moving on now to the bigger themes with my new sound library. I hope to be able to give you something which will mean you no longer need the Peter Gabriel, but if you want to make those enquiries anyway that's fine. It still feels a bit early to send you anything down, wouldn't mind revisiting the Tajik theme after a couple of days break, but it's all going well.

FEB 11. Felicity suggests that Sally listens to the sketches for the first time next week when she travels to Melbourne. But Sally is eager and would like to receive them beforehand on a CD via express post. So Felicity explains that she prefers to be with Sally when she first hears the sketches to be able to see her initial reaction:

> Would prefer to wait if that's ok as we are pretty close now and I just want to keep churning stuff out this week. The way I usually work too is to revisit roughs before the first demo so I am reserving a bit of time late this week to do that. I don't want to rush that process and have been pacing things accordingly. But most of all it is important to me that you hear them for the first time in a good space, with a good sound and full attention. If I am there to gauge your initial reaction and discuss this I will learn more about what is and isn't working. So, although I know you are anxious to hear things, if you can wait a week, I would prefer it.

FEB 12. Sally suggests more references of existing music to Felicity:

> Got this from real world re the Gabriel piece… thought you might like to check out the music. I don't think we will licence it... it is too monotone for us but it is hauntingly beautiful. Do you know his work?

But Felicity insists that she prefers to compose original music, without too many influences from other artists:

> I have made a track with a wind instrument called 'balaban' which is a reedy sound. But it is similar in feel, a bit more dynamic, but with slow beautiful phrases and with this haunting feel. I think you will like it. I am also going to make one (starting today!) with ney[27] flute- the same instrument you hear on the Djivan[28] mp3. So that's next on the todo list. I think we are on the same page with the kind of sound we are after so hopefully there is no need to licence anything from Real World and you can get it from me! I would be disappointed if that were not the case as it is my job!!!!

3.4. FLYING TO MELBOURNE

FEB 18. Felicity flies to Melbourne to meet Sally and I have been invited to join them. Before we leave, I take advantage of this opportunity to ask Felicity about her expectations for this trip. Felicity is enthusiastic about this project. She finds the topic of the documentary very interesting and stimulating. For this trip, Felicity has compiled a CD of seven demo tracks (25 minutes of music in total) which she has written over the last 3 weeks. Those tracks are still rough sketches and some of them contain samples that only approximate the acoustic instruments she will later record. But she is confident that Sally will grasp the core ideas and that she will not be disturbed by the average sound quality for now.

Felicity thinks that Sally might currently be a bit nervous as she has not heard any of the drafts yet. But Felicity has insisted that Sally wait until they meet to be able to talk her through the details during the listening. She also wanted to be present to ensure the music would be played on good speakers rather than, for example, on poor quality computer speakers. She is confident that Sally will feel better after the meeting. She admits, however, that had it been their first collaboration, she would not have waited for so long before letting Sally listen to the first sketches.

At this stage, Felicity still has some concerns regarding the temp tracks. So far, many of the references and temp tracks suggested by Sally are from expensive film productions like “The Kite Runner”[29] or internationally-renowned artists like Peter Gabriel[30]. Originally, Sally wanted to

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[27] Ancient flute played in Persian, Turkish and Arabic music

[28] Djivan Gasparyan, an Armenian musician and composer

[29] The Kite Runner is a 2007 Academy Award-nominated film directed by Marc Forster

[30] English singer and song writer who was a pioneer in world music and who has scored several internationally successful movies such as “The Last Temptation of Christ” (1988) directed by Martin Scorsese

buy the rights to integrate some of those tracks directly into the documentary but then realised the cost would be prohibitive. So Felicity agreed to draw inspiration from them, even though she thinks they are too epic and overly dramatic for the purpose of this documentary. In fact, Felicity usually prefers to compose more subtle themes and so she hopes she will be able to influence Sally in this direction.

After arriving in Melbourne, we meet Sally at her office and go out for dinner. The conversation then mainly concerns the documentary's topic, in particular the possibly tragic consequences of climate changes on farming worldwide. Then, I follow Felicity and Sally to Sally's house to listen to the sketches. It is the first time Sally gets to hear them. Without looking at the film at all, Felicity sequentially plays on Sally's stereo each of the seven tracks from her demo CD.

As they listen, Sally makes comments about where she imagines the music could fit in the film. She also gives her impressions on Felicity's pieces, for example: "*I think it's dark but it is more cruisy and doesn't really evoke danger and cautiousness. […] Instead I would have liked an emotional uncertainty, something that would make you feel that it's all falling apart*". Sally also says that the music should primarily support the emotions the film intends to convey and that it should not be too overwhelming or too noticeable. Yet, for the film's climactic scene (the one for which she had selected a temp track by Peter Gabriel) Sally says that Felicity's piece, even though she likes it, does not contain enough instruments and that it misses "*a layer that grabs you, that reaches you, that takes you one more step*". Felicity has done something more subtle but Sally apparently would like something more substantial.

Overall, Sally seems satisfied and understands that the music is still at an early stage. Even if she is a bit skeptical about some of Felicity's sketches that sound a bit rough, she concedes that "*it will sound better with real instruments*". Both Sally and Felicity agree that it is too early to discuss the music in more detail because the cut is still changing every day. But they believe that the work so far provides a good basis for the development of the film's musical themes, as Felicity reminds her preferred compositional process: "*I see the film, get inspired, and have a bit of a 'spew' and write away. I then give the drafts to the director and out of that may come out the main themes*".

— Felicity: "*That's it, that's the original offering*"

— Sally: "*That's great. I think it's a really good start*"

To conclude, Felicity confesses to me that she is happy with this first meeting. She believes she has "*broken the ice*" and she thinks her music has been well received by Sally. Finally, everyone retires to get ready for the spotting session the next day.

3.5. SPOTTING SESSION

FEB 19. Today is the spotting session, the main reason for Felicity's visit in Melbourne. This is a crucial stage in the project which consists of "spotting" the film, that is, deciding in what scenes there should be music and what the music should achieve in each of these scenes. Three persons are attending the meeting at Sally's office: Sally, Felicity and Tony Stevens, the film editor. The configuration in the room is as follows: Sally sits at the desk next to Tony, who is controlling the editing with Final Cut Pro[31] on the computer; Felicity sits next to them on a couch taking notes as the discussion unfolds; I sit in the corner observing and taking notes, not intervening in the conversation at all.

The cut has changed since Felicity last saw the film. In particular, a few scenes have been taken out. Also, because Sally had explicitly asked her not to compose music for specific scenes, today is the first time Felicity gets to see her music attached to the picture. Tony says that he will burn a DVD with the latest cut to give Felicity before she goes back to Sydney. This time, Felicity requires that the temp tracks are taken out of the cut. As she explains, when she was previously composing music and trying to play it over the film, she had to mute the whole sound track (which included not only the temp tracks but also the sound effects and dialogues) to be able to hear her own music. Taking the temp tracks out would mean she could play her music and still hear the dialogues and sound effects. Felicity also thinks that the format she has been working on so far (i.e., one single file of 800 Megabytes for the whole film) is adequate. Therefore they agree to keep using that format in the rest of the project.

Overall, the meeting lasts for three hours between 9am and 12pm. The process they follow is to listen to each of Felicity's sketches, play them over different scenes and see whether they fit or need adjustment. While Tony is controlling the software and executes the various technical actions, he is also readily involved in the creative discussions and often gives his opinion about the music. To facilitate the editing process, Sally and Tony have stuck on the wall dozens of pieces of paper, each piece representing a scene and having the scene's name written on it. The names are made of a few words describing the landscapes and objects which are presented in the scene, or what is said by the characters; for example: "Tea House", "Ken: 'I love wheat'", "Ken: 'What is it?'", "Helicopter Village", or "Ken Hunting".

As they listen to the various music pieces, Felicity regularly reminds Sally not worry about the current "poor" sound quality and tries to reassure her: "*It will be busy, full, with real instruments*". But Sally and Tony do not seem to be hindered by sound quality, as Sally recognises some pieces already "*have a lot of potential*". The music pieces, as they currently stand, do not always

[31] Professional editing software - http://www.apple.com/finalcutstudio/finalcutpro/

perfectly fit to the scenes they are tried upon. That is normal because Felicity did not write those pieces specifically to fit certain scenes but rather to constitute a basis for discussions and guide the development of original themes. So, at this stage they settle on certain music pieces based on whether the mood is right or not, and Felicity assures she can change the details (such as the pace or tonality) later to "*make it work*".

Throughout the conversation, Tony and Sally use layman's expressions to explain what they want (e.g., "*It has to be quirky*", "*You want something with a bit of attitude*", "*Yeah, like pulling out a 'Laugh!' sign, because it's a comical scene*") or to point out what they like in Felicity's music (e.g., "*It's very optimistic, it has an earthy feel*", "*It gives you the shivers down your spine*").

On several occasions concerns are bought up about the suitability of the temp music. For example, Felicity once criticises one of the temp tracks and advocates for something more subtle: "*I guess it needs to be driving, but isn't that a bit too dramatic?*" Sally then insists that it is an important scene and that the music should reflect it: "*Yeah, that temp track is a bit over the top, but you still want to feel that it's the beginning of a journey*". Another particular dilemma appears in the climactic scene, where an intense epic temp track has been used. All admit that the temp track is "*overdoing it*", so again Felicity suggests composing something more subtle and evocative.

Finally, Sally advises that there will be four different versions of the documentary. Each version is commissioned by a different broadcaster (RTÉ[32], ABC[33], ARTE[34] and the National Geographic Channel[35]) and will vary in length and content, some broadcasters preferring to have more scientific facts and other broadcasters preferring to have more details about the adventures in Ken's journey. This means there will be as many different mixes for the music. What Sally and Tony suggest is to complete the longer version and then give it to Felicity so she can compose the entirety of the music. Eventually they will edit off the parts of the music that are not required in the shorter versions of the film.

Finally, the meeting ends with a light informal lunch at a café. The group then splits with myself following up with Felicity for a debriefing.

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[32] RTÉ (Radio Television of Ireland) is the Public Service Broadcaster of Ireland

[33] ABC (Australian Broadcasting Corporation) is Australia's national public broadcaster

[34] ARTE (Association Relative à la Télévision Européenne) is a Franco-German TV network

[35] American subscription television channel that airs non-fiction television programs

3.6. DEBRIEFING

FEB 19. (SAME DAY) Felicity has mixed feelings about today's meeting with Sally and Tony. While she recognises that it was useful she also thinks that Sally was expecting more from her and might be a bit disappointed as a result. She hopes Sally understands that it is still an early stage and that it will improve as the project unfolds. Furthermore, Felicity is somewhat frustrated by the duration of the meeting (three hours), which she believes was too short to cover every question she had.

Moreover, Felicity is critical about the use of temp music. On the one hand she acknowledges that temp music can be useful for directors as it helps "*them build the narrative*" and also "*sell the film to broadcasters*". But on the other hand she wishes directors and film editors would not listen to temp music so much during the editing process. The risk is that, by listening to the temp track over and over, they may get attached to it and find it difficult to accept the composer's original work; as Felicity explains:

> Sometimes when the director is too attached to the temp track, it's like the door is closed, and you have to contort yourself to get through the crack. […] If they listen too much to the temp tracks then that's what they expect to get. But you should be open to what the composer (the person you're hiring), has to offer. […] So, the other day I told Sally that it'd be good if she could wean herself off the temp tracks and get used to my music. That made us laugh.

Unfortunately, Felicity feels a bit isolated in this process: "*The composer feels alone in that task of fixing problems in the music. I don't have assistants to help me. And the director has the power to tell me 'That's not good.'"* But she also takes responsibility for that task. She concedes that it is part of her job and that she has to act professionally; as described with this interesting analogy of hospitality service:

> I need to be professional. It's like a waitress in a restaurant. If she has an issue with a customer, then she would go back to the kitchen, breathe, and remind herself that she has to remain professional and serve that person responsibly.

At least, Felicity is relieved because Sally has finally heard excerpts of her music and will now start getting used to them. Felicity remains confident and believes that the meeting helped her get a better idea of what Sally wants for the music. Thus, she concludes:

> I want her to be proud of the result as much as I want to be proud of it myself. We need to find the meeting point.

FEB 20. I meet Felicity the next day and we fly back to Sydney. After having thought overnight about yesterday's meeting, Felicity explains that her initial frustration was probably caused by

the fact she had built a lot of anticipation. Because she was flying all the way to Melbourne just for that meeting, she expected the discussions about the music would have been more positive and encouraging. In hindsight, rather than feeling frustrated, she was merely feeling disappointed because her expectations have not been met. On a side note, about one month later (26 March), Felicity retrospectively imagined how that particular meeting should have ideally taken place:

> 1. They would have been more positive about the music I had done. 2. They would have given more time listening in edit room with editor. 3. Longer time spent on spotting. Felt rushed at end. Needed to really have more dialogue than usual at that meeting because it was the only face to face I would get. 4. Just needed to feel they were open to whatever questions I needed to ask + however much time I needed that day to get what I needed to go away with + start writing. 5. Felt frustrated they were quoting so heavily from 'Kite Runner' and 'Temptation of Christ' scores and relying on those temps so much when we obviously don't have those resources at hand. But there were good things about the visit too!

The same day (20 February), I asked Sally via email about her impressions on the meeting. Interestingly, she had a totally different vision than Felicity's and she appeared to be very positive about the content and benefits of the meeting:

> I think the visit from Felicity went well. I enjoyed her pieces of music and it will be interesting to try them with different sections of the film. Yes of course we are on the right track. It always takes time and we are still finetuning our edit and much of my energy is that really. I have every confidence that Felicity will deliver me music which is right for the project.

This shows that there can be a real gap between the two sides of the collaboration. While the project so far is advancing reasonably well, emotional issues and misunderstandings can truly effect people's perceptions and, as a result, the project's outcomes.

3.7. REMOTE DISCUSSION #3

FEB 26. Sally emails Felicity to say that she has started using some of her sketches in the film. She lists how she has matched each musical theme to particular scenes:

> 1. The Tajik theme. We have put that over Ken looking at the cars in Dushanbe. We are planning to carry that through until after the market scene where he buys food. 2. Boys go swimming. SAZ[36] Theme. Works well. 3. Revelation. We have used that at the end where Ken goes back to meet Ahmed in Syria. That's working really well. That's all we have

[36] Saz: Middle-Eastern plucked string instrument

> managed to use so far. Keen to hear some more tracks especially something for the opening.

Then, both engage in an email conversation discussing how certain themes could be better aligned with the images and the desired moods. Felicity suggests sending new versions of the music to Sally and insists on using high quality formats (such as AIFF[37]) instead of lighter but poorer quality ones (such as MP3[38]):

> I have sent you a zipped and compressed aiff file of the opening revelation theme. Hope it downloads ok. If it doesn't let me know and I will send you the dreaded MP3 instead. Please lay it in (working from the cut I received on 13/02/08) 2s 8 frames BEFORE the establishing wide shot of road. Check sync is correct by the tambourine shake on 'Syria' text and the balaban (flute) starts as the car appears. There is also sync detail over the map movement at the end of the piece and the music is generally pretty fitted to the cuts.

Felicity's reply above also shows that, because the communication is remote and mostly conducted via email, she has to write lengthy descriptions of where her music should be laid in to fit the image.

FEB 27. Felicity keeps sending more elaborate sketches. Again, she writes long emails to explain to Sally where to place each of the sketches in the film; for example:

> Here is the Tajik theme as would first come in. Please lay it up to start under the high shot of the white building after the team is looking at the map together, then it goes into the cars, then markets, then travel and through to onion lady. Should stop hard just before she says 'OK!' as the Anouar[39] track did. There are gaps and paring back around dialogue etc. takes off after Ken says 'It's just time...' [..] Here's another one! This is the sequence of stings to go over the hotel story. Please lay them in as follows: Sting 1) starts hard on end of narration saying 'decent night's sleep' as K and N walk into hotel lobby. Sting 2) starts during laughing after 'from 5 to 12!' It is hard to precise the start time but there is a gap in the drums as K says 'it's quite salubrious' and then it stops hard on cut to yukky loo. Sting 3) starts over K saying 'just sleep on the floor.' Last chord hits cut back to K on phone with his back to camera. Sting 4) starts after narration 'no one got much sleep last night' starts hard on shot of driver asleep at wheel. […] Here is a sting based on tajik music to go as van passes on road and comes to stop on shot of driver kneeling next to vehicle. Narration then says '2 hours into the trip…' You have laid in Anouar at the moment, but this is how the

[37] AIFF (Audio Interchange File Format) is a lossless and uncompressed audio format

[38] MP3 (MPEG-1 Audio Layer 3) is a popular audio format that uses a lossy compression algorithm

[39] Anouar Brahem is an artist whose music was initially used by Sally in the temp tracks

> Tajik theme might work. Lay it in at start of shot where van drives by. Should stop hard on driver shot.

Once again, Felicity seems concerned about Sally potentially not liking some of the sketches because of their current low sound quality. So, she warns her: "*Again, it is crunched so not great quality and please imagine real instruments!*"

The same day, Sally places a phone call to Felicity to give her direct feedback about some of the music themes. Sally asks for some small changes, for example with the addition in a scene of tambourine shakes to get some '*sparkle sending shivers down the spine*'. She also asks to remove some percussion from a theme that she thinks is '*too busy*'. Sally sounds quite positive and thinks the work is taking the right direction.

3.8. REMOTE DISCUSSIONS #4

FEB 28. Sally leaves for two weeks to the Svalbard archipelago, in the Arctic near the North Pole. She is following Ken Street to the Global Seed Vault[40], where he is going to store the seeds he found during his journey in Middle East. The aim of this trip to Arctic is to shoot the last scenes for the documentary. During the next two weeks, Sally will seldom have access to the Internet, so Felicity will directly communicate with Tony and Sally's assistants, who are all located in Melbourne. Also, because Tony's computer (the one with which all the film editing is done) is not connected to the Internet, Felicity has to send her music files and instructions to Sally's assistant, who then passes them on to Tony. Sally's email address is attached to every email conversation so she can remotely follow the work's progress.

FEB 29. Tony gives a phone call to Felicity. He tells her that he keeps integrating her pieces into the film. He likes her work so far and he only requires small changes. Felicity asks whether she should send time codes[41] with her tracks. But Tony replies that it is not necessary because the cut changes every day, therefore making the time codes quickly become outdated and irrelevant.

MAR 3. Sally briefly intervenes in the conversation to say that she has been able to connect to the Internet and listen to Felicity's recent tracks. She likes what she has heard so far.

MAR 4. Felicity keeps sending more tracks to Tony. Again, she has to write long instructions to help him synchronise her music with the picture:

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[40] The GSV is a large building situated in the Arctic where collections of seeds from around the world are stored. More information available at: http://www.seedvault.no/

[41] Sequence of numeric codes used for synchronization in recorded media

> Hope you are having fun and comprehending my rather haphazard instructions about where to lay in all these cues. Call me if you need help with sync. If it makes it easier, we can work from timecodes as I have started the cut I downloaded last week at 00.00.00 and my sequencer tracks timecode at 25 f.p.s. This latest is for the discovery of the 'land race' chick pea about 42.37s minutes into film. The synth should start under the sweep across the field and there should be a little bell hitting the c/u of the chick pea plant. It pretty much dips out completely under Ken talking but then will swell back up again for the swimming sequence so just let it run through. […] This is for the big discovery of the wild chick pea on the mountain. The cue starts at 49.36s or after Ken says "wow" and then there is a camera swipe up to his face. So start the first phrase of saz (guitar) over that swipe. The second phrase should fall over c/u of wild chick pea. The saz picks up under shot of him running down the hill. This version of the cue will end after the return flight on the cut to Ken sitting on floor with seeds. I have also cut this cue into two bits, comprising the start and end of this sequence and leaving hole in the middle where they sit down to eat with the villagers. […] As discussed, the revised ney flute theme for lay up under the hairy 3 point turn and hope sign. Please start 2 seconds BEFORE cut to Ken in hat, talking about why they are turning around. It actually begins under shot of scrambling up hill.

As expressed in the quote above, Felicity would prefer using time codes and she even provides exact timings in her instructions. Unfortunately, since the cut is regularly changing, those timings have limited value and can only give an approximate indication to Tony.

3.9. MEETING FELICITY

MAR 7. I meet with Felicity to assess the current situation. So far she has composed twelve tracks. She has worked particularly hard over the last two weeks to have a lot of music ready for Sally to listen to when she comes back from Arctic. She is reassured and relieved because she has recently received positive feedback both from Tony and Sally. Even if the feedback so far is not very detailed, at least she knows they like her music, and Sally also told her that she was confident she would do a great job. However, Felicity is still anxiously waiting for Sally's return and is eager to get more detailed feedback from her. There is about one month of work left and there is still a lot to do, especially with the recording of real musicians.

Concerning the long syncing instructions she keeps sending to Tony, Felicity comments that where this is not difficult to do, it is not precise enough. Her concern is that she is not sure if they will understand the instructions well and sync the music where she expects.

3.10. REMOTE DISCUSSION #5

MAR 7. Sally emails Felicity from London, where she is shooting a few more scenes for the documentary. She indicates that the production is running behind schedule and that the lock-off[42] will be available mid-April instead of the originally scheduled end of March. She is looking forward to hearing Felicity's latest music for the film. Felicity replies that she is already committed to start working on another project by the end of April, so she hopes she can record the musicians soon.

MAR 10. Sally is now back in Australia. Felicity keeps sending new tracks and new instructions:

> Here is a track I did today. Please lay it in straight after Ken says: "let's do it!" -check sync accuracy on map spots- have put in lots of percussion to fit with the animations there. Should come out hard with cut to group sitting around table. […] Here is another file. Lay it in after Ken says "big effort" after the hotel debacle. It needs to start hard on the cut of cars on bridge. Should cut out perfectly at end too. let me know if this is the right mood. […] I have another track. It goes under the first global warming sequence about 5 mins into the cut. there is a zoom into Ian's harvester. Where the zoom stops is where this cue starts. It runs through to Ken going to work. […] This one is for Ian's failed crop at about 28.43 in the cut I have. Please start it straight after the narration says "Ian's crop has shrivelled up". It then goes over Ian sad back to team. […] I have some new themes to lay in. this one goes in the section on Caitlin's work around 24 mins in the cut I have. It starts after she says "toxic to the plant" on the cut to the wide shot of her in the field. let it run through silence until the second part appears. This bit goes over the montage of scientists at work and then transitions back to Tajikistan with the saz sting coming over the van and Ken and then Nata.

MAR 14. Felicity is a bit concerned because she has not received a lot of feedback from Sally yet, and she is uneasy to keep working on some music that Sally may potentially disapprove later. So Felicity sends her an email:

> If you haven't checked what I sent through please do so as I spent a morning on it and think it adds more to the film at this point. What do you think? Please get back to me when you can, I am kind of on hold until I receive some feedback as I want to make sure I am on the right track with everything and have already done so much that I fear getting too far ahead of myself and going off on the wrong track if I keep churning stuff out unchecked! Yet, I realise there is still a lot of work to do. I am staying cool as I know you have much editing to get on top of. But I would really appreciate your making time to focus on the music for say a

[42] Final version of the picture

> morning asap and getting back to me with comprehensive feedback next week if you can. I am concerned of the schedule blowing out if I have to leave things up in the air for too long.

Sally replies with a very long email. She thanks Felicity for all her work and reports that she and Tony have now laid all of her tracks in the film. Sally then gives some detailed remarks about each track. First, she gives some compliments about some of them that she "*love[s]*" and which she thinks "*work beautifully*". She also lists some tracks whose "*tone is ok*" and which only require slight adjustments. However, not all tracks are judged adequate; as Sally says, one is "*not connecting particularly well with the visual sequences*", another one is "*too melancholic*", another one is "*too serious*" and another one is "*not uplifting enough*". Sally is also concerned about a track which "*sounds still too much like the computer*" and so she asks Felicity if she could record a new version with real musicians. In addition, Sally provides specific suggestions for changes. For example, for a track that she thinks is "*rather busy*" she asks for some music that is more "*minimal*"; or for a track where she feels the piano is the "*wrong instrument*", because "*[i]t feels too dramatic*", she suggests using the didgeridoo instead. Finally, Sally describes what she would like the music to express in certain scenes by giving figurative representations; for example: "*The music needs to mirror a sense of planetary forces at work*", or "*[w]e should be full of hope and expectation at what might happen next. A sense of liberation/flying*".

Felicity is initially somewhat surprised by this reply because, in her opinion, it seems Sally likes only a few of her tracks. However, two days later Sally calls Felicity and both have a "*necessary and useful*" hour-long conversation which helps clarify thoughts and misunderstandings.

MAR 17. Felicity sends another track to Sally with more syncing instructions:

> Here now is the cue to go over the markets and the travelling sequence to replace Anouar Brahem. It begins immediately after Ken says "what about the fish? Get a couple of 'em", ie. over the woman behind the counter and just before cut to the money shot. Sync will be obvious as there is a stab on the zoom out over first travelling shot. So the change is very marked there.

Sally replies by giving positive and constructive feedback on where the music would best fit:

> The music works brilliantly through the map-airport-hotel arrival. It then seems to start over the crowd shot as though it is not the beginning but midway through an idea and continues through the car inspection. The travel shot is bare and we think it needs music. Your cue starts mid market which feels like an afterthought. I think it would be better if it wraps through the market scene. Great when we leave market and hit the road. Still feel like the

> music lacks something for the road trip but maybe once live musos[43] get a hold of it it will lift.

MAR 19. Sally notifies Felicity that the documentary's opening scene has been reworked and sends a link where the latest cut can be downloaded from. Felicity is confused about what version she is supposed be writing music for:

> Received and downloaded the cut. I note it says ABC and the last one says ARTE. Are they radically different or should I start changing the ARTE score around this new ABC cut? Should I focus on this one for my first delivery even though the ABC version comes second on the schedule?

Sally replies explaining that the cut is changing to follow the broadcasters' requirements:

> We are still working on the ABC cut but the Arte one will be pretty similar minus the science stuff. I think keep working on what we send you. The opening has caused us some grief this week as we have tried a few options but the ABC keep wanting it a bit different. I think it's closer now although the writing will shift.

MAR 27. Felicity sends a sketch for the new opening scene. Once again she tells Sally not to worry about the low sound quality: "*Don't forget you are hearing this on machines and way compressed, so it will breathe so much more with real instruments at full bandwidth! It is more the structure we need to focus on*".

3.11. MEETING FELICITY

MAR 28. I meet Felicity in a café to look over the last few weeks of work. First, Felicity confesses that she was initially a bit frustrated when Sally was away in the Arctic as she had to wait for a long time before getting detailed and constructive feedback. But she now realises that it is a difficult situation for Sally too, and the feedback she has received from her since her return has been very useful.

Because of delays in the negotiations with broadcasters, the project is likely running behind schedule by one month at least. Felicity is booked for another job in three weeks so she will hire a music editor to edit the extra music that may be required towards the end of the project. Sally has agreed to extend the budget to cover for the delay. The fact that there is a different version of the documentary for each of the commissioning broadcasters renders the situation more

[43] Abbreviation for "musicians"

complex. Felicity admits that, although she has been advised about the different versions when Sally originally offered her the job, she was not effectively prepared for it:

> I thought all the 4 versions would arrive at the same time, but it was my mistake, I should have done more research. A bit of misunderstanding there. But you don't usually have to do so many versions.

Finally, Felicity is really hoping Sally will soon be able to travel to Sydney to meet face-to-face and finalise the details. But Sally is currently very busy getting everything ready to be delivered to the broadcasters, so she is not sure if the meeting will be possible.

3.12. REMOTE DISCUSSIONS #6

APR 4. Felicity reports to Sally that she had a recording session the day before with some musicians (a saxophone, an oud and a violin). The session provided a lot of material which Felicity will be able to use in several of her tracks. Sally is looking forward to hearing the music with real instruments.

APR 7. Felicity suggests a plan for the next two weeks, as she needs to organise the handover to the music editor[44]. Time is running out so Felicity wants to avoid any misunderstanding and ambiguity at this stage. So she will send Sally a video file with all the music embedded in it. That way she hopes there will be no confusion about where the music should be laid in. Felicity also requires prompt feedback so she has time to make any substantial changes in the music before the handover and the final mixing stages.

On the same day, Sally calls Felicity to talk about an issue she has with one of the tracks; as Felicity reports:

> We had to talk about a cue which Sally didn't think was working. Over several emails we had tried to hone in on what about it was not working. When discussed on phone it became clear we were talking about the wrong cue! Tony had laid in a different cue for the helicopter flight scene -an important climactic moment- so of course it was not working! Sally clarified which file was the right cue and laid that in. After that they felt it was working much better (!)

[44] For privacy reasons, and because it is not particularly relevant to the study presented here, the identity of this music editor is not revealed

As we see, email conversations may be ambiguous regarding the placement of music within the film. Without this phone conversation, the wrong music piece may have been used in the scene and the mistake may not have been found until later in the process.

APR 10. Sally calls Felicity to elucidate more issues due to the wrong placement of some tracks in the film. Felicity then realises she has been writing for a cut which was a few weeks out of date. She then encourages Sally to come to Sydney to ensure they both see the same edit and to avoid "blind talking" while making the final decisions. She also tries to reassure Sally about the handover, Sally being a bit worried about working with a music editor whom she does not know and has never worked with before, at this critical stage of the process. Finally, both agree that Felicity will soon send a video file with all the separate tracks and a detailed description as to where each track should be laid up. This would at least allow Sally and Tony to see the same cut as the one Felicity has recently been working on and to precisely understand where Felicity expects the music to be.

APR 14. Felicity calls Sally to ask for more clarification. Through the conversation Felicity realises that Sally and Tony have not been laying up the music to the same version of the cut as hers. She is frustrated because the detail in the cues written would not reflect accurately across a different cut. On the same day, Sally calls Felicity to say that she is ok to hire the music editor to take over the job from Felicity. In fact, Sally has been reassured by the commissioning producer, who has successfully worked with Felicity and that music editor in the past in a similar context. Also, to Felicity's relief, Sally confirms that she will come to Sydney over the coming week end.

Then, as previously agreed, Felicity sends the video file with all her tracks to Sally by post. She also emails the detailed list of all time codes so that Sally can more easily sync the tracks to the picture and properly review everything. Felicity also warns Sally about some important file format considerations:

> Today I sent off the CD with 1) the cut I have been writing to 2) all cues up to 32 minutes plus two cues occurring later in the film which I thought you should hear as they are done. All cues are Aiff @ 48k[45]. The mixes are getting there but still quite rough. You should get it tomorrow morning. Attached is the cue list with time code start points. The time code at pic start was set to 00.00.00 and I am running the session at 25 fps. If you make a new session and bring in the QuickTime file set the session up with audio running at 48K otherwise all the cues will play back incorrectly (too slow and out of tune!). This is most important. Then import the music files at the time codes given below and you will see what I am seeing in my studio right now-hopefully!

[45] High quality audio sample rate

APR 17. Sally calls Felicity to discuss small details about the music as she and Tony have now properly laid up all the tracks. Sally's feedback is positive as most of the tracks are working well. Felicity is reassured by this phone conversation and appreciates Sally's efforts to understand her process and needs.

3.13. SALLY MEETS FELICITY IN SYDNEY

APR 19. Sally flies to Sydney for the week end. The main purpose of this trip is to meet Felicity and go through the whole film with her so they can make the final small adjustments. The meeting takes place in Felicity's studio and I am invited to attend. Felicity has prepared the session by laying in all her tracks synced to the picture in her software, Cubase. Sally and Felicity both sit at the computer desk. Sally looks at the different scenes and gives her opinion on the music, while Felicity directly makes the changes in the software.

Sally asks for a few small changes by using non-musical figurative expressions, for example: "*They run out of time and the music is not picking up on the sense of urgency. It feels too laid-back and lacks momentum. It needs to have a sort of quirkiness, a bit of attitude, a bit of fun*", "*I want it a bit lighter and with a bit more energy*", "*It needs to be fuller or faster*" or "*It feels heavy and dark. The mood is going too ominous. The rhythmic stuff is ok but the setting up is too dark*". Sally also takes advantage of being face-to-face to use body gestures to express herself: "*I think there's something about that flute that's… [Sally crosses her arms and shakes to simulate shivering]*", or "*Something spiky, a bit more humour in there. You know, something like tamtamtam [Sally tapping on the table with her hands]*".

Regarding the music for the climactic scene, which had often been debated with Tony and Sally, Felicity seems to have achieved her initial goal of writing a more subtle and evocative piece than it was originally briefed: "*I didn't want to overkill it*", she says. Sally is pleased with that music and agrees with Felicity's original idea: "*Yes, we don't want it to be too cheesy*".

When the meeting ends, Felicity emphasises how important it was for her to meet face-to-face today, as she tells Sally: "*It's so good you're here. We can show things and move things around*". Sally then acknowledges the difficulties they have encountered in this project: "*It's hard that interstate*[46] *thing. And I wish we worked on a locked picture!*". Felicity is now relieved. As she points out, when she used to talk to Sally on the phone they often got interrupted by collaborators or by pressing side tasks. Today Sally was entirely dedicated to this meeting and Felicity is very grateful for that.

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[46] Sydney and Melbourne are in two different States of Australia, respectively in New South Wales and in Victoria

3.14. EPILOGUE

Over the next few days Felicity makes the final small changes requested by Sally. Then, on April 23th, the composition is officially complete and Felicity moves on to work on another documentary project with a different director. As previously agreed with Sally, Felicity then hands over all her music files (i.e., sound samples and MIDI files) to the music editor, who is also based in Sydney. During a few weeks, Sally and the music editor communicate directly either by phone or email. Sally sends him the locked versions of the film, while he does minor tweaks to the music and mixes it with the picture. During this process Felicity meets with the music editor half a dozen of times to ensure the work proceeds correctly. And eventually, in June 2008, he sends the final mixes to Felicity for confirmation before delivering them to Sally.

The documentary film "Seed Hunter" is released in July 2008. In the first year after its release it is presented at several film festivals in Australia, Japan, South Africa, America and Finland, and wins numerous awards:

- Winner Best Environment Conservation Documentary (Wild Africa ROSCAR – South Africa)
- Excellence Prize (17th Earth Vision Environmental Film Festival – Japan 2009)
- Best Science, Environment and Technology Documentary (Australian Teachers of Media Awards 2008)
- Special Development Prize (Vaasa Wildlife Film Festival – Finland 2008)
- Winner Silver Dragon in Nature Science Category (Science Producers Conference – China)

4. Summary of Findings

In this section I recapitulate the main findings that came out of this study. All of those points will be developed further in Chapters VI and VII of this thesis.

First, this study provided a detailed account of difficulties faced in remote collaboration, as the distance appeared to be difficult for both participants. The geographical separation probably generated frustration and tense situations which could have been avoided with face-to-face. While asynchronous modes of communication like email were useful for exchanging comments or video and music files, synchronous modes like telephone were sometimes necessary to reassure and clarify ideas.

Second, the study garnered information on important aspects of the filmmaker-composer relationship. The trust Felicity and Sally had built in each other through successful past projects helped maintain confidence in a positive outcome. This study also demonstrated that there were

two different perspectives in the relationship and that the collaboration was seen differently by the composer and the filmmaker.

Third, temp music appeared to be both useful and contentious. On the one hand, it helped Felicity better understand what role Sally wanted the music to play in the film. Sally also retrospectively commented, a few months after completion of this study, about several benefits brought by temp music:

> For me as a director it is really important to use temp music in the edit as it grows and changes. Where possible it would be ideal if the music was from the composer but that is not always possible or practical. Temp music is used to try and help the story take shape and convey mood and emotion at a point when we are still trying to shape the film. We also have to show the film to broadcasters at various stages so if we showed it without any music at all the film would be quite empty and emotionless. I also find that using temp music can help convey to the composer what kind of feel we are after for the scene. I don't know all the technical terms for music so I just use lay terms that express the feel I am after. Temp tracks are meant to help not hinder the composer.

On the other hand, temp music was a bone of contention, in particular for Felicity. She found that some temp tracks selected by Sally somewhat limited her creative expression and did not always correspond to her style of composition. She also regretted that Sally got attached to some of the temp music, as it sometimes seemed to make it harder to have her original contributions accepted. Thus, Felicity was relieved as soon as Sally and Tony started including her music in the edits a few weeks into the project. This poses the question as to when, and under which conditions, temp music should be used (this question will be developed in Chapter VII). Generally, temp music is a sensitive topic. It has advantages but also drawbacks and it can be difficult to find the right balance in its use.

Fourth, when working remotely, the issue of low quality audio files comes into play, particularly for the composer. For example, it was important for Felicity that Sally heard her sketches on a proper stereo setup and in high definition before making final appraisals and decisions about the music.

Fifth, scheduling and time management were problematic. Time issues were in fact complicated to manage, not only because of the remote nature of the collaboration, but also because four different versions had to be delivered (to RTÉ, ABC, ARTE and National Geographic Channel, each of these broadcasters requiring a different deadline) and because the project slipped well behind schedule. It is not uncommon in the film industry for schedules to change but Felicity was already booked on another job. The uncertainty that this situation caused, especially towards the end of the project, rendered the process difficult to handle. Clearer communication

about the changing deadlines may have alleviated the stress which occurred during the last stages.

Sixth, it was observed at numerous occasions that the participants had difficulties referring to specific parts of the film. This was primarily due to the restricted means of communication available in remote situations. When talking over the phone or when exchanging emails, the participants could not point at things as easily as when they met face-to-face (which they did only twice: the first time in Melbourne for the spotting session and then at Felicity's studio towards the end of the project). This resulted, for example, in Felicity regularly writing emails with lengthy descriptions of where to lay her music sketches in the film. This introduced ambiguity and caused an extra load of work. This problem was amplified by the fact that the cut was constantly changing, Sally and Felicity therefore working on different versions of the film. Unfortunately this practice is common in the making of documentaries, as opposed to TV series or feature films where the composers more often work with a lock-off version of the picture. As seen earlier, Sally and Tony attributed a different name for each scene to facilitate the editing process, for example: "Tea House", "Ken: 'I love wheat'", "Ken: 'What is it?'", "Helicopter Village", or "Ken Hunting". Potentially, if that naming system had been explicitly shared with Felicity, it could have constituted a common referential to simplify the communication. However, that system alone would probably have not been enough to provide the precision required for effectively syncing audio and video material.

Finally, despite some problems and difficulties (whether emotional, technical or procedural) encountered along the way, this project had a successful outcome. Sally was very satisfied with Felicity's work and the film "Seed Hunter" won multiple awards. However, I believe that some of the challenges that were faced could have been avoided or alleviated. Therefore, the issues raised by this case study will be developed further in Chapters VI and VII.

This chapter described the case study of a real-world remote collaboration between a composer and a filmmaker. The originality of this study is that it featured the day-to-day unfolding of a film score project from the perspective of the two practitioners. The unobtrusive methods used allowed the collection of rich, first-hand and in-depth data. This information led to a series of findings about the frustration and misunderstandings induced by geographical separation, the benefits and drawbacks of using temp music, or the difficulties referring to specific parts of the film because of the limitations of traditional communication tools. While they cannot be fully generalised, these findings shed light on real issues often encountered in the film scoring practice. To complete the exploratory work, a larger-scale study ought to be conducted, as presented in the next chapter.

CHAPTER V

Longitudinal Study

This brief chapter depicts the methods used for collecting and analysing data in the longitudinal study conducted as part of the exploratory research phase. In research, the term “longitudinal” is often used to describe a study that involves repeated observations of the same phenomenon over an extended period of time. Here, however, the term “longitudinal” is consciously used to contrast with the “case” study (Chapter IV) and to describe a study that was conducted over an extended period of time but also involving a series of observations of different phenomena. Indeed, the study spanned a long period (2 years) and received the participation of a large number (31) of expert practitioners. Only the methodology aspects of the study are presented in this chapter; the results will be presented in the next two chapters.

1. Data Collection

In order to gather meaningful research results it was crucial to reach a significant amount of participants. Thus, overall 31 practitioners (see details Table 4) were recruited to participate in the longitudinal study. Each participant was initially approached either directly or by recommendation on the part of another participant. The large majority of participants (26 out of 31) were Australian residents. From the remaining 5, one was in France, one in Italy and 3 in the United States. 17 participants were met in person and 14 were contacted via the Internet, either by email or via online forums.

Participant profiles were varied and covered an altogether 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 the participants were semi-professional, others worked fulltime. Some were well-established in their respective local industry; others were internationally renowned and had worked on movies seen by hundreds of thousands of viewers. Over the 2-

year duration of the study, and data collection occurred sporadically and in varied forms: interviews, written questionnaires, casual meetings and field observations.

Table 4. Number of participants classified by occupation and gender

Occupation	Female	Male	Total
Filmmaker (Director and/or Producer)	3	12	15
Composer	4	10	14
Film editor	0	1	1
Sound designer	0	1	1
Total	**7**	**24**	**31**

Extensive face-to-face interviews were conducted with 4 composers, one director and one sound designer. All interviews were organised at the participants' studios so that they could directly refer to their tools within their work environment and better illustrate their answers (see examples in Figure 19). Each interview lasted between 1.5 and 2 hours, was sound-recorded and was transcribed *verbatim*. The transcripts, which spanned from 4,000 to 10,000 words, were not publicly released to preserve the participants' privacy, although anonymised excerpts are revealed in Chapters VI and VII. The transcripts and recordings (tapes and digital audio and video files) were securely kept in a locked cabinet at my research laboratory.

The *convergent interviewing* (Dick, 1987) process was used to conduct the interviews. This simple process is particularly useful in qualitative research when there is no specific hypothesis to test or when one seeks to refine research issues. The basic idea is to start largely with open-ended questions in the first interviews; then an interpretation of the data is developed by the interviewer: low-priority information that is rarely mentioned is discarded and information that is often mentioned becomes the focus of following interviews. Particular issues and observations judged interesting can be probed to gather further understanding and questions become more specific through the series of interviews. Thus, the initially tentative interpretation of data gradually *converges* towards a firmer state. Applying this process helped frame the focus of the PhD research.

The conducted interviews were semi-structured in that their format was loose and flexible. The order of questions was not pre-determined and questions were asked at relevant moments in the conversation when specific issues were spontaneously raised by participants. All questions were open-ended with the goal in mind to let participants produce most of the interview's content. Examples of questions asked were: "Can you enumerate the different media you use to communicate with your clients, and describe the reasons why you use each of them?", "How do your clients express their expectations about the music to create?", or "What would be an ideal scenario for collaboration in a film score project?".

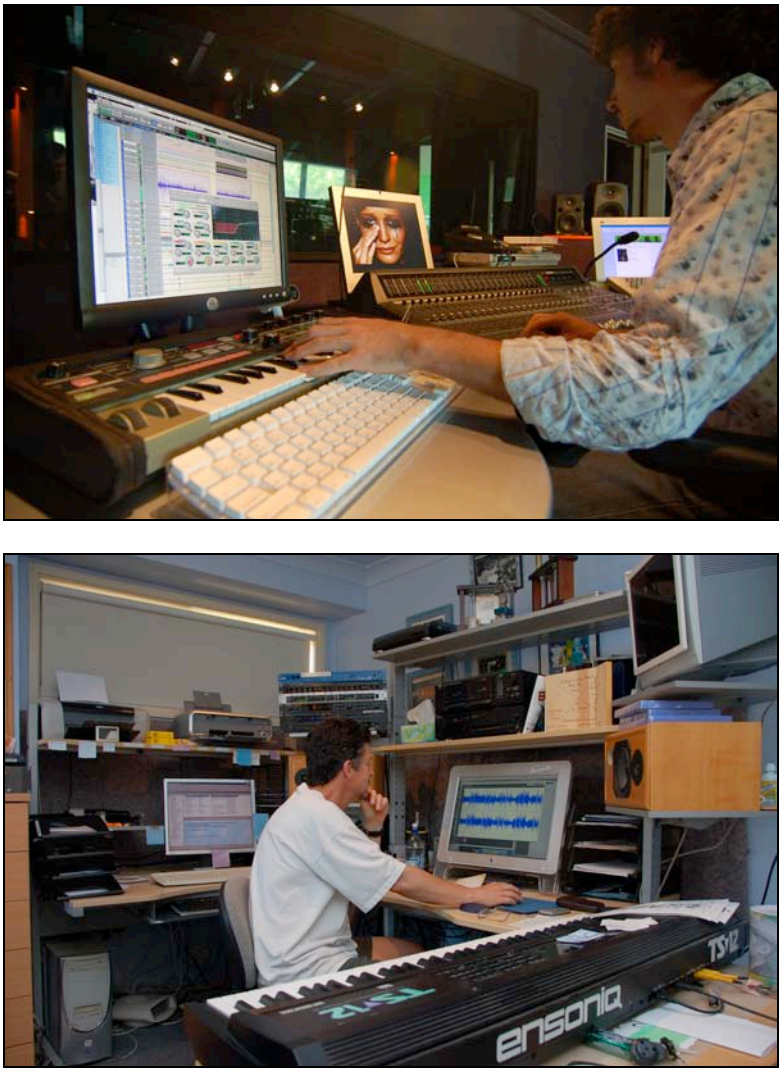


Figure 19: Two film composers observed and interviewed in their studios

Written questionnaires were also devised to collect data from 14 participants (6 composers and 8 filmmakers) whom had not participated in the face-to-face interviews described above. Questionnaires contained multiple open-ended questions, similar to the face-to-face interviews. 3 participants responded online via a Web forum where the questionnaire had been posted, and the others used a word processor to type their answers. No deadline was given to fill out the

questionnaire and participants were allowed to write their answers at their own convenient time and location before returning them by email. Participants reported that 30 to 60 minutes was necessary to complete the questionnaire. Collected answers varied in length, from one short sentence to longer paragraphs. The full list of questions asked is provided in Appendix B.

Lastly, other informal collection methods were used with 19 practitioners: 6 filmmakers, 11 composers, a film editor and a sound designer. Those methods included multiple email and face-to-face conversations with all of these practitioners. All the emails were tagged and the notes taken on the field were systematically digitised to facilitate the archiving of pertinent data.

2. Data Analysis

The combination of all methods listed previously allowed for the collection of large amounts of data in diverse formats: interview transcripts, questionnaire answers, email conversations and field notes. The first layer of analysis consisted of refining the data by selecting the most pertinent quotes gathered from participants. Thus, 274 quotes of 10 to 500 words each were selected. In those quotes, participants provided their thoughts and anecdotes about the themes and issues relevant to the research topic, for example: current work habits, communication issues, or past successful and confronting collaborations. Multiple examples of quotes will be provided in Chapters VI and VII.

The second layer of analysis consisted of *coding* the quotes. The coding process generally comprises the classification of data by assigning codes to each piece of qualitative information. Devised by the researcher, each code aims to describe the trait, character or function of the associated pieces of information. This classification allows for the identification of common patterns and facilitates the interpretation of raw data (Fielding, 2008). Thus, 224 codes were elaborated to summarise the core ideas given in the quotes. Multiple quotes shared the same codes and multiple codes could be assigned to each quote. Examples of codes were: “Some Directors Are Reluctant to Get Composers Involved Early”, “Material Constraints Affect Creativity”, “Importance for the Sound Designer to Know About the Spotting Decisions”, or “Some Directors Have a Clear Idea of What They Want”.

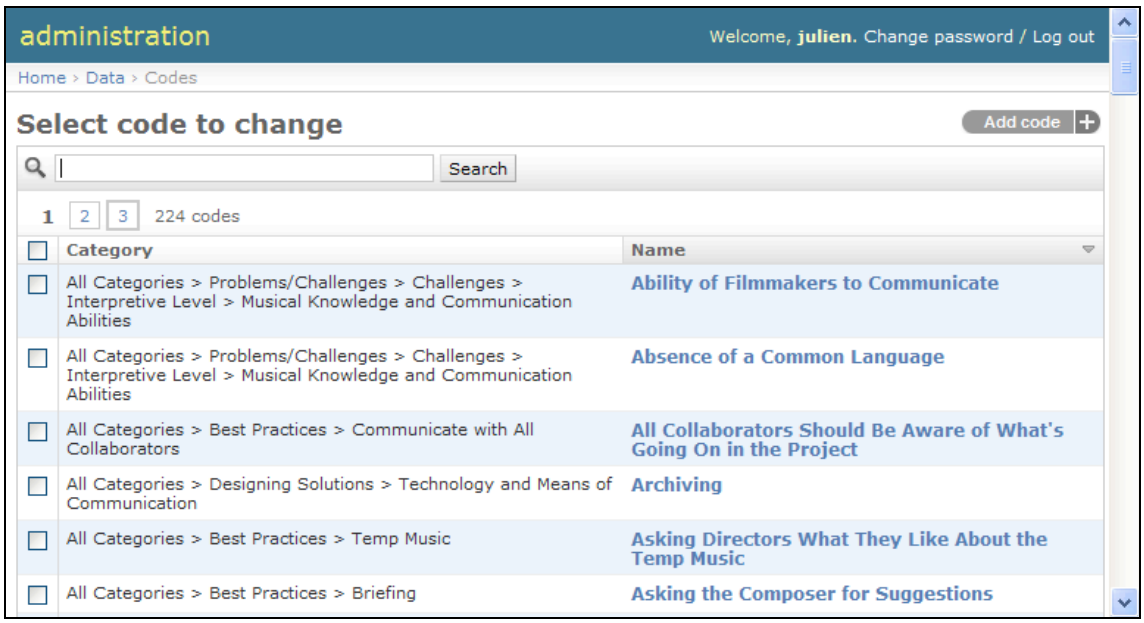
Some commonalities emerged between the codes during this process. Thus, the codes were arranged into a structure of categories that can be likened to a tree with branches and leaves. Two root categories reflected the two main objectives for the exploratory phase of the research, i.e. the identification of “Problems and Communication Challenges” and “Best Practices”[47]. As the interpretation of data was refined, the category tree unfolded into multiple levels of branches

[47] The former will extensively be discussed in chapter VI and the latter in chapter VII

(or sub-categories). The codes were the leaves of the tree, with each code only belonging to one sub-category. The full structure of codes and categories is provided in Appendix C.

This coding and categorisation process greatly aided the shape and structure of this thesis and was only made possible by the computerisation of data. The use of Computer Assisted Qualitative Data Analysis Software (CAQDAS) is a strategy widely accepted for the management of qualitative data (Fielding, 2008; Lewins, 2008). CAQDAS are particularly useful when dealing with large volumes of information and when processing the data is impossible or too time-consuming to do manually. Thus, I developed a customised CAQDAS tool to catalogue all the codes, categories and collected quotes and to manage the connections between them. This tool was a Web technology-based platform built with the Django[48] framework and used the SQLite[49] database engine to store all the data. It ran only on a single local machine, i.e. it was not directly accessible via the Internet, and it was securely protected.

Codes and categories were created via the Django administration interface (Figure 20). A customised interface was then programmed to enter quotes and assign them codes (Figure 21); multiple codes could be assigned to each quote by ticking the corresponding checkboxes. All the quotes and associated codes could then be listed for each document (e.g. an interview or a questionnaire) (Figure 22). Lastly, quotes could be retrieved and filtered through an interactive interface (Figure 23); ticking the codes' checkboxes caused the corresponding assigned quotes to be displayed.



[48] http://www.djangoproject.com/

[49] http://www.sqlite.org/

Figure 20. Django administration interface for managing codes and categories

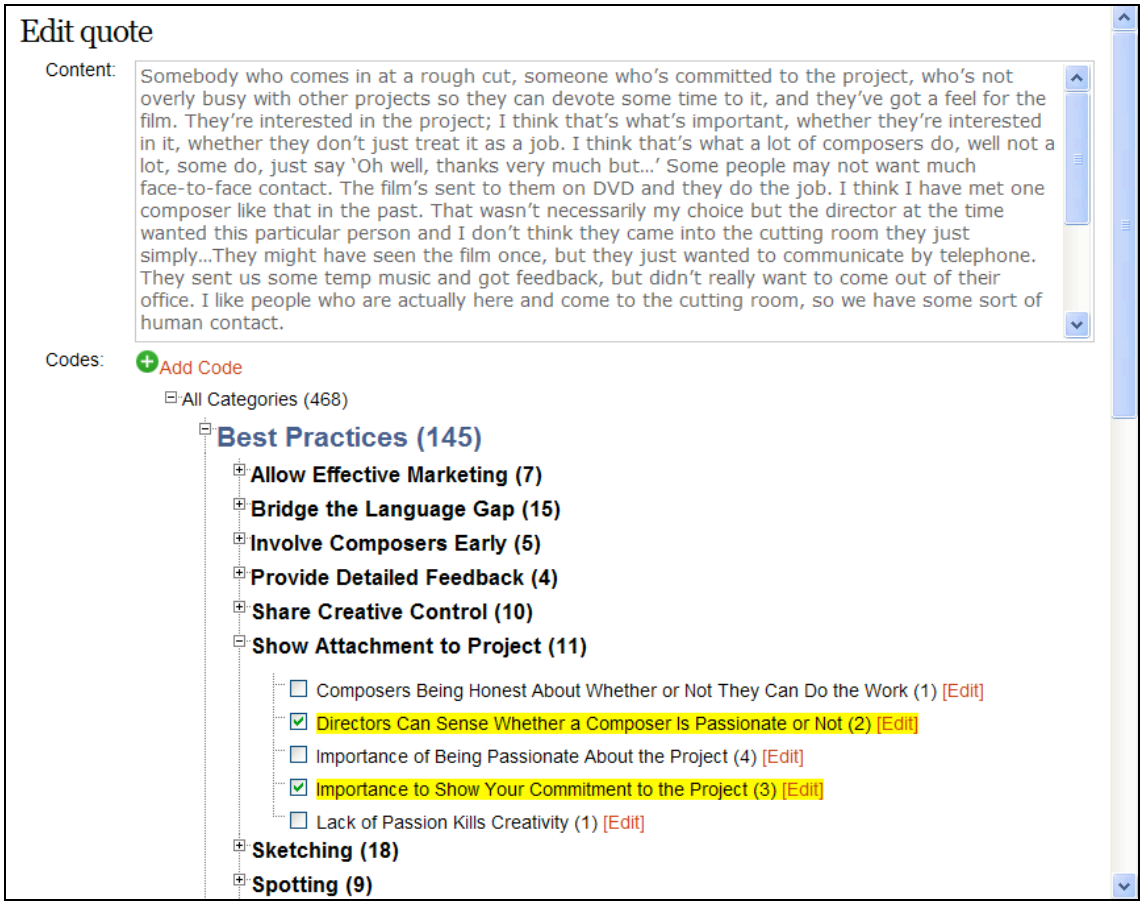


Figure 21. Customised interface for entering quotes and assigning them codes.

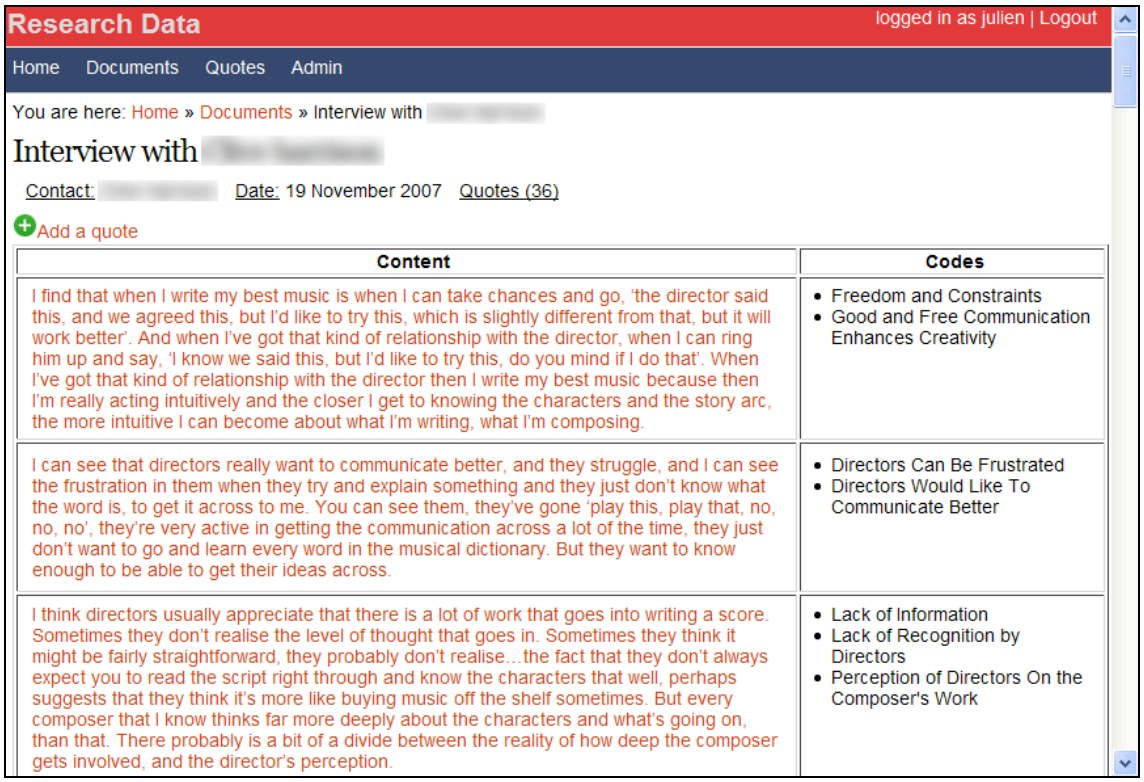


Figure 22. Customised interface for managing quotes from an interview (Participant's name is blurred)

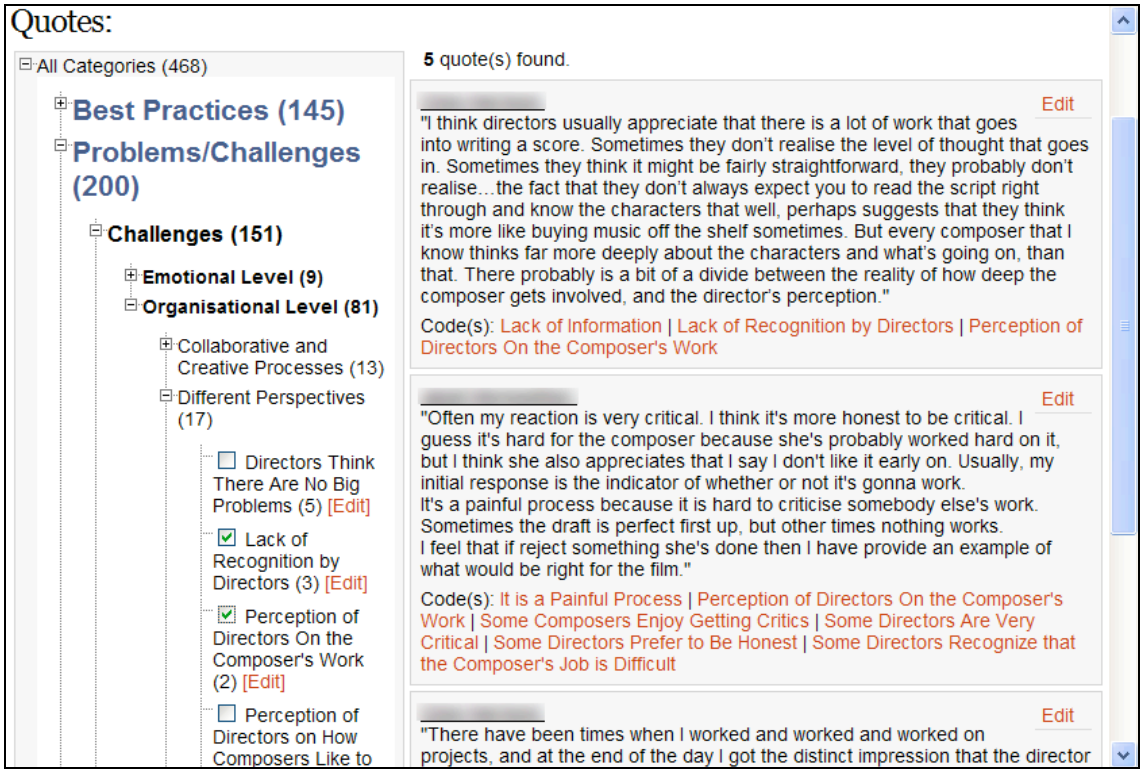


Figure 23. Customised interface for retrieving and filtering quotes (Participants' names are blurred)

This chapter briefly described the methods used specifically for collecting and analysing data in the longitudinal study. Interpretations of the case study (Chapter IV) and longitudinal study will be combined to produce two types of outcomes presented in the following chapters, i.e. the identification of communication challenges (Chapter VI) and of guidelines for best practice (Chapter VII).

CHAPTER VI

Communication Challenges

Collaborations in the film scoring process are not systematically confronting and, fortunately, most projects see a successful outcome. However, in order to design appropriate computer tools, it is first necessary to get an understanding of the context in which practitioners evolve and the difficulties they face and need to overcome. Therefore, in this chapter I will specifically report on the challenges commonly faced in communication between practitioners of the film scoring industry. These challenges were identified during the exploratory phase of the research, i.e. both through the case study (Chapter IV) and the longitudinal study (Chapter V). Here they will be illustrated by quotes selected from interviews, questionnaires, emails or field notes transcribed *verbatim*. In agreement with research participants and to avoid compromising interpretation of this data, the authors of the quotes will be kept anonymous. Also, the challenges will be classified into four discrete and interrelated levels: organisational, emotional, interpretive and indexical levels.

1. Organisational Level

Sociologist Robert Faulkner introduces the “freelance career” model (1983) to consider film composers’ careers in the Hollywood filmmaking industry. These careers are built through the participation in teams of practitioners involved in short- to mid-term projects. Yet, despite the freelancer status of composers (not only in Hollywood but also worldwide), the composer-filmmaker relationship is also built around an organisational model with a hierarchy of roles: the filmmaker as client and the composer as service-provider. In this section I discuss several aspects of this organisational model and the communication challenges that it implies.

1.1. INITIATING THE RELATIONSHIP

Composers use different ways to find new contracts, most of which involve disseminating their music by showcasing samples on their personal website or by sending demos directly to filmmakers. Where some composers may also use the service of agents to help them find work and deal with contract and copyright issues, most of the time, though, filmmakers are the ones to initiate the relationship. They come up with a new film project and seek help from experts, including composers, to carry out the film's production. It is therefore a challenge for filmmakers to hire individuals and form the right team for the project.

Trust is known to be an important component of creative collaboration. This may partially account for the fact that filmmakers usually develop relationships with their composers and rarely work with more than a handful of them in their career, as a TV director explains:

> Word of mouth and pre-established relationships seem to be the most common ways of meeting a new composer; it's a relationship-based industry. Once you have a relationship with a good composer, you tend to stick with them, rather than hire someone new for each job. This allows you to build a creative partnership and an enhanced understanding of working collaboratively.

Personal recommendations also play an essential role in the search for new composers. Knowing that peer filmmakers have already trusted a composer and paid for his/her work gives a sense of comfort when hiring the person for the first time. Networking and accumulating film credits therefore become key factors in ensuring a composer's viability in the industry.

Finally, reputation is another important aspect in filmmakers' choice. Indeed, quite often filmmakers choose a composer because they have heard their music before and so they think that their style of composition corresponds to what they are looking for. "*I think I match the personality of the composer to the film*", says a director. Therefore, the process of selecting a composer generates high expectations about what the composer would, and should, deliver.

1.2. NATURE OF THE RELATIONSHIP

As I previously noted, the duality of art/business resides at the heart of the film industry in general, and of the film scoring practice in particular. Similarly, the nature of the composer-filmmaker relationship oscillates between creative and commercial considerations. While there is a genuine creative collaboration between the filmmaker and the composer, there is also an authoritative relationship where the former plays the role of employer, client or customer, and the latter plays the role of employee or service-provider. So, put simply, the filmmaker is the boss and the composer has to write music that will serve the filmmaker's vision. Beyond the mere employer-employee status of the relationship, filmmakers righteously argue that

composers should assent to the fact that the music has to comply with the filmmaker's original creative intentions; as these two directors point out:

> — The music has to work for the film, not for the ego of the composer in isolation.

> — Film music is at the service of the film. If the composer sees the music as having an aesthetic life of its own the music will probably be overwritten. Effectively the story will be told a second time in music when the audience is already getting it the first time with dialogue and pictures. In most cases, this would be overkill (not all cases granted).

Composers are generally fully aware of this situation and respect it. They are composers for hire and are paid to do, at least partially, what the filmmakers ask for:

> The client pays me to make the music he wants. Whether or not I like that music, it is not my problem. I have to be able to forget my opinion, be professional, and succeed in writing whatever type of music. It is like in a restaurant, the customer is always right.

Yet, composers are not the only ones who have a boss, or a person they are figuratively responsible to. In this industry, everyone is always accountable to someone else: the composer to the director, the director to the producer, the producer to the broadcasters, the broadcasters to their shareholders, and generally every participant to their ultimate judge, the audience. Thus, as a composer interestingly noted to me, "*the stress is passed on through the 'food chain'*".

Now, if one focuses on the filmmaker-composer relationship and on the production of the music, one sees that the pressure is concentrated on the composer's end. The status of a hired freelancer puts the end responsibility on the composer's shoulders. One consequence of this is that they have to rapidly respond to filmmakers' requests. For example, a composer confessed to me that she was once holidaying in a small remote village overseas when a producer required her to send him some music, a week before the pre-arranged schedule. So she had to find an Internet café and settle there for two days in order to write the piece of music with her laptop. "*I just had to deliver*", the same composer told me. Another consequence of that responsibility is that composers have to put up with any frustration and behave as if they were in total control of the situation, as described by a composer:

> Everybody suffers, basically, but the composer most of all, because he's the one that has to solve the problem if there is a communication breakdown. It's equally frustrating for the director, because he's usually of the opinion that he made it quite clear what he wanted, and he's usually terribly disappointed that the composer didn't deliver what he asked for. […] Usually the director doesn't have the tools to solve the problem, so he has to go back to the composer and say, 'it's not right, can you fix it?'. The composer's the one who has to physically change the music, and find the time to make the corrections and deal with the frustration of having not delivered what the director wanted.

As seen in the case study (Chapter IV), the composer can feel isolated in this process; as composer Felicity Fox said: "*The composer feels alone in that task of fixing problems in the music. I don't have assistants to help me. And the director has the power to tell me 'That's not good.'*". Thus, responsibility is not equally shared amongst the parties and "*[p]roducers and directors have in their favour the balance of power symmetry*" (Faulkner, 1978, p. 125). While this is a condition that cannot be altered at an organisational level, I see that more balance could be provided in the creative 'rapport de force', therefore allowing each creative stream to reach personal fulfilment and satisfaction.

1.3. CREATIVE CONTROL

As stressed by American composer Fred Karlin, "*[d]irectors want the score to reflect and emotionally enhance their idea of what the film is about*" (Karlin & Wright, 2004, p. 4). In this context, the degree of creative freedom afforded by the filmmaker to the composer may vary depending on the type of project and on the personalities involved. This poses the question as to who effectively retains the creative control over the making of the film score? In a book written for filmmakers, David Bell, another American composer, warns about the fact that some filmmakers tend to monopolise too large an amount of the creative control; a situation which can be a worry for some composers:

> One of the concerns most frequently expressed by composers today is the tendency for filmmakers to overcontrol all elements within a film score. This manifests itself from filmmakers wanting to preview every note of every cue in the score on synthesizer before going into the orchestral recording session to filmmakers making up their own musical themes on a piano at home and handing them to the composer. (Bell, 1994, p. 20)

Although composers recognise that filmmakers do need to play a part in the creation of the music, some of the composers I interviewed confirm that filmmakers' interventions can sometimes be exaggerated. One composer reported that directors often are "*control freaks*", another one saying that "*[t]hey love sitting for hours in rooms with editors, graders, musicians, they love having control, fine control over their projects*". This phenomenon may reach an extreme extent when the client completely changes the composer's creation; as explained by this composer speaking about certain commissioners from the advertising and corporate worlds:

> Often, when you work with people that are not so creative, especially from the corporate world, once you have suggested an idea they will try to appropriate it for themselves and try to change many things: 'That's good but can you lower the guitar's volume here, can you raise that one there, etc.'. Sometimes they completely change what you originally did, to a point where you detest the final product, but they will love it because they feel like it is their product. [..] The most important is that they feel like they have the power to decide on you and what you do.

Composers are often protective of their creative independence and are also wary of simply mirroring the filmmakers' wishes, reasoning that such an approach may compromise their creative integrity (Karlin & Wright, 2004). However, as they work in a client dominant occupational environment, a composer's creativity is often subject to their client's judgement; a condition that is generally prevalent across the film industry (Faulkner, 2005). Occasionally composers may disagree with filmmakers' instructions or decisions. In some instances it may be too late to argue —the music is indeed often replaced, remixed, edited out or re-synchronised in the cutting room long after the composer has delivered his/her final mixes. In other instances composers may defend their own ideas and engage in a creative negotiation with the filmmakers. An interviewed director suggests that filmmakers should be prepared for this negotiation and should in fact embrace it. For him, it is normal and desirable to have creative "confrontations" with composers:

> Smart directors know talented people can be difficult – but there isn't such a thing as being too difficult. Directors who want people that they can walk all over will only work with second raters.

Naturally, directors' interests and skills often go beyond the mere task of directing actors on stage. It is also their job to supervise the process in its entirety and ensure that every expert involved (e.g., composer, sound designer or editor) all strive to produce their best work for the film. The challenge for them is to not cross the line of all the contributors' expertise and to clearly acknowledge every person's role, as emphasised by this composer: "*I don't like them to tell me how to fix a problem with the music. I just want them to tell me how they feel about it, and then it is my job to find how to fix it*". This view is explicitly shared by one director I interviewed:

> I reckon a composer at her level prefers to hear one creative brief, and head on their way, relying on their understanding rather than on a verbal breakdown of the music or repetitive meetings.

In conclusion, there is not just one definite way of distributing the creative control amongst practitioners. On the one hand, composers should accept that it is necessary for filmmakers to actively contribute to the creation of the music. On the other hand, filmmakers should grant composers the freedom they need to exploit their full potential. It is then a question of finding the right balance where everybody's creativity is allowed to be expressed and to thrive.

1.4. DIFFERENT PERSPECTIVES

While music-composing and film-making activities closely entwine with the construction of the film's narrative and emotions, film composers and filmmakers often live and work in territories which are foreign to each other. There exists both a certain mutual fascination (almost in a

mystical way) and the certain incapacity to completely grasp each other's practice. This results in participants often having a different perspective in the consideration of the processes and outcomes of the collaboration. This particularly occurred at several occasions in the case study (Chapter IV). For example, Felicity (the composer) was sometimes worried about not receiving enough feedback from Sally (the director), fearing her work would not be fully appreciated; whereas Sally repeatedly told me that she liked Felicity's work, was satisfied with the progress and was confident the end result would be a success.

Throughout the interviews, questionnaires and observations conducted with practitioners, the distance between composers' and filmmakers' viewpoints was striking. On the one hand, every single composer I met was pleased to talk about the difficulties in communicating and working with filmmakers, and they seemed quite passionate about this topic. On the other hand, most filmmakers seemed more circumspect; they generally recognised the collaboration with composers was challenging, yet not beyond measure, as this experienced director describes:

> In every film there's some things that are a little bit difficult, I guess. Certain cues are always hard to work out, to get right. You know, seventy-five percent gets done, I think, fairly easily and then you have a twenty-five percent. There's usually twenty-five percent that requires reworking by a composer a number of times, for them to be right. So yeah, there are certain things, certain cues, that are a bit more complicated. […] I've usually had extremely satisfactory relationships, really. Look, some composers don't always hit the mark at the first attempt. Sometimes it takes several drafts. With some composers they hit the mark very quickly. […] I don't think it could go any better, really. I can't think of anything that would make it better. I think the collaborations I have are quite satisfactory.

This same director, however, concedes that communication issues may occur during the creative collaboration:

> I usually have a fairly good idea [of what I want]. Sometimes we [the film editor and I] can't express that idea very well, we want "this sort of thing", and the composer puts something together which is not right. It's either too fast, or too complex… So that's often because either we've been uncertain or we've poorly communicated the idea. Perhaps it's more the latter.

Nonetheless, when specifically asked how they think composers deal with these issues, some filmmakers do recognise that composers evolve in a difficult context; as pointed out by another director:

> I think it's hard for the composers because they have to interpret what the director says. It also must be hard to have your work rejected sometimes. […] I used to be a designer myself so I understand their position.

This same director then tempers this statement by reminding me that "*the process is equally painful for directors and composers*" and that "*you have to acknowledge that it's part of the process*".

When looking from the other viewpoint, some composers confessed they frequently feel that filmmakers have a misconception about their work. For them, filmmakers do not always realise the difficulties and pressure composers have to face in their role as service-provider. Some composers also suffer a certain lack of recognition for their effort, as this composer affirms:

> Sometimes they don't realise the level of thought that goes in. Sometimes they think it might be fairly straightforward. [..] There probably is a bit of a divide between the reality of how deep the composer gets involved, and the director's perception.

Several reasons could be suggested to explain this dissimilarity in practitioners' perspectives. One reason could be that film composers are fully immersed in the film scoring practice, whereas it only represents a fraction of a director's or producer's activities. In this context, composers are likely to feel more engaged personally in the collaborative process. In the filmmakers' defence, it is important to note that the creation of the music often happens in the last few weeks before final release. The film scoring process therefore occurs in a period when filmmakers go through a large amount of stress and have to deal with a variety of issues at the same time (e.g., organising final mixes with sound engineers, preparing for the release or negotiating with broadcasters). In this stressful context, filmmakers may have to prioritise their involvement in all these activities and may not be able to engage as much as they would have liked in the collaborative making of the film score. Another reason could be due to the hierarchical nature of the collaboration. As discussed earlier, composers are hired by filmmakers and so are responsible for the work. If they suffer from certain aspects of the communication then they will have to act professionally and "suffer in silence". If they face difficulties they will generally try to cope with them and fix them, without the filmmakers realising there is a problem at all. If one compares the filmmaking process to an evening in a busy restaurant, clients generally do not know what happens in the kitchen or whether the chef is experiencing certain difficulties. As long as the dish is served and the client is satisfied with it, then no particular issue would be apparent.

In conclusion, there is an organisational context in which the composer-filmmaker relationship evolves that needs to be considered in order to better understand the underpinnings of the collaboration. This context brings a set of communication challenges that practitioners have to face recurrently.

2. Emotional Level

The fluctuating and precarious economic conditions ruling the film and television industries induce a climate where many practitioners have difficulties earning a proper living. This means that professional practice can only be sustained if one is driven by genuine passion. Where it is fair to say that most filmmakers and composers are passionate people, in fact practitioners involved in the film scoring process love their work as more than just a job; it is a vehicle for their creative expression. As one can imagine, it can be challenging to have a job that is also your passion. People often deeply engage themselves at a personal level in the creative process. As a result of that personal engagement, emotional issues may emerge and significantly impact the collaboration. These issues can have multiple specific causes. Firstly, some emotional issues are directly linked to organisational parameters. Since practitioners are part of a hierarchical collaborative system that highly relies on trust, everyone strives to act professionally and appear to be in control throughout the collaboration. In this context, some practitioners may not have open conversations about their emotions if an issue comes up. They may prefer hiding their feelings when the collaboration unfolds in a way that personally affects them. This is particularly difficult to handle when, as I have described before, the composer feels isolated in this collaborative system. Secondly, emotional issues can be caused by a certain lack of recognition one practitioner perceives from his/her collaborators. If one's efforts and skills are not properly acknowledged then one may feel disempowered, as described by this composer who once had a difficult experience with a director:

> I've been to the Conservatorium, I've learnt about all the instruments, etc... All that to come down to one person [the director] saying: 'We could fill this gap with a bit of this and that'. You have to accept that the director is your employer, not your employee. But sometimes they make you feel just like that: someone who provides an average kind of service. I felt like I was used to fill in the holes, like my work was reduced to something very banal. I wasn't treated as a creative person but as a service provider. I felt flattened, artistically squashed.

Thirdly, emotional issues may be caused simply by the criticisms allocated to a piece of work. Filmmakers are usually quite honest about what they think of the composer's work. "*I can be influenced by what a composer offers me, but if it's not on track, I am upfront about saying it's not working, and will give more careful guidelines*", says a director, and "*I try to be as honest as possible if it doesn't work. Otherwise it would be a waste of their time*", says another. Taking criticisms is not always easy. Having one's creations criticised can sometimes, even subconsciously, be assimilated to personal criticism and affect the ego. Even if it is part of the process and part of the responsibilities, some practitioners handle it better than others.

In most cases, practitioners try and succeed in overcoming emotional issues. Keeping some perspective is key to being less affected by them. This can be a tiring and demanding effort, as

one interviewed composer says: "*There's no point in losing sleep… [hesitation] even though I do lose sleep*". For that matter, one wise piece of advice is given by American composer Fred Karlin: "*[i]f an experience becomes so intense that you are either driven to drink or start smoking again —walk*" (Karlin & Wright, 2004, p. 17).

In conclusion, emotional issues are the ones that people have less control of; they are intangible, often rooted in subjectivity and are, therefore, the most challenging issues to address. If they are not resolved early on in the process then they may grow out of hand, introduce misunderstandings and unnecessarily deviate the creative process from its optimal route. Hence, to limit their impact on the creative communication, one should strive to establish a neutral environment so as to defuse the possibly damaging emergence of sentiment. Further challenges can occur at levels which go beyond relational (either organisational or emotional) components of the collaboration. In particular, those challenges may concern the interpretation of the information that is effectively exchanged between individuals. This is what I address in the following section.

3. Interpretive Level

In this section I focus purely on the communication aspects of the composer-filmmaker collaboration. To summarise, filmmakers have to communicate their vision to composers and composers have to reciprocally communicate their own musical ideas in order for the creative collaboration to be successful. The core need for practitioners is therefore to verbalise their ideas about the emotions and the meanings that the music has to support. Yet, verbalising emotions is something that is arguably difficult to do, and "There is no word to describe what I am feeling" is a common thought people have. In Chapter II, I presented the *cooperative principle* which Paul Grice (1975) introduced to provide a basis for the establishment of effective verbal conversation. This general principle is built around maxims divided into four categories: quantity, quality, relation and manner. In this section, I will show that film scoring collaboration recurrently involves the exchange of ambiguous, inaccurate and incomplete information, therefore violating Grice's maxims and potentially rendering the communication inefficient. But first I shall present the context in which these collaborative conversations occur, particularly in relation to communicative abilities and musical knowledge.

3.1. COMMUNICATIVE ABILITIES AND MUSICAL KNOWLEDGE

A major hurdle in communication is that composers and filmmakers do not share a specific musical 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").

Communication therefore relies both on practitioners' general abilities to communicate with other people and on the extent of their musical knowledge.

At the start of a project, filmmakers may have a fairly good idea of the genre or style of music they are seeking. "*You know the film inside out, and you know the emotional tone that's required for particular scenes*", says a director. In some instances, they may also know in detail what is suitable or not, specifically requesting, for example, the use of certain instrumentations. In other instances, however, filmmakers may not know at all what kind of music they want. When that happens, composers have to go through a meticulous and investigative process in order to find out what could eventually please them. "*It is exhausting to 'download' information from filmmakers*", says a composer, "*You have to ask lots of questions and take notes*".

Furthermore, even when they clearly know what they want, filmmakers may not be able to express it to composers; as one director recalls: "*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]'*". Some filmmakers are more articulate than others. Many are music literate in the sense that they have listened to a variety of music in their lives; they usually have a clear idea of the styles of music that they like in films. Sometimes filmmakers are or have been musicians themselves. Obviously in this case it makes the collaboration easier because they have got a more refined hearing and can talk more specifically to the composers. However, in other cases some filmmakers have very little musical knowledge, and that can significantly hamper and slow down the creative process.

Naturally, filmmakers are more used to, and feel more comfortable with, manipulating images than handling music. And when they have to discuss creative aspects of the score with composers they can lose a bit of confidence. A composer even suggests that "*[d]irectors are insecure when it comes to making the music*". This can be a source of frustration for filmmakers who would like to be able to converse more freely; as this composer testifies:

> I can see that directors really want to communicate better, and they struggle, and I can see the frustration in them when they try and explain something and they just don't know what the word is, to get it across to me. You can see them, they've gone 'play this, play that, no, no, no', they're very active in getting the communication across a lot of the time, they just don't want to go and learn every word in the musical dictionary. But they want to know enough to be able to get their ideas across.

Regardless of the filmmakers' musical knowledge and communicative abilities, it is the composer's job and responsibility to understand their tastes and creative intentions. They have to listen to the filmmakers' ideas, interpret them, and then translate emotional and dramatic meanings into melody, rhythm, harmony or timbre. Indeed, that interpretive endeavour is something that is expected from the outset by filmmakers; as these two directors point out:

> — As long as [the] brief is realistic and relatively non-changing, it's up to the composer to get it.

> — My musical knowledge is limited so I expect them to provide solutions. My intention for the film is central; my expectation of them is to offer possibilities.

Most of the time, filmmakers brief composers by describing the feelings and moods they want the music to support. They may ask, for example, to build or release the tension, or to generate fear or exaltation. They may discuss generally what the purpose of the scene is, how the music will embellish it in some way, or how it will add an emotional tone and feel to it. They rarely have a grasp of technical musical terms or concepts and rarely know which instruments they want to play in certain cues.

Another obstacle to overcome is the mismatch between practitioners' capacity for imagining the music before it is actually produced. On the one hand, composers are often able to hear the music in their head long before any note is played by any live instrument or by the computer. On the other hand, filmmakers may have difficulties knowing what they really want until they listen to the final result. Therefore it can be a challenge for composers to communicate their musical ideas in the form of sketches. As seen in the case study (Chapter IV), Sally (the director) was always eager to listen to refined sketches recorded with live instruments; and Felicity (the composer) was often nervous when presenting undeveloped sketches with low sound quality, fearing that Sally could not accurately imagine the finished product and could not recognise the sketches' core values. This is enunciated by the fact that conceiving the music far in advance is something that is quite difficult to achieve. That is why the creative process often requires employing a trial-and-error strategy over several iterations. To illustrate this point, one experienced composer I interviewed provides this profound reflection on the fact that no one — not even the composers— can really anticipate what the music will be, how it will sound or what effect it will eventually have on the audience:

> I don't believe that one can 'know' what a film will look like or sound like in its entirety and in every detail – not until it is in the cinemas or being broadcast. Even those directors who prepare the most to the extent of pre-determining every aspect of a film cannot actually see and hear it before it is made. Rather, as in any form of creation, the Idea of a work can be very strong and strongly articulated, and certain aspects, particularly in design which doesn't involve human interaction, can be visualised. However, a work's inner psychology and its infinite details will always be a product of its creative process, including all the individuals involved in its making. Furthermore, it could be argued by way of ideal that a work of art remains a mystery to its author until its completion, and in some cases, even beyond.

In conclusion, people's communicative abilities and musical knowledge are determining factors in how the creative conversations will be handled. Also, as revealed by my explorative study, these factors may lead to some communication breakdowns, specifically because of the exchange of ambiguous, inaccurate, or incomplete information.

3.2. AMBIGUOUS INFORMATION

As presented in Chapter II, Paul Grice's maxim of Manner (one of four maxims that listeners and speakers naturally assume when having conversations) states the following: "*Avoid obscurity of expression; Avoid ambiguity; Be brief (avoid unnecessary prolixity); Be orderly*." (Grice, 1975). This maxim is concerned with clarity and suggests that one ought to be clear and unambiguous to achieve effective communication. Ambiguity refers to the case where a word, expression or concept has several different meanings or is open to multiple interpretations and explanations. Stacey & Eckert (2003) contend that ambiguity and vagueness in communication can have disastrous impact on the effectiveness of collaborative design work. They argue that, in practice, this vagueness frequently generates useless and counterproductive misunderstandings. Yet, through my research I found that ambiguity occurs at multiple levels of the communication between composers and filmmakers.

In the film scoring practice, most of the communication is operated verbally: either in an oral way via face-to-face or telephone, or in a written way via email or the sharing of documents such as scripts and cue sheets. Also, briefs given by filmmakers to composers often take the form of a verbal narrative or an enumeration of words to delineate the emotions to be carried by the music. Those briefs often contain general instructions similar to those described by this director:

> If something doesn't quite work, we call in the composer and say 'This is what we want to do,' 'This is too fast' or 'The instrumentation's too thick,' or just 'The music's too busy' 'The mood's not right - can you give us something else which might be closer to what we need.'

Nonetheless, it can be risky to trust words too literally. Indeed, when one wants to be absolutely specific in describing a musical idea, words are rarely completely reliable (Karlin & Wright, 2004, p. 21). That is for at least two main reasons, as outlined in the below paragraphs.

Firstly, a given word may have different meanings (i.e., homonyms), could be unknown or unclear to the listener, or could be invented ad hoc by the speaker. For example, a director, once observed while speaking to a composer, said, "*Perhaps the piano is just a touch too obvious or pianoey, instead of a slightly more subliminal gliss*", only him (the director) knowing what 'pianoey' or 'slightly more subliminal gliss' actually mean. Another example is shown in this anecdote related by a composer:

> 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.

Secondly, one's perception of music is utterly subjective and therefore people —and it does not matter if they are music experts or not— have different ways of describing it (Downie, 2003; Kim & Belkin, 2002). To illustrate this point, I ran a small, informal, experiment asking 10 people with various musical backgrounds to describe the same short (two-minute long) musical piece. The collected descriptions were as varied as: "*Joyful*", "*Playful*", "*At times intense, at other times perky*", "*It's the calm before the storm*", "*It's not sad but not happy either*", or "*I don't think it is joyful, it's more mysterious and intriguing*". Now, let us imagine a filmmaker asking for some joyful music for his/her film. If the composer is not careful enough in understanding what the filmmaker 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 filmmaker. Even when they are known by all the conversers, words can be interpreted differently by each individual. For example, what someone would describe as 'exciting' may rather be described as 'powerful' by someone else. Or one may use the word 'ambient' expecting some long and held sounds whereas someone else would imagine tight little noises instead. The problem is that if the ambiguity persists composers might write some music that eventually gets rejected by the clients, hence wasting a lot of precious time. As observed by a composer, "*[t]he composer can do a piece of music, and it will fit exactly what they have been described: 'I want it powerful, I want it uplifting, I want this and this', and what they create is in fact nothing at all what the other person had in mind*".

Therefore it is crucial for composers to clearly identify what filmmakers mean, clarifying when they use vague words and not relying only on their personal interpretation. Also, when they speak back to filmmakers they should avoid ambiguous terms as it may weaken chances for their ideas to be properly understood. This is particularly important in the early stages of a project when the music is discussed conceptually. If composers are unable to clearly communicate their creative ideas, filmmakers may discard these ideas, not understanding their true value.

3.3. INACCURATE INFORMATION

Ambiguity is not the only interpretive challenge faced by practitioners. Another important one has to do with the inaccuracy of some of the information exchanged. Ambiguity and inaccuracy differ in several aspects. An ambiguous utterance is vague and can be interpreted in several different ways. An inaccurate utterance, however, can be interpreted only in one way; but it is

an utterance that is initially originated from a mistake. It is specific, precise and unambiguous but it is also false, incorrect, inexact and erroneous. Grice's maxim of Quality, which states "*Do not say what you believe to be false. Do not say that for which you lack adequate evidence*" (Grice, 1975), suggests that inaccuracy should be avoided at all cost. Yet, this maxim can be violated when practitioners do not master the musical terminology. Filmmakers sometimes give precise instructions that do not accurately translate their original intentions. They may have a clear idea of what music they want but they provide an inexact description of that idea to the composer. For example, filmmakers may incorrectly request a certain style of music, as a composer recalls from one of his projects:

> 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.

There exist common sources of misunderstanding. A particular one is the confusion some filmmakers have between tempo and energy. For example, one may ask to make the music 'faster' —which would literally mean 'increase the tempo'— whereas what is in fact wanted is rather something 'more energetic'. Also, adding energy could be achieved in various ways without changing the tempo at all, for instance by adding some sharp tonic drums. Names of music instruments are also commonly mistaken by non-musicians. Some filmmakers may not be able to tell the difference between a nylon stringed guitar and a harp or between a trumpet and trombone. Yet, they may think they know the right name and send wrong briefs to the composer. And such inaccuracies may potentially lead to compromising 'quid pro quos', as shown by this amusing anecdote from illustrious French composer Maurice Jarre:

> One day a director said, 'You know, Maurice, I would like the clarinet playing that.' So I said, 'Fine. I can give the clarinet that melody.' When we went to the recording session he said, 'But I thought you told me you were going to do this theme here with the clarinet.' I said, 'Yes, it's played by the clarinet.' 'No, no, it's not the clarinet, it's not the sound of a clarinet.' I said, 'Look, it's a clarinet player.' And after that he didn't say anything. And so then the oboe played, and he said, 'That's it, that's the clarinet'. (Karlin & Wright, 2004)

Consequently, it is a challenge for composers to receive very specific briefs and it is important to exercise a critical view. 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 then it can be complicated and costly in time and money to recover.

3.4. INCOMPLETE INFORMATION

Paul Grice's maxim of Quantity, as presented in Chapter II, states the following: "*Make your contribution as informative as is required for the current purposes of the exchange. Do not make your contribution more informative than is required*". This indicates that a balance should be reached between the amount and the relevance of the information exchanged in conversations. However, some interviewed composers lament the fact that filmmakers sometimes provide too little or incomplete information. As shown in this example reported by a composer, some filmmakers fail to communicate all the information that is of value to composers:

> 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).

In the above example, the producer made the common mistake of presuming that the composer can work without a complete understanding of the story that the film aims to tell. As I argued earlier, composers and filmmakers can have different perspectives on how the collaboration should ideally proceed. There seems to be a perception amongst some filmmakers that the composer does not need or want more than just a subset of the available information; as pointed out by a composer:

> The fact that they don't always expect you to read the script right through and know the characters that well, perhaps suggests that they think it's more like buying music off the shelf sometimes. But every composer that I know thinks far more deeply about the characters and what's going on, than that.

One real challenge for the composer is to extract as much relevant information from filmmakers to then be able to shape and narrow down their true expectations for the music. In this type of situation, the composer may not even know that a piece of information is relevant until it is presented to him. Therefore it should be clear to both parties exactly how much information is relevant in order for each one to fulfil their role successfully.

4. Indexical Level

The fourth and last conversational maxim by Paul Grice that I propose to contemplate here is the maxim of Relation. It simply states "*Be relevant*" and is concerned with the pertinence of the information exchanged by the conversers. It suggests that to conduct effective communication one should only provide information that is related to the currently discussed topic; nothing more, nothing less. This maxim is quite straight-forward and, in fact, is generally respected as

practitioners' conversations about the film score remain to the point. However, this maxim may be breached if practitioners inadvertently lose track of the conversation's topic. This is more likely to happen when the collaboration is held remotely, since practitioners have restricted ways to communicate and may not be able to realise when a mistake is made or when the focus of the conversation deviates. Notably, the lack of visual information (e.g., in phone conversations) or the delays occurring between people's responses (e.g., in email conversations) may introduce indexical dysfunctions that hinder the understanding of what is referred to. In this context, the used term 'indexical' pertains to the character of indicating, showing, or pointing at things. Indeed, it was discerned through the exploratory studies (Chapters IV and V) that practitioners sometimes experience difficulties in precisely framing the scope of their discussions. If the scope is imprecise or out of phase, the relevance of the conveyed information may be affected, which may in turn diminish the efficiency of the conversation.

This suggests that the problem of ambiguity should be differentiated into two types: the ambiguity of content and the ambiguity of scope. The former is the type of ambiguity which was described in the previous section and which is concerned with the use of vague terms that have different meanings or interpretations (e.g., "I want some happy music" or "I would like the music to sound like the calm before the storm"). The latter is the type of ambiguity introduced when one imprecisely or wrongly refers to specific parts of the film. A pertinent example is provided by a composer:

> Once, a director asked me to change the music in a scene with a close-up on a character. But she didn't realise that there were several close-ups of that same character in the film. Unfortunately I changed the music in the wrong place, and then she wondered: 'But, nothing has changed where I told you!'

Unfortunately, mentioning the specific time code[50] is not always relevant as the parties may be working in parallel on different versions of the picture. Indeed, the filmmakers may be making slight (sometimes even extensive) alterations in the editing room while the composer is still writing the music. This was particularly observed during the case study (Chapter IV), as the cut was constantly changing —a situation that is very common in the making of documentaries— and as Felicity (the composer) and Sally (the director) almost never worked simultaneously on the same version of the picture.

To avoid these issues filmmakers often develop a lingo comprising 'buzzwords' specific to the film. Each scene is given a name summing up what happens, what is said by the characters, or what landscape, location or object is presented in that scene. An instance of this was observed

[50] Sequence of numeric codes used in the broadcast and film industries for synchronizing audio and video elements

in the case study where Sally had allocated names to every scene, for example: “Tea House”, “Ken: ‘I love wheat’”, “Ken: ‘What is it?’”, “Helicopter Village”, or “Ken Hunting”. Most of the time, however, this lingo is primarily developed to facilitate the editing process and is not systematically shared with other collaborators such as the composers. Therefore, when talking about the film, filmmakers and composers often have to write lengthy descriptions. Again, this was observed in the case study when Felicity wrote numerous long emails describing where Sally should lay her sketches, for example:

> “Please lay it up to start under the high shot of the white building after the team is looking at the map together, then it goes into the cars, then markets, then travel and through to onion lady. Should stop hard just before she says ‘OK!’”

> “This cue starts during laughing after ‘from 5 to 12!’ It is hard to precise the start time but there is a gap in the drums as K says ‘it's quite salubrious' and then it stops hard on cut to yukky loo. […] Hope you are comprehending my rather haphazard instructions about where to lay in all these cues. Call me if you need help with sync.”

> “This one goes in the section on Caitlin's work around 24 mins in the cut I have. It starts after she says ‘toxic to the plant’ on the cut to the wide shot of her in the field. Let it run through silence until the second part appears.”

Not only is it challenging and tedious for practitioners to verbally explain what part of the film they refer to, but also this can prevent ideas to be conveyed accurately. Therefore, while I have shown in the previous section that ambiguity of content was present throughout the filmmaker-composer collaboration, I now also argue that when the collaboration is conducted remotely it is crucial to first resolve the ambiguity of scope. It is indeed an absolute necessity for practitioners to have a common referential to ensure that they are talking about the same things. Otherwise the creative process may be misguided and precious time may be wasted.

In this chapter, multiple communication challenges repeatedly faced by practitioners were classified into four discrete and interrelated levels: 1) organisational level challenges caused by the client-commissionee model of the filmmaker-composer working relationship; 2) emotional level challenges pertaining to people’s personal and professional concerns as encountered in their practice; 3) interpretive level challenges in understanding one another’s intentions and visions; and 4) indexical level challenges in referring to specific parts of the film.

One may argue that those challenges could be seen as opportunities for generating original and unexpected ideas. This may be true, particularly in cases where practitioners are granted enough time and resources to explore what they are doing when they are doing it. However, as

film score projects often occur within tight timeframes and as budgets are increasingly restricted and controlled, little room is left for making mistakes. Communication challenges therefore need to be avoided at all cost to improve the projects' chances of success. With that in mind, the next chapter will offer a series of guidelines for overcoming communication challenges and improving the film scoring practice.

CHAPTER VII

Guidelines for Best Practice

In the first chapter of this thesis, I noted that there is not yet any universal or standard protocol for efficiently handling creative communication in film scoring. Most composers and filmmakers, even those with strong musical education, are self-taught in the particular practice of film scoring. Without prior preparation, they learn on the job and elaborate personal habits to address communication issues faced in collaboration. Unfortunately, as pointed out by American musicologist and composer Fred Steiner, practitioners rarely have the opportunity to share these habits with one another:

> The members of today's freelance composing community do not interact or associate with each other as formerly. They work independently, at home or in their own studios, and there is little occasion to exchange information of share ideas. Most topflight composers are too busy and their work schedules too irregular to enable them –even if they are so inclined– to spend time imparting knowledge or sharing their musical expertise with young aspiring novices. — Fred Steiner in the foreword of (Faulkner, 1983).

Therefore, the motivation for this chapter is to share a set of guidelines, that is, recommendations for facilitating communication amongst all the persons involved in the film scoring process. These guidelines are the fruit of the exploratory research done in the case study (Chapter IV) and longitudinal study (Chapter V). They are based on the surveyed practitioners' confessed habits and techniques for circumventing communication challenges. Like in Chapter VI, the guidelines will be illustrated by quotes selected from interviews, questionnaires, emails or field notes transcribed *verbatim*. In agreement with research participants and to avoid compromising interpretation of this data, the authors of the quotes will be kept anonymous.

Two types of audiences are targeted here: the practitioners who themselves want to discover new perspectives on their practice; and the designers who seek information on how to support creative communication, potentially (but not necessarily), through the use of computer tools. Some practitioners may prefer to use certain guidelines in certain situations but not in others. The choice is left to practitioners and designers to experiment with the guidelines that they find most compelling depending on the context and issues they wish to tackle.

Even if the guidelines are written in a prescriptive form (e.g., “Get involved early”, “Communicate with all collaborators” or “Provide Detailed Feedback”), their intent is only to give an indication for what behaviours and actions are susceptible to improve communication. Some practical guidelines (“Meet Face-to-Face Whenever Possible”, “Get to Know Each Other”, “Show Passion and Attachment to the Project”) relating to a same topic are grouped under a high level guideline (e.g. “Establish and Maintain Trust”). For clarity, all the guidelines are classified in the four same levels as in the previous chapter: organisational, emotional, interpretive and indexical levels.

1. Organisational Level

In this section I develop some guidelines for alleviating issues related to the organisational model and to the employer-employee nature of the filmmaker-composer relationship.

1.1. ESTABLISH AND MAINTAIN TRUST

Trust is a crucial component of creative collaboration as it increases chances for relationships to last over time and across different projects. There are famous examples of long-term collaborations in cinema such as director Steven Spielberg and composer John Williams, Sergio Leone and Enio Morricone, Tim Burton and Danny Elfman, or Alfred Hitchcock and Bernard Herrmann. This also applies to the TV industry with partnerships such as Matt Groening and Alf Clausen, J.J. Abrams and Michael Giacchino, or ABC US channel and Edd Kalehoff. While trust allows creative relationships to last longer, it is also the longevity of those relationships that allows trust to develop. Trust is rarely completely given at the start of a new creative relationship and it needs to be tested over time as the collaborators build a shared history. However, a minimum amount of trust is necessary in order to even let the new collaboration begin, as a composer explains with this interesting analogy with house-building:

> If you're building a house, and you have the plans, I think there's a certain amount of trust that somebody puts in the builder that this is going to turn in what they want, and I think it's the same with music.

Trust can have multiple benefits. Firstly, it lets one have greater confidence in the future unfolding of the project. As seen in the case study (Chapter IV), Sally (the director) repeatedly

told me that she had every confidence in Felicity (the composer) to produce the right music for the film. Such confidence can help adopt a more positive and lucid approach in the collaboration. Secondly, trust can favour the blossoming and reciprocal exchange of creative ideas. On one hand, if the director trusts the composer then s/he will be less apprehensive when s/he is presented with unexpected musical sketches and s/he will not be afraid to criticise or challenge them. On the other hand, a trusting composer would less likely be afraid of having his/her ideas rejected and would be more comfortable in suggesting unconventional ideas. As put by composer Tyson-Chew (2003, pp. 5-6), "*[f]ilm composers have to establish the director's trust and be able to influence him/her on taking the film to another level*". Thirdly, trust is absolutely crucial during decisive moments of the collaboration, particularly at the start when one needs to be sure they have chosen the right persons to work with, towards the end when the deadline is looming, or in the occurrence of personal or creative clashes; as testified by these two composers:

> — Directors need to trust you personally to be sure that in case a conflict arises you'd be able to find your way through it together.

> — If the faith and confidence shake, you never get it back. So it is crucial for everyone to appear reassuring and in control.

Most of the literature about the theories of creativity and about creativity support advocates taking risks, stepping out of the 'comfort zone', in order to foster the exploration of new domains and favour the emergence of creative ideas (Boden, 2003; Csikszentmihályi, 1996; Davis, 1999; Fischer et al., 2005; Resnick et al., 2005; Shneiderman, 2000). Unfortunately, because of the high constraints present in the film industry (both time- and budget-wise) practitioners tend to limit contingencies and avoid taking too many uncontrolled risks unless they hold full trust in their creative partners. Trust plays a crucial role in the collaboration as it reinforces people's reassurance in initiating new working relationships and in taking risks for the realisation of more creative outcomes. Like in any occupation, if one behaves professionally, honours one's commitments and consistently demonstrates these qualities, then one can be deemed trustworthy. In particular, two ways for establishing and maintaining trust came forth through the research: meeting face-to-face whenever possible, getting to know each other and showing attachment to the project.

1.1.1. Meet Face-to-Face Whenever Possible

The composers and filmmakers I interviewed unanimously recognize that face-to-face meetings are fundamental in building propitious conditions for successful collaboration. First and foremost, face-to-face meetings are seen as an essential way of building trust between collaborators. As one composer said, practitioners "*work a lot with [their] gut reaction to things*" and they can quickly get a sense of a person's values and work ethics by seeing the person and

by making eye contact. Often the first meetings do not include any creative discussions and are only used to break the ice by simply having a coffee and an informal talk together. Meetings that occur early in the project also play an important role in the bonding process between individuals. As pointed by a composer, "*they're the meetings where you develop your loyalty to the project, where you become part of the effort and the team*". More generally, face-to-face is appreciated for the unique connections that it brings. A director said that he likes to "*have some sort of human contact*" whenever it is geographically possible and another one said she likes the composer to be present when she listens to the music. A composer also confesses to using face-to-face meetings to play a supportive role for some filmmakers who sometimes experience difficulties with their own clients:

> I like to try and have a weekly meeting, just a regular weekly meeting where they come to you and have a cup of tea and you have a chat – what's happening with the film, and normally they're in the stage where they're playing it to the broadcasters and the distributors and all the executive producers so they've got all their stresses and their little tales of woe and changes to make. So that can be quite bonding because you can offer them quite a lot of support because that's often quite a hard time for directors. And they're up against all these hard executive people and I'm just this earthy musician trying to help them. They're good, good times, good meetings.

At any rate, practitioners should try to meet in person once or several times in a project. Unfortunately, face-to-face is not always possible and it sometimes is a luxury that practitioners cannot afford.

1.1.2. Get to Know Each Other

During the Golden Age of film music (in the 1930's and 40's), it was common for film composers to be hired in long-term and secure contracts by production studios. Nowadays, however, composers have freelancing status (Faulkner, 1983) and, as pointed out by music broker Richard Jay (2005), many composers still make the mistake of concentrating on musical and creative aspects of the work to the detriment of business aspects. In their capacity as freelancers, it is crucial for composers to properly consider market visibility to ensure finding new contracts and initiating new working relationships. Most interviewed composers agree that filmmakers originally find them and commission them because they already know about their compositional styles and work history. In fact, it is rare for a filmmaker to hire a composer without studying the record of his/her abilities and of past experiences. Filmmakers generally have access to that information either via portfolios directly sent by the composers themselves or via the works exhibited on the composers' professional websites. Word of mouth and personal recommendations are also an effective way for composers to gain positive reputation in the film industry, as this composer explains: "*To spread my music I let the clients I already have and the musicians I work with hear all the other stuff I do. Then it is spread by word of*

mouth. This industry is a small world so if you are connected to a few people who work in it, you can rapidly make yourself known". Another interviewed composer also recommends taking a proactive approach when addressing potential clients:

> I would say send me your script or your synopsis and I'll give you feedback. Just try and, before you commit to working together, give them as much of yourself as you can without actually working on their project. I think it's a really good idea to give feedback on the idea behind the film, whether it's in a synopsis or a script or whatever. Or I might have a good long chat with them on the phone: 'What's your film about?' listen, and then say, well it would be interesting to try this or that. You don't want to give away too many ideas because they might then hire someone else and use your ideas, but I think it often wins you points if you absorb what their project's about, give them a reaction like: 'Oh, in that case I would try…We should use…voice and whatever, some ethnic instruments, that might be a great combination'. You might reference a film you've seen that they might have seen. Just so that you can get onto some creative common ground. And if that feels like it's firing, if they like what you've said and you like what they've said and you connect on the phone, just in a preliminary conversation then you can pretty much bet that they'll give you the job, or that they'll feel confident working with you. So I think it's often good to throw ideas around at a very early stage, even when you don't necessarily have a job.

The example above shows that filmmakers generally need to feel there is a mutual creative connection before committing to a new working relationship. This is also true for composers. Even in their role as employees, they too want to know about their clients' background to determine whether they would be interested in, and enjoy, working for them:

> You look at their work record: what they've done, how long they've been doing it, the people they've worked with. Because if you know that someone has worked with x, y and z, that you've worked with them too and that you like them; then that's good enough for you. For example, a person making a film about prisoners in South Africa is probably going to be a decent person. If they have this sort of social concerns they're probably going to be someone with a bit of integrity, interesting and not overly materialistic.

Nonetheless, according to Faulkner (1978), there is a danger permanently run by composers: that of being stereotyped by those who hire them. Filmmakers often base their judgment on composers' screen credits. The problem is that, sometimes, previous success in one type of project is seen as the only type of work that a composer can do. Therefore, composers have to advertise not only what they have done, but also what they can do more broadly. Composers should also take some perspective on their own abilities. For Jay (2005), composers should concentrate on developing and advertising the styles of music they are best at making, especially those that set them apart from the competition of other composers —that is what Jay calls the *Unique Selling Points*. Jay also warns composers: "*Many composers make the mistake of claiming to be able to write every kind of music imaginable in the assumption that this is what*

the [potential clients] would want to hear most. This is to be avoided at all cost". Indeed, some directors believe in the adage 'Jack of all trades, master of none'. If they require a certain style of music for their film, they would be more inclined to hire a composer who is known to be particularly talented in that certain style or who has dedicated himself/herself to it. My research showed that Jay's assumption could not be generalised, as one director said he in fact tended not to work with composers who were too specialised:

> I prefer not to select somebody who specializes necessarily in documentary, as such, because there are many people that do that. And I tend to choose people that haven't had a lot of experience in documentary, because I think they can come up with something a little bit more original.

Therefore, getting to know each other is crucial not only for marketing reasons but also for creative reasons. While there is no universally recommended way to promote one's work, it is important to provide as much relevant information characterising one's background, abilities and personal tastes, to favour the establishment of trust and new successful working relationships.

1.1.3. Show Passion and Attachment to the Project

Through my research investigations, the act of showing attachment to a project manifested itself as an effective way for establishing and maintaining trust in work relationships. In order to naturally feel attached to a project, one has to feel passionate and have a strong interest in the concepts and creative opportunities that the project offers. Expectedly, all survey participants concur that passion is required for letting creativity flourish to its full potential. In particular, one composer gives a poignant testimony coming from his own experience and warning about the dangers of working mostly for money rather than for cultivating creative impulse:

> I've learnt the hard way that I can't take the job that pays well, if I'm not passionate about it. I physically cannot take it. Because if I do it, it nearly kills me. [..] What happened with me was that if affected the musical choices I made, because I was trying to maximise the profit I made, and so I started cutting corners, musically, in order to do that. My focus shifted away from making the best possible film that I could, into how can I get through this project, and into the next project, because I was under pressure financially. But that approach is not sustainable for me. It's sustainable for some composers, but I cannot sustain that because eventually what ended up happening was that I got writer's block. I completely snuffed out my creativity, and I got to the point after eight years where I couldn't think of a piece of music to write. It just completely stopped and for about 12 months I couldn't compose music.

The common belief about passion being required to succeed in the film industry also means that filmmakers have come to expect composers to display a strong bonding towards their work. In fact, personal talent and creative capacities are not enough to earn a client's trust and

confidence. Filmmakers are also in demand for composers who are willing to commit to the projects they are involved in. They want the composers to show interest, respect and passion, as affirmed by this director: "*Talent's not so much an issue because I know all composers are talented in different ways. But it's also I guess partly to do with whether they can devote a lot of time to the project as well [..] I think that's what's important, whether they're interested in it, whether they don't just treat it as a job*". One interviewed composer also explains why it is important to match filmmakers' level of dedication to ensure successful collaboration:

> I think they want and expect you to treat their project with as much respect as what they do. And passion. They expect you to become passionate about the project, because usually they're completely engrossed in the project, they live, breathe and sleep the movie. […] They're passionate about the project, and for two years or more they've been living and breathing this project, so they want someone who'll come along with a similar kind of approach, that will get that involved with the score, and treat it like an extra child, because that's the way they treat their movie, usually, like an extra kid.

Nonetheless, this demand for working with devoted and like-minded people is generally reciprocal. In fact, it can be disheartening for composers too if their clients do not show enough enthusiasm while collaborating, as pointed out by this composer:

> There have been times when I worked and worked and worked on projects, and at the end of the day I got the distinct impression that the director really didn't care about the amount of effort I'd put in. And in that case, to my surprise, I realised the director had less emotion invested in the project than what I had. It was just another gig for him, in that particular case, which was sort of disappointing.

Passion is something that cannot really be faked. Filmmakers, particularly directors, are perceptive persons who can usually sense whether a composer is genuinely passionate about the project or is instead pursuing the job solely for its remuneration. Nevertheless, even when the interest is genuine, it can be difficult to convince filmmakers and earn their trust. One way put forward by interviewed composers is to actively participate in the creative process by regularly suggesting new ideas to them and promptly answering their questions and concerns. Some composers also stress the importance of being honest about whether or not they are capable and interested in taking a certain job. It is suggested by survey participants that honesty is indeed the most sustainable and rewarding approach in a long-term practice. Obviously, because of certain economical realities, practitioners cannot always afford to be too selective and to decline a well-paid job just because it is not truly exhilarating. As discussed previously there is the duality of art/business residing at the heart of the film industry. This duality implies that each practitioner needs to find the right balance that will fulfil both their life and practice.

At any rate, while passion admittedly drives creativity, it is also necessary to accomplish explicit acts communicating that passion and showing one's attachment to the work. These acts reinforce trust in each person bringing their best to the project's benefit, and therefore they should be carried out throughout the project to maximize chances of success.

1.2. BALANCE FREEDOM AND CONSTRAINTS

As described in Chapter II, constraints are often seen by cognitive scientists as positive factors driving creativity. For example, Margaret Boden believes that "*[c]onstraints —far from being opposed to creativity— make creativity possible*" and that "*[t]o throw away all constraints would be to destroy the capacity for creative thinking"* (Boden, 1994, p. 79). In fact, like the stakes used to support growing plants, constraints often provide support and guidance for one's imagination to open up and thrive. Hence, many constraints present in the film scoring industry are what film composers find truly appealing. The challenge of tackling constraints set by the film's script or by the filmmaker's vision makes many composers prefer composing film music rather than, for example, concert music. Essentially, composing music for film cannot go without constraints, and filmmakers are often reluctant towards giving too much freedom to composers; as one director puts it, "*giving enough rope to allow some magic to happen often means that the wrong magic happens*". Composers need external advice and critique, particularly from filmmakers. Otherwise they may lose perspective, as illustrated by this composer's anecdote:

> A situation happened with this telemovie that I just did, where I was given enormous freedom to write what I wanted, because I was one of the directors myself. And so I wrote everything that I wanted to write, but that didn't stop one of the other directors changing what I did because one of the things about being a composer is that you get so incredibly close to the music you've written that you can easily lose a bit of perspective. Basically I delivered the entire score to the director, and then she came back to me with a wishlist of changes. And there were probably 50 different changes, and we changed 48 of them, because I trusted her. She gave me the reason why she wanted to change every single thing. They were only subtle, little changes, but they were all really valid, and really improved the effect because she had some distance from the music. She was able to watch it and go, 'ooh, that jarred a little bit, or that wasn't quite what I meant'. And so that was a really good experience for me because I had all this creative freedom, but then I had another set of ears that I trusted from a slightly more detached point of view, who was able to fine tune what I'd done, from a perspective that I respected. So that was a very good exercise.

However, in practice, constraints do not always prove to be effective. My research confirmed the necessity to make a distinction between two sorts of constraints: stimulants and barriers. Stimulants are "positive" constraints that enable creative thinking. Conversely, barriers are "negative" constraints that hamper the emergence of creative ideas. While the former are rightly praised for the reasons enumerated above, the latter can have unfavourable impact on the

work's outcomes and can induce frustration because of imposed limitations. There are several types of barrier. One type, purely material, is related to physical resources, budget and time, as exemplified by the following anecdote of an Australian composer. In one of her feature film projects, the budget for music production had been severely cut. Money had to be saved and, as a result, she had to fly to Eastern Europe to record a live orchestra that was cheaper than the orchestras available in Australia. She lost a lot of time travelling and supervising this complex process, which gave her less time to concentrate on the actual music's creation. Another type of barrier is the lack of creative flexibility that is sometimes offered to composers by their clients. While it is crucial for filmmakers to communicate what they want for the music, composers do need a minimum of flexibility to be able to explore new paths and do experiments. They need to know that they have the right to get things wrong and then refine them to eventually get them right. As one composer confesses, "*the best music I write is when I can take chances*". Another composer also tells about a positive experience she had with clients:

> I've recently worked on a movie with two directors and a producer. They gave me some temp tracks but I diverged from them and did something that was really 'me'. They've been very appreciative of my efforts to make some music that surprised them. Once they absorbed my music they started thinking about where and how to fit it in the film. They understood that it was necessary to allow musicians to explore so they can find great ideas. In music you have to explore to find what's going to work best. It all comes down to openness.

This issue relates to a question that was raised in Chapter VI, that is, who should detain the creative control over the making of the film score? As discussed earlier, filmmakers often play an active part in the creation of the score. Their contribution is in fact normal and necessary. A creative negotiation has to take place and compromises have to be made between them and the composer in order to produce music that is appropriate. Nonetheless, while it is useful for filmmakers to provide general instructions about what the music should bring to the film, composers should retain control over the details. Composers are the music experts and are better qualified for choosing the low level of details in the music production. For example, a surveyed director adheres to this view: "*I don't talk to composers about specifics. It's more about the tone and feel. We use reference from a wide range of areas to better hone the overall goal. It's then best to leave it to the composer*". This does not mean that composers should be too protective or simply strive to fulfil one general brief. To ensure client satisfaction, composers should also involve filmmakers in the creative process to let them appropriate the music outcome as their own too.

To conclude, some constraints are necessary for composing music that is right and appropriate for the film. They are useful so long as they are constructive and do not constitute barriers to creativity. Some material constraints (e.g., lack of time or money) can be difficult to work

around, but a composer's creativity can compensate for that situation only if s/he is given enough freedom and opportunity for experimentation. Once filmmakers have defined a scope and communicated their original expectations for the music, they should let composers explore new territories and provide evocative suggestions to them. A fair balance in the creative control and between freedom and constraints needs to be reached so as to produce an outcome that is both adequate and fulfilling for all the creative minds involved.

1.3. GET INVOLVED EARLY

During the exploratory studies, questions concerning the ideal stage of the process at which creative discussions should occur were frequently raised. In particular, composers regret the fact that some filmmakers do not realise how costly, or even impossible, changes can be to execute during the late stages, as expressed by this composer: "*Directors should know that you can't change things at the last minute. For example, at the recording session, all you can do is minor changes like making the instruments play the last note a bit longer or remove some instruments in a section of the score*". To avoid complicated situations towards the end of the project, it is therefore recommended that composers have their clients commit early on with the specifications for the music cues. Of course, it is perfectly acceptable to later change one's mind and deviate from the original specifications. However, early discussions can help identify miscommunications and mismatched expectations more quickly and therefore save stress and grief during critical moments of the collaboration. Similarly, it is useful for composers to show early sketches of their work to filmmakers to ensure that they do not go too far in the wrong direction. Thus, a composer explains the benefits of early discussions:

> In the early stages of the project, before the ticking clock is looming, I like to give them [the filmmakers] a chance when there's plenty of time, to go back and forth with ideas and let me know, generally speaking, what they are looking for. If I can do that, and get some agreement with them, about directions and sounds and instrumentations and styles, then later on when we're in the middle of scoring, they will be more likely to have faith that I'll make good choices, if they've got that understanding with me. So I'm investing in my own future, in a way, by getting their participation at an early stage, before the pressure's on.

Some composers enjoy getting involved in the process very early, even before the scoring stage officially starts. They enjoy, for example, reading the film's script before the production starts or observing the actors play on the shooting set. This is a way for them to allow time for their inspiration to seep into the film's story and for progressively developing, at a conceptual level, proper themes for the music. Most filmmakers seem reluctant, or at least do not see the real value of getting the composer involved so early in the project. Yet, as pointed out by American composer David Bell, "*[h]iring the composer at an early date won't cost more money, it will result in a better score*" (Bell, 1994, p. 9). Obviously, this kind of practice may not necessarily suit every practitioner and so it cannot be entirely generalised. For example, one

composer says that he prefers to be involved after the film's production is complete, when the picture is locked. He likes to have a fresh mind without prior influences when it is actually time to compose the music. Clearly, this is a matter of personal taste. However, composers who are willing to engage earlier in the process should be given the opportunity by their clients to do so.

1.4. COMMUNICATE WITH ALL COLLABORATORS

While this research is focused on the filmmaker-composer relationship, interactions with other practitioners also need to be considered (in particular the music supervisor, the orchestrator, the music editor, the film editor and the sound designer). Where most of the creative work occurs in the collaboration between composers and filmmakers, the above-mentioned practitioners may, in some occasions, play an equally decisive part. The music supervisor is responsible for the selection and licensing of existing music that is included as-is in the film. The orchestrator helps the composer arrange the composition for a large music ensemble, in cases where the composer does not have enough time to do it him/herself. The music editor provides technical support to the composer with the fitting and mixing of music tracks. S/he may also help filmmakers select temp tracks in the early stages of the post-production. The film editor, whose principal role is to assemble the visuals into one coherent piece, works closely with filmmakers to decide what ends up in the film and how everything fits together. As seen with the working relationship between Tony (film editor) and Sally (director) in the case study (Chapter IV), the film editor's vision is often trusted by filmmakers and s/he can therefore be involved in creative decisions about the music as well. S/he also often has a determining influence in the selection of temp tracks, as s/he uses them to initially cut the picture. Finally, the sound designer supervises the production of all sounds present in the film, including dialogues and sound effects. The sound and music tracks are generally done separately and in parallel. If, for example, there is an emotional or action climax in a scene, it should be clear to both the composer and the sound designer what, between the music and other sounds, should take precedence. Otherwise there is a risk that the two tracks could compete and produce an undesirable effect. Rigorous communication is required to ensure that the respective volume levels are correct and that the frequency range is properly shared, as explained by this composer:

> When there is a lot of sound design it can be problematic. For example, if there's a scene with a whale or in a basement, then the sound designer might want to make a really low sound or a deep sort of ambiance. If at the same time the composer's idea is to make music with big timpani, drums and analog synthesizers that are really deep; then it will be too heavy in the low frequency range.

Unfortunately, in current practice, there is not enough communication between composers and sound designers. One interviewed sound designer particularly regrets this situation: "*It is a shame that not everybody knows what's going on during the project. It is wasteful of resources.*

Soundies (sic) and composers are the two strands of the soundtrack. They have much in common and can understand each other". Therefore, much attention should be paid to facilitating communication between all collaborators, regardless of their actual level of involvement. A shared environment is required to enable creative communication between each of the participating individuals.

2. Emotional Level

As seen in Chapter VI, practitioners in the film scoring industry often get deeply and emotionally engaged in their work. This means there may be some sensitivity involved in working relationships and, when things go wrong, people may feel disheartened or frustrated. Emotional issues are the most challenging ones to tackle because they are intangible and often linked to subjectivity. Most of the time, clearly establishing the parameters for the collaboration (i.e., defining what everybody expects from each other) at the outset is sufficient to avoid frustration and personal clashes. From the exploratory studies emerged two simple specific recommendations, which I will describe in this section: acknowledge one's efforts and provide detailed feedback. Emotional issues were not particularly in focus when conducting this research, which explains the relatively low number of corresponding guidelines presented here. However, observations and interviews with practitioners clearly show that the emotional level is as important as the organisational, interpretive or indexical levels. Therefore, further research is required to develop solid guidelines and to understand precisely how emotional issues affect communication.

2.1. ACKNOWLEDGE ONE'S EFFORTS

Naturally, being creative persons, composers enjoy having their skills and work properly acknowledged. They appreciate it when filmmakers are fully aware both of the importance of music's role in the film, and of the artistic value personally contributed by the composer. In Chapter VI, I described how a perceived lack of recognition could induce people to feel frustrated, disheartened or even, as one interviewed composer puts it, "*artistically squashed*". Whether or not filmmakers like all the music sketches presented by the composer, it is recommended to explicitly recognise the composer's contribution. A composer summarises this issue:

> I think directors can often forget that, even though we're [the composers] working on their film, on their creation, what we're doing is also creative. What we're doing is our creative effort. I'm a creative person and you need acknowledgement of what you do. […] It's not like you need the little pat on the back but if you've spent hours writing a piece of music, you need acknowledgement that you've tried really hard.

In providing proper acknowledgement and recognition of everyone's efforts there is a greater sense of respect for the project and more confidence and reassurance for all the persons involved.

2.2. PROVIDE DETAILED FEEDBACK

In the composition process, it often takes several attempts for the composer to write music that perfectly suits the filmmaker. At each attempt, the filmmaker listens to a sketch and then returns some feedback and criticism to the composer so s/he can improve the musical piece. This feedback is absolutely necessary but it is only truly useful to the composer if it is detailed enough. In particular, interviewed composers emphasise that criticism is hard to take emotionally when it simply states, for example, "It's not good" or "It's not working". Those composers indicate that they prefer receiving more constructive feedback which not only points at the specific elements of the music that are not working, but also raises the positive aspects of the sketch in question. This view is illustrated by this composer's anecdote:

> I just needed some positivity. I needed her [the director] to say, 'Oh this one's good, this sound you've got is good', I just needed it to be positive basically. Because it's very hard to keep offering up ideas when they're being shot down. You just need some positive feedback sometimes, to get going again. […] When you do something they need to acknowledge the positive aspects of what you've done, then you can move forward and it's much easier to take criticism.

Therefore, filmmakers should be encouraged to provide detailed feedback to composers. Rather than reject any one work altogether, they should underline the parts of the work that are already satisfactory. This is useful for composers to integrate the feedback and make amendments to the music. It also gives them more confidence in their own work and in their capacity to comprehend filmmakers' expectations.

3. Interpretive Level

In this section I focus on the ways to circumvent issues related to the interpretation of communication cues (verbal and non-verbal) exchanged by practitioners in the collaboration.

3.1. BRIDGE THE LANGUAGE GAP

As articulated earlier, the lack of shared musical language between filmmakers and composers can result in a major communication gap. Although some filmmakers do have general knowledge about music, composers often have to deal with clients that are not music experts.

One strategy for dealing with this issue could be to design a new language, in a similar vein to *Esperanto*'s[51] attempt at bringing world languages together. All practitioners across disciplines would have to learn this new common language to be able to communicate within one single unambiguous environment. However, not only would it be challenging, or even impossible, to design such a language encompassing all the subtleties of human emotions and of music and film aesthetics; but it would also be illusory to think that practitioners would all be predisposed to learning a whole new language, especially considering the stressful conditions which these practitioners are regularly confronted with (i.e., tight deadlines and budgets). Instead of devising a new language, one could bridge the communication gap by applying simple strategies which optimise coordination and which channel existing ways of expression. Below, I enumerate such strategies as suggested by participants of the exploratory studies.

First, when initiating a new working relationship, it is crucial to start by gauging everyone's musical knowledge and communication abilities. In particular, one composer explains that the initial conversations can rapidly give a good indication about filmmakers' capacities for handling music terminology: "*If [the filmmakers] can't describe what they want, it suggests that they probably struggle with the musical language, with the vernacular, so they have to find other ways to describe what they are doing. Usually it's a warning flag that I have to do my homework to get to where they are, and understand what they mean*". The same composer pursues by giving an example of how he proceeds to test filmmaker's understanding of music:

> You can usually read between the lines of what they're saying, as you're playing pieces of music for reference and talking about it I'll usually ask questions that give me an idea of the level of understanding that they have. Like I'll ask them about the specific instruments, that they're listening to, and get them to say, so I can tell, do they actually know the difference between a harp and an acoustic guitar, by listening to it. Do they know the difference between a cello and a violin? Can they hear the difference? And most people don't, but if they do, I can start using some musical terminology with them.

Second, in cases where filmmakers have difficulties expressing themselves in musical terms, composers have to adapt their language to favour filmmakers' access to the creative dialogue. This can be achieved, as another composer points out, by making use of layman's terms:

> I think as people who are interested in media and the arts most directors have listened to a fair bit of music and can talk about music reasonably well. They're not ignorant people, especially artistically, they're quite open people. But I think what you do is you don't use

[51] Constructed language designed for international communication in 1887 by L. L. Zamenhof, a Polish philologist

> musical language like you would with someone you'd gone through the Conservatorium with and you get really into the terminology. You don't do any of that, so you describe things in layman's terms. If you're talking about the timbre of an instrument you'll lose them so you say the sound of an instrument or the quality of an instrument. So you can even lose them if you talk about a major key or a minor key. Most directors will understand the difference but you shouldn't assume that they will.

One other composer provides more precise examples of how he would, at the beginning, talk to filmmakers in emotional, thematic or dramatic terms; before switching to more technical terminology once the work is further advanced:

> Examples would be: "So, why don't we try to lift the mood of this sequence by scoring with a lively, upbeat and excited piece" or "Let's play the audience's perspective here by hinting at sadness in the score, even though the vision shows our character is happily unaware of her predicament". I will talk in these terms through the briefing or spotting process, then once I have roughed something into place, I am happy to talk in more technical musical details about what I have tried to achieve. E.g. "Here I used a dark sounding synthesizer pad played at a regular slow tempo as a way to underscore the loss that our character feels".

Third, it is recommended that composers find out about their clients' personal musical tastes. One advantage of obtaining this information is that it helps assess musical backgrounds and thus predict certain misunderstandings. Another advantage is that it provides valuable clues for writing music that will eventually please the clients, therefore increasing chances for the suggested music sketches to be approved. For example, if the composer knows that the filmmaker is fond of jazz, s/he may then anticipate by using a Rhodes[52] piano instead of a classical concert piano. Knowing whether the client is, for instance, a mainstream pop-rock or experimental electronic music enthusiast may also give the composer some clues on how far s/he can go with experimentations in composing the music. Being aware of the clients' musical inclinations is useful in identifying the limits the composer should either absolutely respect or try to challenge. A composer provides examples of the kinds of information he usually seeks from his clients:

> I try to know what their music taste is: music styles they really like, artists they listen to all the time, what they currently like on the radio. What I also try to do is to know what they don't like: e.g. if they don't like strong drum beats, or electric guitars. [...] I try to sus out if they are open or rather conservative, if they are trendy or rather uptight.

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[52] Electric piano invented by Harold Rhodes in the 1960's and which has been extensively used by jazz, rock and fusion artists (http://www.rhodespiano.com)

Four, it is advised that composers invest time educating their clients and teaching them the correct terminology whenever it is possible and appropriate. This investment can be rewarding as it saves time and helps avoid misunderstandings. It allows both parties to develop a shared history, which proves beneficial over the long run especially if the working relationship is carried over to multiple subsequent projects. An interviewed composer suggests an example advocating such an educative approach:

> What I'll do is I'll tell them: this piece of music I'm going to do it with arpeggiated guitars, and it'll sound like "ding ding ding…" [humming]. And I'll make it very clear what arpeggios sound like, so they can use that word again. So in 6 months time they can say, rather than "The strings playing like that": "Can they play arpeggios?". So we start to develop a vocabulary between the two of us.

Fifth, and last, face-to-face meetings can be used to accelerate the communication process thanks to people having access to a richer vocabulary through the use of body language and gestures. Physical presence can indeed help get around communication issues by humming a melody, mimicking sounds or tapping on the table to indicate the pace. Thus, face-to-face can be very helpful in situations where people have difficulty verbalising musical concepts. Finally, one interviewed composer mentioned that she enjoyed face-to-face as it allowed her to see the director's immediate reaction to her sketches. She admitted that she could learn more from the reaction on their face than from their actual verbal feedback.

3.2. CLARIFY THE BRIEF

In Chapter VI, I presented how the filmmaker-composer collaboration normally sets out with an employer-employee organisational model: the composer is hired by filmmakers and therefore has to respond to a given brief. In the same chapter, I also explained that a brief can be inefficient, or even counterproductive, if it contains ambiguous, inaccurate or incomplete information. Conversely, developing a clear brief early in the process can go a long way for saving time, effort and frustration to all parties involved. In this section I put forward some procedures for an improved and more effective briefing.

Filmmakers are not always able to write a complete brief by themselves. This is usually either because they do not know what they want or because they do not know how to express what they want. When this happens, composers need to take an investigative approach by meticulously asking a number of questions. Examples of questions suggested by survey participants are: "Where are the key moments in the film?", "Do you want certain sounds to be associated with certain characters?", "Do you want some music that specifically makes you feel a certain way or something rather unsettled?" or "Do you want the music to help point out something particular (e.g., a character or an object) in the scene?". Other questions may concern the role music should play in relation to the picture. In Chapter II, I presented the

concept of counterpoint, that is, the interplay between music and picture. The two integral entities can either be harmonious or deliberately contradict each other: music can either follow the action on screen (e.g., dynamic drum beats over a car chase scene) or play against it (e.g., restless discordant melodies over an apparently peaceful love scene). To help filmmakers describe how the music should be positioned, one interviewed composer also advises referring to the "foreground", "middleground" and "background"; his clients tend to easily understand that analogy:

> Usually they're [the filmmakers] visual people, so if I talk about foreground, middleground and background in the music they kind of get that. They'll play me something and I'll say, 'In that case the French Horns are in the foreground, but when I do it I'm going to put them in the background. So you'll notice them less.' And they'll get that sort of thing. So it's an easy way to give them a visual tool to describe what I'm doing. And then they'll come back to me and say, that thing where you've got that instrument in the foreground, can that go into the middleground, or the background? So I'm kind of giving them a bit of a verbal tool to communicate with me on that level.

In cases where filmmakers are still not able to answer questions about what they want, composers may follow a process of elimination by asking questions about what they do *not* want instead. Directives can then be specified by default. By eliminating alternatives, composers find that they can respond appropriately to the client's wishes (Faulkner, 1978). In cases where filmmakers have a clear idea of what they want, they should communicate their brief using general terms so as to give enough leeway to the composer's creativity. Filmmakers should, for example, describe their vision for the scene, construe its conceptual meaning, explain the message it intends to carry, or express what the audience should experience at this point in the film. It is then the composer's job to translate these general terms into actual music by selecting the appropriate instruments, chords, tones or rhythms. This approach is lauded by most surveyed composers for the freedom in interpretation that it allows, as pointed out by this composer:

> Generally it's not about speaking about music, it's more speaking about what they want the scene to feel like. If somebody says "I want this scene to feel really warm and I want it to be beautiful, and by the time we get to the end I want people to be refreshed." Then, there's a whole variety of instrumentation you could use to do that, and as long as that emotion comes across, I think that whoever the director is, I think they're really going to appreciate it.

It is perfectly acceptable, however, for filmmakers to sometimes give more detailed instructions. They may be, for instance, particularly inclined towards the use of a certain instrument or music style. One risk is that, as explained in Chapter VI, filmmakers may employ specific terms which do not accurately describe their real intentions; and the composer may produce the wrong

music based on a too literal interpretation of the brief. Hence, when such specific terms are used by filmmakers, the composer should prompt them to verify if they truly understand their meaning. A composer advises how to proceed in this type of situation:

> If they come back at me with musical terminology, I usually check with them, straight away. If they say something like, 'I want a diminuendo,' that's one that's been used in the past, I want to know if they know what diminuendo actually means. So my next question will be diplomatically asking them, 'So you want it to get softer?' 'No, slower.' Oh, okay. So this is someone who doesn't actually know what he's saying, but he wants to know the words. So then you have to diplomatically explain to them that they're looking for a retard in the music, or something like that. So that usually give me indications that they like and want to use the terminology, they want to speak in the musical language, so they need a little bit of help.

Furthermore, most composers find it useful to have access to as much information about the film as possible. It is understood that composers have to do some research by themselves, but clients should also make relevant information accessible to composers alongside the brief. Knowing about, for example, the script, the characters' history, the cast or the geographical locations in which the film was shot, can help composers both gauge the essence of the story and understand the filmmakers' intentions. Filtering and analysing all that information is a demanding but necessary process that composers need to follow. A process that can be assimilated, as described by this composer, to a puzzle solving exercise:

> I like to read the script. I like to, in the case of animation, look at the early character drawings. I like to look at storyboards, anything like that that will help me come up with solutions to the musical problems that this particular project presents. Because it is a puzzle solving exercise, and a lot of the time it's like doing a cryptic crossword or a sudoku, or something like that. It's like every piece of vision presents a bunch of technical problems and creative problems, or challenges, and part of the fascination is coming up with elegant solutions to those problems.

Finally, particular attention should be paid to one critical early stage of the project where most of the briefing formally takes place; that is the spotting session. The spotting session generally is a long, face-to-face meeting between the principal collaborators, including the director/producer and composer, often also the film editor and music editor, and in some occasions the sound designer and music supervisor. The focus of this meeting is to discuss precisely where there should and shouldn't be any music in the film. What each music cue needs to achieve to support the various scenes is also discussed. During this process it is vital to produce a set of written notes. First, the *cue sheet* lists all the music cues the composer has to write; it has a contractual value and is used to manage performance royalties. Second, the *spotting notes* contain the filmmakers' thematic and emotional intentions for each cue as well as early sketches of ideas. It is highly important to share these notes across all collaborators so as to ensure

everyone is aware of the directions to take. The notes also constitute a valuable referential for other discussions later in the process and provide accountability for the creative decisions made.

3.3. USE TEMP MUSIC WITH CAUTION

Mere words are not always enough to make an effective brief and embody all of the filmmakers' creative intentions. As American composer Fred Karlin observes, "*[w]hen you want to be absolutely specific in describing a musical idea, words are rarely completely reliable*" (Karlin & Wright, 2004, p. 21). In Chapter II, I presented how boundary objects, according to Star (1989) and Wenger (1998), are required to facilitate the establishment of common ground between practitioners coming from different disciplines. In that regard, utilising music itself as a communication medium often proves to be useful for both saving time and avoiding misunderstandings. Music can be an effective replacement or complement to verbal descriptions (Cross, 2005; Hargreaves et al., 2005) and may be used as a "*gateway toward informing textual analysis*" (Sadoff, 2006). As affirmed by an interviewed composer, music is worth a thousand words: "*If somebody calls you for the first time and says 'I want you to do some music', it's going to take a lot of conversation, meetings and emails to say what one little demo could do*". For this reason, filmmakers often provide or refer to some *temp music* ('temporary music'), that is, already published music similar to what they wish the score to sound like. Where in some instances temp music is valuable for describing how the music should sound, its use is not necessarily liked by every composer as it can be a source of frustration. In this section, I present the characteristics and issues of temp music that emerged from the exploratory studies (Chapters IV and V).

Temp music has a number of advantages. In the cutting room, film editors often select temp tracks to help set the pace for the film and facilitate the assembling of all the scenes. Temp music is also used by directors and producers to get a sense of the atmosphere, genre, rhythm or instrumentation that would suit the film; it is then used as a role model to communicate their vision and preferences to the composer (Karlin & Wright, 2004). From the filmmakers' point of view temp music is mostly beneficial, as illustrated in this quote by director Sally Ingleton taken from the case study (Chapter IV):

> For me as a director it is really important to use temp music in the edit as it grows and changes. Where possible it would be ideal if the music was from the composer but that is not always possible or practical. Temp music is used to try and help the story take shape and convey mood and emotion at a point when we are still trying to shape the film. We also have to show the film to broadcasters at various stages so if we showed it without any music at all the film would be quite empty and emotionless. I also find that using temp music can help convey to the composer what kind of feel we are after for the scene. I don't

> know all the technical terms for music so I just use lay terms that express the feel I am after. Temp tracks are meant to help not hinder the composer.

Most composers recognise that temp music is useful to better understand what filmmakers like and what would please them. These elements of satisfaction are essential since the composed music has to eventually be approved by filmmakers. As one composer says, "*[t]emp tracks are good in that you've got a good solid idea of what your director wants. They're particularly good if you like what they've chosen and you don't mind writing in that style and you're good at writing in that style*".

However, temp music also has important down sides. First of all, a lot of composers find it limiting, especially if it does not correspond to their preferred styles of composition. As expressed by this composer, "*if they've [the filmmakers] put temp tracks that you don't connect with, or in a musical genre that you're not very adept in, it can be quite discouraging, and it can actually get in the way of you bringing something really good and fresh*". Sometimes filmmakers use temp music excessively and in a prescriptive way, asking composers to imitate it rather than create something new. When that occurs, not only are there dangers of plagiarism, but it is also a frustrating situation for the composers as they have very little room for expressing their creativity. Thus, as composer Felicity Fox says in the case study (Chapter IV), "*it's like the door is closed, and you have to contort yourself to get through the crack*". Secondly, temp music is often borrowed from repertoires of big budget movies, such as 'Superman', 'Star Wars', 'The Lord of the Rings' or 'Gladiator'. The composer is then asked to reproduce similar music while working on a drastically smaller budget, which is either quite hard or even impossible to achieve. Thirdly, filmmakers sometimes get too attached to the temp music and find it difficult to disconnect from it once the composer starts offering original compositions. "*They love it so much that they can't see beyond it*", says a composer. The challenge is then to 'educate' the filmmakers, making them take some distance from the temp music. But, as described by these two composers, one can feel powerless in that 'education' process:

> — Directors can become very attached to what they listen over weeks and weeks and weeks, and then you play them something completely different that's working for you. Obviously their initial reaction is going to be 'Oh! No! Too different!' But quite often they'll live with it for a week, or just get used to it and then like it, and see extra layers that weren't in the temp track. And if they're really not liking it then you have to change. You have to give up and just do what they want.

> — Turning a director around once he has fallen in love with something is tough. Sometimes you need to be firm. Sometimes a rational and logical approach works (by pointing out how the temp music doesn't meet the approach in the spotting notes). Sometimes preparing and presenting roughs can help. Sometimes enlisting an ally (such as the producer or the sound designer) can help. Sometimes there is nothing you can do.

When filmmakers give too much importance to the temp music, it can affect composers' ego as they feel their own contribution is not fairly valorised. As Felicity says in the case study (Chapter IV), "*[i]f you listen too much to the temp tracks then that's what you expect to get. But you should be open to what the composer, who you're paying, has to offer*". While Sally (the director) was eventually pleased with Felicity's compositions, it may happen that, in some extreme situations, the original score is purely and simply rejected by the clients. One famous example[53] is with Stanley Kubrick rejecting Alex North's compositions for "2001: A Space Odyssey", preferring the existing classical music he had initially selected as temp track.

Temp music is now widely used by filmmakers. Composers, whether they enjoy working with it or not, have to cope with it. But temp music is not all good or all bad; it just needs to be used cautiously. First, filmmakers should be encouraged to use previous works by the composer they hire as the temp music. This would ensure both that what they ask is achievable by the composer, and that the style of music eventually produced will reflect the style of the temp music they originally selected; as advised by this composer:

> Often what I would do is, instead of using temp tracks of existing music, I'll try and give them piece of music that I've already done for other films, and quite often before even the spotting session happens I'll give the director a CD of music, maybe 10 tracks: some from films, some orchestral, a whole bunch of different things, and then they can start having a think. It gets us in sync because they start getting an idea of what I can do.

Moreover, temp music should be used parsimoniously. It may be used as a loose guide in early stages of the editing process or to build mock-ups to show and sell the film to broadcasters. But it should then be discarded as soon as possible so filmmakers do not get too attached to it, thus leaving more room for the composer to express his/her creativity. It is also recommended that composers release music sketches to filmmakers early so that they quickly replace the temp tracks and start getting used to the original compositions.

Finally, composers should investigate deeper than just listening to and trying to reproduce the temp music they are given. As this composer suggests, by asking detailed questions about why the clients selected a certain temp track, one can more easily find the core of what is actually wanted:

> Quite often, nearly always, it's something completely surprising, as to what they like about a piece of music. They'll play me a big, bold and brassy John Williams score from Star Wars or something like that, and I'll ask them what it is that they love about it, and they'll say 'the

[53] See http://www.rejectedfilmscores.150m.com for more examples

> cymbals'. Because it's a storm sequence, and they love the fact the cymbals are crashing all over the place. It's a real eye-opener.

3.4. USE MUSIC SKETCHING

As seen in Chapters II and III, sketching is often valued for its quality to inform design as it helps organise conceptual problems and elaborate new ideas. Also, sketches can play the role of boundary objects to impart knowledge and to facilitate the establishment of common ground in multidisciplinary collaboration. Similarly in film scoring, when instructions provided by filmmakers are limited or unclear, composers are used to making a few musical sketches for the filmmakers to listen to and then choose the one they prefer; as described by this composer:

> If someone said "I want something cooky and childish", I might do four different tracks but only develop them about 30%, and then give them those and say, "Have a listen to this and what do you think?". And they might say "Not 1. Not 2. Number 3 I really like. Number 4 I don't like but I really like the piano in it, and I'd like to try that". So then you develop the number 3. And that means, from the very start, that you're doing something that they like.

This iterative process is, in fact, necessary. It is rare that composers produce the perfect score on the first attempt and inasmuch the progress of the work cannot be linear. Filmmakers may even change their mind after hearing a few sketches, so it often takes several iterations before the new composition is eventually approved.

Sketching has multiple broad benefits. On the one hand, it allows filmmakers to get more involved creatively, which itself has two ensuing beneficial effects: it lets the composer refine his/her interpretation of the filmmakers' expectations and it provides filmmakers with a greater sense of control over the creation of the score. On the other hand, the use of musical sketches can be handy for composers when they need to convince filmmakers that their instructions are not adequate or could be improved. As indicated by this composer, it is sometimes easier and quicker to show rather than tell:

> If you're asked to do something that's not going to work, then show them why it won't work, don't tell them. [...] If for example somebody was making an ad for nappies and I was thinking of having a cute little guitar, some ukuleles and bells, and the director said, "What about just a didgeridoo over the whole thing?" Then I would think, "Didgeridoo... nappies... It might not work." If it really isn't going to work, then you can show them. You can go: "Give me one second". I've got a didge in my studio, otherwise I'll get a sample of a didge, load up the ad, put the didge on it and say "Look at this... wooOOwooOOooOO [imitating didgeridoo]. It's going to be crazy, right?" But at least they can look at it and go "Ok, cool". Now that's done, I can let that go and then move on to something else.

Through the explorative studies, I have identified two main approaches for sketching: making rough sketches that are simple and unsophisticated, and making elaborate sketches that sound close to the final score. Both approaches have advantages and shortcomings. Composers may prefer to always use one approach over the other, or they may choose one approach depending on the context of the project and on the persons they work with.

Rough sketches are only developed to a low level and mostly contain the core of the musical idea. "*The most important is the basic idea*", says a composer, "*That's what is hard to find*". Another composer agrees: "*It doesn't matter if it isn't all finished and it's not all real strings and voices or whatever, if they feel the energy's right, or they feel that the brief is right, then they'll like it*". A rough sketch may contain, for example, only the main melody played on the piano without the accompanying orchestra, a rapid collage of virtual instruments and music samples, or recordings of real instruments but without any refined mixing. Composers advocating rough sketches argue that they are quicker to make and therefore quicker to get feedback on; their flexibility allows for faster turnarounds. Those composers also prefer not to commit to recording live instruments before ensuring that the suggested musical 'vibe' is approved by the clients.

Rough sketches also have some limitations, especially if the filmmakers are not able to imagine how the music will sound once it is complete and properly recorded. Composers are experts at projecting the music in their mind and at imagining a full orchestra based on just a few notes played on the piano. Filmmakers, however, do not always have that capacity. This was in fact a major worry for Felicity (the composer) during the case study (Chapter IV). She was anxious because she feared that Sally (the director) may reject her sketches for being too rough and featuring samples with low sound quality. Therefore Felicity warned Sally about this issue at several occasions; for example:

> As far as delivery of roughs goes, what I propose is that I rough a version of each theme with samples. This will not really do the oud and violin tracks justice, but I feel it is better to get the music right between us first and then get the musicians in to record. It will just require a bit of faith and imagination from you as the digital versions, of what is essentially very organic acoustic music, will be limited.

The other approach observed during the exploratory studies is to produce elaborate, polished, sketches. This approach has grown in popularity over the last decade, mainly due to the radical advances brought by technology. It is now very affordable for composers to purchase libraries of high quality samples allowing one to reproduce virtually any instrument (not only instruments from classic orchestras but also more exotic ones like traditional instruments from India, China, Pacific Islands or Europe). Hardware or software synthesizers are also capable of producing high quality sounds used in many modern film scores. These, combined with powerful sequencing and editing computer tools, now give composers the ability to make sketches and mock-ups that plausibly sound as good as a finished product. One important advantage of

sophisticated sketches is that they can reassure filmmakers as they give a clear indication of where the composition is heading. As explained by this composer, high quality sketches give a chance to impress clients and to gain their trust:

> I won't give them a little sketch, because that's quite often counter-productive. I usually go away and actually orchestrate it fully, and do a really well produced demo. It's an opportunity then to win their confidence that this is going to work with me.

However, producing elaborate sketches is not necessary ideal and, in fact, can be counter-productive, primarily because it is time consuming. Despite the opportunities offered by today's technology, it still takes a significant amount of effort and time to reproduce natural sounding instruments or orchestras. Although software tools and digital sound libraries are constantly improving, it is still hard and sometimes even impossible to completely match the expressiveness of live musicians. Considering the tight deadlines regularly faced in the film industry, composers cannot always afford to meticulously prepare several iterations of the same polished sketch. When under such pressured conditions, it is vital for composers to rapidly identify the right musical concepts, commit to them and only then pursue with developing in more detail or with live recordings.

Choosing the right method of sketching requires one first critical step —that of assessing the clients' capacity for imagining full-scale music compositions based on simple core musical concepts. As explained by this composer, this assessment can be done through getting to know the clients' preferred work habits:

> Some filmmakers have that capacity, some don't, but I wouldn't expect them to at first. I would only start developing that expectation after I'd got to know them pretty well and know what they'd listen to, and how they listen to stuff. I'd need to spend some time with the director to work out what their level of understanding is of this composing and demo process. If they're familiar with sketch demos, if they're used to hearing just a simple piano arrangement of a melody, then great, if that's the way they've worked in the past. [..] I need to feel confident that they know what's going on and know how this works.

The same composer also indicates that using rough sketches is more conceivable when there is a shared history and a mutual trust between the composer and the clients:

> Before I start doing sketches I need to have a relationship with the director where I trust, I have an idea of how much of a leap of faith they can make. Like if we have a track record together, a history, and I know what they listen to and we've gone through this process before, then I can sit down with them and play them a piano melody, and they trust that I can orchestrate that and make it sound like whatever their model is. But if we don't have that sort of relationship I would very rarely give them a little sketchy model.

One important purpose of using sketches is to generate valuable and constructive feedback. Composers would want to avoid their clients being distracted by supposedly meaningless, unimportant details. It could be argued that one can be distracted by the roughness of some sketches as well as by ornamental trivialities in polished sketches. However, research endeavours in other areas like design or human-computer interaction show that people tend to concentrate more easily on core ideas and core principles when dealing with rough, unsophisticated sketches (Buxton, 2007; Hearst, 1998). More research is necessary to demonstrate whether the same observations directly apply in the context of film scoring and to understand how filmmakers' judgement is affected by the sketches' cosmetic qualities. To avoid most distractions, opting for one of the extremes might be recommended: either produce a highly polished and detailed sketch, or produce a deliberately rough one. With the former, the quality would be so impressive that filmmakers could more easily envisage the final score. With the latter, musical concepts would be so exaggerated that they would become more apparent to filmmakers and therefore easier to grasp. Every shade between these two extremes, I believe, would more likely bring out the distractive drawbacks articulated earlier.

At any rate, whenever a sketch is delivered to filmmakers, the composer should make it clear what the production values are. The composer should mention, for example, what the estimated percentage of completion for the sketch compared to the anticipated final piece is; what the core ideas presented in the sketch are and what specifically should be paid attention to; or what the issues the composer is already aware of are. In other words, the composer should clearly state what s/he is concerned about with the given sketch and how carefully it should be listened to. In return, filmmakers should describe as precisely as possible what they like and dislike about the sketch, and whether it matches or differs from what they originally had in mind. Composers and filmmakers should also agree to coordinate through an approval system, where it would be clear to everyone by which date feedback has to be provided at every stage of the project, so that the composer can amend the sketches and proceed with the rest of the composition.

4. Indexical Level

As seen earlier in this chapter, face-to-face is valuable for establishing trust and bridging the language gap. In fact, face-to-face is also praised by practitioners as a way to solve certain problems more rapidly. For example, one director says that she enjoys sitting at the composer's computer so that they can try out multiple instrument samples together. In a matter of minutes the composer is able to play various samples and the director can give instant feedback until the appropriate sample is found. Thus, face-to-face is helpful for tackling indexical issues as people can more easily and accurately show and point at things; a specific example is given by a composer:

> Sometimes they complain it's too busy or discordant, and sometimes you can just fix it by taking one element out. The problem is that they don't necessarily know what element annoys them (it could be an instrument or a melody). If you're sitting next to the person, at least they can point at it or explain it with body expressions, and you can quickly correct it.

If the collaboration is conducted remotely, tasks like the one described in the above example may require multiple emails over several days. With interaction between people collaborating remotely remaining drastically limited, indexical issues are much more difficult to handle. As explained in the previous chapter, indexical issues may introduce ambiguity when defining the scope of conversations. And, as also argued in the same chapter, it is a priority in remote contexts to resolve this ambiguity of scope because it may impact all other aspects of the collaboration and cause unnecessary workloads and misunderstandings. Unfortunately, as seen in the case study (Chapter IV), there currently is little help available for dealing with indexical issues in remote collaboration other than, for example, communicating tedious and lengthy descriptions by email or telephone. This is a problem which, I believe, could be solved through the use of specifically designed computer tools. The proposed design approaches for making such tools will be delineated in the next chapter.

This chapter featured a set of guidelines for alleviating communication challenges and facilitating the film scoring practice at the organisational, emotional, interpretive and indexical levels. These guidelines can be applied whether the composer-filmmaker collaboration is conducted remotely or face-to-face. However, it was argued that, in remote settings, indexical level issues ought to be resolved in priority, otherwise all other aspects of the collaboration may be jeopardised. The focus of this PhD being particularly on remote communication, efforts will be narrowed down to specifically address indexical issues. The next chapter, which marks the beginning of Part 3 of this thesis (*Solution Making*), will describe the design process followed in the creation of computer solutions to these identified issues.

PART 3:

SOLUTION MAKING

CHAPTER VIII

Designing Solutions

This chapter aims to study the opportunities for designing computer systems to alleviate indexical issues in remote collaboration. Film scoring practitioners already make significant use of computers on a daily basis but, as discussed earlier, holding precise creative discussions over distance still remains challenging.

The design of computer support for interpersonal communication may raise a number of concerns with collaborators, particularly regarding the trust aspects described in Chapter VI and VII. Regrettably, Nathan et al. (2002) 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 (1998) who argued that what technology lacks in the trust aspects of communication can be repaired by some initial face-to-face contact. Participants of the exploratory studies 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 (1997) and Rocco et al. (2000) provide inspiring information for understanding trust aspects of human-human interactions through collaborative computer frameworks. At this stage, the first step in conceiving an effective system should be to assist —not replace— rich interpersonal relations. Designers should not aim to replace all the techniques and media that practitioners already use to collaborate but rather to complement their collaborative process and assist them through it.

Therefore, two studies will be presented in this chapter. The first study will describe the development of personas to facilitate the understanding of the main roles involved in the film

scoring process. The second study will showcase the design of a low-fidelity prototype to assist the remote discussion of music and video artefacts.

1. Persona Study

Following Cooper's (1999; 2007) Goal-Directed Design methodology, presented in Chapter III, a study was organised to develop, test and refine a set of personas to facilitate the design process[54]. The context, procedure and results of this study are now presented, preceding a reflection on the benefits of the approach and suggestions of refinements.

1.1. CONTEXT

The first steps of the design approach consisted of identifying, in detail, the profiles of the target audience and the true goals and motivations these people held. Aided by the data captured through the exploratory studies, presented in Part 2 of this thesis (Chapters IV to VII), a set of four distinct *personas* (two composers and two filmmakers) were developed. The personas were fictitious, realistic characters that represented the key stakeholders 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 prototype development, when considering potential users of a solution.

2. To validate with study participants that there existed in the researchers an accurate understanding of the main roles and concerns in the film scoring process

As originally introduced by Cooper (1999) in software design, personas are used to give a detailed and individual identity to a group of potential users of a 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" (Pruitt & Grudin, 2003). 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".

[54] This study, published in (Phalip et al., 2007), was conducted with the assistance and guidance of Matt Morphett, an Australian film composer and experienced interaction designer. Parts of this section (*Persona Study*) were co-written with Matt.

1.2. PROCEDURE

Early versions of the persona descriptions were disseminated to eight professional practitioners (composers, directors and producers), six of whom had not participated in previous exploratory studies. Descriptions took the form of tables (see example in Figure 24, and the complete versions in Appendix F) containing information about all four personas. 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.

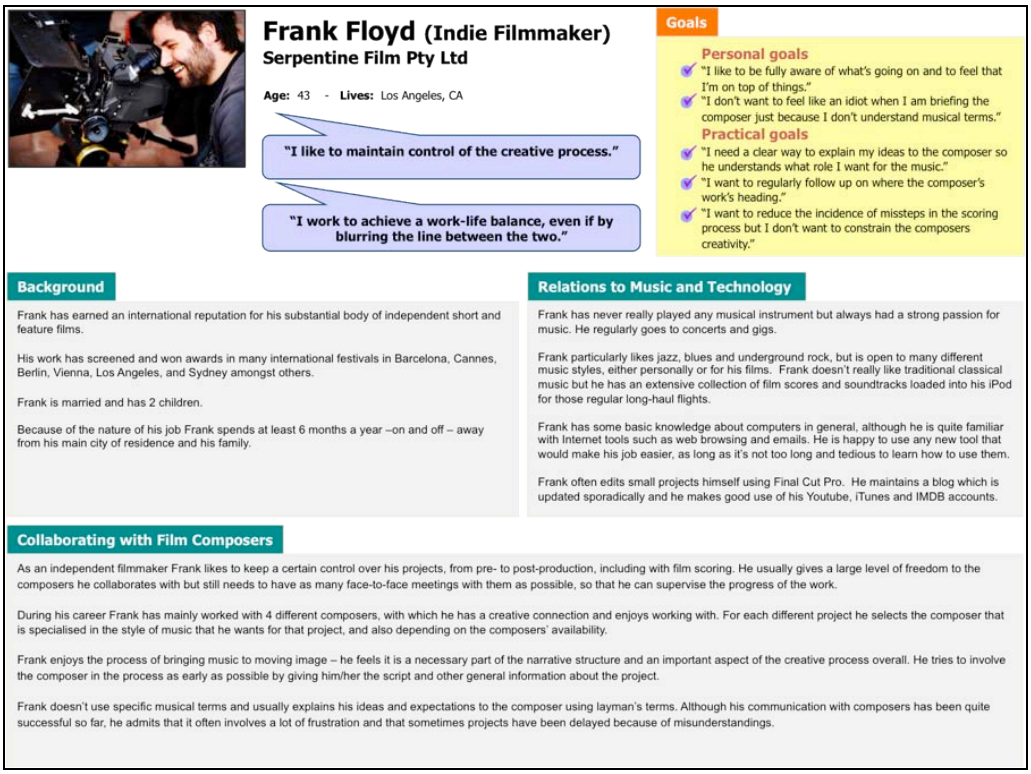

Figure 24. One of four persona descriptions assembled as part of research activities

Participating practitioners were given one week to fill out a feedback sheet. The task was to comment on the plausibility and authenticity of the information contained in each of the tables' sections, for each persona: general information (age, gender or occupation), background, relations to music and technology, collaboration with composers/filmmakers, and goals (both personal and practical). The feedback collected through this study was then incorporated to refine the personas. This process resulted in the assembly of richly rendered archetypes of potential users for the computer tools to be designed.

1.3. RESULTS

The personas represented all the needs and concerns that real-life practitioners had expressed. And, overall, study participants clearly provided positive feedback, saying that the personas were "*very realistic*" and sounded "*true and accurate*". Other comments stated, for example: "*As*

much as it is possible, you seem to have broken the personas down to a very realistic level", *"[This persona] describes the current filmmaker generation pretty well*", or "*Very good job in accurately representing some of the key persona involved in this industry. I think you have done a very good job in matching the right attribute to every single character*". Several participants also noted that the personas seemed familiar: "*I know about 50 of these guys*", "*I know some people like her*", "*I know quite a few composers with this kind of background*", "*This persona is perfect. I can name at least 2 [people like him]*", "*I regularly work with [people like] all the mentioned personas*". This comforted the understanding of the roles and concerns which had come from the exploratory studies.

Between the two composer personas, Mary and Jasper, significant variations in behaviour, attitude and goals were discovered. One persona, Mary, 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, Jasper, 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. Oliver 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, Frank and Oliver, were also different from each other. Representing the large group of semi-professional and professional writers/directors and producers, Frank 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. Frank would usually choose from the same small number of trusted composers. The second filmmaker, Oliver, 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. Oliver 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 the personas. An example of the goals identified for one of the personas is included in Table 5.

Table 5. Identified goals for one of the personas.

Frank Floyd (Independent Filmmaker)	
Personal Goals	*Practical Goals*
❖ "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."	❖ "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 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.

1.4. BENEFITS OF THE APPROACH AND SUGGESTED REFINEMENTS

As the research progressed, benefits of the adopted interaction design approach were identified. First, that approach provided a detailed description of practitioners' profiles and concerns. The development of personas and goals helped validate early hypotheses about the targeted domain and design space. It also helped structure research priorities around the specific needs of a well defined set of users. This improved the chances of a genuine application of the research into the service of people who needed it.

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 engage the participants deeply in the

research. "The power of fiction to engage" described by Pruitt & Grudin (2003) was confirmed, as it was observed that:

- Participants embraced the identity of the personas, referring to them by name: "*I feel Frank wants to be successful and known for his vision*".
- Participants were able to identify with and relate to the personas: "*He's a sweetheart. I totally relate to him*", "*On my part, I would probably fit right in between Mary and Jasper*", "*[I am] Frank with a small portion of Jasper thrown in (I am more commercial than Frank – so less of an artist but I relate to his dedication and drive, and have a good understanding of technology like Jasper)*", or "*I identify with Frank because I can relate to his goals, both personal and professional and because we share similar jobs. I think his goal set is well structured and diverse enough to satisfy the often stringent requirements of the Indie filmmaker*".
- Participants 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 participants 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 to balance the different comments and to reach a more objective vision of reality.

Some lessons learned through the research process suggested refinements to the approach. The goals articulated for the personas were identified purely in the context of the film scoring process. However, it appeared 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 not initially seeing this as a primary motivator for him in the context of film scoring communication. Interestingly, one of the survey participants 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.

Lastly, the feedback sought on the personas was extensive, asking for comments against every aspect of all four personas. Consequently some of the participants struggled to respond within the one week they were allowed. Therefore, it is now believed that reducing the amount of feedback requested should be preferred over allowing a longer response time. Asking for explicit feedback against each persona's goals only with a general response for the rest of the persona description would have optimised compliance.

2. Low-Fidelity Prototype and Design Study

In this section are first exposed the motivations for conceiving a Web-based system to solve indexical issues. A low-fidelity prototype of this system, designed to facilitate the establishment of a clear scope for creative discussions in online and asynchronous settings, is then described. Lastly, the characteristics and results of a design study, conducted with two composers and a filmmaker, are presented to discuss the suitability of the prototype's concepts.

2.1. TOWARDS A WEB-BASED SYSTEM

Based on all the observations made during the exploration phase of the research (Chapters IV to VII), three considerations should make designers lean towards a Web-based system: familiarity, accessibility and flexibility. As discussed earlier, today's practitioners are increasingly familiar with computers and Web technologies. Both as a consequence and a cause of this familiarity, the accessibility of Web technologies is also amplified with the growing number of people having Internet connections at home and at work. Websites can be accessed by a large population of users as they can be used virtually on any platform (e.g., Mac or PC, desktop or mobile phones). Accessibility is particularly relevant here as the research focus of this thesis is remote collaboration, where collaborators cannot benefit from direct face-to-face expressions. Flexibility is also an important aspect as Web-based tools can be conceived to allow people to access the system at their own preferred time and to participate both in synchronous and asynchronous communications.

In Chapters II and VII, it was argued that the exchange and use of *boundary objects*, namely artefacts for bridging the gap in communication between different disciplines, would facilitate the establishment of common ground in creative collaboration. A Web-based system could well be envisaged to allow the upload of working artefacts (e.g., music or video sketches), the participation in creative discussions and the annotation of the uploaded artefacts. Coupled with a database, the system could also enable the preservation of artefact, annotation and discussion histories. Computer support for the annotation of artefacts is widely regarded as necessary, yet challenging, in the collaborative process. Several solutions for text-based documents have already been widely used (Microsoft Office[55], Google Docs[56] or Adobe Acrobat[57]). A range of tools like Scribblr (Weakley et al., 2007) have also been designed to annotate drawings and image sketches online. Likewise, compelling systems have been proposed for the annotation of multimedia documents and video material (Bouvin et al., 2002;

[55] http://www.microsoft.com/office/

[56] http://docs.google.com/

[57] http://www.adobe.com/products/acrobat/

Ramos & Balakrishnan, 2003). There also exist popular online tools like Viddler[58] through which users can post comments (textual or video-recorded via a webcam), at particular points in time in a video (Figure 25).

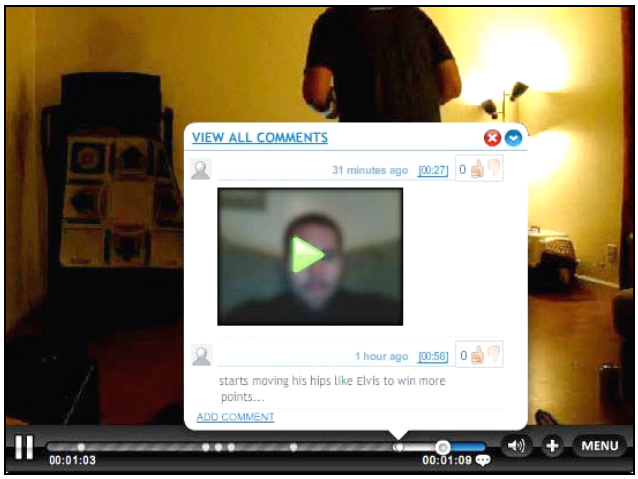

Figure 25. Viddler.com allows users to annotate videos at particular points in time with textual or video comments.

As already mentioned in Chapter II, a set of web-based applications dedicated to collaborative music making has recently emerged. Good examples are IndabaMusic.com (Figure 26 and Figure 27), Jamglue.com or SpliceMusic.com, through which users can exchange music samples, lead discussions via chatting, forum or in-song commenting tools, and execute multiple editing tasks in a sequencer to compose new pieces.

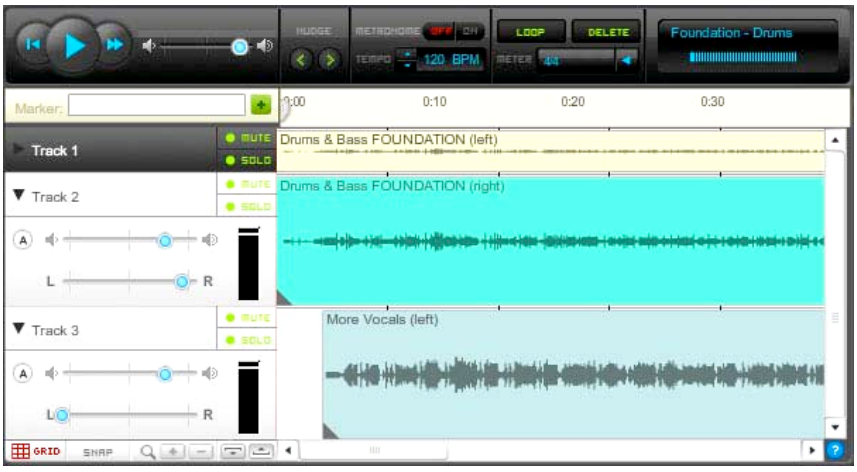

Figure 26. Example of an online sequencer at Indabamusic.com

[58] http://www.viddler.com/

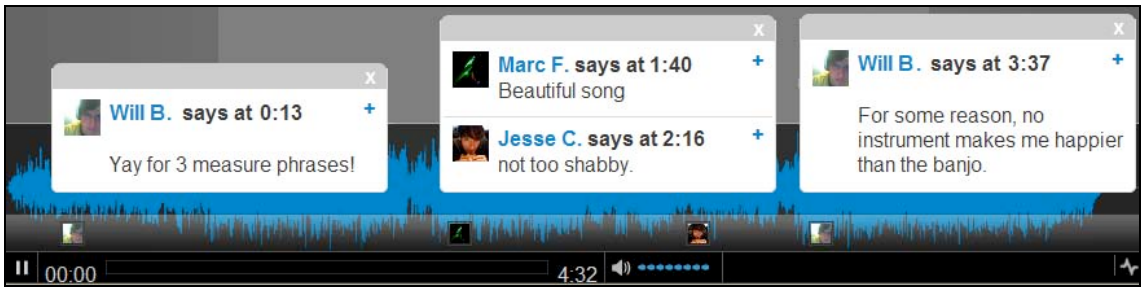

Figure 27. In-song commenting system at Indabamusic.com

However, existing online annotation tools are not satisfactory as they do not provide the level of precision required for solving the indexical issues practitioners are confronted with. For example, Indaba and Viddler only allow one to comment respectively on one whole song or one whole video, rather than on the individual layers the song or video is made of. Also, they only allow one to select discrete points in time rather than to demarcate time periods within the commented artefacts. Another problem with Viddler is that if multiple discussions occur on the same artefact the interface can rapidly become overly cluttered and difficult to interact with, as illustrated in Figure 28.

Figure 28. Control bar of the video player at Viddler.com. Each dot represents a discussion thread.

Thus, to appropriately address indexical issues in remote collaboration, it is judged necessary to design a fully integrated Web-based system supporting the detailed creation and precise annotation of video and music artefacts.

2.2. LOW-FIDELITY PROTOTYPE

Crabtree's (2003) *evolutionary prototyping* was one important inspiration for this research's methodology and, as announced in Chapter III, its principles were applied in the design of a low-fidelity prototype. Prototyping has widely been recognised in design disciplines for its capacity to support not only internal communication between designers, but also external communication with potential users. In particular, low-fidelity prototyping and interactive sketch techniques have increasingly been seen by interaction designers as a valuable way to demonstrate and test new solutions at low cost and with maximum efficiency (Buxton, 2007). Similarly, Crabtree argued that the incomplete character of a prototype is meant to allow for quick turnover and rapid feedback from users:

> [The prototype] represents an initial first guess as to what might constitute a realistic design solution. That is, an informed guess that might be evaluated, elaborated, amended and/or refined by consulting end-users, and built upon in light of users hands-on experiences in an evolutionary process of development. — (Crabtree, 2003, p. 129)

Thus, following evolutionary prototyping principles, the first iteration of the system's most prominent and complex component, the sequencer, was completed by assembling concepts learned from exploratory studies into a low-fidelity, paper-based, prototype (Figure 29 and Figure 30). Like most existing sequencers, the prototype enabled basic tasks such as the mixing, editing, syncing and playback of video and music elements. Essentially, users could upload files (e.g., music sketches or video files for particular scenes of the film), import them into the sequencer and position them so that they play back in sync within the mix. This laid a common base of information that every stakeholder could access and refer to. The fact that all parties were then able to visualize and modify the various elements within the same environment constituted the first necessary step in defining a precise and shared scope for communication.

In addition, thanks to the novel concept of discussion tracks (-e- in Figure 29), the prototype offered the ability to annotate music samples and video footage present in the mix.

Figure 29. Prototype sequencer overview:
(a) Controls, (b) Timeline, (c) Video track,
(d) Audio tracks, (e) Discussion tracks.

The principal novelty of discussion tracks, compared to other tools such as Indaba or Viddler, was in their visual and fully-integrated representation. Discussion tracks were placed under audio and video tracks and contained stacks of discussion threads. Each thread was

symbolized by a small horizontal bar that could be created by clicking and selecting a region within the discussion track. The position and length of each bar respectively represented the start time and duration of the audio or video section above it. This representation enabled the demarcation of specific sections of the mix, therefore establishing a clear temporal scope for each discussion. Examples of a discussion could then be: “I don’t quite like the piano here, can you try another instrument?” or “This part feels too slow to me. I think we should increase the tempo”. In those examples, ambiguity of the words “here” and “this part” would be removed, thus avoiding long descriptions of the conversation’s topic and alleviating indexical issues.

Then, clicking on one of the bars opened a window with all comments previously posted in the corresponding thread. It was then possible to post new comments to contribute to the discussion (Figure 30). Bars that contained comments not yet read by the user got highlighted and brought up to the top of the discussion track.

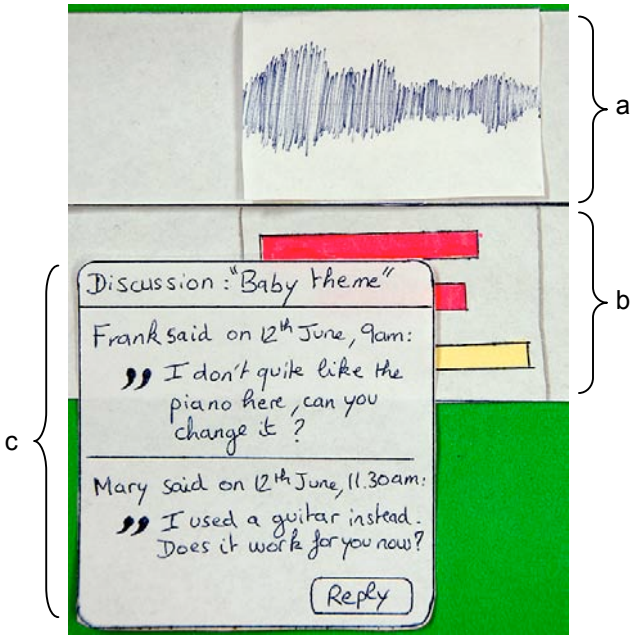

Figure 30. Prototype annotation and discussion system:
(a) Audio track containing the waveform of an audio sample,
(b) Discussion track containing three threads,
(c) Discussion window.

Moreover, to avoid potential cluttering when a large number of elements were present in the mix and to provide flexibility in managing the work space, it was possible to collapse and reorder all tracks within the sequencer.

Lastly, whenever changes were made in the mix (e.g., new music samples were added or new comments were posted) all stakeholders were automatically notified with an email sent by the system, announcing for example: “Mary has added 3 new music samples in the ‘Baby theme’

mix and has posted 2 comments". This automatic notification mechanism brought the benefits of easily tracking changes made by others and of accelerating asynchronous discussions.

2.3. DESIGN STUDY

The design principles assembled in the prototype described above were based on an understanding of the field and on issues raised by exploratory research. The next step was then to conduct a design study to verify that the prototype was addressing real issues and providing appropriate solutions. In this section, the specific objectives of this study and the methods used are exposed[59].

2.3.1. Objectives

Based on Mogensen's (Mogensen, 1992) prototyping approach in systems development, Crabtree suggested that a prototype's validity may be assessed against three main criteria:

> 1. Seeing the sense of the prototype: Can the end-users see the sense of the prototype in a practical point of view?
>
> 2. Recognizing the relevance of the prototype: Can the end-users see the relevance of the prototype to their work?
>
> 3. Appropriation of the prototype: Do end-users wish to appropriate the prototype to conduct their work with? — (Crabtree, 2003, pp. 140,167)

With the above criteria in mind, the primary objective of this study was to appraise the prototype's usefulness: would the prototype alleviate communication challenges faced by practitioners in remote settings and would practitioners be able to perceive the benefits? At this stage, the study was mainly concerned with appraising the design principles rather than with testing the usability of the interface. As Greenberg & Buxton (2008) argued, conducting usability tests too early in the design process would have little impact and may even be counterproductive. This was additional motivation for using a paper-based prototype, as it was known to increase chances for study participants to focus on the general characteristics and functions of the system rather than on the aesthetics and low-level interaction details (Buxton, 2007). Auxiliary objectives of the study were to identify potential design flaws, collect suggestions for improvement and uncover important issues that may have been overlooked.

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[59] This study, published in (Phalip et al., 2008), was conducted with the assistance of David Jean, a Masters student from the University of Toulouse, France

2.3.2. Participants

With the system design still at inception phase, it was decided to conduct a qualitative and in-depth study with a small group of participants. According to Christensen et al. (1998), small numbers of participants are appropriate if those are genuinely representative of targeted users:

> [S]mall user groups are representative, not in terms of broad categories of different users but in terms of *the work* members of small groups are required to perform. [..] Thus, consulting but a small number of competent practitioners (i.e. skilful doers of workaday activities) can elaborate much about the general character of support for workaday activities even in large Organizations of Work. — (Christensen et al., 1998) as cited in (Crabtree, 2003, p. 149)

Thus, three practitioners were recruited: two composers and one director. The director was new to this research. The two composers had participated in the exploratory studies and already knew about the research topic. It was the first time, however, that the participants were shown concrete results from the research and therefore they had no preconceived ideas about the system's features.

All participants were based in Sydney, Australia, had more than 15 years of experience in the film industry and had been working on a wide range of projects throughout their career: documentaries, feature films, short films and advertising. All had previous experience with distance collaboration and with collaboration including little face-to-face contact. One of the composers had just completed a film score project with a director based in a different city in Australia and the other composer regularly collaborated with filmmakers in the United States.

2.3.3. Procedure

Three individual sessions were organised, each session involving one participant and two observers (one leading the experiment, the other one taking notes). Following Crabtree's (2003) recommendations, the sessions took place in the participants' actual work environments (Figure 31). Thus they could easily refer to their own tools while giving feedback.

Figure 31. Design study sessions at the composers' studios

A few days prior to the sessions the participants were sent the description of the four personas (see Appendix F). Each session lasted for two to three hours where the same procedure was consistently applied. The process began with a demonstration of the prototype sequencer's features: track creation, audio/video editing, and annotation and discussion systems. A scenario walk-through then simulated the various actions directly onto the paper prototype (Appendix D). The scenario narrated the fictional story of a collaboration between Mary, a classically-trained composer based in Sydney, and Frank, an independent filmmaker based in Los Angeles. As recommended by Carroll (2000), Crabtree (2003), and Cooper et al. (2007), the scenario aimed to stimulate participants' reflection and to facilitate the comprehension of the prototype's features in realistic conditions of use. In Crabtree's terms, it aimed to let users "see the sense" and "recognise the relevance" of the prototype.

After watching the demonstrations the participants were asked to specifically comment on the prototype's features. This led to a free discussion where participants gave their opinion on the prototype, shared personal anecdotes, and provided feedback for improvement. Notes of the participants' comments were recorded and further questions were asked probing into particular ideas and issues that were raised in the discussions. This qualitative and flexible method allowed for the collection of rich and contextual data. Results compiled after the design study are presented in the next section.

2.4. RESULTS

2.4.1. Virtues of Asynchronous Communication

The exploratory studies, presented in Part 2 of this thesis, had shown that face-to-face meetings were fundamental in building propitious conditions for successful collaboration. Nonetheless, participants of this design study conceded that, in particular instances, they preferred remote and asynchronous modes of communication. On one side, the composers said that they were sometimes frustrated by their clients' feedback and criticisms and that dealing with that

frustration was not easy if the clients were standing in the same room. One of them said: "*Face-to-face can be very confronting, especially when you deal with 'difficult' people*". Being employed by the filmmakers and therefore being responsible for the work, the composers would have to put up with the frustration and behave as if they were in total control of the situation. Hence, the composers reacted positively to the prototype, one of them calling it "*a sanctuary, a place of safety*". Participants also noted that the system would provide filmmakers with the ability to access the sketches at home, listening to them multiple times if necessary; whereas during face-to-face meetings they would generally not have enough time to listen to the sketches more than two or three times. On the other side, the director declared she often felt nervous before meeting with composers. She was afraid of hurting their feelings:

> Often my initial reaction is very critical, I think it's more honest that way. But I am nervous when I listen to the music for the first time because I fear I'd have a bad reaction. If the composer sits next to me it could be awkward because they'd see your bad reaction. I guess it's hard for them to take all that criticism because they've probably been working hard on it.

She also said that she would prefer listening to the sketches before the meetings, so she would have the time to ponder over her feelings and would be able to deliver more constructive feedback. Clearly, there is a high level of emotion and sensitivity occurring in creative collaboration between filmmakers and composers, and as evidenced by the participants' testimonies some virtue can be found in asynchronicity. These observations highlight the need for more support regarding the interpersonal communication issues and corroborate the design principles put forward in the prototype.

2.4.2. Scope and Shared Environment

As already stressed in Chapter II, there is a necessity for creative professionals to explore ideas within the same environment (Fussell et al., 2000; Luff et al., 2003; Mamykina et al., 2002; Soliman et al., 2005). Yet, there is currently no integrated environment that efficiently supports distant collaboration between practitioners in the film industry. The participants' feedback especially revealed the lack of coordination between the existing tools they used (e.g., email, telephone, instant messaging, or file sharing via File Transfer Protocol [FTP] programs); a lack which was recognized both as a burden and as a source of ambiguity. On the one hand, the director disliked using FTP as it required her to download each individual musical piece posted by the composer. She also had to manually lay all the pieces in her own editing software before syncing them to the picture. She found it was a lengthy and tedious process, and she appreciated the fact that with the system every element would be centralized and manageable from one place. On the other hand, current communication tools were blamed for potentially carrying ambiguous information, as illustrated by a composer's anecdote:

> I once received some feedback from a director. It was a very long email telling me what he thought about various cues I'd done. He must have spent 3 hours writing that email, and I didn't even quite understand what he was referring to. I wished he could have pointed precisely where the problems were.

Consequently, the annotation feature was well received by the participants. They clearly valued that it would assist with framing the scope for discussions, therefore reducing the chance of ambiguity occurring and avoiding time wasted in tedious and uninteresting descriptive tasks.

Participants also made the remark that the system could facilitate the inclusion of the sound designer and film editor in the creative loop. If those third-party collaborators had access to the system they could follow the evolution of the work and contribute to the discussions when necessary. For example the sound designer may advise the composer of all the sound effects that would be laid in the film earlier in the creative process, which would prevent potential conflicts between the music and sound tracks: "*It would be good if the sound designer could participate in the discussion. He could advise on the things to keep in mind, like 'Don't put a violin solo here as there will be a big explosion and you won't be able to hear it'*", the director said. Also, as noted by the director, a shared environment would help bridge the gap caused by the variety of technologies people were currently using:

> We never got around the problem between the composer and the sound designer. My sound designer works with Protools and my composer with Cubase and there's no way to easily transport the work other than manually.

These results put an emphasis on the need for implementing a shared collaborative environment and for defining a clear scope for creative discussions.

2.4.3. Work Load Division

When designing the prototype there were concerns with how the work load performed on the system would practically be divided between the targeted user groups (filmmakers and composers). Therefore the participants were asked whom they thought would spend more time administering the system, that is, setting up and maintaining the projects, uploading files, creating mixes via the sequencer, managing events and so forth. The answer was unanimous: it would be the composers. On one side, the director assumed that composers would be responsible for most of the work executed on the website. She said that she would probably not have enough time available except for listening and commenting musical pieces, or for doing slight mixing adjustments. On the other side, both composers acknowledged filmmakers' lack of time and both also anticipated taking on the bulk of the work. However, the composers said that it would not necessarily represent a major surplus of work as they were already used to making pre-mixes and to packaging mock-ups to show their clients. Nonetheless, composers indicated

that they would be averse to "doing things twice", that is, making fine-grained mock-ups locally on their computer and then again online on the collaborative system. Practitioners were already used to performing complex mixing and editing tasks with powerful tools on their desktop computers. Hence, they declared they would rather use the prototype system to post pre-mixed elements and then only perform basic mixing tasks on it to illustrate the creative discussions. These remarks thus accentuated the need for supporting high level collaborative tasks over the purely technical ones.

2.4.4. File Encoding

Online systems often come with a set of constraints, particularly when dealing with heavy media like audio and video files. Considering the current broadband capacities, it was usually necessary in common online systems to encode those files with lossy compression algorithms to provide reasonable download and workflow speeds. These constraints initially represented a concern as they may have negatively influenced the targeted users' acceptance of the system. However, that concern was somewhat lessened by the participants' feedback, for two main reasons. First, they primarily viewed the system as a way to exchange and discuss works in progress rather than finished and polished works. Therefore, it was not an issue for them to use mp3 or QuickTime files. In fact, they already preferred manipulating compressed files as it was faster and more flexible for them to work with. Second, the participants saw file compression as a way to protect their work from piracy. Compressing audio and video meant that the files would not be suitable for broadcast. In the case where a file was intercepted by an ill-intended third-party it could not properly be taken advantage of.

2.4.5. Other Results

Apart from the predominant results presented above, a number of issues, concerns and suggestions worth considering for improving the system also emerged from the study.

First, all participants expressed some anxiety regarding security, privacy and copyright issues. Although, as mentioned earlier, compressing files would prevent full exploitation by ill-intended third-parties, it is still of absolute necessity to protect the content of the work and discussions exchanged within the system by implementing a restrictive access scheme.

Moreover, it was a requirement of the practitioners that they preserve archives of the discussions as well as a history of the work's evolution. Considering the large amount of information exchanged throughout the collaboration, maintaining archives would help practitioners remember past states of the work, as noted by a composer:

> It's good to have archives, so you can compare with old versions. I always have the old versions loaded in the computer, in case they ask to hear them again. They can remember their feelings from previous versions they heard but they need to hear them again to be able to say what they liked or disliked about them.

Other specific reasons given for keeping a precise history were to be able to track 'who had changed what', and to be able to refer to decisions made in previous discussions.

Furthermore, the system was seen as a potential device for finding new jobs and collaborators. In particular, the director appreciated the fact that she could listen to realisations posted by composers on their portfolio page. However, she did not want to be solicited by strangers looking for work. It is therefore important to let the users decide what personal information may be publicly shared or should be kept private.

Finally, although the automatic notification system was originally designed to report on the explicit actions made by the users (e.g., comments posted or editing tasks performed in the sequencer), the composers suggested that it also sent reports when the work was simply viewed by the filmmakers. They said that it would relieve some of the nervousness they commonly experienced not knowing if their sketches had been heard at all.

2.5. REFLECTION ON THE METHOD

In this section, a reflection on the method used in this design study is proposed; a method which enabled to gather compelling data with a small number of participants.

First, despite the length of each session (between two and three hours) the participants showed a lot of enthusiasm. This was probably due both to the qualitative approach and the fact that the research addressed issues at the heart of their practice. The procedure was flexible and informal, permitting the participants to interrupt the demonstrations with their own questions and remarks. Although there was a pre-established set of questions the participants were allowed to spontaneously raise their own issues, which then were probed with further questions on the fly. It was found that this approach generally favoured the emergence of personal anecdotes and ideas from the participants.

Additionally, there were multiple benefits in organising the study at the composers' studios (the session with the director was conducted in a plain room because of untimely schedule). In the first place, composers felt comfortable being in their work environment as they were already used to receiving clients and collaborators in their studio. Also, being close to their computers they could show the programs they used pointing at features they would like to see included in the prototype. Participants also showed excerpts of emails, reports or notes that had been taken at professional meetings, which would have not been possible had the sessions occurred in different contexts.

Furthermore, the personas helped greatly in the process as they gave a more realistic tone to the demonstrations. The participants engaged naturally in the discussions and spoke freely about their peers, for example: "*It's hard to work with directors like Frank, Frank is god*", said a composer, or "*A producer like Oliver is more an employer than a filmmaker. Oliver is more*

concerned with budget and deadlines whereas a filmmaker would care more about the outcomes", said the director. It was also noticed that the participants mostly referred to the personas representing the practitioners on the other side of the collaboration (i.e., composers speaking about filmmaker personas and vice versa). This could be explained by the fact that throughout their career they have collaborated with practitioners filling roles other than their own.

Lastly, using a paper-based prototype proved to be an efficient way to convey the design principles, as a composer commented: "*I like the physicality. When you showed it, I really got it. It really speaks to those that are not computer savvy*". All participants were stimulated and spontaneously moved elements around themselves, asking questions or suggesting ideas for improvement. They rapidly understood the sense of the prototype's features, explicitly recognised the system's relevance to their work, and appropriated the interface for themselves thanks to their familiarity with sequencing tools.

This chapter described two design studies. The first study was concerned with the elaboration of personas to refine the understanding of the main roles and needs in the film scoring practice. The second study consisted of the creation of a low-fidelity prototype to tackle the indexical issues identified in remote communication. The assessment of this system by the practitioners validated its usefulness in that all three criteria suggested by Crabtree (2003) (i.e., seeing the sense, recognising the relevance and appropriation of the prototype) were fulfilled. This calls for further development and for the implementation of the prototypes' features described in the next chapter.

CHAPTER IX

Implementing Solutions

To give more concrete expression to the design principles presented in the design study (Chapter VIII), a high-fidelity version of the prototype was implemented. This version, named *Screenfaction*, was developed as a Web platform consisting of two main components: the general website and the sequencer. This chapter showcases *Screenfaction*'s features with numerous screenshots and brief textual descriptions.

1. General Website

The general website was implemented using traditional Web technologies: Hypertext Markup Language (HTML) and the Javascript and Python programming languages. The website's core was built with the Django framework[60] and was deployed with the Apache Web server[61] and a MySQL database[62]. The website's modules were all coded from scratch by myself, the researcher. The characteristics of this general website are now presented.

Once logged in to the website, users are shown the front page (Figure 32) displaying *notices*, or a summary of all recent actions taken by the user him/herself, and his/her collaborators. Each user can create any number of projects s/he likes, for example one project per film score production. All projects the user is a member of are listed for easy access on the right hand side of all pages of the website (see example in Figure 32).

[60] http://www.djangoproject.com

[61] http://www.apache.org

[62] http://www.mysql.com

Figure 32. Front page and notices

The website contains the notion of *contacts* to ensure security and privacy. Two website users must be contacts in order to collaborate on the same projects and to communicate with each other. Contacts can be blocked to prevent any communication with certain users. The management of contacts can be done via the webpage shown in Figure 33.

Figure 33. Contact management

Screenfaction lets users demo their past audio and video realisations on their portfolio page (Figure 34). This allows users to better know their collaborators' creative styles and capacities.

Figure 34. A composer's profile page

Once a project is created, the team of collaborators can be managed from the page shown in Figure 35. To participate to a project, a user has to be invited by another member of the team or by the creator of the project.

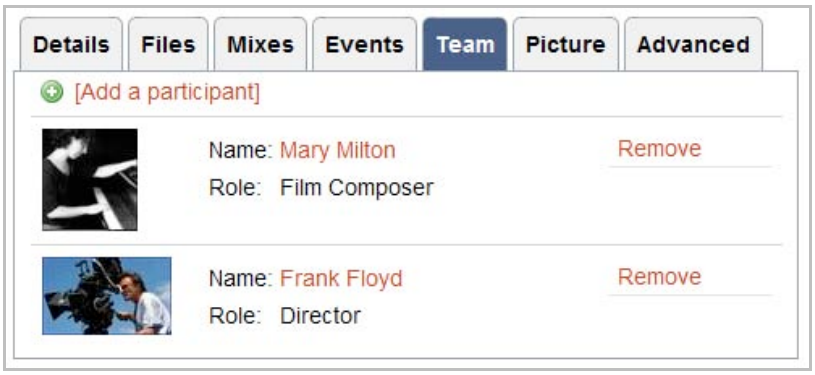

Figure 35. Team management

It is possible to upload files of any format to a project (see example in Figure 36). Every uploaded file is automatically encoded on the server with lossy compression algorithms: MP3[63]

[63] MPEG (Moving Pictures Experts Group) Layer 3

for audio files and FLV[64] for video files. This process enables the reduction of file sizes with a 1:5 ratio, thus permitting faster loading via Internet connections, but at the expense of sound and visual quality. It also allows the utilisation of formats that can easily be imported into the sequencer (see next section).

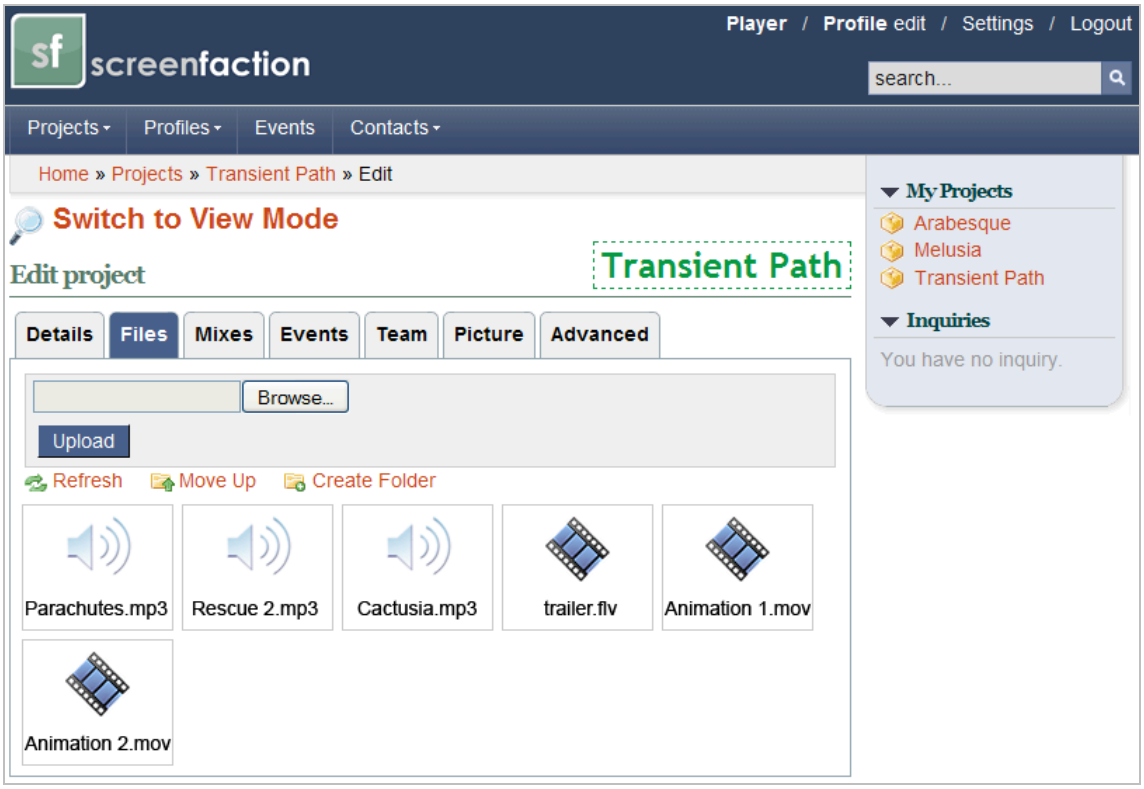

Figure 36. A project's file gallery

As seen in the case study (Chapter IV), scheduling is a crucial aspect of film production. All collaborators need to have a common frame of reference and need to be aware of the important deadlines (e.g., dates of spotting session, lock-off delivery or film's release). Therefore a simple event management component is featured in *Screenfaction* (Figure 37). It allows every user to look up and manage events related to any given project s/he is a member of.

[64] Flash Video

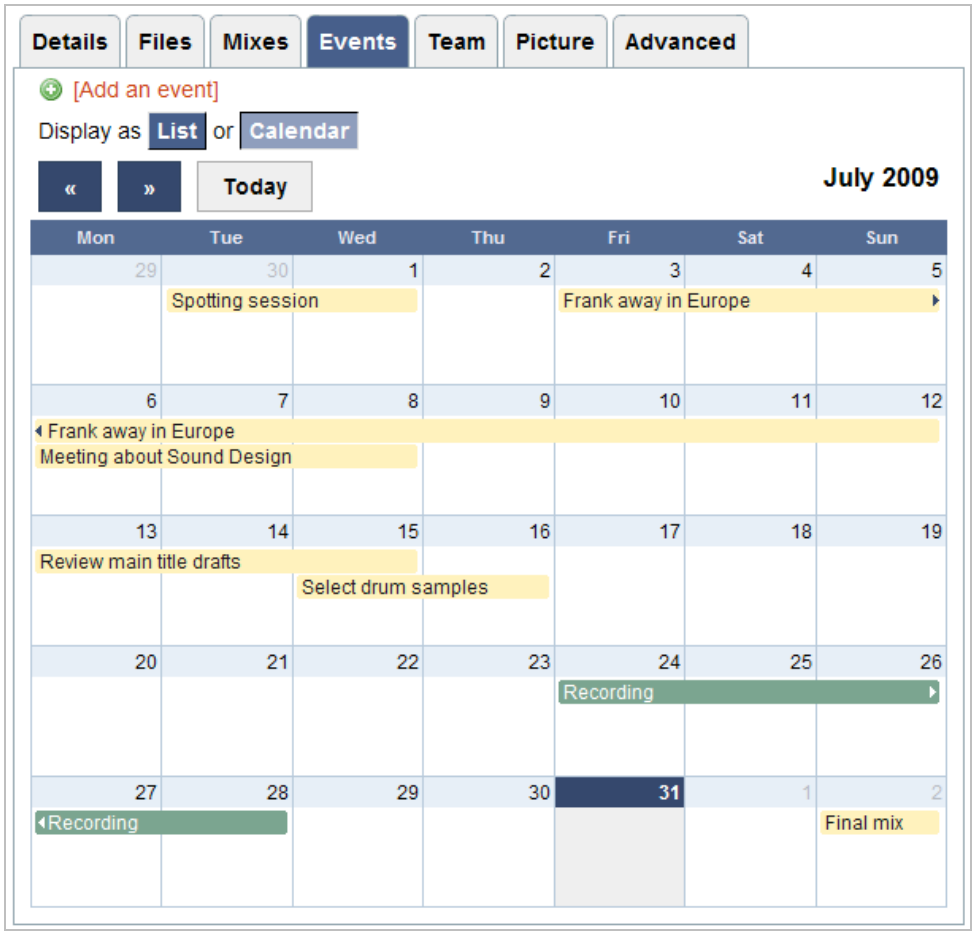

Figure 37. Calendar of events

Lastly, it is possible to create any number of audio/video mixes in a project. Each mix can then be populated and modified via the *sequencer*, described in the next section.

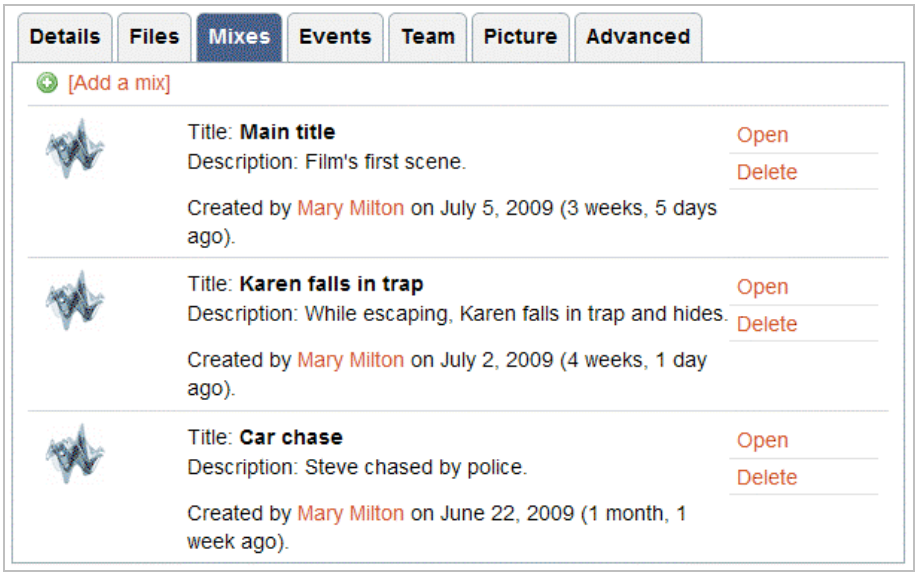

Figure 38. List of a project's mixes

2. Sequencer

As introduced in Chapter VIII, the sequencer is *Screenfaction*'s most complex component. It was implemented in Flex[65], a technology permitting the construction of highly interactive Web interfaces. It allows the creation and precise annotation of music and video mixes. It renders asynchronous collaboration possible so that each user can independently make changes to a mix from their own personal computers. The specific implementation of the sequencer lasted for 7 months[66].

As shown in Figure 39, each video or audio track is divided in two parts or sub-tracks: the media track that contains yellow blocks symbolising the audio or video elements, and the discussion track that contains blue blocks for discussing or annotating the corresponding yellow blocks above. Each yellow block and its attached blue block can be moved to build the mix and to sync music pieces to the picture. To save space on the interface, each discussion track and its contained blue blocks can be masked by clicking the bubble icon in the track header on the left hand side.

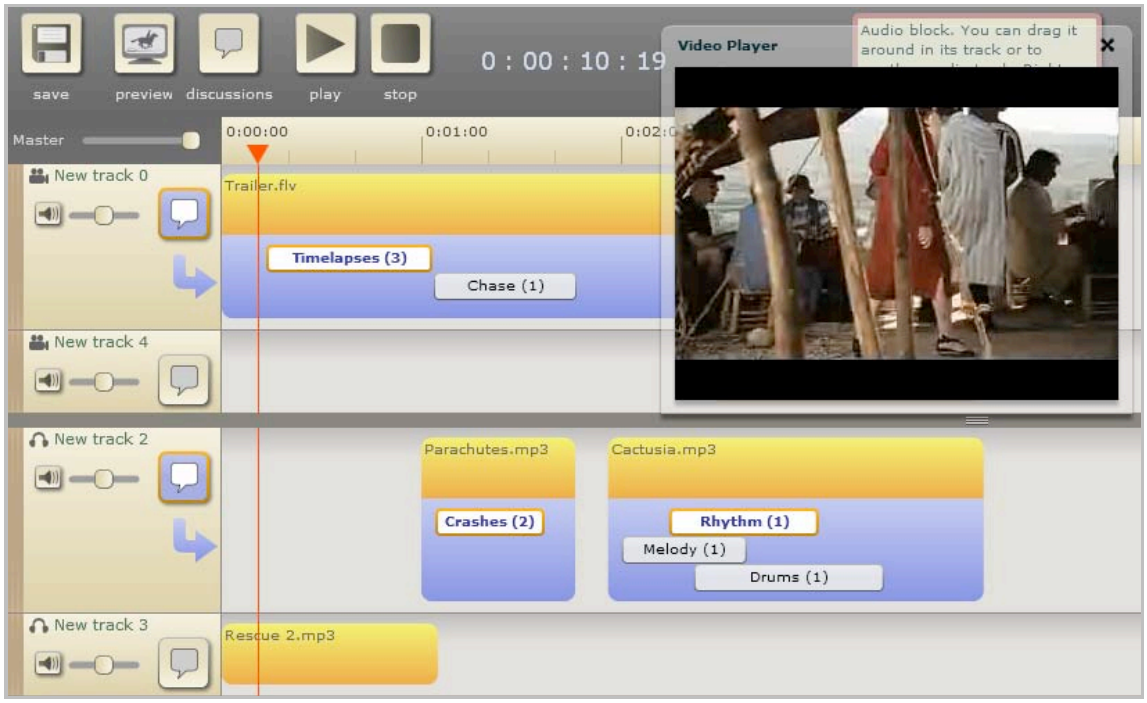

Figure 39. Overview of the sequencer's interface. This example contains 2 video tracks (above the horizontal grey line) and 2 audio tracks (below the line).

[65] http://www.adobe.com/products/flex/

[66] A visiting scholar at the Creativity and Cognition Studios, David Jean, also provided some assistance to develop the foundations of the sequencer

Files previously uploaded and automatically encoded in FLV or MP3 via the general website can be imported into the sequencer from the file explorer (Figure 40).

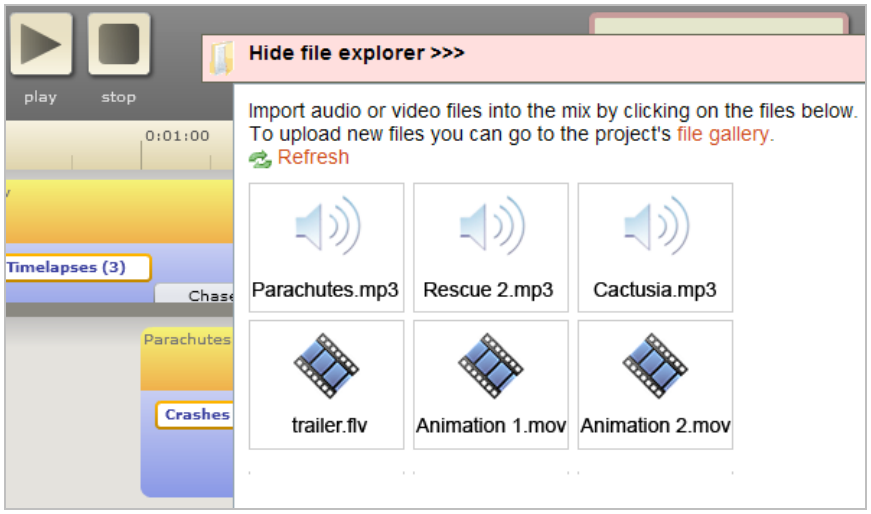

Figure 40. Importing audio and video files into a mix

To create a new discussion thread, the discussion track has to be expanded by clicking the bubble icon in the track header. Then, one has to select a section in the blue block corresponding to the period of time the discussion applies to (Figure 41-1). A popup window then appears where the user is invited to provide the subject of the discussion and type the first message of the thread (Figure 41-2). After clicking the OK button, a discussion bar displaying the discussion's subject is created at the selected location (Figure 41-3).

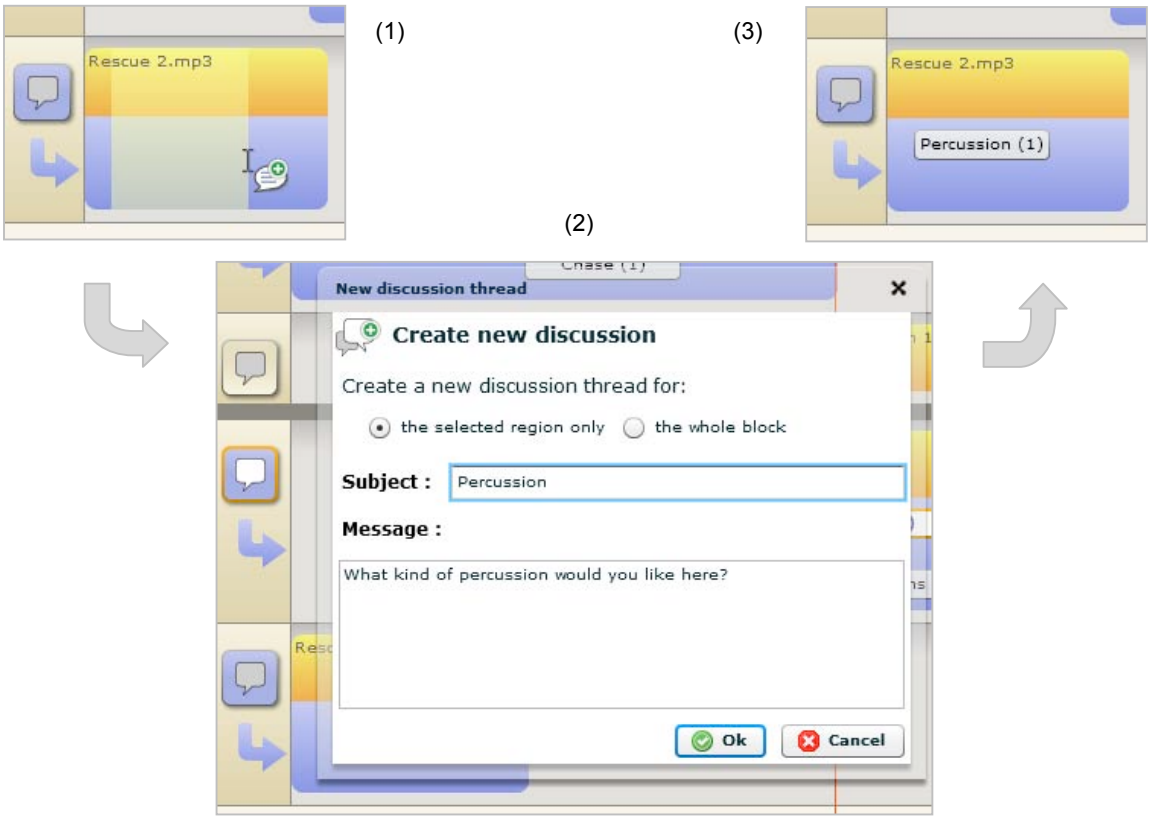

Figure 41. Process for creating a new discussion thread: Select a section in the blue block (1); type a subject and a message (2); the thread appears in a discussion bar (3).

If multiple discussion threads occur for the same audio or video element, discussion bars are stacked in the blue block (Figure 42). A colour scheme indicates whether the thread contains unread messages (white bar) or not (grey bar). Threads with unread messages are automatically put at the top of the stack. Numbers in brackets are displayed next to the discussions' subjects to indicate how many messages there are in the threads. Hovering a bar with the mouse cursor causes the section in the yellow block above to be highlighted (also Figure 42).

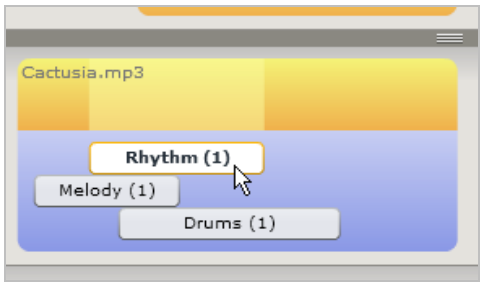

Figure 42. Highlighting a thread's time section

Clicking on a discussion bar causes a popup window to appear and display the content of the discussion thread (Figure 43). From there, users can post replies to contribute to the discussion.

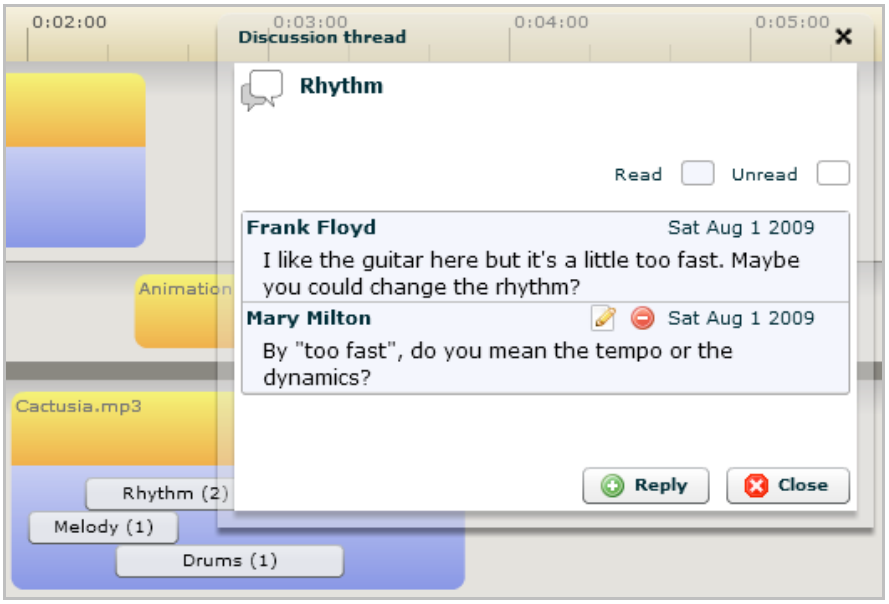

Figure 43. Discussion blocks and discussion window

If the discussion thread's timing is not correct, it is possible to adjust both start and end times by resizing the discussion bar (Figure 44).

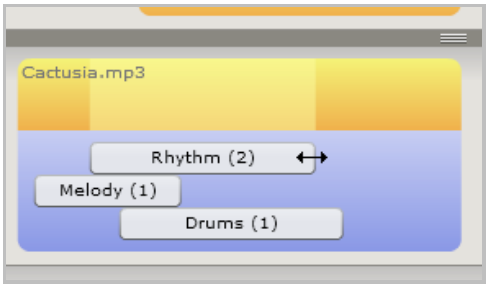

Figure 44. Adjusting a discussion thread's timing

The sequencer also has a zooming functionality. This is useful, for example, for zooming in to make precise adjustments (Figure 45-a) or for zooming out to get an overview of the mix (Figure 45-b).

(a)

(b)

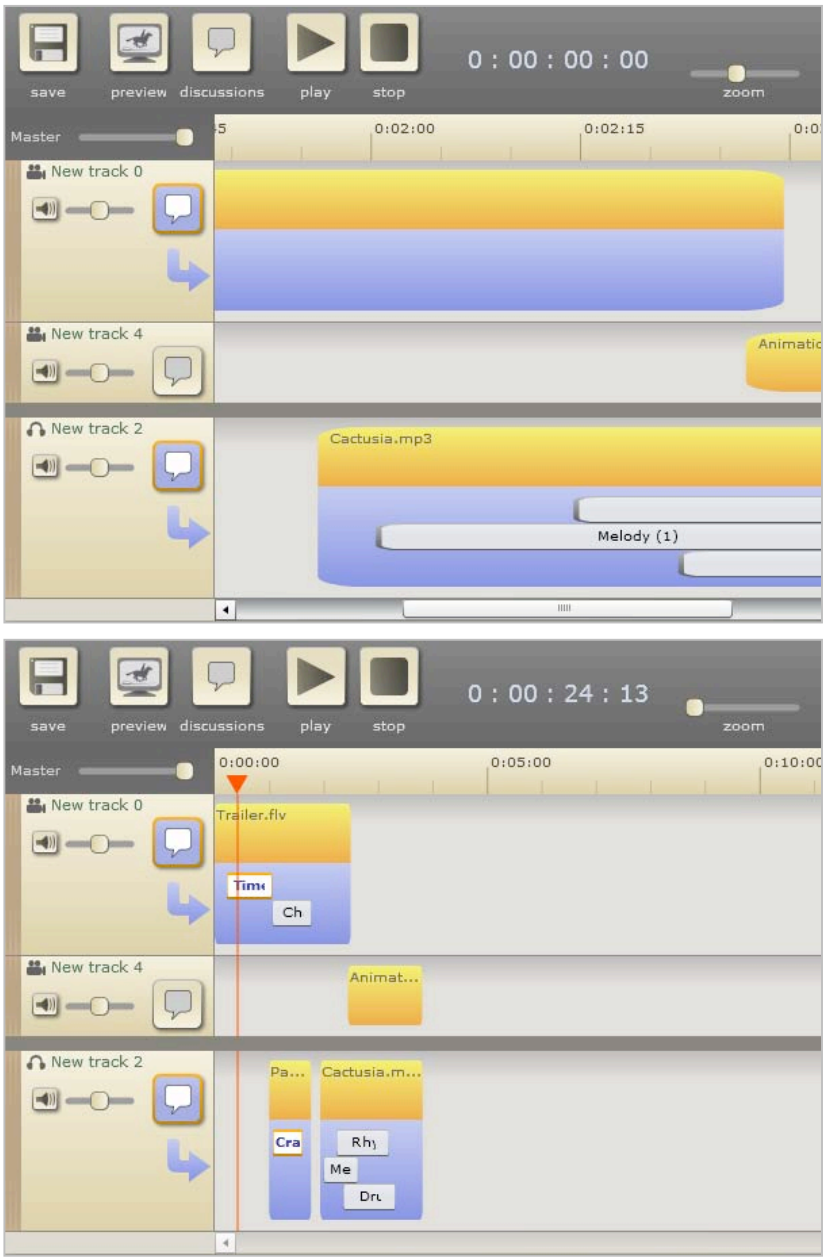

Figure 45. Zooming in (a) and out (b)

While discussion blocks allow the discussion of specific sections of the mix, it is also possible to hold general discussions about the whole mix or about broader concepts with the general discussions window (Figure 46). This window contains all of the general discussion threads and makes use of the same colour scheme as the specific discussion bars, i.e. white for threads with unread messages and grey otherwise. White threads (or unread messages) are automatically put to the top of the stack.

Figure 46. General discussion window

Lastly, when clicking the “Save” button, all changes are stored in the database and an email notification is automatically sent to all members of the project so that they can, in turn, open the mix, view the changes and respond to the new comments.

This chapter briefly presented *Screenfaction*, a high-fidelity implementation of the prototype described in Chapter VIII. In the next chapter, *Screenfaction* will be evaluated in real-world conditions to assess whether it contributes to resolving the identified indexical issues in remote communication.

CHAPTER X

Evaluating Solutions

To complete the PhD research, a qualitative evaluation study was organised in the context of a real expert collaboration. The aim was to verify the new assumptions that had emerged from the design study (Chapter VIII), namely that asynchronous communication was acceptable and that a shared collaborative environment and a precise annotation tool were appropriate for solving indexical issues. At this stage, I was more concerned with evaluating the usefulness of *Screenfaction* rather than its usability. Despite the encouraging findings from the design study and despite the advanced state and robustness of the high-fidelity prototype (presented in Chapter IX), real-use testing was still required.

1. Context

1.1. THE PARTICIPANTS

I recruited two participants for the evaluation, Nerida Tyson-Chew (Figure 47) and David Curl (Figure 48). Nerida is a renowned Australian composer based in Sydney. She has been classically trained at the University of Sydney and at the University of Southern California where she studied with eminent composers like Henry Mancini, Jerry Goldsmith and Bruce Broughton. Nerida is also an accomplished orchestrator and conductor. Her compositions span across a wide range of styles, from classic and symphonic to contemporary rock and pop. She has composed for different media, from feature films such as "*Hotel Sorrento*" (Franklin, 1995) or "*Anacondas: The Hunt for the Blood Orchid*" (Little, 2004), to documentaries for the National Geographic Channel or a number of TV Series. Nerida has won numerous prestigious awards in her career, both in Australia and internationally.

Figure 47. Composer Nerida Tyson-Chew

David Curl is a director, producer and cinematographer based in Perth although he regularly travels for his work in various parts of Australia, such as Alice Springs and Darwin. David holds degrees in zoology from Oxford and Monash Universities. Throughout his career he produced and directed many wildlife documentaries commissioned by major broadcasters such as the ABC[67] and the BBC[68]. David produced and directed two of Australia's most successful wildlife films, "*Silhouettes of the Desert*" (2000) and "*The Call of Kakadu*" (1996). His work has been recognised by many prestigious awards presented by the Australian Cinematographers' Society and in international festivals such as the Banff Television Festival.

Figure 48. Director David Curl shooting a documentary in Uluru, Northern Territory, Australia

[67] ABC (Australian Broadcasting Corporation) is Australia's national public broadcaster

[68] BBC (British Broadcasting Corporation) is one of the world's largest broadcasters

At the time of the evaluation, Nerida and David had known each other for eight years and had already collaborated on several successful projects:

- *"Silhouettes of the Desert*" (Wildlife Feature Film). Awards: Australian Cinematographers Society 2002, Golden Tripod in Wildlife and Nature category (Won); Australian Guild of Screen Composers 2001, Australian Screen Music Award for Best Soundtrack Album (Nominated); Banff Television Festival 2001, Banff Rockie Award for Best Popular Science & Natural History Program (Won).

- Promotional trailers: "*The River*", "*The Rock*" and "*The Kingfisher*".

Nerida and David also had plans for future collaborative projects, for example with "*Shadows of Uluru*, *The Kangaroo*" and "*The Kingfisher & the Cuckoo*". Because of the geographical separation, they had learned to collaborate remotely and their working methods had evolved over the years alongside technological advancement. At this stage they were used to communicating via email and telephone and exchanged files via FTP. Nerida was already familiar with the proposed research and with *Screenfaction*'s design principles as she had been one of the design study participants (Chapter VIII). David, however, was new to this research and did not initially know about the system's characteristics and features. This situation helped recreate conditions that were plausible in light of the design study findings, namely that composers would generally be responsible for the work executed on the system and would, therefore, become the expert users in this online collaboration.

1.2. THE PROJECT

For this evaluation, the participants offered to use *Screenfaction* in one of their real projects. The selected project was a 50 minute-long documentary entitled "*From Ayers Rock to Uluru*". This documentary was both about the wild habitat (fauna and flora) and about the interaction between Aboriginals and Westerners surrounding the cultural site of Uluru (also known as Ayers Rock) located in central Australia. The project had originally started three years before when a first version of the documentary was realised. That first version had been specifically made for preview screenings at festivals. Nerida had already composed the entire film score for that version. Then, David went on to shoot additional scenes, in particular some landscape time lapses, which took time and delayed the delivery of the final version. In the meantime, he had also changed his mind about some music cues and required some of the music to be modified to reflect his updated vision. Therefore, the aim of the work David and Nerida wanted to do for this evaluation was to discuss and rewrite those cues to complete the score and bring the documentary project to a close.

The official synopsis of the documentary states as follows:

> Two decades ago, Australia's most famous natural icon – Uluru, as it is now called – was "handed back" to aboriginal people. This film looks at life at Uluru today and at how park rangers and aboriginal people are trying to work together to manage Australia's most high-profile national park. Following the story of Rene Kulitja, one of Uluru's best known artists and custodian of one its major songlines, and Jim Clayton, a ranger working with aboriginal people to bring back the endangered rufous hare wallaby (one of the most important creatures in the songlines of Uluru), it takes you on the journey from "Ayers Rock" to "Uluru".

Figure 49. Snapshots from "From Ayers Rock to Uluru" (provided by David Curl)

2. Procedure

The duration of the evaluation spanned four weeks and the collaboration was entirely conducted remotely. Where I did not meet David in person, I met Nerida only once for a one-hour training session at the beginning of the procedure. A similar training session occurred with David over the phone. The principal reasons for this training were to present the full range of features that *Screenfaction* offered and to limit the influence of potential usability flaws. Data was collected in different ways. First, the participants carbon-copied me in all of their email conversations; thus I could follow their collaboration, observing when the use of email was preferred over that of *Screenfaction*. Second, Nerida maintained a log for the phone conversations she had with David, recording the date, the initiator of the call and a brief summary of the conversation's content. The log was a useful medium to capture conversations that I would not have been able to witness directly. Third, I was automatically notified every time one of the participants executed an action on *Screenfaction* (e.g., after creating or saving a mix). Fourth, the

participants filled out a questionnaire at the end of the evaluation giving feedback on their experience while using the system (Appendix E).

Thus, as recommended by Crabtree (2003), the evaluation was *situated*; it was not conducted in a laboratory but rather in a real situation where each participant worked in their usual environments throughout the procedure. This led to the compelling results presented in the next section.

3. Results

3.1. BENEFITS OF PRECISE ANNOTATING

As discussed earlier, the original problem *Screenfaction* intended to solve was the ambiguity of scope caused by indexical issues in remote collaboration. In this regard, the novel concept of discussion blocks and threads, enabling the precise demarcation and annotation of specific parts of the mix, proved to be useful to the evaluation participants. Nerida particularly appreciated this system as it would keep the discussions short. David also recognised how it would simplify conversations:

> Probably what's most useful is being able to link specific comments to precise locations (e.g "cello seems a bit too prominent here"). There's no doubt about where you're referring to. It's relatively easy to place comments in position with the music. [..] We don't have to say 'At such and such time code could you add some violin?'. It's all visually represented.

Nonetheless, the evaluation revealed other unexpected benefits for this annotation system. First, it was seen by the participants as a way of showing and reviewing multiple versions of a mix. Second, Nerida valued the fact that all comments logged into the system would render clients accountable for their requests; as she said: "*It forces the client to be very clear, revealing how vague or contradictory they can be, and also keeps an inventory of their demands. It also reveals the delays they cause. This accountability is a good thing*". And third, David considered that the system would naturally foster more thorough communication: "*[w]riting comments down also provides a useful discipline and can help ensure that a director has said everything they need to*".

3.2. ASYNCHRONICITY + PORTABILITY = FLEXIBILITY

The evaluation participants enjoyed the flexibility brought by *Screenfaction* into their workflow, particularly due to its asynchronous and portable characteristics. Initially, Nerida believed that asynchronicity would help gain flexibility in time management, arguing that the work could be reviewed at times that are individually convenient rather than scheduled and mutually accessible. She thought that *Screenfaction* would help with the fact that practitioners often work outside the hours where a face-to-face is appropriate: "*A director could look at the mix at 11pm,*

it doesn't matter [..] It also means that clients can review the work after hours – I have a producer who loves to work very early in the morning, and a director who shoots other productions during post-production". Indeed, it was observed during this evaluation that most of the email correspondence and most of the communication done via *Screenfaction* by the participants occurred in the evenings after 8pm. Even if this observation cannot be generalized, it is necessary for communication systems to cater for these types of situation.

Nerida also envisaged that *Screenfaction* would be most beneficial for asynchronously and iteratively reviewing small chunks of the work. In face-to-face situations practitioners tend to present a large volume of work at once to get the most out of their time together. With *Screenfaction*, Nerida saw that the work could be broken down into manageable parts and that the downtime spent waiting for each other's replies could be utilised for thinking and exploring new ideas.

Moreover, portability was found to be a key asset of *Screenfaction*. On the one hand, the technologies used for building *Screenfaction* were portable in the sense that the system could virtually be used on any common platform or Web browser. For example, while the two participants had two different browsers installed on their computers, they could still both fully use all the features offered by the system. On the other hand, *Screenfaction* was judged portable as it could be used in mobile situations. This was experienced by David during the evaluation when he once travelled to isolated parts of central Australia. He was then able to connect to the website due to the wireless Internet connection on his laptop and view a mix posted by Nerida. Thus, as David recognised, "*[f]or a director who's travelling or doesn't have an editing program on their laptop, this system could be a useful and effective way of working remotely*".

Nerida also enjoyed this portability as she could access the system from multiple locations outside her studio:

> One of the good unexpected features is the convenience that I too can work away from my studio and access the site from a laptop rather than my main studio. I can take mp3 files and notes and update the files without having to be at the [studio's] computer.

As the researcher, I also believe that the flexibility generated by Web technologies, both in terms of portability and asynchronicity, can favour the establishment of a shared environment between practitioners with diverse backgrounds, habits and workflows.

3.3. LIMITATIONS OF ASYNCHRONOUS COMMUNICATION

Initial findings from the design study (Chapter VIII) had shown that, in some situations, practitioners enjoy asynchronicity because it gives them time to ponder their initial reactions and formulate detailed feedback. However, David expressed some concerns about asynchronous

communication. In particular, where he recognized that getting one's comments in writing is a good discipline for directors who are musically literate, he thought that it might be confronting and limiting for those who do not fully comprehend musical terms:

> Disadvantages would be that the written word can seem quite harsh and also that directors unfamiliar with musical language might find it difficult to express what they're feeling or what they want.

David generally did not feel comfortable writing criticisms about Nerida's music via *Screenfaction* or via email; he was afraid that his words could be too direct or too dry and thus may offend her. For him, synchronous modes of communication, like telephone for example, are often more appropriate for discussing potentially critical matters, as "*the instant feedback of even a phone conversation makes it easier to ensure that neither party gets upset with what's said in writing*". As shown here, sensitive conversations may be difficult to handle asynchronously. These issues did not eventually play a significant part during this evaluation because the participants knew each other well and were used to collaborating together creatively. To obtain a deeper understanding of this delicate topic, further investigation with practitioners involved in newly established working relationships would be necessary.

3.4. COORDINATION ISSUES

Over the four-week duration of the evaluation, the participants' use of *Screenfaction* followed an irregular pattern. The participants sometimes exchanged multiple comments within a few minutes and other times they did not connect to the website for a few days. Some of the long time intervals between connections were justified, for example, by the fact that Nerida was busy composing new pieces or that David was away travelling for work. However, some time lapses between connections were unjustified and unnecessary (as later recognised by the participants themselves), the main reason being that there was a lack of coordination between the participants.

As presented earlier, coordination issues had originally been anticipated by implementing an automatic notification system in *Screenfaction*. Essentially, an email was automatically sent to all members of a project every time someone saved modifications into a mix (e.g., after adding audio/video samples or writing comments). On the one hand, participants found that the automatic notifications were valuable as they enabled awareness of the other's activity and of the availability of new mixes or comments. But on the other hand, this system was not enough to guarantee effective coordination as it did not allow clear identification of the procedure to follow. Although the system featured a colour scheme to signal unread comments, it was sometimes unclear to the participants who had to take the next action, and when. This resulted, for example, in Nerida once waiting for David's review of a music sketch that she had uploaded, while David was in fact waiting for Nerida to provide further sketches. To get around this kind of

issue, participants periodically resorted to sending emails or to having phone calls to clarify what they expected the other to do for the work to proceed.

This showed that more support should be provided to accelerate asynchronous communication and to allow users to delineate more distinctly the expected procedure of the collaboration. For example, a dedicated apparatus could be envisaged to let users define a roadmap for the collaboration and maintain a journal of tasks attached to certain deadlines (e.g. “Review this sketch by this date” or “Select your favourite sketch and comment on changes to be incorporated before delivery date”). Finally, Nerida required the comments be colour-coded to reflect their level of urgency and their order of importance. Such prioritization and scheduling functionalities would, according to the participants, save stress and time, both at the professional and personal levels.

3.5. TECHNICAL ISSUES

The evaluation revealed some important technical issues. In particular, the size of the uploaded files posed a problem in mobile situations. For example, in the first week of the evaluation Nerida uploaded a large video file (450 Megabytes) containing the entire length (50 minutes) of the film. As explained earlier, the file automatically got encoded to Flash Video format (FLV) on the server and its size got reduced to 90 Megabytes. Despite this 1/5 compression ratio, the size of the file was still quite hefty. At that time David was travelling for work to Yulara (Uluru) and Alice Springs in central Australia. As he usually does while travelling, David brought his laptop and used a wireless connection to be able to access the Internet more freely, even in remote areas like the Australian desert where he often shoots scenes for his films. The problem was that wireless Internet plans were expensive and limited in Australia. His plan, for instance, was limited by a very small data download allowance (400 Megabytes per month). After connecting to the website, visualising the mix and loading the large video file a few times, his data allowance maxed out and his connection got restricted. As a result he could not access the Internet on the wireless network anymore until the following month. It was a few days later, as he returned to his home in Perth, that he could access it again. From there he could use *Screenfaction* normally due to a fast Internet connection (ADSL2+) with unlimited downloads. Nerida, however, did not encounter such difficulties since she herself always had access to a fast connection from her studio. For the remainder of the evaluation, the participants used smaller files (up to a few minutes in length only) to discuss specific segments of the film and of the corresponding music. Breaking files into smaller parts rendered the process easier and faster, but this could not be satisfactory for discussing large portions of a mix or for getting an overview of the entire film. Hence, this particular example illustrated that there are some important external technical conditions, such as download limitations enforced by Internet service providers, which need to be considered. However, I believe that the impact of such unfavourable conditions will likely soon diminish. Bandwidths are already much faster than they

were only a few years ago. Capabilities are ever increasing and in the near future, the size of files exchanged over the network will likely not be problematic anymore.

Moreover, some interesting remarks were made about the encoding process itself. The participants were not inconvenienced by manipulating compressed video and audio files of lesser visual and sound quality than the originals. They easily accepted the trade-off of quality and size to facilitate the playing of rich media files in an online context. However, it appeared that the encoding process slightly changed the aspect ratio of the video, which posed a minor problem to David. David always used the 16/9 ratio for his productions and the compressed videos accessed via *Screenfaction* were 4/3. This shows that attention should be paid to technical aspects that affect the nature of the artefacts exchanged via the system. This particular issue of image ratio will be fixed in next versions of *Screenfaction*.

Finally, the high-fidelity version of the prototype used for the evaluation contained some syncing issues. Some elements, particularly video samples, did not always play perfectly in sync with the rest of the mix and there were sometimes slight delays between the picture and the music. This did not dramatically influence the collaboration because most of the mixes created by the participants did not feature music tightly coupled with the picture. However, syncing is generally a crucial question in the film industry and this would likely be a problem in situations where the music and the picture have to be closely tied together. Those syncing issues were purely due to limitations of the technology used (Flex/Flash) and should be fixed in the near future.

Consequently, these technical issues illustrate that some compromises can be made, especially in the context of idea sketching and of high level creative discussions. However, some trade-offs are not acceptable, especially if they directly affect the intrinsic meaning of ideas or if they introduce confusion into the communication.

In the next section, I confront and reflect on the findings generated both by the design study (Chapter VIII) and by this evaluation study.

4. Reflection

As it is often the case when doing research, the work raised more questions than it brought answers. On the one hand, the design principles proved to be effective in addressing the original premise (i.e., to resolve the indexical issues and the ambiguity of scope occurring in remote settings) and all the study participants considered *Screenfaction* a useful tool for simplifying and clarifying creative discussions. On the other hand, the studies described in this chapter and in Chapter VIII unexpectedly raised a number of issues inherent to remote and asynchronous communication in creative practice.

First of all, the requirement for a unified and shared environment was clearly expressed. It also appeared necessary for this environment to be accessible not only by the user groups that were

originally targeted (i.e., composers, directors and producers), but also by a wider circle of practitioners such as sound designers, music editors and film editors. The design and evaluation studies also confirmed that composers and filmmakers were generally familiar with sequencers as they already used similar tools respectively to produce music and to edit films. Little explanation was required for the participants to understand the system's basic features so this validated the sequencer as a promising candidate for building such a shared and accessible environment.

Secondly, the studies highlighted important advantages and disadvantages of asynchronicity, at multiple levels of the collaboration. At the interpersonal level, synchronous communication (particularly face-to-face) was found to be potentially confronting. As revealed in the design study (Chapter VIII), composers recognised that it could be difficult taking criticism in person and so the asynchronous system was praised for providing "*a sanctuary, a place of safety*". The director from the same study also dreaded face-to-face meetings with composers as she feared she could have spontaneous reactions resulting in hurt feelings. However, the evaluation study showed that, in a real-use context, it could also be difficult to give considerate criticisms without the help of synchronous means like face-to-face or telephone. Therefore, a balance should be attained in the use of asynchronous and synchronous communication so as to diffuse emotions and avoid interpersonal clashes. This is a complex problem that depends on a multiplicity of variable parameters, for example: the type of project, the prior personal and professional relationships between collaborators, or the personalities and current moods of the people involved. In this regard, further studies ought to be conducted over long periods of time to evaluate how practitioners adapt and how they reach a comfortable balance between various means of communication. At the coordination level, asynchronicity appeared to be limiting and responsible for provoking unnecessary wait times. This stressed the need for more support in coordinating the collaborative process in remote settings.

Thirdly, although asynchronicity and Web technologies' portability provided a beneficial flexibility for remote creative collaboration, the evaluation showed that all communications cannot effectively be conveyed by just one type of tool. The participants thought they could use *Screenfaction* to perform all the necessary communication with some collaborators they were used to working with. However, most of the participants stressed that a face-to-face meeting was essential at the beginning of a project or when starting a new working relationship. They also stressed that in some critical situations (e.g., when approaching an important deadline) they would need more "personal" means of communication than the pure use of technologies in order to retain reassuring conditions within the collaboration. Therefore, a wide palette of tools should be offered to practitioners, who should then be allowed to select the most appropriate tools given their personal taste and the specific context of the collaboration.

Finally, the methods used in the design study (Chapter VIII) and in the evaluation study appeared to be complementary. The “physicality” of the low-fidelity prototype tested in the design study helped the participants concentrate on the features’ usefulness rather than on minor aesthetic considerations. The high-fidelity prototype tested in the evaluation study provided valuable information on real world conditions which could not have been simulated in a laboratory.

Conclusion

This thesis is the fruit of three and a half years of PhD research. As expressed in Chapter I, it set out to study the collaborative making of film music and facilitate remote communication between music experts (composers) and non experts (filmmakers) through the use of computer tools. Throughout this research I have worn multiple hats (i.e., ethnographer, designer, programmer and evaluator) and I have followed a qualitative approach inspired by several domains and methodologies, namely Human-Computer Interaction (HCI), Computer-Supported Cooperative Work (CSCW), ethnography in design, evolutionary prototyping, interaction design and goal-directed design. The outcome of this work confirmed the need for further support in resolving ambiguities that occur in distant communication. It also generated a comprehensive insight into the composer-filmmaker relationship and uncovered complex interpersonal issues that need to be considered in the development of computer support. In this chapter, I first recapitulate the different phases followed in the research process. I then summarise the main benefits brought by the computer system, *Screenfaction,* I have developed. After listing the principal contributions of this PhD work and answering the original research questions, I conclude by providing the future directions envisaged beyond this PhD.

The research process was divided into five consecutive phases. Phase 0 (*Preliminary Work*) consisted mainly of the review of academic and trade literature published in areas relevant to this research. Phase 1 (*Exploration*) included two studies: a 5-month long case study with a Melbourne-based director and a Sydney-based composer (Chapter IV) and a 2-year long longitudinal study (Chapter V) with 31 practitioners. From these exploratory studies came two sets of outcomes, namely the identification of communication challenges (Chapter VI) and the elaboration of guidelines for best practice (Chapter VII). For clarity and ease of comprehension, the identified challenges and elaborated guidelines were classified into four main levels: organisational, interpretive, emotional and indexical. It was then argued that, in remote settings, indexical level issues (i.e., difficulties in referring to specific parts of the film or music) ought to be resolved in priority; otherwise these issues may affect all other aspects of the collaboration and cause unnecessary frustration and misunderstandings. Phase 2 (*Design*), comprised of two design studies, was engaged to progress towards appropriate solutions for these indexical issues (Chapter VIII). The first study led to the assembly of personas to facilitate the understanding of the main roles involved in the film scoring process. The second study showcased the design of a low-fidelity, paper-based, prototype to assist the remote discussion

of music and video artefacts. The subsequent Phase 3 (*Implementation*) consisted of the construction of a high-fidelity version of the prototype, named *Screenfaction*. Finally, Phase 4 (*Evaluation*) was concerned with the evaluation of *Screenfaction* in real conditions of use.

Multiple benefits and achievements are brought by *Screenfaction*. First of all, it is a potentially useful system for alleviating indexical issues in distant communication, as research participants recognised it helps simplify and clarify remote discussions. Second, *Screenfaction* facilitates the use of asynchronous communication, which can, in some situations, be a valuable alternative to face-to-face, for example when dealing with emotional and personal issues. Third, *Screenfaction* brings some flexibility into the collaboration. Being built with standard Web technologies, it can be accessed at any time, from any computer equipped with an Internet connection. Fourth, *Screenfaction* embodies a shared environment where potentially all collaborators (not only composers and filmmakers but also any practitioner working on the project) can participate actively in the creation of the film score. Overall, I believe that these benefits combined can both provide necessary relief in the pressured conditions that exist in the film industry and maximise chances for creative ideas to emerge and be carried out.

Beside *Screenfaction* itself, multiple contributions have come out of this PhD research, as summarised below:

- The case study report (Chapter IV) provides a unique account of a composer-filmmaker collaboration, with a high level of detail and continuity;
- The communication challenges (Chapter VI), identified through the exploratory phase of the research, indicate in a readily digestible way the kinds of issues recurrently faced in the film scoring practice;
- The guidelines (Chapter VII) allow practitioners to discover new perspectives on their work and provide designers with information on how to support creative communication;
- The four personas (Chapter VIII), which facilitated the design process in this research, can be reused by designers interested in domains that are related to film scoring;
- Results of the design and evaluation studies (Chapters VIII and X) will help improve *Screenfaction* in future development iterations and may inspire designers in the conception of similar systems; and
- The different methodological approaches described throughout this thesis, which allowed to produce a variety of compelling results, may inspire other researchers working in areas that have common characteristics with the film scoring industry.

Although more research is inevitably required, the work performed in this PhD largely advances towards the broad aims articulated in Chapter I, i.e. to enhance creativity in film scoring and

favour an enjoyable working experience. Looking back at the research questions also presented in Chapter I, answers can now briefly be given as follows:

- Question 1: Precisely what are the communication challenges faced by filmmakers and composers and what are the ways to alleviate them? Answer: There are four main levels of challenges commonly faced by practitioners (organisational, emotional, interpretive and indexical levels); these challenges are presented in detail in Chapter VI, and the ways to alleviate them (i.e., the guidelines for best practice) are given in Chapter VII.

- Question 2: Which challenges should be addressed in priority when collaboration is conducted remotely? Answer: Indexical level challenges, described in Chapter VI, are the ones that should be solved in priority in remote contexts. I also argue that computer tools can be designed to resolve these types of challenges.

- Question 3: What viable computer-based solutions could be developed? Answer: *Screenfaction*, as displayed in the results of the design and evaluation studies (Chapters VIII and X), offers promising solutions that are shown to be worthy of further development towards production level tools.

The design and evaluation studies were essentially qualitative and involved a restricted amount of participants, partly due to practitioners' limited availability for participating in such intensive research. Therefore it is important to note that, at this stage, all the findings expressed in Chapters VIII and X regarding the low-fidelity and high-fidelity prototypes cannot be fully generalised. However, the results which have been compiled after these two studies constitute a strong basis for proving that *Screenfaction* demonstrates solutions to the problems addressed.

Future directions are now envisaged to pursue the research beyond this PhD. While this work validated the usefulness of *Screenfaction*'s design principles, more research is required concerning usability issues. Therefore, an intense development phase will next be conducted to produce a full-scale working prototype. The usability of the next prototype will be tested with practitioners to ensure that it can effectively be used with minimal or no training. To monitor the prototype's advancements, quantitative surveys will be organised with a larger panel of practitioners, including not only composers and filmmakers but also film editors, music editors, orchestrators and sound designers. Also, while *Screenfaction* is currently focused on facilitating the remote exchange of information and on clarifying the ambiguity of scope, problems related to the ambiguity of content still remain. More work is therefore needed to specifically support an accurate interpretation of the information conveyed via the system. Lastly, over the longer-term, I envisage extending the research to other industries that share similar creative and collaborative dispositions with film scoring, such as architecture, graphic design, dance and dramatic arts.

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Appendix A. Case Study Consent Form

Below is an example of consent form used in the case study (Chapter IV).

creativity and cognition studios

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UTS HREC REF NO 2006-304P- 0601

CONSENT FORM

I, _____(*participant's name*)

hereby give my consent to participate in a case study organised by Julien Phalip, PhD student at the Creativity and Cognition Studios, University of Technology, Sydney (UTS).

I understand that the purpose of this study is to provide an understanding of the creative collaboration between filmmakers and film composers. Research data (video and music files, interview transcripts, email conversations) gathered in this study will contribute to the ongoing research of the student Julien Phalip. I understand that these data will not be shared with any third party in their raw form, and that the findings from the study as well as some selected quotes from interviews and conversations may be published in academic articles or in Julien Phalip's thesis. I understand that my name and the names of other participants of the study may be published only as a way to provide contextual information about the study. I understand that I will be given by the researcher the opportunity to read and to verify the truthfulness and the appropriateness of the information described in the articles and in the thesis before their publication.

I understand that my participation in this research does not involve any perceivable risk. I am aware that I can contact Professor Ernest Edmonds at UTS (02 9514 2384) if I have any concerns about this research. I also understand that I am free to withdraw my participation from this research project at any time I wish and without giving a reason.

I agree that Julien Phalip has answered all my questions fully and clearly and that I can contact him if I have any additional questions.

Signature: _____ Date: ____/_____/_____

Note: This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: +61 2 9514 9772 Research.Ethics@uts.edu.au). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix B. Exploratory Research Questionnaire

Below is an example of questionnaire used in the longitudinal study (Chapter V) as part of the exploratory research phase.

Relationship with Filmmakers

1) In general, are you happy with the communication you have with filmmakers?

2) Do you think filmmakers realise the difficulties encountered by composers in understanding them and their expectations, and why?

3) Who do you think suffers most from communication problems? Composers or filmmakers?

4) What do you think filmmakers expect from you in a film score project? In return, what do you expect from them?

Creativity

5) What do the terms “creativity” and “being creative” mean to you? In general and in the specific context of film scoring?

6) Do you think that bad communication between you and filmmakers may lead to producing uncreative work? If so, please specify for what reasons.

7) Do you believe technology can help you (and/or filmmakers) be more creative? Could it make the collaboration more effective and how?

8) Do your clients enjoy getting involved in the creative process or do they give you a maximum of freedom?

9) How do you express your own creativity against constraints set by your clients? Do you stick to what your clients ask for, or do you try to go beyond? How do you do to convince your clients that your work is taking the right direction?

Trust aspects

10) Do you trust technology and Internet enough to be useful and secure for collaborating on a film score? What would you require from a computer system to trust it?

11) What sort of information and conditions would you require from filmmakers to trust them creatively?

12) What is important for you to do or tell to filmmakers about yourself to let them trust you?

Communication

13) Do you use spotting notes and cue sheets to cope with syncing the music to the picture? If so, who writes them, what form do they take, and how do you use them?

14) Do you have anecdotes where a filmmaker gave you an ambiguous brief that you interpreted differently than him/her?

15) Do you have anecdotes where a filmmaker asked for something very precise and specific (that is, not ambiguous) but later you realised he/she was using the wrong terms?

16) Do filmmakers always provide you enough information with their briefs? What helpful information should they provide?

17) What questions do you ask filmmakers to be sure you really understand what they want?

Educating the clients

18) Do you try to “educate” your clients in the cases when they cannot imagine how the music you are making will sound in the end, when they get too attached to temp music, or when they do not realise that what they are asking is unachievable or inadequate? How do you proceed to make them change their perspective and take some distance?

Remote Collaboration

19) Do you work with filmmakers either that live far away from you, or that you can rarely meet face-to-face because of schedule incompatibilities?

20) How different is it from working with filmmakers that you can regularly meet? Is it more difficult to manage? What are the pros and cons of remote communication against face-to-face communication?

Stories

21) Do you have interesting anecdotes on how things went wrong (say, for example, a project has been cancelled or delayed) because of bad communication with a filmmaker? (Note: if I decide to publish some of your answers, any name or information that may identify the sources will be blanked out or replaced by fictional information to avoid any sort of embarrassment. This also applies to every question of this survey).

22) Please describe an ideal situation or a perfect scenario for collaborating with a filmmaker, step by step from briefing to final score. In that scenario, the only constraint is that the filmmaker is remotely located. Consider that you may use any sort of communication tools, even some fanciful tools that may not exist at all. Please give free rein to your imagination.

A few extras questions

23) Do you think improving communication between composers and filmmakers is an important research issue?

24) How long did you take to fill out this questionnaire? Did you think it was relevant, interesting, or too long, uninteresting, etc?

25) What other questions do you think I should have asked in this questionnaire?

Appendix C. Exploratory Research Coding Scheme

Here is presented the arborescence of codes and categories developed as part of the exploratory research, in particular in the longitudinal study (Chapter V). Two root categories reflect the two main objectives for the exploratory phase of the research, i.e. the identification of “Problems and Communication Challenges” and “Best Practices”. The category tree unfolds into multiple levels of branches (or sub-categories). The codes are the leaves of the tree. Numbers in brackets represent the number of quotes each code is assigned to.

Problems and Communication Challenges

- Communication Challenges (151)
  - Emotional Level (9)
    - Creatives are Sensitive (1)
    - How Filmmakers Criticise Composers' Work (1)
    - One Should Know That Working With Talented People is Not Easy (1)
    - Some Composers Enjoy Getting Critics (1)
    - Some Directors Are Very Critical (1)
    - Some Directors Prefer to Be Honest (3)
    - Some Producers Do Not Care About Hurting Composers' Feelings (1)
  - Indexical Level (5)
    - One May Refer to the Wrong Scene (1)
    - Referring to Scenes (2)
    - Struggling to Make Precise References (1)
    - Using References and making Up Words (1)

- Interpretive Level (58)
  - Ambiguity (9)
    - Example of Vague Brief (2)
    - Importance to Clarify Speech (1)
    - People Can Make Up Words (1)
    - Terms Used by Filmmakers to Describe the Music (2)
    - Words Can Be Interpreted Differently (3)
  - Inaccuracy (6)
    - Directors Do Not Know About Instruments (2)
    - Directors Do Not Know Specific Terminology (3)
    - People Can Use Some Specific Terms and Not Mean Them (1)
  - Incomplete Information (8)
    - Composers Need Information About the Film (2)
    - Good and Free Communication Enhances Creativity (1)
    - Lack of Information (3)
    - Some Filmmakers Cannot Express What They Want (2)
  - Musical Knowledge and Communication Abilities (34)
    - Ability of Filmmakers to Communicate (4)
    - Absence of a Common Language (1)
    - Cultural Differences Can Be a Challenge for Communication (1)
    - Directors Would Like To Communicate Better (1)
    - Directors' Musical Knowledge (7)
    - Filmmakers Can't imagine how the Music Will Sound in the End (2)
    - Filmmakers Sometimes Do Not Know What They Want (2)
    - Filmmakers Sometimes Know Exactly What They Want (1)

        - Filmmakers Talk in Terms of Feelings and Moods (2)
        - How Filmmakers Communicate What They Want (1)
        - How Filmmakers and Composers Exchange Ideas (1)
        - It's the Composer's Job to Understand What the Filmmaker Wants (4)
        - Some Directors Are Musically Literate (4)
        - Some Directors Have a Clear Idea of What They Want (2)
        - Wasting Time/Energy Trying to Understand What Filmmakers Want (1)

- Organisational Level (81)
    - Collaborative and Creative Processes (13)
        - Collaboration Process (4)
        - Creative Process (9)
    - Composer-Filmmaker Relationship (30)
        - Composer Fighting For His/Her Ideas (3)
        - Composers Can Feel Lonely (1)
        - Composers Can't Say 'No' (1)
        - Composers Take Full Responsibility (1)
        - Composers Work at the Service of the Film (2)
        - Directors Want to Have Control (3)
        - Everyone Has a Boss (2)
        - Filmmakers Work with a Small Number of Composers in Their Career (1)
        - Master-Servant Relationship (4)
        - Producers Trust Composers' Creativity (1)
        - Pushing the Director in a Direction (2)

    - The Film Composer is a Freelancer (1)
    - The Filmmaker is the Boss (7)
    - Who Should the Music Please First (1)
- Different Perspectives (17)
    - Directors Think There Are No Big Problems (5)
    - Lack of Recognition by Directors (3)
    - Perception of Directors on the Composer's Work (2)
    - Perception of Directors on How Composers Like to Work (1)
    - Some Directors Don't Realise the Costs and Time for Making the Music (1)
    - Some Directors Recognize That There Can Be Some Communication Problems (1)
    - Some Directors Recognize that the Composer's Job is Difficult (3)
    - Who Suffers Most From Communication Problems (1)
- Initiating the relationship (7)
    - Finding Work (1)
    - Finding a Composer (2)
    - How Filmmakers Choose a Composer (4)
- What Everyone Expects From Each Other (8)
    - Composers Should Know Their Craft Throughout (1)
    - Filmmakers Want Composers to Be Technology-Savvy (1)
    - What Filmmakers Expect from Composers (6)
- Composers Want to Do a Good Job (1)
- Dividing the Work Load (2)
- It is a Painful Process (3)

- General Observations (46)
  - Face-To-Face (14)
    - Cons of Face-to-Face (3)
    - Importance of Face-to-Face (7)
    - Important to Meet at the End of the Project to Validate the Work (1)
    - Sometimes Hard to do Face-to-Face (1)
    - You Work Faster in Face-to-Face Situations (2)
  - Remote Collaboration (13)
    - Dealing With Remote Collaboration (1)
    - Examples of Remote Collaboration (3)
    - Filmmakers Do Not Like to Work Remotely (1)
    - Technology Can Help in Situation of Remote Collaboration (4)
    - What They Think About Remote Collaboration (4)
  - Trust (19)
    - Easier if There's a History in the Collaboration (1)
    - Face to Face Helps Establish Trust (2)
    - Importance of Trust (5)
    - More Communication Required if Practitioners Not Used to Working With Each Other (1)
    - Reassuring the Filmmakers That the Work Is Taking the Right Direction (1)
    - Resolving Conflicts (1)
    - Sketches Can Help Install Trust (1)
    - Tools Can Be Used After Initial Face-to-Face Contact (4)
    - What Filmmakers Need to Know About Composers in Order to Trust Them (3)

Best Practices

- Allow Effective Marketing (7)
    - Composers Should Show Their Work and Tell About Them to the Filmmakers (1)
    - Making Yourself Known (1)
    - Some Directors Do Not Like Composers Who Are Too Specialised (1)
    - What Filmmakers Want to Know About Composers (4)
- Bridge the Language Gap (15)
    - Assessing Directors' Knowledge of Music (1)
    - Better to Speak About the Music in Terms of Emotions and Feelings (1)
    - Educating the Filmmakers (2)
    - Filmmakers Shouldn’t Be Afraid of Looking Dumb in Front of Composers (1)
    - Helping Directors to Describe What They Want (2)
    - Making Music Language More Accessible (3)
    - Questions to Ask Filmmakers (1)
    - Show Rather Than Tell (1)
    - Using Music to Clarify Communication (3)
- Briefing (6)
    - Asking the Composer for Suggestions (1)
    - Dealing With Specific Briefs (1)
    - Dealing with a Vague Brief (1)
    - Examples of Briefs (1)
    - Importance of Good Briefing (1)
    - Tell If the Music Should Go With or Against the Picture (1)
- Communicate with All Collaborators (8)
    - All Collaborators Should Be Aware of What's Going On in the Project (1)

        - Importance for the Sound Designer to know About the Spotting Decisions (1)
        - Importance to Communicate With Other Collaborators (2)
        - Importance to Talk to the Film Editor (1)
        - Importance to Talk to the Sound Designer (2)
        - Sound Designers and Composers Understand Each Other (1)
    - Freedom and Constraints (8)
        - Composers Can Lose Some Perspective As They Get Too Much Into the Project (1)
        - Composers Need Some Flexibility (2)
        - Freedom and Constraints (2)
        - Material Constraints Affect Creativity (1)
        - You Need Constraints to Be Creative (2)
    - Ideal Scenarios (5)
        - Ideal Scenario According to Filmmakers (5)
    - Involve Composers Early (5)
        - Benefits of Getting Composers Involved Early (3)
        - Some Directors Are Reluctant to Get Composers Involved Early (1)
        - Some Directors Like to Get the Composer Involved Early (1)
    - Provide Detailed Feedback (4)
        - Composers Like Having Their Work and Effort Acknowledged (3)
        - Composers Need Positive/Constructive Feedback (1)
    - Share Creative Control (10)
        - Composers Try to Involve Filmmakers in the Creative Process (2)
        - Composers Want to Retain Control of the Details (1)
        - Filmmakers Wanting or Not to Be Involved Creatively (7)

- Show Attachment to Project (11)
  - Composers Being Honest About Whether or Not They Can Do the Work (1)
  - Directors Can Sense Whether a Composer Is Passionate or Not (2)
  - Importance of Being Passionate About the Project (4)
  - Importance to Show Your Commitment to the Project (3)
  - Lack of Passion Kills Creativity (1)
- Sketching (18)
  - Assessing Directors' Capacity to Deal With Rough Sketches (1)
  - Can Directors Understand Sketches? (1)
  - Dealing with Poor-Quality Sketches (1)
  - Explain Directors How to Listen to a Sketch (1)
  - How Filmmakers Criticise Sketches (2)
  - Music Sketching (4)
  - Music Sketching Is Time Consuming (2)
  - Should Sketches Be Detailed or not? (1)
  - Sketching Allows Filmmakers to Get Involved Creatively (1)
  - Sketching Can Be Good to Communicate Ideas (1)
  - Sketching Is Useful (1)
  - The Core Idea is Most Important (2)
- Spotting (9)
  - Developing Themes in the Music (1)
  - Importance of Spotting (4)
  - Taking Spotting Notes (2)
  - Using Spotting Notes (2)
- Temp Music (26)

        - Asking Directors What They Like About the Temp Music (1)
        - Directors Like to use Temp Tracks (3)
        - Filmmakers Can Get Too Attached to Temp Music (4)
        - Filmmakers Should Use the Composer's Own Music As Temp Music (1)
        - Importance of Using Temp Music (1)
        - Pros and Cons for Temp Music (5)
        - Selecting Temp Tracks (1)
        - Some Directors Do Not Have Enough References (1)
        - Some Directors Give Temp Tracks From Big Budget Movies (1)
        - Some Directors Give the Cut Without Temp Music (1)
        - Temp Music Can Be Good to Communicate Ideas (1)
        - Temp Music Can Be Quite Frustrating for the Composer (2)
        - Temp Music Helps Finding Out What the Filmmakers Want (1)
        - Temp Music Is Limiting (2)
        - The Film Editor Often Has a Strong Influence on the Temp Tracks (1)
    - Importance of Early Discussions (8)
    - The Composer Has to Work in the Interest of the Film (1)
    - What Composers Want to Know About Filmmakers (4)

Appendix D. Design Study Scenario Walk-Through

This scenario walk-through was used to present the low-fidelity prototype in the design study (Chapter VIII).

Context

Mary had been approached by Frank 6 months ago to compose the music for his latest feature film, “Transient Path”, a drama about the problems of the handicapped in society. Mary had agreed to take on the job, but the film was still in production and since then Mary had only received little amount of information about the movie, apart from the script and a few still images taken on the shooting stage. Mary was fine with that process though, as she said: “I usually prefer to work on a locked picture with a fresh mind and free of pre-conceived ideas”.

Then, last week, Frank had sent to Mary a rough cut of the film in a Quicktime file, along with a few temp tracks. He told her: “I already have some ideas in mind for the music, but I'd like first to give you a chance to look at the cut and muck around with it. Let's have a talk in two weeks to see where you're at and then we can go from there”.

Frank and Mary had worked together several years ago on two short films. Their collaboration had been quite successful and both enjoyed working together. Then Frank moved to Los Angeles and they didn't collaborate again until today. The reason why Frank hired Mary for “Transient Path” is because he thought she was right for the job: “I like her style of composition, she can do very original and elaborate music with classical instruments and that suits my vision for this movie. I'm sure she'll do a great job”. When asked if he minded the distance that separated them, he said: “Well, to be honest, I usually prefer face-to-face. But I know Mary and I trust her. Also I thought it could be a good experience, so why not give it a try? Mary also reassured me that she uses a tool, Screenfaction, that helps with distant collaboration. So, we'll see how it goes”.

Mary has been using Screenfaction for a year now, as she finds it very useful to communicate with her clients and collaborators. She recently made Frank create an account on it, but Frank hasn't used the website much yet. To set up the project on Screenfaction, Mary has uploaded

the movie file and the few sketches she's been working on over the last two weeks. Now is time to talk with Frank about those first sketches and to discuss the next steps.

Events

a) Mary would like to let Frank listen to her sketches. She logs into the “Transient Path” project page on Screenfaction and creates a new mix. The Sequencer appears on the screen. She then opens the explorer and imports into the mix the video and all the five audio sketches she had uploaded beforehand to the project's file gallery. She moves the audio samples to put them in sync with the picture. She then adds a few comments under some of the sketches, asking Frank, for example, if he likes the instruments or pace.

When the comments are saved by Mary, a notification email is automatically sent to Frank. Mary then logs out from Screenfaction and returns to other business.

b) As he wakes up in the morning, Frank checks his emails and receives the notification email from Screenfaction: “Mary has left some comments on Screenfaction. Click here to see those comments.” He clicks on the link and his web browser loads up the Screenfaction mix page. As the sequencer opens, Frank’s attention is caught by the highlighted discussions icon. He clicks on it and the discussion window appears with a list of all the discussions started by Mary. He clicks on one of the discussion and a track opens under the audio sketch commented by Mary. He then clicks the highlighted bar and a popup appears with Mary’s comment. He adds a new comment. Mary is instantly notified by email.

Appendix E. Evaluation Questionnaire

Below are the questions asked to the two participants at the end of the evaluation study (Chapter X).

1. Could you imagine working with this tool in the prototyping state as it is now? If not, what features are missing or what would need to be fixed for the tool to become really useful to you?

2. Did you find the interface intuitive? Did you have difficulties using the tool?

3. Did you feel that the tool facilitated the creative process? Could it allow you to be more creative, and if so, how?

4. Does the tool allow you to do things that you could not do otherwise, and if so, what things?

5. Do you think such a tool could make you save time, stress, or money in any way?

6. What kind of communication is ok to do with this tool? Could you imagine doing all the communication via such a tool? Or is there anything you would prefer to do via other means of communication, and if so, please tell which other means?

7. What did you like or dislike about the specific comments (in the blue boxes under the audio/video elements) and the general comments (for the whole mix) functionalities? What advantage, if any, do they have over your current and usual communication tools?

8. Was it clear what you had to do every time you opened a mix? If not, what kind of guidance would you have liked to get?

9. What did you like or dislike about the automatic email notifications? Should there be any automatic notification at all? How and when would you like to be notified when other team

members perform some actions on the website? How and when would you like the other team members to be notified of your actions?

10. Did you see any advantage of visualizing/hearing the video and audio mixes on the Internet via a web browser?

11. Does this tool favour co-working, and if so, in what way?

12. Did you notice synchronisation problems? Was it a problem? Was the tool still useful despite those syncing issues and if so, why?

13. Who do you think among the composer, director, or other collaborators is likely to use this tool most (e.g. creating projects, uploading files, etc.)? Personally, what types of actions would you generally expect to perform on the tool if it was used in your projects?

14. Would you use this tool even if your collaborators did not know about it yet? If so, how would you convince them to try it out?

Appendix F. Personas

On the next four pages are given the four persona descriptions developed as part of the design study in Chapter VIII: Frank, Oliver, Mary and Jasper.

Frank Floyd (Indie Filmmaker)

Serpentine Film Pty Ltd

Age: 43 - **Lives:** Los Angeles, CA

"I like to maintain control of the creative process."

"I work to achieve a work-life balance, even if by blurring the line between the two."

Goals

Personal goals

- "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."

Practical goals

- "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's heading."
- "I want to reduce the incidence of missteps in the scoring process but I don't want to constrain the composers creativity."

Background

Frank has earned an international reputation for his substantial body of independent short and feature films.

His work has screened and won awards in many international festivals in Barcelona, Cannes, Berlin, Vienna, Los Angeles, and Sydney amongst others.

Frank is married and has 2 children.

Because of the nature of his job Frank spends at least 6 months a year –on and off – away from his main city of residence and his family.

Relations to Music and Technology

Frank has never really played any musical instrument but always had a strong passion for music. He regularly goes to concerts and gigs.

Frank particularly likes jazz, blues and underground rock, but is open to many different music styles, either personally or for his films. Frank doesn't really like traditional classical music but he has an extensive collection of film scores and soundtracks loaded into his iPod for those regular long-haul flights.

Frank has some basic knowledge about computers in general, although he is quite familiar with Internet tools such as web browsing and emails. He is happy to use any new tool that would make his job easier, as long as it's not too long and tedious to learn how to use them.

Frank often edits small projects himself using Final Cut Pro. He maintains a blog which is updated sporadically and he makes good use of his Youtube, iTunes and IMDB accounts.

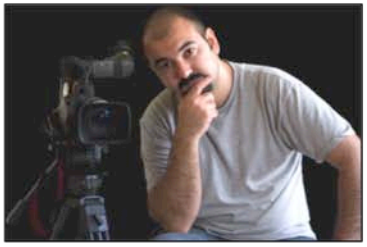
Collaborating with Film Composers

As an independent filmmaker Frank likes to keep a certain control over his projects, from pre- to post-production, including with film scoring. He usually gives a large level of freedom to the composers he collaborates with but still needs to have as many face-to-face meetings with them as possible, so that he can supervise the progress of the work.

During his career Frank has mainly worked with 4 different composers, with which he has a creative connection and enjoys working with. For each different project he selects the composer that is specialised in the style of music that he wants for that project, and also depending on the composers' availability.

Frank enjoys the process of bringing music to moving image – he feels it is a necessary part of the narrative structure and an important aspect of the creative process overall. He tries to involve the composer in the process as early as possible by giving him/her the script and other general information about the project.

Frank doesn't use specific musical terms and usually explains his ideas and expectations to the composer using layman's terms. Although his communication with composers has been quite successful so far, he admits that it often involves a lot of frustration and that sometimes projects have been delayed because of misunderstandings.



Oliver Ortega (TV Producer)

Delta Production Ltd.

Age: 36 - **Lives:** Sydney, Australia

**"I have deadlines.
The job has to be of quality but I won't sacrifice budget or timelines"**

"The music must be driven and pacey, with a clubby dance beat and guitars... it has to lift and excite the client's conference participants" – recent composer brief

Goals

Personal goals

- "I want the job to be quick and effective. The less time I lose at my work, the more time I can spend with the kids or sailing."
- "I want my clients to see us as professional and responsive."

Practical goals

- "I need to know that a complete and accurate brief is understood by the composer."
- "I need to be able to get music into the production and in front of my client as quickly as possible."

Background

In 2001 Oliver established Delta Production Ltd, a TV production company specialising in commercials, series and entertainment programs.

Oliver's talent and social skills have allowed Delta Production to quickly grow and become one of the most prolific TV production companies in Australia.

Delta Production currently employs 2 other producers.

Oliver has a regular group of directors with whom he regularly works. He selects a particular director based on their availability and the stylistic requirements of the project.

Oliver is divorced with 2 children. The kids spend a weekend with him every fortnight.

Out of work activities: sailing and deep sea fishing.

Relations to Music and Technology

Although dealing with musicians and composers through his work, Oliver wouldn't describe himself as a music expert. He doesn't play any instrument and knows little music theory.

Only about 25% of his projects involve music produced originally by hired film composers. However, Oliver believes in the value of original music and would like to increase that percentage, but says that "considering the current state of things, with stressing and short timeframes and tight budgets, hiring composers can be quite risky".

Oliver is quite knowledgeable about technologies and Internet.

Oliver has a "sat-nav" system in his (fully electronically optioned) BMW X5 but freely admits to using it rarely, claiming "It often gets it wrong and usually picks the slowest route!"

Collaborating with Film Composers

For most projects where music is required Oliver uses music libraries that he has purchased or that are royalty-free. Occasionally he also pays royalties to artists to use their published music and songs.

Oliver often allows his directors to take the leading role with the music work but he does know what he likes and will voice his opinion with the director or composer where he sees fit.

On small jobs, Oliver often briefs the composer and drives the music.

On other jobs he simply passes on his clients' wishes to the composer.

Oliver does not speak a musical language but he knows how to communicate what the music must achieve in terms of style and emotive mood.

Mary Milton (Film composer)

Sunrise Music

Age: 35 - **Lives:** Sydney, Australia

"I like to keep my creative independence."

Goals

Personal goals

- "I want to feel that my clients trust me and let me take creative decisions."

Practical goals

- "I want to know about my clients' background, where they're coming from, what their tastes are."
- "I need to understand the conceptual ideas the client want for the music."
- "I want to be able to reassure my clients in early stages about my work taking the right direction."
- "I want meaningful feedback (especially the positive things) at the right stage but I won't send something before I am happy with it."

Background

Mary completed the Bachelor of Music degree (Honours First-Class and University Medal) in 1997 at the Sydney Conservatorium where she won numerous awards, including the Youth Excellence Prize in two consecutive years.

She then completed a Masters degree in film music composition at the ASSC (Australian School of Screen Composition), where she now is a part-time lecturer.

Since 1998 Mary has written scores for a variety of productions, including documentaries for Discovery Channel, opening ceremony of the Commonwealth games, and short and feature films prized in international festivals.

Her widely acclaimed composition style expands from classical to jazz and experimental electronic.

Relations to Music and Technology

At a composition level Mary enjoys using her piano and the good old pen and paper.

However, she also has a home studio featuring a computer and some audio recording devices. Mary uses Protools, Reason for home recording and mockups.

She prefers recording music in professional studios but if the budget doesn't allow it she can make decent recordings with a limited number of musicians in her own studio. She also uses sample libraries and virtual instruments to produce high-fidelity mock-ups.

She doesn't define herself as a technology expert but masters the few tools she needs for her work.
She is familiar with the usual internet tools like email and browsing.

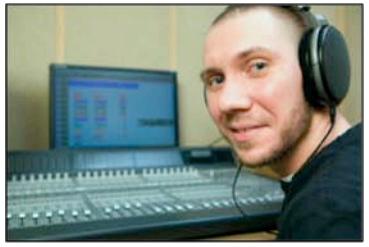
Collaborating with Filmmakers

Mary's proven talents being highly sought after she is now in the position to choose, to a certain extent, the projects she's more incline to work on.

Mary stays busy by capitalising on existing relationships and through client referrals. Mary does a small amount of networking through industry associations and events. She maintains a CV including credits and emails it to prospective clients on request.

She particularly enjoys face-to-face contact with filmmakers. However, while she is very open and seeks suggestions from them, she likes to keep a certain creative independence.

Yet, she sometimes finds it difficult to express her ideas and to convince possible distressed clients that her work is taking the right direction.



Jasper Johns (Film composer, Music producer)

Cherry Tree Studios

Age: 31 - **Lives:** Los Angeles, CA

"Composing music is my passion and I'll work hard to get there."

Goals

Personal goals

- "I want to feel that I'm making a creative difference."
- "I want to feel that I'm controlling what I'm doing."

Practical goals

- "I need a structured method that helps me avoid the (sometimes) hit and miss rollercoaster ride when trying to understand what my clients want."
- "I need to be able to communicate my musical ideas in a way that my client understands – but minimises the need to do countless mock-ups."

Background

Jasper left his job as a bank accountant in 1996 to follow his passion for music. Although he doesn't have any formal music education Jasper is an accomplished musician. After touring in America for 2 years as a lead guitarist in his rock band "The Green Potatoes", he established Cherry Tree, a recording and post-production studio based in New Orleans.

During 6 years Jasper produced local artists before he finally moved to LA to "conquer Hollywood" and accomplish his long-time dream of becoming a film composer.

Since then Jasper has continued offering his service for recording local artists but has gradually settled himself and his studio in the Hollywood post-production industry. Jasper's recent experience in film scoring led him to work on several TV programs, short films, commercials and trailers. But this promising artist aspires to one day establish himself as a respected film composer and to produce scores for major feature films.

Relations to Music and Technology

Jasper is always keen to learn more theory about music composition and film scoring. He regularly reads books on the subject and recently signed up for courses at the Conservatorium.

Jasper is very familiar with technology in general. He has built his studio himself with a large collection of hardware and software.
He has basic notions of web and graphic design and has built a website for his company.
He often communicates with his clients through emails, video and audio conference.
Jasper has a Myspace page and has experimented with putting some of his work onto sites like Youtube in an attempt to reach a broader audience.

Jasper prefers to work with raw inspiration, shaping his music as he records it. He plays by feel and rarely writes his compositions down. He does however save his guitar rig patches in his recording software.

Collaborating with Filmmakers

Jasper never formally learned music theory but has so far successfully relied on his musician's instincts. This also applies to his relationships with filmmakers, as his social skills help him get through most situations.

However, he does not really follow any formal method and feels like he has to start from scratch each time he works on a new project or with new clients.

Collaborating with filmmakers is something that he really enjoys. However, he deplores the fact that many clients either give him too little information about what they want or seem to dictate their choices for the music. When that happens, he doesn't always dare or know how to defend his own ideas. He says, "It's part of the job, I guess you have to cope with it".

Jasper often works on projects that have been previously scored with temp music. This is a blessing and a curse. On the upside it gives him a very clear understanding of what the client likes but they often get wedded to the temp music – and it is usually high budget stuff that is very difficult to top.