

A didactical framework for audiovisual design

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Abstract

In contrast with many other design tasks, the design of audiovisual sequences seems to depend highly on the designers' particular talents, insights and creativity. Quite some customers experience the intangibility or rather the sheer impossibility of discussion on design decisions, due to the lack of an overall audiovisual design methodology. Especially at the microlevel, that is the level of concrete images and sounds, audiovisual program development tends to be a matter of taste instead of well-considered decisions. To provide a vocabulary for functional program design, the present article introduces a didactic framework that serves as a classification scheme. It constitutes some 49 microlevel functional categories that support both the design and the analysis of audiovisual sequences. The structure and contents of the framework are based on empirical evidence on learning and instruction. The present article describes and discusses all categories of the framework.

Introduction

New technological developments gradually have changed the educators' focus from traditional linear media like film and television to interactive, computer-based media. One might even presume that the former title of this very journal (the Journal of Educational Television) has been adapted to address these new developments. Indeed, in the last decade many new computer-based applications have been introduced in education, including programs for drill and practice, simulations and more recently the Internet. Despite these developments, educational television, video programs and even audio programs still play an important role in education. In addition, since the performance of computers has tremendously increased over the years, more and more audiovisual elements are being incorporated in the computer environment, be it on a different technical standard. By now, many computer programs contain spoken words, sound effects, video streams and animations. In addition, a growing number of satellite and cable television companies offer video-on-demand and pay-tv successfully; also distribution of audio and video over the World Wide Web (Web casting) is quite promising. For these reasons, one might expect a renewed interest in methods and techniques for audiovisual design.

In early days the audiovisual program (film) was generally considered a piece of art, rather the result of inscrutable and mysterious talents than of steady craftsmanship. Indeed, many films embodied the magic power of masterpieces, constructed by inimitable and cheered geniuses. The advent of television some half a century ago, partly caused a demystification of film in that it opened up film -or rather a new audiovisual modality comprising film- into everyday live. Nowadays film and television are considered a valuable economic line of business, offering thousands of people jobs and offering millions of people more or less appreciated products. More than before, the production of audiovisuals is regarded a professional business in which creativity is valued as such but dominated by craftsmanship and control.

A similar development can be observed in education. The idea of teaching as an art or as a wholehearted vocation has gradually made way to the idea of education as a professional activity that can be specified in terms of required knowledge and skills as in any other profession. Indeed, instructional design and educational technology mark the technocratic vision that regards teaching as a mere technique, although some talents may help.

From the above one might be inclined to conclude that the common ground of television and education should show a highly rationalised process, applying successful formulas and methods to meet the pursued goals. Indeed, at the level of decisions on the purpose, objectives and cost of educational programs, this is certainly the case. And even decisions on program structure and program style are usually highly explicit and underpinned. However, at the microlevel of audiovisual design, i.e. the level of concrete images and sounds, decision criteria are less pronounced. Here, producers and directors have to rely on their creativity and professional feeling to realise the right atmosphere, the right tempo, the right timing and the right cues. It is at this stage that many questionable decisions may be taken, giving rise to disappointing results. By analogy with storytelling, one might end up with a well-structured and well-styled story, that regrettably is being told badly.

The present article introduces a didactic framework of microlevel functionalities. The framework is to serve both synthetic (design) and analytic (review) tasks. Rather than restricting the program makers' working space, it is meant to facilitate and support creative and effective program design. While it focuses on the level of semantics or functionalities, it does not interfere with the program makers' choices for audiovisual styling. On the contrary, by making the involved functionalities more explicit, it rather invites the program makers to generate adequate cinematographic solutions.

General didactic framework

Audiovisual programs (for short 'films') are to be regarded stories or statements that use cinematographic conventions to convey meaning. Even audiovisual sequences that are embedded within a multimedia environment are statements in itself, serving up chunks of information to the viewer. Although film in itself lacks the characteristics of a real language (Monaco, 1977) it comprises a variety of communication codes, including traditional codes (spoken words, written text, gesture, mime, etiquette etceteras) as well as specific cinematographic conventions (lighting, *mis-en-scène*, montage, framing, camera moves etceteras). The process of reading and understanding the messages in film demands a high level of sophistication, because of the high level of ambiguity. Sometimes a picture of a rose represents just what it is: a picture of a rose (denotative or manifest meaning), but it may also symbolise the concepts of 'love', 'peace', 'nature', 'innocence', 'pleasant smell' etceteras (connotative, symbolic or hidden meanings). As a consequence, watching film is a permanent struggle of getting the message right by assigning the 'right' meaning. To avoid irretrievable misunderstanding or disorientation, it is necessary for program makers to build in a set of relevant cues. Such cues should regularly establish the storyline and allow the viewers to keep up with the story. During the design stages, unfortunately a great deal of discussion and brainwork is spent on the manifest contents of cinematographic elements, which involves a lot of arguing on aesthetics. Without asserting that the aesthetics of a program are not important, we emphasise that a discussion about underlying meaning or rather about possible misunderstandings would be a better start. It is this level of meaning that our didactic framework is addressing: the microlevel framework skips all concrete words, phrases, shots, angles and camera movements, but only deals with the underlying functionalities. Unfortunately, the word "viewer" when associated with audiovisual media, has a rather passive connotation. Yet, viewing an audiovisual is to be regarded an active process that stimulates and improves the viewer's mental functioning. In the sequel of the paper, we will prefer to use the word 'learner' instead of 'viewer'.

Attempts to construct a conceptual framework for educational television have been made before by Koumi (1991), starting from practical experiences. The structure and contents of the present framework are based on empirical evidence on learning and instruction. While referring to a variety of educational research outcomes, Knirk (1986) identifies five universal principles that should be included when conducting any kind of instruction. These general principles are assumed to hold for any pedagogic approach:

1. Prepare the learner
2. Direct the learner's attention
3. Provide learner participation
4. Provide feedback to the learner
5. Provide repetition

Indeed, violating these principles seems to be unwise. Not preparing the learner and not directing the learner's attention means that the learner is unable of ignoring irrelevant stimuli. Neglecting active learner involvement is broadly recognised as a negative factor for the quality of learning. Omitting feedback may easily cause misconceptions. Finally, withholding sufficient repetition does not support retention (see also Fleming et al., 1985). The table below gives an overview of the present framework and its 49 sub-categories that all represent didactic functionalities. For the sake of convenience, the various functional tools are labelled with an index-code. A provisional version of the scheme has been published before in Dutch (Westera, 1995).

1 Learner preparation	1.1 Capturing attention	1.1.1 Surprise 1.1.2 Shock 1.1.3 Temptation 1.1.4 Emotion
	1.2 Announcement	1.2.1 Explicit announcement 1.2.2 Implicit announcement 1.2.3 A-specific announcement
	1.3 Attuning	1.3.1 Attune to prior knowledge 1.3.2 Attune to subcultural characteristics 1.3.3 Attune to presentation context
2 Direct attention	2.1 Introducing	2.1.1 Sketching outlines 2.1.2 Prediction 2.1.3 Contextual announcement
	2.2 Emphasising	2.2.1 Compelling images 2.2.2 Guiding texts 2.2.3 Stressing by timing
	2.3 Relating	2.3.1 Connecting subjects 2.3.2 Activating prior knowledge 2.3.3 Building upon known ideas 2.3.4 Integrating knowledge
3. Learner activation	3.1 Tension (suspense)	3.1.1 Arousing expectations 3.1.2 Stressing contrasts 3.1.3 Information lead 3.1.4 Information lag 3.1.5 Delay 3.1.6 Identification 3.1.7 Pathetic outburst
	3.2 Raising questions	3.2.1 Facts-related question 3.2.2 Comprehension-related question 3.2.3 Fantasy-related question 3.2.4 Problem
	3.3 Allowing for reflection	3.3.1 Room for interpretation 3.3.2 Restricting the information load 3.3.3 Varying tempo 3.3.4 Delayed timing
4. Providing feedback	4.1 Direct feedback	
	4.2 Natural feedback	
	4.3 Delayed feedback	
	4.4 Projected feedback	

	4.5 Generalising	
5. Repetition	5.1 Plain repetition	5.1.1 Literal Repetition
		5.1.2 Repetition in a different symbol system
		5.1.3 Repetition in a different context
	5.2 Summarising	5.2.1 Material summary
		5.2.2 Structural summary
	5.3 Confirming	5.3.1 Legitimising the issue
		5.3.2 Establishing relationships
		5.3.3 Rhetorical question
		5.3.4 Establishing style

TABLE I. Microlevel didactic framework for audiovisual sequences.

Detailed description

Below, we will briefly outline the various components of the framework. To illustrate the items, many examples are included.

1 Learner preparation

It is commonly accepted (Fleming et al., 1985) that learning processes are more effective when the learners have been well prepared for their learning tasks. At any time, it should be clear to the learners why they are watching a film or video and what they are expected to do during and after the presentation. This helps them to discriminate between relevant and irrelevant stimuli. Throughout the program, new preparative cues are necessary to make the learner susceptible to new impressions. We distinguish three modalities of learner preparation, each of which constitutes some subclasses.

1.1 Capturing attention

Capturing attention fits in with the learner's natural curiosity. It concerns short and pregnant stimuli that makes the learners want to know what is coming next.

1.1.1 Surprise

A surprise is an unexpected event that can rouse curiosity. Surprises may be associated with humour and entertainment. In many cases, a surprise effect can be evoked by simple cinematographic means like a revealing pan or zoom (revealing slums contrasting with a first class hotel), an unexpected association (the presumed nasty husband appears to be charming and handsome) or an unusual location (an interview on a horse back). Whenever a surprise is overdone or forced, it is counterproductive and it may cause the learners to withdraw from the program. Unfortunately, many films contain unwanted surprises in that learners make associations the makers did not anticipate.

1.1.2 Shock

Some events may cause the learners to 'wake up' instantly. One might think of intrusive images of reality tv, with people fighting, a car crash or an attempted murder. Such images cause a rapid increase of the adrenaline level in the blood, which is associated with the three F's: Fright, Fight and Flight.

1.1.3 Temptation

Highly aesthetic pictures and sounds are inherently attractive to the learner. Indeed, some high quality commercials are literally irresistible, no matter what messages are being conveyed.

1.1.4 Emotion

Of course, all previous classes are associated with emotions. Yet, we introduce a separate category for compelling events that involve stirring emotions (sorrow, sadness, distress) that learners are inclined to adopt. Clearly, the proverbial 'tearjerker' contains a lot of such events to capture or maintain attention.

1.2 Announcement

In announcements (signposts), emotions are less prominent. Announcements are meta-communicative utterances that allow the learners to anticipate what's coming up.

1.2.1 Explicit announcement

An explicit announcement unambiguously states the contents of the program. Such announcement can be local ('..and now the weather forecast..') or distant ('Later on we will join Christine, but first...'). Note that even a big close-up of the intended murder weapon would be classified an explicit announcement.

1.2.2 Implicit announcement

This is a more subtle way of announcing. The announcement cues are somewhat 'hidden' in words, pictures, objects, facial expressions, a change of mood (via montage, shots, light or sounds) or even in the presented events. Here, the learners have to find out themselves what the announcement is. Therefore, implicit announcements may help to activate the learners.

1.2.3 A-specific announcement

Sometimes, an announcement does not specify *what* comes next, but it only indicates *that* something new is coming: '...and now, for something completely different...'. Such an a-specific announcement is a useful means for arousing curiosity.

1.3 Attuning

Striking the right note is essential to realise effective communication. Therefore, program makers should constantly take into account the characteristics of the target group.

Correct attuning prevents misunderstandings, irritation or even rejection of the program.

1.3.1 Attune to prior knowledge

The level of complexity should be right. That is, there should be no extensive disquisition on things that are supposed to be known already. This is one of the greatest problems of television: considerably large groups of viewers feel offended by the (too simple) way they are addressed in the programs. Likewise, however, too much complexity will easily cause the learners to drop out (Fleming et al., 1985).

1.3.2 Attune to subcultural characteristics

The design of a film should preferably correspond to the subcultural characteristics of the target group. This concerns the style, tempo, choice of music, texts, leading characters, etceteras. A program for elderly people would better not be implemented with hip-hop music, unless an alienating effect is pursued.

1.3.3 Attune to presentation context

The presentation context of a film is an important design variable. For instance, programs meant to be shown on a fair or exhibition should show short and dynamic cycles to be effective. Nowadays, feature films, originally designed for the white screen, are often broadcasted or distributed on video-cassettes. Yet, the small tv-screens and reduced resolutions are by no means capable of approximating to the intended impact of the white screen.

2 Direct attention

Audiovisual media are notorious for their information overload (Postman, 1986). Because of the dynamic characteristics of the medium, the viewers are continuously confronted with new stimuli. Since humans (as well as animals) are very sensitive to perceptible change (Gordon, 1991 and Colavita, 1974), any new shot, object, camera move or sound may distract the viewer's attention. Too much complexity in the stimuli pattern may even cause rejection, annoyance or boredom (Fleming et al., 1985). Therefore unmotivated or meaningless change in the audiovisual pattern should be avoided. According to Wember (1976), such meaningless stimuli are inherent to the medium. He introduced the term 'Augenkitzel' (literally: 'eye tickle') and accused the producers to manipulate their viewers for ideological or political reasons. Anyhow, from time to time it is necessary to direct the attention of the viewers by re-establishing the message or emphasising key elements of it.

2.1 Introducing

The introduction of an issue is one step farther than the announcements described before, because here issue-related content is presented. We distinguish three kinds of introduction.

2.1.1 Sketching outlines

In a brief outline, the most important concepts and their relationships are presented. For instance, in a sequence about the information flow of a production company it would be appropriate to start with an overview of the involved departments. This allows the learner to adopt a baseline pre-structure that stimulates the correct assimilation of information later on. The presentation of such a pre-structure refers to the epitome concept of Reigeluth et al. (1983) as well as to the advance organiser of Ausubel (1968). Both ideas are assumed to improve the learning.

2.1.2 Prediction

A speculative prediction of an event in a film focuses the attention on the correctness of the prediction. This effect can be enhanced by presenting two competitive predictions ('I think it will break'; 'O no, I think it will smoothly bend'). In fact, prediction concerns proposing a hypothesis and the consequent testing of its validity.

2.1.3 Contextual announcement

This announcement differs from previous announcements in that it not only clarifies *what* is coming next, but also motivates *why* it is coming (Koumi, 1991). Therefore it directs the attention, while it warrants and positions the new subject ('To find out what happened, let's ask the victim....').

2.2 Emphasising

Film has its own means to highlight information.

2.2.1 Compelling images

With the right camera position, framing or camera movement, the attention of the learner can be directed at will. Also the contents of the image can be highly compulsory. For instance, a changing eye line or a pointing gesture can hardly be resisted.

2.2.2 Guiding texts

Sounds, be it music or sound effects, can be as compelling as images. However, utmost explicit directions arise from spoken words that guide the eye: '...and just below the knee we see the double fracture...'. Here the words give additional information that focuses the attention on specific details of the picture.

2.2.3 Stressing by timing

Emphasis can be attained when the information of words happens to coincide with the information in the picture. When the camera slowly tilts down the human body, one could stress the various parts of the body by speaking the concerned words at the right moment: 'head, chest, belly....'. This doubling of information using different communication channels is called *redundancy*. In some cases redundancy proved to increase the quality of learning. Yet, many studies report contradictory results. Negative effects are reported as well because of the overload of irrelevant cues (Reese, 1984). Indeed the text 'This is a banana' would be rather inconvenient when showing a picture of a banana.

2.3 Relating

Separate chunks of information always have to be related to a broader body of knowledge. If this is omitted, the learner is left with knowledge that is highly fragmented or segmented and thus lacking sufficient meaning (Fromm, 1955 and Postman, 1984).

2.3.1 Connecting subjects

Subsequent topics within an audiovisual sequence should be related to one another. Reigeluth et al. (1983) use the term 'synthesiser'; Koumi (1991) prefers the term 'link'. To link two concepts to each other, shared attributes can be used: 'Besides the penguin we observed the fur seal...'. Here the shared attribute is the actual

location. Procedural steps are easily interlinked by using chronology: 'after the dough has risen, it is put into the oven...'. Principles represent the insight and understanding of events and processes in the surrounding world. Here linking is realised by reasoning and argumentation while referring to causal or conditional relationships.

2.3.2 Activating prior knowledge

The activation of prior knowledge is a process that hardly can be avoided, because the learner always tries to relate any new information to what is known already (Ausubel, 1968). To enhance the quality and effectivity of learning, it is advisable to briefly review some basic concepts that are conditional to the understanding of the new information (Fleming et al., 1985).

2.3.3 Building upon known ideas

Learning by analogy allows the learner to understand new knowledge by comparison with a known model. For instance, electric current may be regarded a waterflow, molecules may be introduced as tiny marbles and the heart may be looked upon as a pump. It is the similarities with known ideas that are stressed. However, analogies are not restricted to models, but also play a role in the metaphors and metonymies that are characteristic to the audiovisual media (Monaco, 1977). Any abstract idea (love, hate, wealth, intelligence, ..) that is illustrated by concrete pictures, comprises an analogy.

2.3.4 Integrating knowledge

When some new concepts have been introduced, it is useful to interrelate these concepts in an 'integrator' or 'post-synthesiser' (Reigeluth, 1983). Such an integrator enhances the coherence and deepens the understanding. An example would be a sequence in a language course with actors demonstrating the use of present tense and past tense in everyday live.

3. Learner activation

One of the dangers of audiovisual media is that the learners end up in a receptive mode that may obstruct the active processing of new information. Active involvement is known to improve the quality of learning: it is known to stimulate a better understanding, to enhance retention and to facilitate the transfer of the knowledge to new situations. Therefore, it is necessary to include sufficient stimuli that support involvement, reflection and the active construction of ideas.

3.1 Tension (suspense)

Tension stimulates the emotional involvement of the learner. It is associated with a problematic event or situation of which the future is unclear. Its activating characteristics arise from the fact that the learner will generate private hypotheses on the outcomes.

3.1.1 Arousing expectations

Dramatic tension arises in the case of two (or more) rival expectations: 'Will it be A or B?'. Virtually any event in film would be suitable for building up tension, whenever the outcome is unclear. Especially in feature films, such mechanisms are frequently used. For instance, every film of 'James Bond' contains a dramatic 'time-lock': a bomb will explode within one minute. It is not so much the question whether the bomb will explode or not, but rather how James will manage to defuse the bomb in time. Note that this item is closely related to the predictive announcement in 2.2.1.

3.1.2 Stressing contrasts

Contrasts always disrupt harmony, agreement or unity, and therefore always demand for a solution. Contrasts may either arise from exaggerated differences, conflicts, obstacles or even dialogues. A simple example of a dramatic contrast would be Stan Laurel opposing Oliver Hardy.

3.1.3 Information lead

In many cases, the learners or viewers have an information lead over the leading character of the film. While learners can hardly wait to tell or warn the leading

character ('watch out, behind!'), they are certainly highly involved in the story.

3.1.4 Information lag

Sometimes the learners suffer under a severe information need. Activation of the learners is realised when they are puzzling about 'what is going on' and trying to search for the lacking information. However, a steady flow of meaningful cues is necessary to prevent the learners from disorientation, frustration or even dropping out.

3.1.5 Delay

Delay of action is the outstanding source of tension in drama. In a whole length feature film, most of the scenes aim to realise a delay of the *dénouement*, which only covers the last five minutes of the film. To avoid frustration or impatience of the learner during the delay, intervening clues should be presented that generate new expectations and new complexity. When a final solution seems to be near, a new obstacle can be introduced to cause delay. Another example would be the *cliff-hanger*: a highly dramatic scene (for instance the leading character hanging at a cliff) is suddenly interrupted by a different scene representing a parallel storyline ('Meanwhile, at home...'). During the delay the learner can hardly wait to see what happens to the character at the cliff. The delay is thought to improve learning because the learner has the time to imagine the possible pay-off.

3.1.6 Identification

Substantial involvement of the learners is attained when they identify with one or more of the characters. In the case of *introjection* the learners adopt the feelings of the character; now they are ready to enter the cinematographic dream or fantasy. For example: a toothpaste commercial showing beautiful models with beautiful teeth is likely to cause introjection; who could withstand to dream of having beautiful teeth? In the case of *projection*, it is the learners that attach their feelings to the leading character of the film. This is likely to happen when events in film have many points in common with the particular living conditions of the learners.

3.1.7 Pathetic outburst

Any severe emotional outburst (*pathos*), be it unconcerned laughter or heartbreaking distress, will cause an emotional response. Watching people laugh can be very contagious. Even the soundtrack of a laughing audience, which is often used in tv-comedies, arouses such responses. Note, that this effect is not necessarily related to personal identification; virtually any character may arouse such emotional responses. The effects of music and other stylistic means rest on the same principle.

3.2 Raising questions

Any question cries out for an answer. Therefore, explicitly posing a question, creates the learners' need to find an answer. It is this simple mechanism that accounts for the success of television quizzes. In contrast with dramatic tension that addresses emotional involvement, questions arouse intellectual or cognitive engagement. Sooner or later, on any question an answer should become available, in order that learners' can check the validity of their tentative answers.

3.2.1 Facts-related question

In most television quizzes, it is facts that is asked for: 'Who wrote the famous novel....?'. But also in documentaries and drama a lot of explicit questions can be found: 'Who could ever have painted this beautiful picture?'. Such questions on factual knowledge stimulate the learners' memories to find the answers. The nature of the associated mental activities is reproductive.

3.2.2 Comprehension-related question

'Now, why does the water boils here far below 100 degrees Celsius?'. Such questions surpass the level of mere knowledge reproduction, but rather appeal to insight and understanding. The learners are incited to a process of inductive or deductive reasoning in order to find a satisfactory explanation.

3.2.3 Fantasy-related question

Some questions rather appeal to fantasy and creativity, than to memory and intellectual skills. A question like 'How would it feel to be an elephant?' could never be answered wrong. It addresses empathic skills and associative thinking. The learners are allowed to dream away for a little while within their own frames of reference.

3.2.4 Problem

Any film is based on problems: without a problem, there wouldn't be a story to tell (Egri, 1946 and Monaco, 1977). Usually mainline problems are easily recognised: 'Whodunit?', 'Will he succeed?' or 'Who is going to win?'. At the microlevel the learner is also continually faced with cues that represent deductive or interpretative problems. However, a great many of these micro-cues are implicit, concealed or unclear: a door is blocked, the car breaks down, it starts raining, a key doesn't fit, etceteras. Since the learner might interpret virtually any object, sound or event as a significant cue, it is the program maker's task to control the cues. Irrelevant cues should be avoided as far as possible.

3.3 Allowing for reflection

A steady flow of audiovisual stimuli may hinder the learners to process the information in an active way. To promote active processing and knowledge construction by the learners it is necessary to build in sufficient breathing space, once in a while. Clearly, this need for pauses and ease is somewhat adverse to current opinions on shot rates and the dynamic contents of images and sounds.

3.3.1 Room for interpretation

Leaving enough room for interpretation allows the learners to fit in new information into their own frames of reference. It enhances meaningful and active learning as the learners themselves draw conclusions, colour the information or make value judgements. To this end, it is important that program makers are reticent about promoting their own interpretations. Paradoxically, learners appear to become activated when they are confronted with information gaps and incompleteness (Gordon, 1991). This is because they will try to complete the missing information.

3.3.2 Restricting the information load

Our capabilities to process information are limited. It is stated that our short-term memory can contain only 7 concepts at a time (Miller, 1963). When a commentary text contains too many difficult words in a row, the information processing is severely obstructed. Various experiments show that including enough and substantial pauses, improves the learning (Fleming et al., 1985). In addition, words and pictures should preferably converge to convey the same message (Salomon, 1981).

3.3.3 Varying tempo

Program makers shouldn't try to burn the candle at both ends. Learners may hardly be expected to show full concentration at length. Exacting sequences should preferably be alternated with sequences that allow the learners to recover.

3.3.4 Delayed timing

Using a subtle time delay between words and pictures can be very activating to the learners. When pictures are slightly ahead of the words, the learners get the opportunities to establish the basic concepts even before these are mentioned in the text. For instance: showing a picture of the Eiffel tower, with a two seconds delayed commentary text that states 'The Eiffel tower.....', allows the learners to recover the name of this tower from memory. Next, the spoken text acts as a confirmation. Similar activation occurs when words would precede the pictures: when hearing the words 'Eiffel tower', learners will try to recover the associated image from memory.

4. Providing feedback

Any film should anticipate possible thoughts, interpretations, expectations or feelings of the learners in order to provide correcting or confirming feedback. First of all, feedback is necessary to prevent the learners from constructing misconceptions. Secondly, feedback

is a useful and necessary tool to regulate tension. As the temporal structure of film continually raises expectations about the future, it is virtually impossible to leave out cues that provide feedback. For the program makers, it is important to recognise such cues and to constrain these to act in a desirable way.

4.1 Direct feedback

Direct feedback is usually connected with an explicit question or assignment: 'Now, watch the dog's behaviour in the following scene...'. The direct feedback would comprise an explicit review of the scene that covers the key behaviours the learners should have observed: 'You may have noticed that.....'. The whole scene may even be replayed, if necessary frame by frame.

4.2 Natural feedback

In every film natural feedback is abundant. Any scene, shot or object is destined to raise expectations: a closed door, the noise of an approaching car, a ghostly shape in the dark, these all stimulate the learners to generate their own hypotheses. Natural feedback arises from the events that clarify the ambiguities: when the door is opened the learners are allowed to check the validity of their suppositions. The feedback is called 'natural' because it is implied in the normal actions or events of the film. Even a simple dialogue shows complex and dynamic patterns of human communication that either represent appreciation or disapproval. It may be this continuous probing of human behaviours that determines the strength of film and tv.

4.3 Delayed feedback

Delay of action is a major means for the enhancement of dramatic tension. Unexpected turns or intermezzos (cf. a cliff hanger) deliberately delay the dénouement of a film: indeed, the climax of a story should be at the end. There it acts as an ultimately delayed feedback. But also at the microlevel, a delay can be a useful tool. Above we touched already on the delayed timing (3.3.4) as a means for learner activation. To stimulate the learners a permanent flow of answers would be unfavourable: learner activation and delayed feedback are two sides of the same picture. However, for program makers it is not easy to determine what the right duration of the delay should be. Delays that are too short may lead to passive viewing, whereas long delays may cause annoyance or disorientation.

4.4 Projected feedback

A major restriction of film is that it is not capable of providing tailor-made feedback for each individual learner. However, via the mechanism of psychological projection this individual address can be approached to some extent. When the learner identifies sufficiently with the leading character in the film, any feedback this leading character engages, is adopted to some extent by the learner. Because the mechanism of projection is related to the more primitive brain structures (i.e. the limbic system) best learning effects should be expected at this level, that is at the level of conditioning and attitude change. Projected feedback is manifest in all feature films, as well as in many commercials, promos and films for propaganda.

4.5 Generalising

In film, abstractions are hard to represent. While most images show concrete events, particular situations and specific individuals, it is not easy to recognise the underlying meaning in terms of general concepts. Showing some starving individuals hardly gives any insights in the economic and social problems of the Third World. To some extent, the learners will be able to draw conclusions themselves. But, if the level of abstraction becomes too high, it will be necessary for the learners to check their conclusions. Therefore, it is recommendable to make more explicit, from time to time, the underlying generalised concepts and ideas (Westera, 1995).

5. Repetition

The fixed order and fixed tempo of film do not make things easy for the learners. Besides the fact that usually there aren't many pauses to process the offered information, one moment of inattention may cause the learners to miss an essential cue. Repetition of essential information is necessary to avoid the learners from dropping out.

5.1 Plain repetition

This first category represents repetition in its most simple form: conveying the same message once again.

5.1.1 Literal Repetition

Whenever a new concept or name is introduced, it would be recommendable to repeat the term: 'This is called the susceptibility... [PAUSE]. The susceptibility is'. Literal repetition can often be used in dialogues: 'I am going to Amsterdam' / 'Really? Are you going to Amsterdam?'. The replay of a goal in soccer can also be classified as a literal repetition, though sometimes slow-motion is added as a new feature.

5.1.2 Repetition in a different symbol system

Changing the symbol system provides a more subtle way of repetition. For instance, one could first present a graphic animation to demonstrate a certain process and subsequently use spoken words to explain what happens. Here the same message is put across while addressing different parts of the brain. This multimodal communication is assumed to improve the information transfer (Salomon, 1981). Note that this kind of repetition closely resembles the activation category 'Delayed timing' in 3.3.4 (the Eiffel tower example).

5.1.3 Repetition in a different context

As stated before, it is not easy to draw a general or abstract conclusion from concrete images or examples. By showing another example, another situation or another perspective while putting across the same message, the learners will be able to focus on similarities and differences, which may be regarded as the starting point for the construction of abstract knowledge.

5.2 Summarising

A summary or review is the counterpart of an announcement (cf. 1.2). It acts as the conclusion of a sequence. A summary differs from the generalisation (4.5) and the integrator (2.3.4) in that no new information is presented.

5.2.1 Material summary

A material summary aims to consolidate the new knowledge by reviewing the outlines. For example: '.....So, we have seen that the light intensity decreases quadratically with distance.....'.

5.2.2 Structural summary

An structural summary indicates what issues have been discussed so far. It rather focuses on structure than on content. Example: '...So far, we have investigated the dependence of light intensity with distance.....'.

5.3 Confirming

Under the steady and abundant flow of new cues, the learners continually try to construct meaning by searching for structure, coherence and relevant associations. Clearly, individual interpretations are likely to differ quite notably. To avoid misunderstandings or misconceptions, it is necessary to build in sufficient possibilities for the learners to check their interpretations against a common frame of reference. Such confirmations meet the learners' needs for confidence and encouragement.

5.3.1 Justification

During an audiovisual sequence, learners may easily be tempted to drop out, when an issue doesn't seem to make sense. Hence, it is necessary to warrant the issue by repeatedly stressing its relevance and objectives. It should address the simple question 'Why should I watch this?'.

5.3.2 Establishing relationships

Learners have a natural tendency to interrelate subsequent cues, be it objects, words, statements, characters or situations. To avoid misunderstandings, program makers should (re-)establish correct relationships from time to time. A cinematographic example would be the wide establishing shot at the start or at the end of a sequence, to confirm the geometrical relationships between objects.

5.3.3 Rhetorical question

A rhetorical question represents a statement rather than a question. It never asks for an answer; it is an answer in itself while reconfirming a previous or implicit conclusion. For example, the line: 'Did you ever see such a car...?' representing the statement 'This is a very special car...!', establishes the value judgement that learners may have adopted before.

5.3.4 Establishing style

Applying a consistent cinematographic style improves communication, because it enhances the susceptibility of the learners (Koumi, 1991). After a short stage of familiarisation, the learners will be able to surpass the syntactic level of presentation and directly take up the underlying meanings. For instance, when graphics are presented, the consistent use of colours, lines and symbols will facilitate the learning, because the learners become familiarised with the particular graphic code (Fleming, 1985).

Conclusions

So far, the presented framework has been used occasionally in the design and analysis of several audiovisual sequences of the Open University of the Netherlands. In addition, it had been applied in sequences of the science tv-series 'Kwintessens', that the Open University of the Netherlands produces in co-operation with the Dutch Educational Broadcasting Foundation (Teleac/NOT). We found that the presented framework offers a sensible methodological tool to attain well considered design decisions. It unmistakably acts as a useful vocabulary that makes the communicational functions more explicit. It is advised for any professional in the field of audiovisual program design or program analysis to become familiar with recognition and assignment of the distinct categories. Although further investigations are necessary to realise fine-tuning of the framework, it is clear that it makes discussions and decisions much more transparent. Though this microlevel framework primarily focuses on the educational use of audiovisual sequences, broader application is believed to be quite possible. After all, any audiovisual sequence aims to convey or create meaning.

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