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Looking through the sphere; Illustration in virtual reality

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Abstract

Artistic expression ways of illustration that take place in visual communication design/graphic design changes and develops day by day. Having a rich history, illustration field has developed different visual communication ways and reached a broad usage area. Instead of consisting of just book limning, with various techniques, methods and technological opportunities it continues to take place in other places. Especially the usage area of 2D-3D illustrations on digital media enlarged led to different production processes and designers found new display possibilities and design processes. One such example is 360° illustrations that can be designed and displayed on virtual reality media. Virtual reality is an interational virtual media that can detect the location and movements of users, appeal to one or more artificial senses and give the feeling of being inside the simulation. 360° display and production on this media takes not only VR glasses but also web portals and some developer programs.

Keywords: Illustration, virtual reality, panoramic illustration, graphic design, art education.

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1. Introduction

Humankind for centuries has been choosing face-to-face interaction in order to express a thought or give information. The term 'interaction' has changed its form in years with the development of new communication ways. Computer communications field has arrived as the digital age has begun. According to Cagiltay (2016), theoretical and practical works in the Human–Computer Interaction field aims information and communication technologies products to be people and need oriented. A new interdisciplinary field, Human Factor, first appeared in 1970s and spread with an increasing speed in 1990s and its popular piece 'Human–Computer Interaction' works in order to do away with these problems to increase the amount. One of the main supporting fields for Human–Computer Interaction is Graphic Design. In this study, illustration processes in virtual reality applications and their potential in the art education are examined.

2. Virtual reality

One of the Human–Computer Interaction fields is Virtual Reality. According to Craig, Sherman and Will (2009), when we speak of VR, we refer to a computer simulation that creates the real world, our physical environment and senses that are a reflection of the world. In order to convince the brain that it's a real world, the computer simulations monitors the user movements and adjusts the sensory display and indicators in a way to give the user a feeling of taking part in the simulation. To sum up, virtual reality is a tool and simulation that enables users to physically take part in environments that are created in accordance with the real environments. VR is an interactional virtual environment that senses the location and movements of participants, interacts with artificial senses and gives the feeling of taking part in the simulation.

According to another definition, VR creates 3D environments using computers and enables users to interact in it. This interaction contains the ability to move and sense the 3D environment, using and directing the objects within the environment (Gutierrez, Vexo and Thalmann, 2008).

Humankind that in the recent information technologies is in a way regarded as 'techno-being' that creates dreams, artificial intelligence by designing a reality delusion in the developed virtual—cyber techno environments. VR substantially uses the concepts and techniques of surrealism as well. Surrealists that describe objects and environments in an extremely realistic way, changing the real physical conditions by using objects all together, create fictions that give the feeling of a dream environment. While creating these fictions, they use main formal narration features such as 'space, viciousness, transparency, disorder, materialisation' (Turker, 2005). It is inevitable to use computer technologies to digitally visualise the fictional place in a virtual reality environment. Yet computers are only tools to implement designs as the actual responsibility is of designers'.

In order to give the users an appropriate virtual reality experience, it takes some special equipment. These tools enable the creation of an alternative environment sense, providing the participants with a feeling of existing in another environment. For this experience, the user wears a head-mounted display that is right in front of the eyes. With sensing devices that monitor user movements, users can move the objects in the virtual place. Along with these, another virtual reality experience is given by the display of images on screens that cover around the users. Just like the display system of an airplane simulator (Sherman and Craig, 2003).

One of the most important elements of Virtual Reality is to sense the users' position. One can't create a virtual reality without the sense of user location, movements, pointed/reached spots. With this user location detection called 'Tracking', the virtual reality system gives feedbacks to participants according to tracking data, by which an interaction comes to place.

Along with head-mounted displays, glasses in which mobile devices are placed can also be used to have a virtual reality experience. Inside supporting tools such as Google Cardboard, a smartphone is

placed and the display image is divided into two for the both eyes. In this way, smartphone movement sensors are used to create a virtual reality experience.

VR consists of three different paradigms. The first of which is the placement of images in an environment. This paradigm doesn't contain any interaction but images surrounding the user's environment. The location and direction of the participant is taken into consideration and the participant feels within a ball. The second is head-based screens by which the system responses according to the user and the images move. In this case, the user also motions sensor gloves. The third is hand-based screens which are a special example for hand-based paradigm. These screens give an alternative perspective for the VR. Unlike the other cases, the screen is in a hand-held shape.

Virtual reality, brought by technological developments, is a new environment where a lot of experiences take place in order to find more effective ways of practical applications and interactions (Sherman and Craig, 2003). It consists of four key elements which are Virtual world, immersion, sensory feedback and interaction. As it can be seen, it is an interdisciplinary application environment in which many different fields meet. And in this study, it is stated and examined that we can create original designs with alternative techniques and approaches in a virtual world.

3. Drawing in virtual reality space

Virtual reality enables users to interact in the designed fictional environments. With the foundation of VR, a new drawing technique of illustration in a virtual 3D platform has emerged. This drawing technology allows people to easily and intuitively draw on 3D platforms. The biggest advantage of being able to draw this way is to be able to have intuitional 3D drawings without the need of any complex software. In addition to this, it enables the designer to reflect their limitless imagination as if it is real. According to Brody and Hartman (2001), to be able to draw without feeling the gravity feels like drawing in a dreamy world where you can reflect the whole imagination.

The development of VR Technologies enabled 3D drawings on virtual platforms, giving users the chance of intuitively drawing without the need of any experience. With the head-mounted screens, various VR painting tools has been released to the market. Within the scope of this technology, both artists and the audience can physically walk around in 3D drawings. Many research studies are done concerning the technology behind this new drawing style. But it is necessary to examine this technology from the viewpoint of art education as well.

VR illustration tool has first been introduced in a festival that took place in North America, being held by Kaleidoscope VR community which is composed of directors and technologists. In the festival where the best examples of Virtual Reality were displayed, a Google product 'Tilt Brush' was also introduced. Tilt Brush has the characteristics of a scenario providing users with an alternative and creative thinking platform in the virtual reality field. The plainest explanation of Tilt Brush is a virtual brush that enables 3D drawing in a virtual reality platform. Introduced by Google with the motto 'the possibilities are endless' provides designers with new design practices. Tilt Brush and similar drawing tools can be regarded as new expression forms of illustration. In this application, designers have real-time drawings on a virtual reality platform. This technology of a new brush-surface relation format that is used both in digital and traditional illustration techniques can be seen as a new supporting field of creativity. Users can create 3D figures using brush and pallet, walking around in a virtual platform.

Microsoft has made cooperation with designers to show the potential of the drawing tool Tilt Brush. Using this tool, designers created conceptual platforms utilising light, colour, form, line and 3D to reflect their own imagination (Figure 1). The most interesting part of this application is that users can walk around within the drawings (<https://www.tiltbrush.com>).

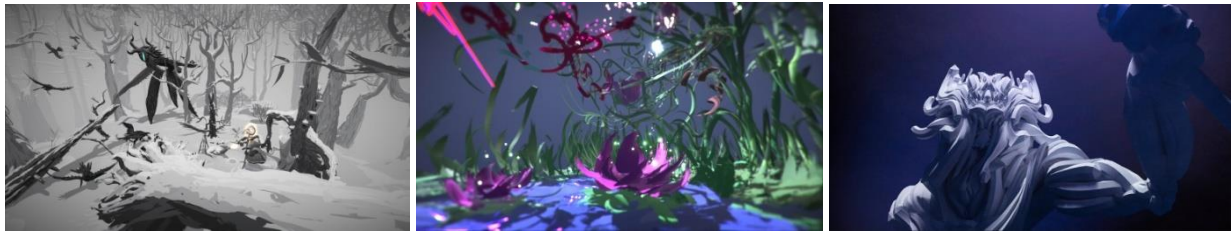


Figure 1. Respectively from left to right are the Tilt Brush works of Chain, Miss Led and Steve Teeple

Tilt Brush and similar applications are seen recently among the hit applications of the art and technology association. The application can be seen to be beneficial of art education. Especially in order to provide the department of fine arts students with an alternative experience in the works of form, colour, sizing and composition, the advantages this technique can provide need to be considered.

With the expansion of Virtual Reality applications, different and new approaches and development processes have emerged in the world of art. VR is in a way the redesign of the reality. It is possible to alternatively create the platform with 2D illustrations in the creation process of the virtual world. What comes to mind when one mentions VR is generally a head-mounted screen. And mostly the displayed images are the ones that are created with 3D software. Yet, with an alternative and original approach, it is possible to create a virtual reality experience using 2D illustrations. One of the best examples for that are 360° panoramic illustrations.

3.1. 360° panoramic illustration

360° panoramic illustration is fundamentally based on creating panoramic displays. According to Benosman and Kang (2001), the history of panoramic illustration leads back to 1794s. The first examples of panoramic illustration took place in books, newspapers and magazines back then to provide people with a wider view of cities and the nature. These wide displays enabled horizontal images to be perceived in 360°. The main purpose of panoramic illustrators is to recreate the real world realistically, make people believe the image they see is real and completely surround them with images.

Panoramic images and virtual reality platforms are created and produced with the same purpose as well. The main purpose is to surround the viewer with 360° images. But in terms of surrounding, virtual reality not only makes use of horizontal but also vertical perception as well. That way, users are entirely left in a ball/cave.

The display of the virtual reality images can be seen not only with VR glasses but also on web platforms. Users can have this experience using their mobile phones. As in the hand based virtual reality paradigm mentioned before, without needing any glass, users can see this image using their mobile phones with motion sensors. It gives them a feeling of looking through a window, opening to another world.

New methods and techniques are developed in order to increase the imagination of designers, enabling them to create an original and surreal virtual world. The main goal of creating 360° images is to fill inside a 3D ball because the participant looks through a ball in a VR platform. Just like the separation of a world map, when the ball form is separated on a flat surface, the rectangle that comes up is the workplace of designers. That is called *Equirectangular Image* (Figure 2). There are reference lines on this surface that forms a ball. When illustrations are made considering these lines and images filled inside a ball, an exact 360° panoramic image is created. Users can view the whole surfaces of the ball horizontally and vertically in Virtual Reality.

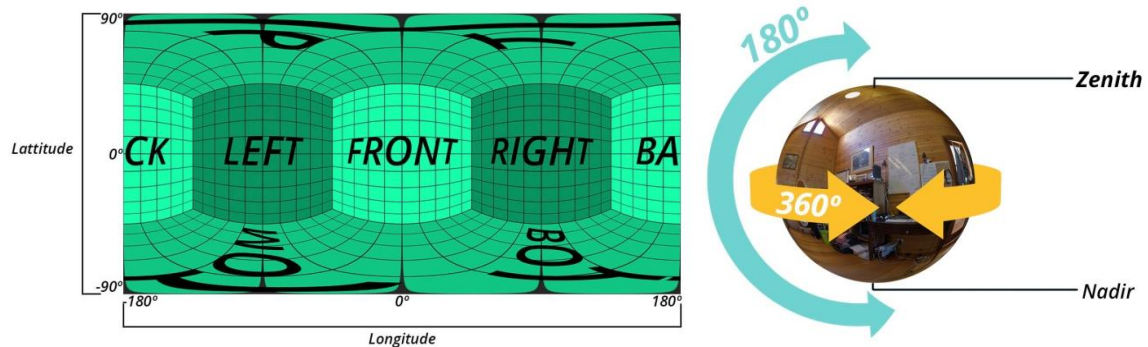


Figure 2. Equirectangular image (http://stateofvr.com/?page_id=16864).

To create 2D illustrations on such maps can lead to some issues. The biggest one of such problems is the mistakes in the distance between perspectives and objects when images are displayed in a ball. In order to prevent such issues, the necessity of real-time virtual reality illustrations has come up and 3D feature to create panoramic images are added to Adobe Photoshop's CC version. Thus, designers can see how the images will be displayed in the virtual reality platform while drawing on the map. Another way is to use Cubemap, by which one can draw on a map obtained from the separation of the ball. Finally, the images can be displayed, changing their Metadata or uploading them on 360° supported web platforms.

To display the obtained illustrations, aforementioned hand-based virtual reality technique can be used. Display systems consisting of Art Station, Kulla and similar web platforms enable drawings to be viewed in a virtual reality application form (Figure 3). New generation mobile devices perceive user motions and display images accordingly.



Figure 3. 360° panoramic illustration. (<https://kuula.co/post/7lg1h>)

3.2. Suggestions with regards to art education

Virtual reality in a way is the redesign of the reality. Designer's visual perception and plastic forming skills play a big role in the redesign process. Main purposes of the art education are to improve students' designing skills and enable them to reflect their conceptual thinking on images originally. Students of the faculty of fine arts use new methods and techniques to create graphic forms, perceiving designing as a transformation process. In the art education, new technologies that respond to modern-day requirements are made use of. Illustrations on VR platforms that are mentioned in this study can be said to be beneficial for the art education as an educational material. Especially using

applications like Tilt Brush, students can explore how to reflect their conceptual thinking on lines and forms, while physically taking place in a 3D platform. They can improve their line, plane, colour, form and 3D creation skills of the graphic form design. In addition to this, these technologies can be beneficial for the development of basic skills and forming abilities that are necessary for 3D. Because the designer works not on a 2D surface but in the platform that illustration takes place. That way, students can develop real-time expression ways of creativity.

A lot more experiments need to be made in order to determine the utility value of VR as an educational material. If the experiments prove the encouragement and effectiveness of VR, the whole curriculum of art schools and universities will need to be reviewed (Kayabasi, 2005). Even though Virtual Reality doesn't yet take place in education, the potentials and outcomes need to be considered.

4. Conclusion

We come across the graphic design field as the illustration art of thoughts and concepts. Just like the other fields, the graphic design field and education is substantially affected by the technological developments. Especially creative thinking platforms and practices in the illustration field change day by day. Illustration in VR comes up as a new art concept. In virtual reality, artists find the chance to alternatively illustrate and present their conceptual thinking. In addition to the traditional and digital illustration techniques, being present within the drawing area requires new design methods for designers. The real-time display of 360° equirectangular images in virtual reality platforms brought new design forms along.

In this age, art education is based on the cooperation of design, science and technology. Interdisciplinary is now inevitable in art education. To lead and increase student potentials to the right direction in seeing, perceiving, interpreting, designing and creating fields, VR technologies in art education can be seen as an alternative. VR that in a way is experience, showing an unreal experience as real, provides students with a creative thinking platform. Along with the design of the created, imaginary and surreal environments, display ways by users also leads to different experiences as much as the design itself. Even though virtual reality technologies are used as supporting materials in education, what's important is to develop original expression ways based on creativity.

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