Fostering Interactivity Through Analogue Principles Applicable to Design of Virtual Reality Games

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Abstract. This contribution presents interactive art model, introduced and tested in the art practice by J. Vančát with respect to the tradition of Czech school of structuralism. In principle, this model attempts to visualize the interaction of larger groups (8–12 persons) in a pluralist environment through a symbolization process with real objects. This model might offer an alternative view of a game in virtual space alike. Social impact of such a project might have a potential in visualization of the social roles and interests in a group. Authors briefly investigate also the potential this model might offer to the design of virtual reality environments and computer gaming in general.

Keywords: Czech school of structuralism · Virtual reality design · General interactivity principles · Structuralism and collaborative design · Art-based interaction design practice · Playful experiences

1 Introduction

We argue that virtual reality (VR), although currently speeding up its development on the technological level (hardware and software), is in its implementation limited in the level of the imagination of the users.

The imagination of the VR user must be reconfigured from the modus of reception that has been constructed by the previous visual structurations. We understand such a structuration from the position of the general visuality development (see Fig. 1).

Current generations do still meet the meaning of art education in the frames of visual model Nr. IV in Fig. 1. The majority of the population is successfully decoding the visual model of Renaissance as these recipients are already trained by daily processing of the cinematographic image and this includes a perception and understanding of mutual interrelations of visual objects, although related only to the stable position of the viewer. Introducing the viewer to the perception and understanding of the visual substance in VR is then not only simple utilization of natural perception but an instruction in the decomposition of the Renaissance model in dependence to the movement of the own body. Here must be emphasized that the imagination in the frames of model Nr. V in the relation to the movement of the own body is applicable only to the small minority of the recipients. The vast majority of the recipients is still

X. Fang (Ed.): HCII 2019, LNCS 11595, pp. 57–66, 2019.
https://doi.org/10.1007/978-3-030-22602-2_6

dependent on the understanding of the Renaissance model and not trained in the comprehension of abstract art model.

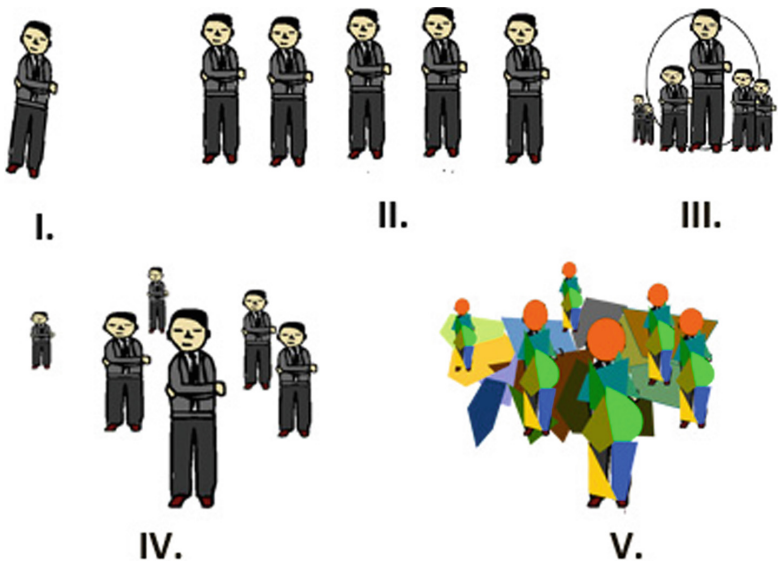

Fig. 1. In our model, we understand the development of visual expression as an instruction of the viewer in the comprehension of gradually increasing number of relations between displayed objects and particular elements: I. Paleolith, II. River Civilizations, III. Art of Christianity, IV. Renaissance, V. Modern Art.

In such a virtual interaction model, any collaborative activities among large number of persons lead to the loss of overview over the corpus of interaction. These days, the developers still design computer interfaces more or less in the face-to-face mode, so in the art where the mutual understanding of collaborative virtual interface is problematic and limited. The user of computer games might swap between different roles in the game, but in principle is still impossible to associate the roles in real time with the taking the roles by the others. In virtual reality computer games, the option to swap the roles is not identical with a requisite to hold a gross overview about the co-location of the other players as the essential prerequisite of pluralistic discussion. Although recent rapid developments in the area of game design for collaborative virtual reality keep the promise of such an environment, currently is the visualization of pluralistic communication still easier in the analogue physical situation settings.

In this contribution, we present the potentials of original art project model that might open new pathways in the process of virtual reality design. During the interactive sentence, this model enables the users to gain a gross idea about the background of virtuality and overview of the particular interactive situation as such.

2 Legacy of Structuralist Approach in Arts

Paving the way to the structuralism, this became, as may be seen today, one of the great contributions of Czech culture to the world heritage in the interwar period, when Czechoslovakia became surrounded by totalitarian regimes. During their study of language and art, the members of the Prague Linguistic Circle proposed a different model for understanding of large corpuses. Especially, uncovered how this model applies to organizing a supernumerary quantity of individuals, components or elements.

Cézanne's invention of how to fine-tune 'the relationships of various tones' [1], so as to achieve a 'perfect' picture is activated by Mukařovský's definition as the 'effect of transformations of parts to transformations of content and the dynamization of wholes, through which, by the nature of this dynamic, transformations, and the growth of their relations' [5], we can attain an entirely new *structural approach to the world* 'We refer to the mutual relationships between a structure's components, relationships that are intrinsically dynamic, as a specific characteristic of the structure of art. According to our conception, we can consider as a structure only such a set of elements, the internal equilibrium of which is constantly disturbed and restored anew and the unity of which thus appears to us as a set of dialectic contradictions. That which endures is only the identity of the structure in the course of time, while its internal composition and the interrelationships of its components are in constant change.' [5].

Dialectical contradictions still retained some residue from Plato in the concept that only one or the other contradiction might be sustained in the structure after such a 'duel of dialectical contradictions'. However, if we view the elements of the structure entering such an interaction also as structures at their subordinate level, also composed of elements one structural level lower, their interaction is not necessarily a duel of A versus B, but rather a structural modification of each of the interacting elements.' [5].

It is outside the scope of this contribution to provide more detailed evidence of how the concept of structure was enriched and further developed by French postmodern philosophy, which emerged from a critique of the static interpretation of structure by Levi-Strauss, who – as opposed to Mukařovský's interpretation – sought in it a solid, timelessly stable network of mutual relationships.

Levi-Strauss sees the meaning of structure as a set of stable parts 'Probably there is nothing more than that in the structuralist approach; it is the quest for the invariant, or for the invariant elements among superficial differences.' [3].

For a purpose of analyzing visual works, we can understand postmodern philosophy and art theory as an elaboration of Mukařovský's synthesizing dynamic definition of structure in details, which had been known far earlier from the efforts to resolve the question of organizing a painting – by comparing, for example, one of Derrida's fundamental discoveries 'The play of difference supposes, in effect, synthesis and referrals which forbid at any moment, or in any sense, that a simple element be present in and of itself, referring only to itself.' [2], with Cézanne's description of his method for building the picture 'The secret of drawing and modelling resides in the contrasts and relationships of tone'; 'There is no such thing as line and modelling. Drawing is a relationship of contrasts or simply the relationship between two tones, black and white' and 'There is no light painting or dark painting, but simply relations of tones.' [1].

In our research approach, we understand and promote the study of the visual representations that characterize postmodernism not only as an undeniable visually mediated fact, but as a *method for organizing structure from a supernumerary quantity of elements,* Mukařovský's approach thus still might offer very clear, valid and understandable criteria.

3 Postmodern Echo

If we can therefore understand modernism – as we can see with our own eyes from the pictures it produced – as a deconstruction of the preceding solid, objective world through sharpened attention to its parts, postmodernism can show what this is good for: to be able to investigate more deeply and thoroughly how the world functions in motion and change, in growth and transformation.

The new Grand Narrative that postmodernism offers, despite the currently predominant skepticism, builds the whole not from stable parts determined by their sole purpose but also from individual active agents cognizant of their unique potential and capable of using it in their interactions with other equally free agents, thus forming unprecedented wholes with as yet in-credible possibilities.

Consequently, many established positions must be re-evaluated from their very foundations so as to arrive at the new Grand Narrative: thus the notion that vision copies reality has suffered the same fate as the 'realistic' nature of pictures. Cognitive neurologist Vilanayur S. Ramachandran interprets vision as a strong back-projection, with the brain checking which visual images that the brain created earlier and has available for a given situation are best suited for an incoming percept. The earlier order of 'percept – image' proceeds in the opposite sequence, and thus in a new hierarchy – 'The imagination controls perception'. In the end, it is the imagination that guesses what solution best applies to the given situation. These suitable solutions, interpreted as 'true vision', are accompanied by an active reward, thus creating preferred visual fields of our experience in the world.

'In a sense, when we look at the world, we are hallucinating all the time. One could almost regard perception as the act of choosing the one hallucination that best fits the incoming data, which is often fragmentary and fleeting.' [8].

Authoring visual images – models for 'hallucination' as described above – is evidently the purpose of art. Experimental art constructs images that, for now, are not at risk of being incorrectly applied. If such a defective model occurs in art, the worst-case scenario means then only that a particular person doesn´t like the picture. But, if we do, they become visual images that will subsequently have a major impact on our real life orientation in the real world.

In this way, we can use pictures to create daring visual images that we have not yet encountered in our everyday lives but that we sense may suit us in situations that have yet to happen and in places that we have yet to reach.

4 Interactivity as a Design Principle

4.1 Idea

The difference in interaction between the objects, invented by Dadaism, and also by Surrealism in the 1930s, in this the objects had a metaphorical effect and focused on feelings of individual, personal levels - such as subconscious contents, dreams, erotic content.

On the other hand, in postmodern situation, these originally sensational interactions are outdated, they are visible everywhere, they became to be trivial. Their effect is being manifested in social trends (at a structural level higher than the level of individual existence that are the result of interactions of these individual interests (see Fig. 2).

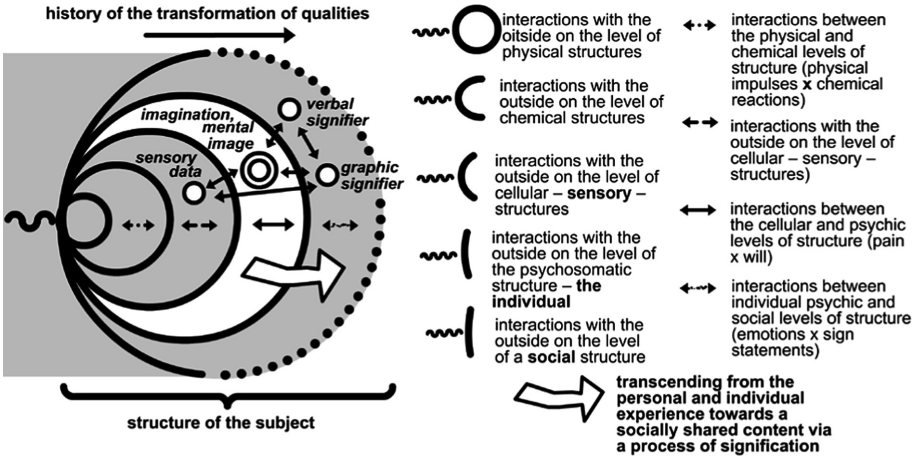

Fig. 2. J. Vančát – Structural Model - Visual Reception [7].

4.2 Interactive Approach

Interactive media have at their disposal a power to set the designed environment and objects into various relations and are so an ideal medium for the expression of the multiplicity of ideas. A commonly shared experience offers a prerequisite of any sort of a fair communication.

We would like to establish such a communications in the frames of interactive media experience we have experienced during our research and pedagogical activity at the Creative Arts Department at the Faculty of Humanities, Charles University in Prague.

Part of the department's primary research focus is a current state analysis of creative arts from the point of view of gnoseological and communication impacts. At the core of our research is the development of a methodology for collaborative visual

design that facilitates the understanding of the pluralistic character of these gnoseological and communication processes for both students and researchers.

According to this methodology, our students operate with design objects (inspired by Dadaist and Surrealist artistic techniques) and set these objects in mutual relationships according to their personal preference.

Complex structures might be designed in the case of the implementation of a higher number of included elements (see Images 1, 2, 3). The interpretation varies according to the algorithm given to the user, and these users must act according to this algorithm without having the option to communicate with the others about joint design. Such poly-valence in designed structures is then a stimulating source of inspiration for the following interpretation, discussion and evaluation. The configuration and composition of objects, while not plain in logical descriptivism, expresses visually experienced approach. Such an intuitiveness has been enabled by the alteration of various set-ups of designed object formations, the alteration of a single object's positions carries with it the alteration of a network of relationships alike.

4.3 Design Workshop

While the surrealistic acts of avant-garde are modeled by interactions of individual objects with one another[1], the postmodern approach is modeled as follows:

Approximately 12 students and the objects (e.g. boxes of cigarettes, pencils, apples, etc.), it is good to agree that two or more listeners do not have the same subject, as then it would appear a problem with identifying their involvement in of the corpus. Gradually one by one, they each place one object on a defined area (tabletop, bounded on the floor). The same procedure has been reiterated in the further cycles.

The main feature of the workshop is to define the instruction that becomes the way to gradually add its objects to the surface. The most common instructions are:

a. try to guess what tendencies are taking place in the collaborative work and try to support them. During the process, you must not talk to anyone;
b. try to stand out by the composition of their sequentially folded items. Here we usually severely limit the area so that, in the absence of space, individual projects have to intersect and compete. This way we add a rule that a participant can remove one of the already placed objects in the highest layer instead of placing their own instead of inserting their own item when it comes to it.
c. arrange with a couple and their subjects to try to excel - without further co-ordination;
d. find someone whom you will complement and support by submitting your subjects without any mutual support;
e. one half of the participants in the first part of the game can, if they come in line, place three objects (it has so much influence on the foundation structure); in the second part, three objects have the second half (it has the possibility to influence the final shape of the structure).

[1] Comte de Lautréamont, who inspired the surrealists, quoted: 'It is beautiful as a random meeting of the sewing machine and the umbrella on the autopsy table!'.

In our research practice, we have learned and tested that it is possible to alter much more instructions performed by the participants of the design project in a mutual interaction.

Image 1. The configuration of structures has become established in the various sets of even objects chosen by the users, while not being aware of the intention how the objects will be further implemented. (In the concept of pluralistic approach, introduced in the frames of interactive process, is the option interpreted as the unique determination that has been personally introduced into any type of interaction. The participants do learn how to utilize the potentials of the selected object towards enforcing the original features in the totality of the corpus structure.)

In the final phase, the participants draw their object-placement strategies, and the intended situational placement and the one that really appeared on the scene. Other drawing then attempts to visualize what the participants consider as dominant in the structure, valid creation elements, or objects representing the success of the concept. Further, our participants may watch the video-documentation of the running project and so identify milestone in the structural design. These positions identify the point when their plans have become fulfilled. Such a structure by its versatility in the process clearly demonstrates transformational impacts of these interactive design procedures.

Image 2. The results of instruction: attempt to uncover what tendencies develop within the structure and try to promote them with own object-types. Such a structure in this period mimics a picture style by Kandinsky and so evokes its relationship to the structured reality closer than expected.

All these and other similar tasks, which the students are called upon to do, aim at studying processes in structure growth and its interactions, which I consider, this has become an innovative qualitative feature of postmodernism. Students are free and active to participate in the structure and its development. On the contrary, their inventions are being welcomed both in the creation itself and in the analysis of the results.

You often plot in drawings and compare how these sketches often present different views of the same structure according to the position the listener tracks from the structure - usually he notices more relationships about the part of the structure he himself has created.

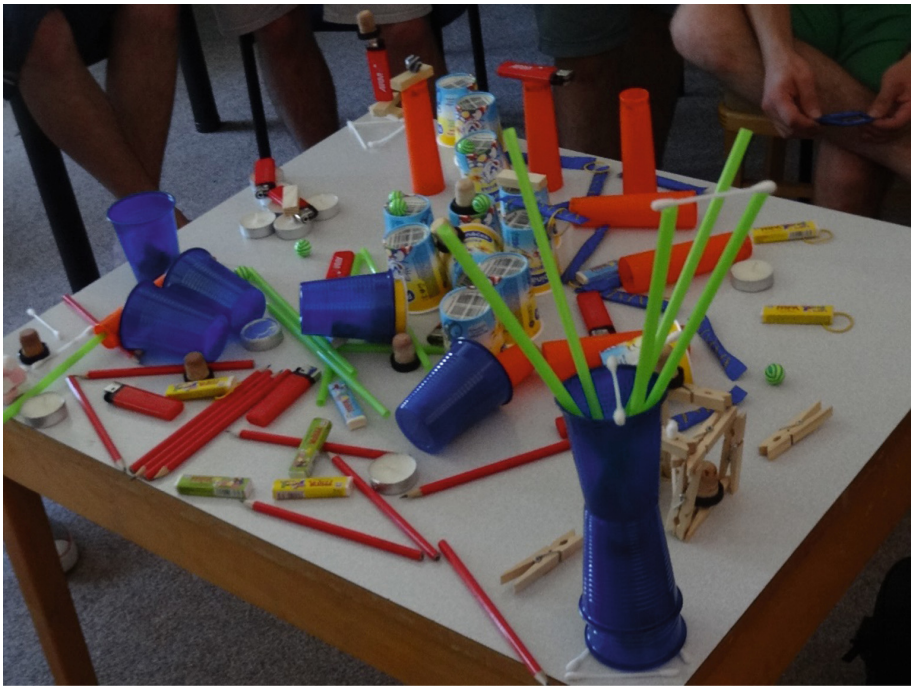

Image 3. The result of interaction with the instruction: 'attempt to surpass others'. With the exception of objects positioned with aspiration to be above other, normally comes to higher condensation in the frames of single type of object. The participants often attempt to design a shape isolated from the other participant's objects.

5 Conclusion

Our understanding of the principles of interactivity learned in the research and daily educational practice in the frames of creative arts department might bring the following impacts in the area of virtual reality design:

1. The participants do profit from learning about the process of relational structuration of spatial object and cultivate their virtual imagination.
2. The participants might become able to visualize their spatial situation in its gradual dynamics and so perceive virtual reality not only in its full sensory 3D position but also in its time-space transformation.
3. The participants get an idea about the principles of visual structuration of their senses much closer to the abstract model of art (Nr. V in Fig. 1) and so implementation of the achievements of (post) modern art in the visual perception.

Acknowledgement. This publication was supported by the The Ministry of Education, Youth and Sports - Institutional Support for Longterm Development of Research Organizations - Charles University, Faculty of Humanities (Charles Univ., Fac. Human 2019), Czech Republic. A result of research led in the frames of research scheme PROGRES Q21 Text and Image in Phenomenology and Semiotics.

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