Why use linear work flows with non linear tools?

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Abstract

Although the technologies used to make films have changed completely during the 90-year life of sound film, the film making workflow has remained strangely unaffected. We still make films as if they are shot on film that has to be developed and printed by a lab, mechanically cut and spliced by a film editor and sound edited on mag tape. The transition to digital cameras and sound recorders and digital non-linear editing machines and audio work-stations, has had very little impact on the working practices of the film industry.

This article proposes to change that. The transition in to a non-linear workflow would enable everyone involved in film post-production to collaborate in a more dynamic and creative way. By allowing more time for the sound editor and picture editor to experiment with sound in the editing process, more informed choices can be made in this critical phase. It would also enable the sound editors to have creative collaborations not only with the editor and the director, but also with the composer.

Keywords: sound editing, non-linear workflow, creative collaboration, sound design, theatrical practice, film editing, film music, computer games

The division of labour and the methods that were established in the infancy of sound film, created a practice that is still used today. Most textbooks on film consequently still teaches this linear way to shoot, edit and sound edit film.¹Of course, ninety years of technological development haven't passed unnoticed by the film industry, but although we are now using digital tools in every step of filmmaking, this hasn't had any decisive impact on the workflow.

Today we record sound and images on digital media, and the editing, sound design and colour grading takes place in non-linear computer-based workstations. We no longer need to wait for the film lab to process the negative and make work prints, or for the editing assistant to put the sound and picture in sync.

¹ One example of this is Lewis Yewdall, David: *Practical Art of Motion Picture Sound*, USA: Elsevier inc. 2007

The original sound no longer has to be transferred (in real time) to mag for film sound editing or to 2" 24-track tape for video sound editing. The synchronization between sound and image is more or less automated in the editing computer, by time code or by software that interprets audio waveforms. The sound recording device is probably, just like the camera, a non-linear hard disk or memory card recorder. Picture editing and sound editing take place in a computer that reads video and audio files from hard drives, whether it is the production sound, sound effects or music. The sounds don't have to be copied, they can be played directly from hard drives located in different locations, via computer networks. One can make infinite numbers of versions of each scene, and then revert to any previous version with just a few mouse clicks.

The sound mix is really just a recording of automation data right up to the final mix. The audio file, which constitutes the film's final mix, is coded, along with the finished image file to become the final print, called a DCP Digital Cinema Package.

These digital tools allow for a completely different, non-linear workflow, which provides new possibilities for creative collaborations. However, most film production companies do not seem to take advantage of these opportunities.

Change is difficult and it takes time. In countries where there's still a big film industry, there is an inherent inertia in the production system. If production company wants to break the standard procedure, it affects a number of people and organisations who are used to working in a different way. Over the last 15 years I've tried to implement a non-linear workflow in editing, sound editing and music composition. In Sweden, this kind of change may be easier to implement, as film sound engineers here traditionally have performed multiple tasks in each film, and the film industry is relatively small². In recent years, a few other film producers and sound editors have also started to question the traditional ways for post production, in favour of a non-linear one.

Picture editing and sound editing

Film editing is often described as the last rewriting of the script, or the moment when the film finally is realized. Clearly, the editor makes many decisions about how the

² Until the late 1990-s it was common practice for the location sound recordist and the boom operator to also be a part of the sound editing crew, as well as providing foley and designing sound effects. This work method was also common in Finland.

film should be constructed during this operation. These can be questions about the order of individual scenes and how these scenes should be put together. What information does the audience need to understand the plot, and how should this information be revealed? For each of these questions, there are several possible answers. Editing, as well as sound editing, is a search for the optimal combination of sound and image.

You could sit in one room with one pile of dailies and another editor could sit in the next room with exactly the same footage and both of you would make a different film out of the same material.³

In this work, sound plays a key role. Sound and music can completely change the spectator's perception of a scene, a location, a character and an event. The editor has to experience this change to make the right decisions. Each scene is unique, and although an experienced film editor to some extent can predict how the sound will affect the scene, they can never be quite sure. Is the pause too long or too short? How does the pace of the scene change when the music and the sound is added? Can the sound really provide the missing information in this scene, or does it have to be conveyed in some other way?

Judging from the end credits of films, the biggest changes in the workflow over the past 40 years is an increased division of labour. It wasn't uncommon in Hollywood until the mid-1970s that the picture editor also did some of the sound editing. As both the picture post and the sound work became more complex, this arrangement became impossible, and the work was transferred to a growing group of increasingly specialized sound editors.⁴ One example; the James Bond film *Casino Royale*⁵ from 1967 has four sound editors credited in the end title. The remake from 2006⁶ list a staff of 40 for sound post production.⁷ With so many people involved, the issue of communication becomes essential - not only the communication within the sound crew, but also the communication between them, the composer, the editor and the

³ Murch, Walter, (1995: 13) *In the blink of an eye*, USA, Silman-James Press

⁴ Allen, Dede: lecture at the School of Sound, London 2005

⁵ Columbia Pictures Corporation, Famous Artists Productions, USA/ England 1967

⁶ Columbia Pictures Corporation, Eon Productions, USA, 2006

⁷ From IMDB.com, accessed may 5 2015

director - all has to work.

Because sound and image influence each other so much, it would make sense for communications to flow both ways. In a linear workflow, this is impossible, because the picture probably is locked⁸ when the sound editors begin their work. In my own experience, the picture changes that do occur during the sound editing is hardly ever answers to requests from the sound editors. They're usually driven by other factors such as response from test screenings or indecision on the part of the director and/or the producer. I have never in my own career as sound editor been able to get picture changes that would improve the sonic possibilities of a scene. That is, not until I changed to a non-linear postproduction workflow.

Staging a Theatre play

Many Swedish directors have alternated between working with film and with theatre. Victor Sjöström and Ingmar Bergman are examples of this, as is Susanne Osten. This infelicity applies even more to actors, but set designers, costume designers and makeup artists regularly also move between these two worlds. That makes it all the more strange that the theatrical, parallel way to stage a play hasn't rubbed off on the film industry. I've had the pleasure to be involved in a production of Ibsen's *The Wild Duck* at the Dramatic theatre in Stockholm⁹. The director, Anna Pettersson and I started talking about the use of film sound practices and conventions on stage about a year before the premiere. My task has been to look for traditional ways of creating sound effects in the film industry. We then looked which of these could be integrated into the stage play. This project gave me the opportunity to attend the rehearsals, to see how different ideas were tried and changed as the play emerged.

What struck me was how all the different crafts were involved right from the beginning and how they could influence and be influenced by each other. While the actors and the director worked with the text and the scenery, the set designer, costume designer, make-up department, sound designer and lighting designer began to try out their ideas. These tests were visible to every one involved. They all had the

⁸ The term locked means that no more changes in the picture edit are allowed, because the negative cutting has started. Once you've cut the negative, you can't make changes, since the splices destroy the frame before the first and after the last frame of the edit.

⁹ Dramaten, Stockholm; premiere April 23, 2015

opportunity to inspire and be inspired by each other, and everyone could see how the acting changed in response to these ideas. Costumes with high starched collars made the actors move in a particular way, loud music or loud sound effect on stage forced them to change their voices and their manner of speaking, and the lighting made them move to certain spots on stage where they would be visible or obscured. For me, with very little practical theatre experience, this seemed to be a far more organic creative approach than an average film production. I was also intrigued to see the director's role in this collective creativity. She always had a broad choice of ideas and proposals to work with, and her feedback on each of these immediately came to the attention of everyone. All the different crafts persons could assess every choice by the director, and judge it's effect in their own work area.

In the videogames industry¹⁰

Video games have grown into a major industry in Sweden, with several leading domestic companies.¹¹ Thanks to the rapid development of graphic cards and CPU performance, these games can look and sound like live action movies. The gaming industry also recruits many of their sound and image creators from film schools and from the film industry.

Despite this, they have developed a very different workflow.

A new game can start out by someone in the production team having a game idea. Maybe she makes sketches of the main character, and outlines an idea of how the game should work. What's the character supposed to do? Is it a multiplayer game, a first-person game, or a platform game? From this idea, the Art Lead, a graphic designer, begins sketching the game's graphical concept. Usually he collects material for a mock-up with pictures or film clips to visualize it.

Starting from this basic material, a small group begins creating game events with sound and image. These are rough sketches. There is still no script at this stage. In certain types of games, there never will be a script in a strict sense. In multiplayer games for instance, the players themselves create the story as they play, depending on the decisions they make during the game. Even at this early stage, test audiences are used to assess different aspects of the game – the story, the menus, the dialogue etc.

¹⁰ Interview with Mari Saastamoinen Minto, Audio director at DICE

¹¹ Apart from DICE there are: Massive, Avalanche studios, Paradox Interactive among others

At this stage, both sound and graphics may still be rough sketches. At this point there may be as few as five people working on the game. When the real work starts, the group will expand to between 20 and 50 people in various disciplines. One group will be working with the graphics for the characters and environments, others will do sound or music. As the different parts emerge, they are implemented into the game engine, the software that makes the game playable. Since all of the team members are working on the same material, everyone hears and sees what everyone else is doing. An update by any of the animators is immediately visible to the sound crew, and as soon as a new sound event is made, everyone else will hear it too. In this way, the game progresses in parallel in all different departments, with information flowing in all directions.

Sometimes there's drastic change, but as soon as it's made, everyone will get it, and can adapt to it. Mari says that key persons in the creation of new games have become better at communicating changes, because they've learned to understand who's affected by what kind of change. Often changes occur because someone involved has come up with a new technique to animate certain kinds of objects, for instance foliage or water. So suddenly a whole course or level in the game is set in rain or in a forest. This totally changes things sound wise, but usually there's time for the sound crew to adjust their work to suit the new visuals.

Non-linear workflow in film post production

This idea occurred to me when I was asked to be sound supervisor for a TV series, Svenska Slut¹², about 15 years ago. I had previously worked successfully with the producer who offered me the job, but this time, I was reluctant. The problem in my opinion, was the director, a young debutante. I feared that we wouldn't be able to communicate in a creative way about the work, and that we had no references or language in common. The producer however, was convinced that I was the right person for the task, and persuaded me to read the script and look at some rough-cut scenes. So I did, and I agreed that this was precisely the kind of film that suits me and my way of sound editing, as the producer had said.

Of course I've had quite lively discussions with directors before in my studio, and

¹² Giraffilm AB, Sweden 2002

sometimes they can become strange if we don't understand each other. Sometimes we've ended up arguing about verbal descriptions of sounds rather than about the actual sounds or what they're supposed to contribute to the film. Moreover, it is difficult both for me and for a director to predict how a particular sound will affect a scene. There has to be room for quite a lot of experimentation. Sound is a volatile medium, it is difficult to get a hold on it and describe it. Therefore, I think we must find a better way to communicate about it.

I decided to submit the director to a little test. I wanted to see if we could collaborate without talking about the sounds. This test was very simple - I went through my sound effect library and picked twenty or so sounds which I thought could fit into the world that the director was creating in this series. To prevent him from being biased by knowing the sound's origins, I re-named them after what I heard in them. I remember that one of them was called "whale song in a tunnel", and another "clickfizz".

I sent the sounds to the director, and after a few days I called and asked if he had heard them and if he liked them. The answer to both questions was "yes", so then I went to meet him for the first time. He played a few rough-cut scenes where he'd used some of my sounds. That way I could see which of them he liked and which he didn't. I could also see how he thought the different sounds could be used.

After this meeting, I agreed to take the job, but I had one more requirement. I wanted to start audio editing in the middle of the picture edit. I didn't want to wait until the episodes were completely finished and locked, and all the important decisions made. This meant that I voluntarily subjected myself to what sound editors usually detest most of all, picture changes during the sound editing.

You've been editing the dialogue for four weeks, and you've made thousands of detailed, interrelated edits and countless fragile overlaps. Knowing that the film was locked five weeks ago, you confidently built your editorial house of cards. Now you learn that the director and picture editor have made hundreds of 'small changes'. "Don't worry," they

tell you, “most of the changes are just a couple of frames each”.¹³

We agreed that I would work half-time during the last twelve weeks of editing, and six weeks full time when the episodes were locked - a total of twelve weeks. My idea was to use this Methalogue¹⁴ process to show the director what I can do and what the sound can bring to his series, by simply letting it do just that. One unexpected advantage with this set up was that, although I formally worked part-time during the picture edit, I couldn't stop thinking about the scenes. Many technical and dramaturgical problems were solved while teaching or working with other things in the other half time. Creativity is a difficult thing to schedule.

Yewdall writes on the subject of letting a film music composer begin to work before the film is completely finished:

Setting the music composer as far in advance as possible and submitting work-in-progress videotapes allow (sic) the composer the same advantages to write a far more creative score than having to deliver the score overnight.’¹⁵

I'm surprised that Yewdall, being a film sound editor, doesn't propose the same practice for sound editors.

The results of my experiment was even better than I could have imagined. The verbal communication with the director was confined to questions about whether he had seen and heard what I'd sent, and whether he liked my ideas. If he liked them I continued along the same lines, if not, I tried something else. I did not have to explain and devote time to put my ideas into words, and he did not have to think about how he expressed his views. We both knew that very little was at stake in these early sketches. Even the most advanced first sketches that I sent was the result of less than one hour's work. Usually, it was significantly less, so I could them and start from over, without feeling that I'd killed my darling.

As the editing continued, more of my sounds and sketches were added. The director could immediately see and hear for how long he could keep a pause, and how the perception of pace was changed by the sound. Meanwhile the sketches that had been

¹³ Purcell, John (2007: 239), *Dialogue editing for motion pictures*, USA, Elsevier inc

¹⁴ Methalogue is a term that was created by the the British anthropologist and communications theorist Gregory Bateson. (This needs futher citation!!) This means that one communicates through the medium in question, such as dancing about dance or in this case communicating with sounds about sound.

¹⁵ Lewis Yewdall, David (2007: 463) USA, *Practical Art of Motion Picture Sound* Elsevier inc

approved were developed further and became more sophisticated. At any time along the way the director could revert to the previous version if something took a turn that he didn't like.

In his classic film sound manifesto 'Designing a Movie for Sound'¹⁶ Randy Thom describes how he believes film work should be organized and implemented to provide space and opportunity for sound to play a bigger part. Although I agree with most of his ideas, I am not entirely convinced that his solution to the dilemma is feasible or even desirable. He proposes that the script writer should have sound in mind when he or she begins to create the story. I think that would be complicating the script writing process unnecessarily. In my experience the screenplay usually doesn't contain much information about either the image or the sound. This is added in the next step, when the director and the cinematographer turn the words into visuals. I believe that the approach I have outlined provides a sound practitioner with a better opportunity to contribute to the film by gaining influence in the movie-making process at the time when the film finally is created; in the editing.

Some colleagues that have tried similar methods

Carl Edström tried a non-linear method when he was sound supervisor for the TV-series *Ängelby*¹⁷. He reports that the idea came out of several collaborations with post production supervisor Peter Bengtsson¹⁸. In this case, the plan was to involve the composer as well as the sound supervisor at the early stages of picture editing, to enable collaboration between the composer, the sound editors and the picture editor. This gave them the opportunity to establish the broad sonic ideas for the series right from the start. He also states that the other advantage of working in this way, is the possibility to make technical assessments of the dialogue at an early stage.

Carl admits that sound post production may take longer if you work in this way, but it will get you closer to the final result at an earlier stage. That will help the director and the editor to make well-founded decisions in the post production, and, in the end, lead to a better film.

¹⁶ http://www.filmsound.org/articles/designing_for_sound.htm

¹⁷ Tre vänner Produktion AB, Sweden 2015

¹⁸ E-mail interview 5 may 2015

It may seem awkward to start dialogue preparation before the picture editing begins, but it gives the editor a much better soundtrack to work with. It also enables the editor and the director to start considering ADR, based on the technical quality of the dialogue track. Edström says that he would like to use this kind of workflow again.

The children's TV-series *Barna Hedenhös uppfinner julen*¹⁹ also implemented a nonlinear post production approach.²⁰ In this case, it began with the film editor wanting to work in close proximity with the VFX artists. So the editor moved into a editing suite in the same building as the VFX-company. By coincidence the sound post facility was also on those premises, as was the series music composer. Fredrik Lantz, the sound editor and dubbing mixer of this series, states that the editor started his work while they were still shooting, but sound editing really started when the editor had locked a few episodes. He could however sit in on meetings during picture edit. The music composition however, began almost simultaneously with the editing. Another benefit of including audio and composer in the discussions at an early stage and have them work close to the editor was that they had more access to the director than is usual. Fredrik also did sound design sketches for some critical scenes before they were locked. This proved helpful for both the sound crew and for the editor. He estimates that sound work overall took a bit longer than usual, but that they gained a lot in quality by having a better creative process.

How do I do it?

I have used this method on a number of films and TV series of different kinds. The procedure usually look something like this: I've come aboard the project around half way in to the picture edit, sometimes even earlier. The editor sends some material to me; it might be a few scenes that are in recurrent locations. In some cases the footage is totally unedited. The aim is to give me an idea of the film's different locations, key events and characters. Traditionally I'd start sound editing by sorting out the dialogue. The dialogue track is the foundation of the sound track, and it's always nice to be able to schedule ADR and Foley at an early stage. As dialogue editing is the most intricate

¹⁹ Svensk Filmindustri (SF), Sveriges Television (SVT), Breidablick Film AB, Jolly Roger, Sweden 2013

²⁰ e-mail interview with Fredrik Lantz may 2015.

part of sound editing, it's also the most difficult part to change when scenes are re-cut. Therefore I found that it's better to start from the opposite end. I start with backgrounds and sound effects. I design and try spot effects for recurring events, such as doors and equipment and I can also start designing the different backgrounds and distinctive sounds for events and characters. Long dialogue scenes are ignored at this point, excepting some experiments with atmospheres. I spend most of my time working with scenes in noisy environments with little or no dialogue. Quiet scenes are also interesting to sound design at this point. This will help both the picture editor and the composer to make good choices.

When I'm happy with a sketch I send it back to the editor. If they don't like it, I get to know that right away, so I can try something else. On the other hand, if they like it, it stays in the scene in the editor's computer, and editing continues with my sound in the scene. Meanwhile, I continue to work with other scenes. Eventually, the scenes come back to me in a more finished state. My sound sketches are still there, as temp tracks, so I can pick up my work from where I left it. Meanwhile I've worked with other scenes and that has generated new ideas that I can try, before I return the scene to the editing room again. Some scenes do quite a few of these trips back and forth between me and the picture editor.

In an ideal situation, the music composer has started her work at the same time. This has created a 'golden opportunity' for collaboration that will lead to a soundtrack where music and sound blend together and support each other. When at last the scene, the episode or the reel is finished, much of the sound design, sound editing and music is completed.

It's quite obvious that this way of working influences the picture editing as well as the sound editing. On several occasions when I've delivered sound sketches for scenes, the picture editor has dared to keep a pause for a few seconds instead of cutting right after the last line of dialogue. The silence which might seem empty without the added sound is now interesting and meaningful. Once the editors are comfortable with this workflow, they also tend to send scenes to me, asking if sound can solve a narrative problem or not. Another effect of this method is that the sound editing is in an experimental phase for much longer than is usual. It allows me to try new ideas and start over several times with some scenes. It's not until the episodes or reels are locked that I have to decide which way to go. Also, as the locked reels come back to me, they contain my a very elaborate temp track, full of ideas that I can refine

and use elsewhere in the film. This manner of working leads to a lot of shuffling of sound files in Pro Tools, to adjust the sound to fit the re-cut scenes.

Software is now available that conforms sound editing to new picture versions. I have never used them though. I don't think it's that much of a problem to move the tracks and nudge audio files manually. Because I know that the picture will change constantly, I arrange my Pro Tools sessions so that this can be done quite easily.

If I could make a wish it would be that Avid makes it possible for the picture editing software and the sound editing software to communicate in a dynamic way, and not only one-way through static AAF-files.

Any disadvantages?

One of the methods I use to be able to move around sounds and whole scenes, is to pre mix certain sound effects and backgrounds. This only works if I know that I'm the one doing the final mix. Pre-mixing limits my freedom somewhat in the final mix, but if something absolutely has to be changed that late, I can revert to an earlier version and remix the pre mix, or transfer all the elements to the final mix session. There have been one or two occasions when it has become a real problem. It's crucial to keep track of all versions so that you can go back anytime you want to make changes.

The risk of drastical changes at a late state is considerably smaller with this method however, since the director, the editor and the producer have heard the soundtrack evolve over several weeks, if not months, of editing. There should be no major surprises in the mix.

It is wise however to limit the number of tracks in the sound edit. This is less complicated than if you work linearly, because you don't have to safeguard with lots of alternative sounds for the final mix. The mixing gets to be a matter of balancing the different sound design elements against each other instead of selecting sounds. By that time the director and the producer should have a clear understanding of how the film is going to sound. This also allows us to save time (and money) in the final mix. To edit dialogue at the end of the sound edit requires above all strong nerves. It would be a bad thing to discover at the very end that scene isn't working dialogue-wise. To prevent this from happening the sound editors have to do some dialogue preparation before the reels are locked. That way they can start planning the dialogue editing in

advance and start scheduling ADR sessions and Foley.

The most positive aspect of this way of working is the positive response I received from the editors and directors. They become more involved in the sound post and they get more time to try different things with sound and music. Personally I think the sound post production process becomes much calmer, because I never have to be uncertain as to whether the director will like what I do. Moreover, I get to collaborate with the composer, so that we together can create the best possible music soundtrack for the film.