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# Visual Communication in Interactive Multimedia

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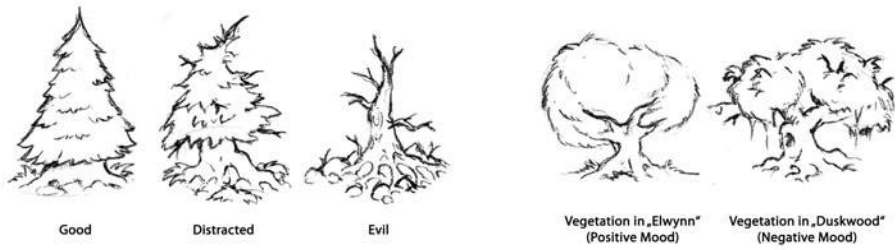
**Abstract.** Careful selection of graphical design can push the narrative strength of graphical projects by adjusting the visual statements to the content-wise statements. While many projects of computer science lack of consequent implementation of artistic principles, graphic designers tend to neglect user interaction and evaluation. In a recent project we therefore started a successful approach to combine both sides. In future work we plan to research on further integration of visual narration into interactive storytelling.

## 1 Motivation

It is a well known principle of practice for professional visual designers to appreciate the psychological impact and subtle transport of information through graphical elements. Artists carefully think about the consequences of their decisions for building graphical elements like shape, color and relation between visual elements to emphasize the story they intend to tell through their artwork.

As it is an essential idea behind the work of artists the awareness for visual impact and expressiveness is described in various art literature. Especially authors who come from fields like cartoon animation business where narration is tightly connected to graphics appreciate to carefully think about object appearance to transport the element's meaning in the told story [1,2]. Application of these concepts is proofed by many examples of practice in illustration, movie making or interactive media. Frisky genres like fantasy and adventure qualify for noticeable visual adjustments of this kind in particular.

While it is a tool of the movie makers to subtly adjust the audience's mood to the mood of the characters on screen other examples like the famous role playing game "World of Warcraft" utilize visual narration in an even more obvious and content-related way. In an artbook about making the game [3] it is shown how similar environmental objects differ in appearance according to the mood and theme of the location they are placed in. Figure 1 resembles a tree layout used in the game's artistic concept where the trees look corpulent and healthy in peaceful environments. The graphical design changes towards disturbed and noisy shapes the more negative and depressive the dramaturgical atmosphere gets, up to withered plants in the most evil landscapes. Summarizing this practice basically means that the *inner world* coins the *outer world* where *inner* is meant to



**Fig. 1.** Tree shapes related to environment dramaturgy concept similar to artwork used in “World of Warcraft”. In good-natured environments trees look healthy and bulky. Evil settings reflect in less healthy tree appearance.

be any disembodied state like emotion, mood, dramaturgy or fate. *Outer* means any physical or expressive manifestation like visual decoration, shapes of motion, acoustic variations or any dynamic target value in common.

It is possible to apply this principle to various aspects of graphical and content-wise authoring like camera, lighting and staging as known from cinematography as well as character design interpreted in a way of *personality* design. Although this is a common practice in arts, work presented at conferences like “International Conference on Intelligent Virtual Agents (IVA)” suggest that members of other disciplines like informatics often seem to disregard the graphical impressiveness in their work. In consequence the characters’ overall appearance is inconsistent from which the user’s engagement may suffer. However our teaching experience shows that it is not just a matter of insufficient artistic talent but in big parts simply the lack of *awareness for visual impact* which keeps people from utilizing purposefully design decisions to improve the user perception of their work. The appeal of a virtual character strongly increases when designers plan not only random aesthetics but when they also construct a personality which is strongly affected by living conditions like fate, education, experience or habitat. Everything that influences the life form may also have effects on the artistic design of the virtual character which in turn may help to transport the spirit and increase the impression of liveliness. For example the age and life experience of a creature must not only result in gray hair but can also characterize the way the creature moves, reacts and talks in aesthetical as well as content-wise way. When users are confronted with the virtual artwork process of time may also change inner states reflected by outer changes. For example when the artwork is part of a movie, the storyline proceeds parallel to playback time. The acting characters experience happenings of the storyline the way that their personal fates are affected and changed. Passing years or shocking experiences may lead a person to age visually for example. Dramaturgical elements leave there marks this way and deepen the expressiveness of the whole narration by weaving past events into present and future situations. In our upcoming work we intend to do further research on connecting such visual dramaturgy with interactive storytelling. Basically the movie’s principles of influence by proceedings can be applied to interactive applications too. The main difference is that influence is

no longer linear, defined by time, but branched and bound to user input or any dynamic source in common.

## 2 Exemplary Application

Within the DynaLearn project we aimed to implement visual suggestion by creating a set of virtual characters which goes beyond being just a decorative feature. Each character fills a specific role on screen and acts as a contact person for the user to reach program functions like help, feedback and model diagnosis. The different functions as well as the different virtual personalities which build a social dramaturgy where strengthened by deliberate graphical design decisions to suggest the underlying meaning visually. Our adjustments included various aspects of visual modeling like shape, colors and motion space for gestures and animations.

To proof our approach of visual suggestion we did three evaluations with 283 international students. We first compared our set of cartoonish hamster characters directly to other virtual character designs (Character Compare), evaluated usecases of our characters in software context compared to similar usecases with characters of other projects (System Compare) and asked finally for a comparison of our agents against each other to test the perception of different roles inside the same graphical set (Role Compare). We asked participants to agree or disagree on a seven point scale for various attributes of impression for each character like “[*the character seemed to me*] open for new experiences”, “conventional, uncreative” or “dependable, self-disciplined” and compared it to a ranking of these values previously given by the designer. This way of asking for impression ranking gave us a much better idea of how our characters were perceived compared to asking simple yes/no questions on subjective popularity which basically gives not much conclusion of the reasons or general perception. The participant’s impressions indeed matched the designer’s intentions very well, confirming the transportation of non-verbal signals. Yet this project applied visual suggestion mainly to physical attributes so that effects could be deepened in future projects by additionally influencing environmental properties of the stage and scenery. Furthermore realtime 3D technology should be used to enable adjustments in expressivity in realtime which was not possible when using prerendered images for the hamster characters.

## 3 Future Work

We attempt to incorporate the non-linear nature of interactive media actively influenced by users which requires the connection of graphical artwork with dynamic processes, done by utilization of AI concepts. There is already research on adaption techniques for bringing methods of cinematography to interactive media [4] which deals with separate aspects like camera management [5,6,7], lighting [8,9,10] and soundtrack adjustments [11]. Starting from these study results visual dramaturgy methods as inspired by Shim and Kang [12] can be used in interactive applications that deal with non-linear, interactive dramaturgy and emotion in influencing or perceptive ways.

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