

Examining *creativity*

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Abstract

This paper explores and illustrates the fashion in which Interactive art creates a channel for the flow of social creativity from both ends; the creation and the participation. It exercises and inspires recipients' creative thinking and, if extended to real-life situations, it has a direct influence in the creation of cultural norms. If art gives some indication of the character of our society then the exploration of active collaboration, creativity and sharing of experiences and knowledge should be explored. Boundaries between art, technology and society are being challenged. Similarly to the way that the borderline blurs between professional and non-professional developers in the sense of what it means to be a developer, a programmer or indeed a user of software. Our society is a hybrid of fiscal and non-fiscal economy. Both are defining elements in the creation of cultural norms and could not exist without one another. The popularity of open sourcing is a relatively new phenomenon in our culture and has raised many issues in the politics of our society. Its impact in relation to influencing our value systems as imposed by proprietary economy is unquestionable. The new *sharing culture* and its social, legal, technological and economic aspects alter our social relations by giving different perspectives in understanding the role of an individual in the society as well as the society as a whole. Our cultural norms are constantly changing and evolving. Open source sharing of ideas and concepts are feeding a resurgence of Interactive art encouraging creativity from artist and the general public alike. Interactive artworks offer the recipient the opportunity to become a creative collaborator as opposed to remaining a relatively passive viewer, thus mobilizing their cognitive processes through active involvement. Such participation stimulates the recipients' creative and critical thinking which can have a further influence on cultural norms and social development.

Contents

Chapter 1 – Introduction	1
Chapter 2 – Literature Review	3
2.1 Interactivity and Interactive art	3
2.2 Digital Media	5
2.3 Free/Libre and Open Source Software	7
2.4 Social Creativity	10
2.5 Cultural norms and Creative Industries	11
Chapter 3.1 – FLOSS communities	13
3.1.1 Sustainability	14
3.1.2 Licensing	14
3.1.3 FLOSS as social phenomenon	15
Chapter 3.2 – Interactive artworks	17
3.2.1 Process of creation of artworks	17
3.2.2 Process of co-creation	18
Chapter 4 – Cultural norms and social creativity	22
4.1 Cultural norms are defined by media	22
4.2 From consumerism to sharing	22
4.3 Interactive art and cultural norms	25
4.4 Contradiction in social creativity	25
Chapter 5 – Case study - The Universal Construction Kit (2012)	28
Chapter 5 – Conclusion	31
Bibliography	34

Table of Figures

Figure 1: Levin, G. and Lieberman Z. (2005) <i>Messa di Vocce</i> Installation in Artrock Festival Sainn Briec, France, performed by children recipients.....	19
Figure 2: Levin, G. and Leberman Z. (2003) <i>Messa di Vocce</i> Art Performance at London, Institute of Contemporary Art, performed by Jap Blonk	20
Figure 3: Sets of adapter bricks. <i>The Universal Construction Kit</i> , Available: http://studioforcreativeinquiry.org/ and http://makezine.com/2012/03/19/universal-adapter-set-for-construction-toys/ [accessed 15 March 2016].....	28
Figure 4: K'Nex to Krinkles adapter brick. <i>The Universal Construction Kit</i> . Available: https://www.thingiverse.com/thing:15960 [accessed 15 March 2016]	30

Chapter 1 - Introduction

When one examines art through an observant eye, a lot about the time and the environment of its creation can be discovered. Art can talk about people; it can reveal many characteristics of whole societies and their development. In this sense, the art of today is not different. Artists build upon concepts of their predecessors and contemporaries, take subjects from their immediate surroundings and manipulate, represent, critique or experiment with the gathered information, concepts and technologies.

Attempts to blur boundaries between art, institutions and audiences have been explored for decades; starting with the Situationists in the 50's who were interested in social relations and exploration of human experiences (Debord, 1967). Those attempts of the arts became however clearly obvious since Bourriaud's Relational Aesthetics and more so again with the emergence of participation in art in the 90's (Kester, 2011, Bishop, 2012). The issues of the artist's relation to society are one of the fundamental questions in contemporary art criticism. The position of an artist in society has been ambiguous. With constantly emerging new art streams - which is descriptive of the contemporary society submerged and challenged by the rapid expansion of technology - an artist is becoming a scientist (Eduardo Kac), a social worker (Rirkrit Tiravanija) or indeed a programmer and collaborator (Golan Levin). Art audiences are going through similar issues as the artist. They cannot longer be seen as sole viewers of art. The efforts of the arts in involving their audiences in creation processes have been abundant. Fluxus and Situationists would have included the audience in their performances and happenings outside the galleries (Claes Oldenburg, *The Store*, 1961, New York), participatory and dialogical artists often attempted to open communication channels also (but not only) within the galleries (Liam Gillick, *Big Conference Centre Limitation Screen*, 1998, London). The opening of communication channels between artists, institutions and public means that audiences are becoming aware of the fact, that such artworks are incomplete without their involvement. With the development of technology as tools for artistic expression, the endeavor of the arts have moved from its task to offer a physical and observational representation into a form of providing experiences and social encounters to its recipients.

In this thesis the attention is brought to the effect that active participation in creative processes of interactive artworks can have on recipients' perceptions, thinking processes and their further behavior in society and communities. The investigation into the fields of Interactive art, its collaborative

techniques and the effects on its recipients is impossible to conduct without understanding the art's wider socio-technological environment. Involvement of the audience in the art creation processes together with collaborative practices of artists, raises awareness of particular characteristics of our society. *Sharing society* and *social creativity* are terms which recently became widely used in context of the information society, thus also in the context of art. The collaborations of artists and programmers on one hand and the recipients' involvement in the creative processes on the other, form a multi-level cooperation which draws from but also has implications in social and economic levels of our society. How does this collaboration manifest itself and what exactly are those implications? Could we observe signs of a new emerging global identity through the investigations into Interactive art? And if yes, how does this global identity manifests itself? Are we becoming a more creative species? If art is somehow descriptive of society then it makes sense to explore its aspirations and outcomes with a hope that it will reveal new perspectives to help understand and create both the art and culture.

The methodology of this research paper is focused on an investigation of the position of Interactive art in socio-technological relations of open culture which exists within neoliberal environment of the Information society. Interactive art is explored mainly through Kwastek's investigations into the functioning of Interactive art (Kwastek, 2013). It is seen, by this paper, as an experimental environment for exploring the behavior of its recipients as well as a sample of the whole society.

The fact that interactive artworks are often created in collaboration leads the discussion to the explorations of the socio-economic environment of open source software and the sharing culture. The main discussion is then led from two perspectives. *The Cathedral and the Bazaar* (1999), a study proposed by Eric S. Raymond, provides a clear distinction between two different models of software development. The two opposing philosophies serve to the further investigations firstly into the political influence of the markets through exploring the *Creative Industries Mapping Document* (1998) which focuses on dealing with creativity and Creative Industries. Secondly, the philosophy of the Bazaar development model leads the discussion into the functionalities of the open source software communities. The focus on the technological and the social aspects of our culture in its political context is explored through several writings on social creativity by Gerhard Fischer.

Chapter 2 – Literature Review

We are entering a new age, a social age which is defined by digital media. Media as a platform dominate our culture. The *interactivity* of digital media is a term widely used in today's society. The fact that Interactive art is largely (but not only) construed by the help of digital technology directs the focus of this thesis towards this particular technology and its relation to our society. This chapter will give an overview of necessary theories relating to the discussion about *sharing culture* and *social creativity*. Interactive art, Open Source Software (FLOSS) and social creativity are the main topics of this chapter.

Because of the heterogeneity of contemporary art works as well as the blurred boundaries between art, technology and society it is necessary to set the terminology. This paper refers to the concept of a creator as a *programmer* or an *artist* and to the consumer as *user* or *recipient*. The connotations of some of those expressions clearly point to the character of contemporary society which is submerged in the digital world of a computer. We will see, in the course of this thesis, that this differentiation is necessary in order to express the artists' and the participants' relation to society. Further, we should understand *knowledge* as any contribution (in a form of software contributions, information or ideas) relating to a particular subject.

2.1 Interactivity and Interactive art

Manovich claims that new media are interactive by their very definition and *interactivity* is understood too literally (Manovich, 2001). Not all actions performed on a computer are interactive in the actual sense of the word. Interactivity is natural and necessary in order to operate digital media and therefore calling them interactive is '... a tautology.' (Manovich, 2001, p. 55). Interactivity requires cognitive and/or physical activity of the user. Manovich claims that all works of art, even classical art, are interactive. However, with modernity and subsequently new media, the borders of interactivity are being pushed further. Jewell defines three main elements which are necessary elements for the art to become interactive:

Audience interacting with
Performers or work of art
Affecting results
(Jewell, 2016)

Interactivity, as it exists in Interactive art, takes the behavior of the recipient of the art, manipulates it and returns an altered result back to the recipient in a form of an experience. 'It is the recipient's activity that gives form and presence to the interactive artwork, and the recipient's activity is also the primary source of his aesthetic experience.' (Kwastek, 2013, p. xvii). Kwastek's theory of media art aesthetics offers tools for a deeper analysis of the subject.

Levels of recipients' interaction vary depending on their ' . . . degree of intensity, which range from observation and navigation to participation [and] co-authoring . . . (Kwastek, 2013, p. 119). The process which happens through recipients' experiences together with their contributions as co-authors remains central to this thesis. Recipients' participation in interactive artworks is a necessary element in the creation process. Debord's (1967) theoretical aspirations for mobilizing society, whom he denounced as sole spectators, into searching for authenticity in life, have been exercised by the arts and culminated in the late 90's with Bourriaud's Relational Aesthetics (2002) and Participatory art. The spectators (of art) became participants. Bishop (2006) and Kester (2011) describe Participatory art as an activity with a social purpose where the main aim lies in the *inclusion* and therefore activation of participants rather than the artworks themselves. Such participation should not, however, be confused with participation as used in relation to Interactive art as it does not necessarily carry the same social connotation. As much as the social aspect of interactive artworks cannot be denied, participation is not its primary goal. Interactive art looks at connections between the recipient of art and the given environment or tool for interaction. Together with the artist and configured environment the recipient becomes another fundamental element during the creation process (Kwastek, 2013).

It is also necessary to contextualize the intentions of the artist. The artwork can be understood as the artist's ' . . . reception proposition to be experienced in the here and now.' (Kwastek, 2013, p. 44). Works of *dynamic-interactive* character are those whose art object contains ' . . . internal mechanism that enables it to change or it may be modified [while] the human 'viewer' has an active role in influencing the changes in the art object.' (Candy and Edmonds, 2001).

The art object does not need to be understood strictly in its physical sense. In the 60's, Burnham (1968) proposed a term *systems aesthetics* which explores the process as it happens during the art creation (Kwastek, 2013). The *process* signifies ' . . . a dialogue [that] would evolve between two systems, with both systems in a constant stage of change.' Burnham in (Kwastek, 2013, p. 57). The communication between the two systems – technology and the social element – was, as Burnham envisaged, a critical component in the society's transformation ' . . . from an object-orientated to a systems-orientated culture.' (Burnham in Kwastek, 2013, p. 57). His concept of constantly changing and evolving processes in socio-technological relations (process-based art) together with Bourriaud's

analysis of the system of human relations through Participatory art provided a theoretical ground to the emergence of artistic configurations of environments.

'Artistically configured interactivity can be viewed in the overall social context as a kind of "extracted sample" [which can act as an] analytical, critical, or deconstructive model of interactivity . . .' (Kwastek, 2013, p. 39) as such. Interactivity itself is a vital element of media art which is computer-based and therefore it is a vital element of the whole Information society (Kwastek, 2013). Artistically configured environments provide artificial socio-technological structures which can be revealed or at least questioned by the process of its creation. Burnham believed that '*. . . art had an educational duty . . .*' (Kwastek, 2013, p. 57) in demonstrating the relational processes rather than the materiality of itself. Artistically configured interactivity thus provides a sample of behaviors which can be applied to behaviors encountered in different areas of life in information society and should act as an inspiration to the society's awareness of socio-technological relations.

A new media artist generates '*. . . aesthetic experiences of mediated interaction. . .*' (Kwastek, 2013, p. 42) with help of contemporary tools for creation; tools that are created by the information society and its ideology which defines the essence of interactive digital artworks.

2.2 Digital Media

McLuhan uses interchangeably the words medium, media and technology. For McLuhan a medium is an extension of our being which is in a broader sense understood as technology (McLuhan and Lapham, 2003). He claims that the conventional pronouncements fail in studying media as they and focus on content which prevents them in seeing its actual character. Instead, McLuhan observes that any medium intensifies an existing process which results in psychological and social effects (McLuhan and Lapham, 2003).

McLuhan's emphasis on the message of media being rather social and psychic extends further into portraying every medium as an inheritor of previous media (McLuhan and Lapham, 2003) as every medium necessarily develops from its predecessors. From a social perspective, new media can be therefore considered as an accumulation and expansion of previous media (printing press, TV, radio, cinema) in combination with new experiences.

In *The Language of New Media* (Manovich, 2001) Manovich depicts several elements which define new media; *digitalization* (data being repeatedly translated to numerical language), *modularity* (possibility to access every information independently), *automation* (which removes a human element, to a

certain degree), *variability* (the ability to use the same data for different interface, hyperlinks, periodic updates, scalability) and *transcoding* (Manovich, 2001) which is a transfer of information into metadata. 'Metadata is the data about data.' (Manovich, 2002). A computer translates data into metadata in order to manipulate them and translate them back into a different form. As data is converted e. g. into a set of pixels or vectors it becomes a digital 'translation' of the data and as such gains a further dimension for analysis. Thus, rather than discussing content or meaning of the image we are getting into the world of files and data. Further, Manovich examines two different layers which are created by those defining elements of new media; *cultural layer* and *computer layer*. The computer layer, by its very structure and nature, directly influences the cultural layer and vice versa. This reciprocal influence results in creation of new '... cultural categories and concepts [which are rooted in the computer layer.] New media thus act as a forerunner of this more general process of cultural reconceptualization.' (Manovich, 2001, p. 47).

From a structural and historical perspective, Manovich's analysis of digital media is vital in order to ground the theory of new media. However, the approach with which it was written was largely formalist and therefore incomplete (Galloway, 2011, Hansen, 2004, Galloway, 2010). Galloway similarly to McLuhan analyzes new media with the emphasis on the social structure within which they are used. Building on Manovich's notion of reciprocity between cultural layer and computer layer, Galloway offers a reading of a computer and new media in relation to their social environment, claiming that the social aspect of technology is the primary aspect of it. (Deleuze in Galloway, 2004). Where possibilities of other media (TV, radio, film etc.) are quite limiting in the sense that they offer one-directional stream of information, computers offer endless iterations of the available information together with a platform on which those iterations can be performed.

Computer should be understood as a simulator of different environments rather than as an environment itself. There are two factors which define the simulation process. Firstly, it is the user's input (his command) with which he or she becomes the 'director' of experiences which are then re-mediated by the computer. 'The world no longer indicates to us what it is. We indicate ourselves to it, and in doing so the world materializes in our image.' (Galloway, 2010, p.278). The computer is a tool which we use in order to 'curate' our experiences; it provides a space which contains the essence of time, space, being or knowing. Such metaphysical territory (Manovich, 2006, Auge, 1995) is there to be utilized and employed by the user. The computer cannot however be considered as a sole facilitator of such metaphysical space but it actually simulates such environments. It therefore needs to be defined not only in relation to some other/external essence (as a mediator of user's input) but also to itself as

it simulates or ‘. . . remediates the very conditions of being itself.’ (Galloway, 2010, p. 281). Such simulation is based on logical rather than meaningful relations.

Galloway’s simulator embodies itself in the metaphysical form of a digital ‘space’. Such space is described by Auge as a *non-place* which manifests itself in a feeling of a ‘. . . continuous temporality . . .’ (Auge, 1995, p. 76). Auge refers to this space as a ‘no man’s land’ or a space with no or very short memory or history. He relates the *non-place* to travelling, to passing-through spaces such as airports, highways or hotel chains or indeed to ‘. . . cable and wireless networks . . .’ (Auge, 1995, p. 79).

2.3 Free/Libre and Open Source Software

Internet networks allow a dissemination and development of elements of the digital world. Such expansion happens through cheap and relatively well available and distributed Internet connections of Western society. The constantly emerging Internet communities and societies are not dependent on the physical location of their members but are rather defined by relations arising from having a common interest and providing a sense of belonging. (Wellman, 1999, Fischer, 2005a). The world of remote connections, McLuhan’s Global Village (McLuhan and Powers, 1989), is a foundation for Internet societies and communities which allowed the emergence of open source software.

The nature of open source software originates from the hacker culture which is based on ‘. . . those who share a love of programming, an activity seen to fuse artistic creation and expression with technological innovation.’ (Coleman in Kologlugil, 2012, p. 851). A model of software development based on the free sharing of ideas and knowledge originated from communities of hackers. This model had spread into the society, its economy, its technological development and many other disciplines. Even after the expansion of FLOSS into the wider society its core concept remains the same: to work in support of sharing of knowledge with the aim of achieving a common goal, independently of closed-off proprietary software. Open source software sprouted from users expressing their ‘. . . increasing discomfort about the cost, complexity, and constraints of many commercial products.’ (Fuggetta, 2003, p. 77).

One of the constraints relating to the cost and the associated involvement of a limited number of specialized developers are restrictions posed by intellectual property rights. One of the commonly recognized arguments in favor of proprietary rights is the idea of the copyright stemming from the inability of the creators ‘. . . to protect their [digital] creations against theft [in order to] earn an adequate living. [Without proprietary rights] there will be inadequate incentives to create. Thus the law must step in and create a monopoly called an intellectual-property right.’ (Boyle in Ghosh, 2006) p.

241). However, open source software has found its way to the markets. The interest in the novel open source production has sharply risen in the late 1990's after Linux was recognized as mainstream (What is Open Source?, 2015). As FLOSS turned into a subject of commercial distribution on a large scale, appropriate product licenses outlining liabilities and rights of users became inevitable attachments to products. FLOSS operates under a particular set of open software licenses - GNU GPL (General Public License) and OSI (Open Source Initiative) Certified licenses - which guarantee certain freedoms in distribution and the manipulation of the software by users. While OSI licenses are adapted to the commercial facets of intellectual property (Nimmer, 2005) rendering them legally closer to the proprietary copyright laws, GPL licenses (written by Richard Stallman, the founder of Free Software Foundation) are based on supporting and '... respect[ing] users' freedom[s]...' as follows:

Freedom 0: The freedom to run the program, for any purpose.

Freedom 1: The freedom to study how the program works, and adapt it to your needs. (Access to the source code is a precondition for this.)

Freedom 2: The freedom to redistribute copies so you can help your neighbor.

Freedom 3: The freedom to improve the program, and release your improvements to the public, so that the whole community benefits. (Access to the source code is a precondition for this.)

(GNU, 2016)

Licenses of open source products can be *copylefted*. Free modification and distribution of the modified code under copylefted license is limited by the condition that new licenses regarding the modified code are consistent with the licenses relating to the original product. 'Copyleft says that anyone who redistributes the software, with or without changes, must pass along the freedom to further copy and change it. Copyleft guarantees that every user has freedom.' (GNU, 2016). The objective of copyleft licensing is to create and maintain a legal area where the proprietary ownership by one person is prevented while the emphasis remains with the product allowing it to develop organically through other users' contributions.

The fundamental purpose of open source licensing is to deny anybody the right to exclusively exploit a work. Typically, in order to permit their works to reach a broad audience, and, incidentally, to make some sort of living from making works, creators are required to surrender all, or substantially all, of the rights granted by copyright to those entities that are capable of distributing and thereby exploiting that work.'

(St. Laurent, 2004).

The *entities* mentioned in the above quote are those who distribute software under copyright licenses which renders the works into the realm of proprietary software. The imposed surrender of creator's intellectual property rights means the renouncing of his or her abilities and knowledge in favor of the distributors. *Knowledge* is a necessary element of any creative process which is ' . . . widely disbursed [. . .] throughout society...' (Kologlugil, 2012, p. 833, see also in Benkler, 2006, Shirky, 2010). Veblen regards knowledge as an accumulation of cultural experiences gathered throughout generations. This immaterial equipment has been naturally exploited by every society and used as a common resource which leads towards progress. '[Knowledge] belongs to the "cultural" life history of the society as a whole.' (Veblen in Kologlugil, 2012, p. 832).

Knowledge is a key component of a larger pool of immaterial equipment which Putnam (2001) calls *social capital* or Boyle the *commons of the mind* (Ghosh, 2006, p. 241). Within this pool Boyle lists examples of other components such as ' . . . a gene sequence, an MP3 file, or an [digital] image. . .' (Ghosh, 2006, p. 241) which can, thanks to digital technology, be used and copied by multiple parties endlessly and repeatedly, without causing a potential interference with other prospective users; use of material possessions, (e. g. use of a chair) would be more likely to acquire a copyright license. The character of copylefted licenses in opposition to copyright supports open collaborative practices during the process of software development.

Each of those two types of licenses (open source licenses and proprietary licenses) attaches different intellectual property rights to a particular software development model. In *The Cathedral and Bazaar* (1999), Raymond discusses fundamental differences between two specific software development styles. Firstly, the *Cathedral* model is the one of closed-off proprietary enterprises employing skilled software educated designers who work on the development processes. Raymond recognizes the main difficulty of software development in general being the debugging procedure. Because of the limited number of software engineers (even though highly skilled) in the *Cathedral* model the processes tend to be lengthy. In addition the fact that the first releases of software for beta-testing are kept secret until the projects are close to completion further prolongs the development processes.

The second development style as proposed by Raymond is the *Bazaar* model. As an illustration Raymond uses the example of Linux which ' . . . was the first project to make a conscious and successful effort to use the entire world as its talent pool.' (Raymond, 1999). This *talent pool* can be accessed thanks to creating and cultivating an online community of programmers regardless of their professional qualifications. Projects are then able to become subject to early and frequent releases with the intention of testing the code for bugs from numerous perspectives and finding solutions to discovered problems. A *Bazaar* project can only happen under the condition of the access to cheap

Internet and the application of free software licensing. 'Linux is subversive. . .' (Raymond, 1999) and so is the initial nature of open source software.

Open source software communities are part of a larger picture of *sharing society* (Fischer, 2005b). 'The commons is a social regime for managing shared resources and forging a community of shared values and purpose.' (Clippinger and Bollier in Ghosh, 2006, p. 263). The knowledge which is being shared within the communities comes from their members, regardless of their formal education. Shirky (2010) proposes the theory of *cognitive surplus* addressing a concept of the general public possessing an abundance of time and knowledge which can then be used as inventive and creative input in different areas of life. The concept of cognitive surplus assumes that people who possess those resources are willing to share them with wider society who might be interested in sharing the same interests or solving similar issues. As a result of the compilation of cognitive surplus in particular areas of interest coming directly from community members who are personally facing similar issues, the contributions are a fundamental element in finding relevant solutions to issues (such as discovered problems, debugging or discussing new ideas) from multiple points of view.

Other topics related to the functionality of FLOSS communities, such as issues of usability (Sen, 2007), leadership (Raymond, 1999, Foster, 2016) or other concerns of their inner and outer economies and relations are not a focus of this paper. It is the social aspect of communities and their role in society which, after all, provides the ground for employing social creativity.

2.4 Social Creativity

Individual creativity is defined by Fischer as a building block of *social creativity* which became an element of our culture naturally occurring in the 21st century. Social creativity is only able to exist in an '[a]ppropriate socio-technical settings [which] can amplify the outcome of a group of creative people by both augmenting individual creativities and multiplying rather than simply summing up individual creativities.' (Fischer, 2005b). Individual creativity comes from one's personal experiences which are applied to a particular situation. Social creativity ' . . . is the result of the life experience, culture, education, and background knowledge of the individual, as well as the individual's personal interest associated with a particular situation.' (Fischer, 2005b). Social creativity happens through the means of interaction with other individuals. 'Creativity does not happen inside a person's head, but in the interaction between a person's thoughts and a socio-cultural context.' (Csikszentmihalyi in Fischer, 2005b).

Social creativity is therefore a multiplication of one's creativity by the creativity of others which happens in a suitable socio-technical environment. Such environments can be catered for by open source communities which Fischer interprets as a ' . . . success model of collaborative design. . .' (Fischer, 2005b). Additionally, the idea of *informed participation* which is a supporting methodology further develops the concept of social creativity. '*Informed participation* is a form of collaborative design in which participants from all walks of life — not just skilled computer professionals — are empowered to incrementally acquire ownership in problems and to contribute actively to their solutions.' (Brown et al. in Fischer, 2002).

2.5 Cultural norms and *Creative Industries*

The last part of this chapter is a short overview of other terms relevant to issues of creativity. Firstly, the term *cultural norm* refers to ' . . . attitudes and patterns of behavior in a given group [. . .] that are considered normal, typical or average within that group.' (Heberle, 2016). Clippinger and Bollier suggest that cultural norms of the modern culture (they refer specifically to the culture of 'American life') lay in ' . . . a celebration of laissez-faire capitalism, radical individualism, and the alienability of all human activity and nature for market consumption.' (Clippinger and Bollier in Ghosh, 2006, p. 259). Clippinger and Bollier justify the attitude of the people by the fact that they have little or no control over the running of events.

Secondly, the use of the following policy will be discussed in chapter 3 of this paper. In 1998, the New Labour party of the UK issued *Creative Industries Mapping Document* which, in order to ' . . . justify public spending on the arts. . .' (Bishop, 2012, p. 13), changed the terminology used for cultural sector, rendering the arts into the bracket of *Creative Industries*. Criteria for particular industries to gain the connotation of being *Creative* included

. . . those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property.
(Creative Industries, 1998)

The art and antique market were included together with TV and radio, design, architecture or software and computer services. The main critique includes issues related to new terminology (intellectual property rights in particular) which rendered all Creative Industries as a ' . . . key source of future employment growth and export earnings.' (Garnham, 2005, p. 25). The funding for creativity has been directed towards educating ' . . . creative workers . . .' (Garnham, 2005, p. 26) for the particular Creative Industries instead of seeing and funding ' . . . artistic experimentation and research as values in and of

themselves.' (Bishop, 2012, p. 13). The conflict in terms is a result of intersecting of the cultural, industrial and economic policies. (Garnham, 2005).

Chapter 3.1 – FLOSS communities

Being an offspring of new media, FLOSS inherits some of its characteristics. If we understand new media as a social phenomenon, FLOSS should be understood in the same fashion. The social aspect of FLOSS extends itself into the realm of information and knowledge sharing and collaboration among users. Out of the many issues relating to free software development, distribution and consumption this chapter will examine FLOSS communities and their products in relation to being able to sustain themselves on the commercial markets.

FLOSS communities provide a particular socio-technical setting (Fischer, 2005b). The social aspect is present by providing a space for collaboration and a sense of belonging (Wellman, 1999; Fischer, 2005a) to its users while the technical aspect is catered for by the Internet networks and the particular technological requirements of each community. Every community consists of members whose contributions can be very diverse, coming from particular areas of expertise, personal experiences and/or training of each individual member.

Members' contributions create pools of ideas and information which need to be organized; the different contributions need to be verified for their quality and accuracy. 'Let us not be fooled: open source does not mean the unvarnished truth but rather a specific communicative artifice like any other.' (Galloway, 2011, p. 383). It would be misleading to think that FLOSS communities are full of experts meeting on the platform and discussing projects, even though there are necessarily naturally emerging specialists-developers. '[O]nly a small fraction of the [FLOSS] community actually contributes to the code base. More people help out by providing support service to new users, answering questions posted to bulletin boards.' (Athey and Ellison, 2014, p. 309). The demography of FLOSS communities varies of course, from project to project. Each community is a snippet of our society and as such it consists of a variety of people with various skills, yet all driven by the same objective. The verification of contributed information happens through forums or communities' boards. Thanks to common the interests of the members, there is a natural tendency for a peer-review as it is in each of the member's personal interest to pay attention to the accuracy of the posted information. The platform that FLOSS communities provide should be understood as a space for communication and exchange or as an ongoing work in progress (Feller, 2005) which can be utilized by users, helping them to reach their particular goals.

3.1.1 Sustainability

The knowledge is shared within FLOSS communities with very little or completely without any monetary involvement. This raises the question of the sustainability of FLOSS projects, which is itself a broad subject for analysis and discussion. It is important to stress that FLOSS communities are able to sustain their projects on the basis of contributions from their members whose motivations are other than that of financial reward. The fact that not all FLOSS projects are always successful does not jeopardize the incentive of their members in putting their efforts into those projects which, in fact, repeatedly achieve fruitful results¹. A web based survey conducted amongst 684 software developers involved in 287 FLOSS projects (Lakhani and Wolf in Feller, 2005) revealed the motives and objectives of the contributions in those projects. The survey observed that only about 40% of the developers were paid for their participation. The motivations for contributions to the projects were driven by the intrinsic motivation of users, such as obligations to a particular community or his or her personal needs. Further, the ‘. . . intellectual satisfaction or scientific achievement from contributing to a high-quality product. . .’ (Lakhani and Wolf in Athey and Ellison, 2014, p. 309) was found to be an important motivation. ‘Programmers who have used [FLOSS] are motivated by reciprocal altruism to publish their own improvements.

The evolution of the open-source project depends on the form of the altruistic benefits. . .’ (Athey and Ellison, 2014, p. 294). Those altruistic benefits, together with notions of identity or ‘. . . ongoing moral, social and personal relationships. . .’ (Clippinger and Bollier in Ghosh, p. 263) are a common element occurring in communities in general and as such, it seems legitimate to utilize them through employing shared cognitive surplus in favor of the success of the projects. Thanks to open sourcing, the distribution of users contributions can, to a certain extent, bypass the traditional marketing process and the involved copyright restrictions. This allows the society ‘. . . to use, build upon, and advance its software technology without the involvement of business capital.’ (Kologlugil, 2012, p. 833).

3.1.2 Licensing

Collaborative objectives of FLOSS communities do however have to respond not only to their inner social functionality but also to the politics of the outside world. FLOSS is a part of a wider society and economy and is therefore somehow dependent or rather inter-dependent with markets. The Cathedral development model, because of its market-oriented character, designs and distributes products ‘. . .

¹ E. g. Linux – operating system, Apache – web server, Ubuntu - operating system, Red Hat – provider of open source solutions or Processing – programming language for visual artists and designers, VLC – a free, open-source video player

from the perspective of seeing and treating humans primarily as consumers.’ (Fischer, 2002). Products with copyright licenses are designed to be used by customers as final; the producers don’t intend to create modifiable products for free distribution. This leads to a rather passive consumption on behalf of the user. Copyright licenses ensure that the proprietary rights stay with the particular enterprise; they do not reveal the source code and are not open to sharing their specialized knowledge with their customers. Such closed-off systems deprive themselves of the knowledge of their users in favor of the narrow specializations of a limited number of in-house developers.

The neoliberal perception of a product not having any value outside of markets (Jelinek, 2013) is being challenged by many successful FLOSS projects. Such projects prove that not only are they able to be commercially successful and remain stable but also that they provide support, platforms for users’ communication and free or low cost upgrades when compared to the proprietary solutions. To a creative user copyleft licensing increases the non-fiscal value of the product, leaving the potential for its commercial success in the hands of the consumers while intellectual rights remain with its creator. These two factors maintain a healthy competitiveness within the markets. Further, ‘. . . the open quality of the creative enterprise spreads; it is not simply a donation of a program or a work to the public domain, but a continual accretion in which all gain the benefits . . .’ (Boyle in (Ghosh, 2006 p. 244). Open licenses allow for knowledge to be spread, parts of software to be reused for different purposes in different areas of life². The fact that FLOSS projects are entirely open to the market and its critique makes the sustainability strategies mainly (and naturally) orientated towards the users, their contributions and solutions or suggested solutions as seen from different perspectives in the real-life situations.

3.1.3 FLOSS as social phenomenon

The definition of hackers directs us to the initial character of FLOSS which was established thanks to a profound computer literacy and inventiveness within the hacker communities, both underlined by a rather subversive attitude. Yet, because of the financial viability of many FLOSS products, the necessary licensing changes were put in place in order to protect the altruistic objectives of the contributors. Copyleft licenses prevent the collaborative nature of FLOSS from being exploited by ‘. . . entities that are capable of distributing and thereby exploiting that work.’ (St. Laurent, 2004, p. 4). The attention of FLOSS communities is directed towards its existing as well as new users who are potential agents for the much needed support services. The communities’ search for reward isn’t

² E. g. Processing software, which is essentially a tool for artists and designers, is also used for visualizations by commercial companies, by teachers for introductory courses for programming etc.

fiscally orientated but rather in expanding the community foundation by involving as many members as possible and necessary.

Sustainability of FLOSS projects and their general success on markets stand on the shoulders of countless contributors who largely donate their time and knowledge towards the development of products. FLOSS, as a platform, should then be considered more of a social phenomenon than an economic one. Knowledge and its accomplishments should not be understood in a sense of market competition but in a sense of social development. 'Social exchange is an "evolutionarily stable strategy and thus the critical platform for cognitive development in humans . . .' (Clippinger and Bollier in Ghosh, p. 266). In order to progress as a society, the exchange of knowledge and collaboration is therefore necessary. Copyrighted licenses don't support open collaboration and lead therefore to a passive consumption while eschewing vast amounts of freely available communal knowledge and experience.

Chapter 3.2 – Interactive artworks

The underlying purpose of this paper is to explore Interactive art in its relation to creativity and to the collaborative practices of FLOSS communities. Social changes occurring in contemporary Information society originate from modern technological development of which FLOSS communities are a great source; therefore the following chapters should be read while keeping this in mind. This chapter explores Interactive art as a means for collaboration and artists' expression through the creation of artificial environments within which recipients' experience can be materialized.

The interactive artists in contemporary society are subject to utilization of digital tools as a means of expression. The ambiguity of the process from the perspective of the artists lies in the character of these tools as they require a particular technological knowledge. An artist either acquires the role of a *consumer of technology*, a *commentator of technology* or a *researcher* (Wilson in Harris, 1999). To further analyze the artists' relation to technologies would be the subject of a different discussion; as would be questions of ownership³ which necessarily arise from collaborative practices. The necessary software literacy on different levels is however evident. The artist, in Burnham's eyes, was seen as a ' . . . critical observer of technological and social system.' (Burnham in Kwastek, 2013, p. 57). If an artist should aim to comment, question or research socio-technological relations then the appropriate literacy and knowledge of those systems has to be in place. The artist creating dynamic-interactive artworks becomes, to different extents, a programmer. The option, or rather the necessity, of working in collaboration with others gives interactive artists a wider range of concepts originating from the experiences, issues and knowledge of other people.

3.2.1 Process of creation of artworks

During the creation process artists have to take into account many social, technical and aesthetic aspects. Many interactive artists agree that the ' . . . aesthetic experience lies in the action of realizing the work. . .' (Kwastek, 2013, p. 48)⁴. The aesthetic experience, as pre-defined by the artist, takes into account the intensity of receivers' interaction. The artist specifies the extent into which recipients will be able to influence the outcome of the artwork and has therefore a decisive power over the range of experiences that can be achieved and the level of creativity that recipients can add to the process. Construction of the work's concept should involve the artist's consideration to revealing or questioning socio-technological concerns which would be exposed through the recipients' participation.

³ Questions of ownership in Charnley, K. (2011) 'Dissensus and the politics of collaborative practice'. *Art & Public Sphere*, 1(1).

⁴ As seen in the comment of Kruger 'Response is the medium!' (Kwastek, 2013, p. 48) or the one of Ascott 'The aesthetic in this transformative work lies in the behavior of the observer. (Kwastek, 2013, p. 48).

In order to control the flow of actions performed by recipients a structure for setting instructions and limitations needs to be in place. Rules⁵ act as a channel within which recipients will be expressing his or her actions and improvisations (Kwastek, 2013). Each particular artwork is constrained within a particular set of rules which provide an arena⁶ for action. In this initial stage of the work's concept creation, Manovich's cultural layer (the artist's and recipient's inputs) meets with the layer of the computer (computer's simulation). The rules need to comply with the rules, possibilities and foremost by the particular aesthetics which are enabled by the computer environment; those are ultimately based on the computer's logical calculations. The data that are inputted into the program through different forms of capturing a recipient's activity (camera, microphone or different sensors) are transcoded into metadata allowing for them to be manipulated by the computer. While the artist acts as an initiator and the computer as a simulator of the processes, it is the recipient who supplies its form and dynamics. Through the simulation of a computer the recipient becomes a manifestation of the artwork (Kwastek, 2013).

3.2.2 Process of co-creation

The work materializes itself in accordance to the form which is supplied by the recipients. Kwastek emphasizes that the art of interactive works does not lie in its physicality but in its experience (Kwastek, 2013). An artistically configured arena for action presents an opportunity for recipients to encounter aesthetic experiences and to become the work's co-creators. 'Interactive art places the action of the recipient at the heart of its aesthetics.' (Kwastek, 2013 p. xvii). The amount of recipients' contributions is not only dependent on the level of interactivity as defined by the artist but also on the individual involvement of recipients and on their personal interpretation of the work. '[T]he artwork is experienced aesthetically only when the recipient permits and actively produces that kind of experience. At the same time, the experience evoked by the artwork is different for each recipient.' (Dewey in Kwastek, 2013, p. 49). The experience is dependent on the *realization* or *comprehension* of interaction which is crucial in order to ignite recipients' cognitive processes. Activation of cognitive processes can take different forms. Recipients can take a position of a sole observer which in itself leads to some cognitive understanding of the process (Kwastek, 2013). Levin, in his interview with Kwastek and Muller, refers to the term *vicarious interaction* which '. . . denotes a cognitive comprehension of others' interactions.' (Kwastek, 2013, p.95). A greater understanding than by a sole observation comes however from an active participation in the creative process which '. . . usually

⁵ Implication of rules and instructions was previously seen e. g. in Kaprow's *18 Happenings in 6 Parts* (1959) or in Sol Lewitt's *Wall Drawings* which are being created by his instructions up to now.

⁶ Kwastek (2013) from Yvonne Droge Wendel et al., *An Architecture of interaction*, exhibited in Mondrian Foundation, 2007.

begins with procedures of *experimental exploration*.' (Kwastek, 2013, p. 128). Such experimentation can take a form of *play*.

Based on theories from the 50's the concept of play is defined by a sense of *freedom*, *unproductiveness* and the *self-containedness* of an activity in terms of time and space which has to satisfy conditions of a *voluntary participation* and a *lack of material productivity* (Kwastek, 2013, p. 74). Hughes (2009) explores the concept of creativity through play by observing controlled groups of children. The result of his research indicates that through play, which involves the process of problem solving and the openness to new experiences, creativity can be encouraged. Kwastek sees the importance of play and experimentation in Interactive art as they are both '... based not only on contemplative perception but also on action.' (Kwastek, 2013, p. 74). Action and contemplation are a necessary element in play as well as in Interactive art (Kwastek, 2013).

American new media artist and contributor and advocate of FLOSS Golan Levin has characterized open source as a means for '... creation of tools for social creativity and expression. . .' (Aksioma, 2015b). As an interactive artist, researcher, programmer and commentator of technology, Levin works in support of open culture, cultural critique, exploration of technology and software education. The works that Levin and collaborators produce are often experimental. Levin views his works as being beautiful and interesting rather than useful. 'There is not a lot of money in the kind of work that I do.' (Levin, 2013). The non-commercial character of the works opens up opportunities to more freely explore aesthetic and experimental areas for creation. Levin considers such space as a '... wide open field [where] there is plenty of opportunity to explore new ways and new kinds of things to make.' (Levin, 2013). One of the purposes of these artworks lies in discovering new identity and finding a new potential of recipients '... as a creative actors . . .' (Levin, 2013). Levin presents his works as *Gestural and Audiovisual Play Systems* (Levin, 2013).



Figure 1: *Messa di Vocce* Installation (2005), performed by children recipients



Figure 2: *Messa di Vocce* (2003), performed by Jap Blonk

In this playful interaction between technology and the recipient, *Messa di Voce* (2003) visualizes the human voice with an abstract visual reading of sound produced by the recipient, regardless of a language or content. Preprogrammed by the artist the whole artwork depends on the interaction, participation and the performance of the recipient. The works were designed to allow the recipients to become creative through play within the boundaries of the space and the programmed elements. The immediacy of it highlights the reciprocal relationship between technology, the artwork and the recipients. The recipient becomes a manifestation (Kwastek, 2013) of the artwork.

The physical movement which, while not voluntary but likely, the production of sound as well as the visual outcome of the artwork naturally ignite cognitive processes of the recipient. The viewer becomes a performer and as such becomes a fundamental and necessary part of the work. The recipient becomes a 'console' for directing the processes of the program. In this case, Levin succeeded in making the participants getting '...away from the mouse...' while using their '...full body as a way of exploring aesthetic experiences...' (Levin and collaborators, 2016). Artists and non-artist have played and explored *Messa di Vocce* and as such, shown that given the right type of media framework, anyone at any skill level may become creative.

Creativity itself lies in being able to re-create new things out of existing ideas, tools or materials. 'By combining old things, new things are created.' (Haahr, 2004). Interactive art creates artificial socio-technological environments in which recipients are encouraged to play and experiment with the given ingredients for creation. Jelinek proposes to understand art practice in general as a ' . . . part of a knowledge-forming discipline . . . ' (Jelinek, 2013, p. 119). Seeing art recipients as co-authors of interactive artworks reveals the intentions of artists to mobilize Debord's *spectators*, by calling them to participation and taking part in creative processes. Those intentions of Interactive art, which are not new in modern art history, take every-day technologies as instruments for creation and share the creative/artistic processes with gallery visitors. Interactive art acts as a supporting mechanism for generating creativity.

Chapter 4 – Cultural norms and social creativity

Perceptions as to what is the norm and what is outside of it are diverse. Those perceptions about culture and its norms in contemporary society are shifting. Collaboration and creativity are the core of many discussions. This chapter outlines the origins of the term *social creativity* as well as the many and varied applications for which it can be used. Considering that the term *creativity* is so widely used, the question as to whether we are actually becoming more creative arises.

4.1 Cultural norms are defined by media

Communication in the Global Village is largely mediated. The underlying significance of such mediated communication has an impact on the way that cultural norms are created, on our perception of society and therefore our behavior. Cultures are defined by media (Fischer, 2002, McLuhan and Lapham, 2003). A closer examination of McLuhan's idea of the *medium being the message* brings attention to the importance of media to our perceptions of messages and information. The means in which information is *mediated* interprets the message through its own form; altering the meaning from that for which it was designed. The medium then gives another layer of meaning to the message within its own context. Modern media are designed by software developers and as such the method in which they are developed is somehow defining of our perception of the messages.

4.2 From consumerism to sharing

The individual mind performs in dependence on the *socio-cultural context*. 'The power of the unaided individual mind is highly overrated.' (Fischer, 2002, 2005, 2005b). The Global Village has changed the context in which we share our knowledge, express our ideas and generate creativity. 'Creativity occurs in the relationship between an individual and society, and between an individual and his or her technical environment.' (Fischer, 2005b). Social creativity arises through collaboration which is catered for by the Internet networks. Fischer points out the importance of collaboration in generating pools of knowledge by online societies and communities where social creativity can be nurtured. The ideas of how social creativity should be used are diverse. The contrast is in this paper proposed through two different attitudes to software development; the Cathedral and the Bazaar model. The following discussion is conducted from a simplified yet concise viewpoint that the Cathedral model distributes its products with copyright attachments while the Bazaar attaches the open copyleft.

Our society considers market consumption as the cultural norm (Clippinger and Bollier in Ghosh, 2006). Professionally dominated enterprises, which are representative of the Cathedral model, play a crucial role in the creation of this norm. As they are directly financially dependent on the market consumption of their products, their efforts are directed towards creating a base of consumers in order to keep up with their market competitors. 'A large number of the new media are designed to see humans only as consumers.' (Postman in Arias *et al.*, 1999, p. 1). In their endeavors to remain the sole and only original producer on the market, copyright, which is reinforced by neoliberal politics in the first place⁷ is attached to product licenses. Copyright prevents the code from being manipulated and shared by individual users with no financial gain for the producer. If social creativity is a result of open sharing of individual creativities (Fischer, 2005b) then the Cathedral model does not support such creativity. Informed participation and the active contributions of users are therefore not the aim of this model. From the users' perspective, informed participation is not possible to reach ' . . . in communities in which most of the members regard themselves as consumers.' (Fischer, 2002).

While the Cathedral closed-off model of software development restricts itself to not using the open paths of the Internet to get a relatively straight forward access to communal knowledge, for open source software it is an essential component of their very existence. The ' . . . individual discoveries [in open source] are shared in a common pool rather than – as used to be the norm – secretly squirreled away in in-house labs for further commercial exploitation.' (Ghosh, 2006, p. 3). For FLOSS projects and communities consumerism is not considered as a fixed norm.

The challenges to this norm come firstly from different activist groups. An example of such a group is Free Art and Technology Lab [F.A.T. Lab]⁸ which operated between 2007 and 2015. Being aware of the importance of mediated information the Lab worked ' . . . in order to produce free code, tools and toys which would allow people to adapt media around them.' (Levin, 2013). The Lab announced its closure in early August 2015, claiming to have lost the belief that ' . . . technology could take other paths than surveillance, centralization and consumerism . . .' (F.A.T. LAB, 2015). However, the efforts of the group in *liberating media* (Levin, 2013) through open sourcing and creating ' . . . tools that allow other people to engage with and manipulate pop culture. . .' (Levin, 2013) act as a sample of subversive

⁷ By reinforcing copyright (Garnham, 2005), the Creative Industries Mapping Document (1998) also reinforces market consumption in support of proprietary companies. In doing so it supports consumerism as a cultural norm.

⁸ F.A.T. Lab was an international community of activists, hackers, researchers, lawyers, programmers, musicians and others, who worked in support of open culture while questioning the concept of copyright as well as other issues related to security or surveillance. 'The Free Art and Technology (F.A.T.) Lab is an organization dedicated to enriching the public domain through the research and development of technologies and media. Release early, often and with rap music.' (F.A.T. LAB, 2015). The Lab offered an environment, platform for discussion about subjects of current socio-technological environment.

communities who aim to activate the society as a whole in taking part in the creation of pop culture rather than in just consuming it (as is the aim of the markets).

A broader challenge to market consumption, as a cultural norm, comes from open sourcing and the commons as a whole. 'Unlike markets, which rely upon price as the sole dimension of value, a commons is organized around a richer blend of human needs . . .' (Clippinger and Bollier in Ghosh, p. 263) which motivate contributors to participate in projects. FLOSS doesn't hold the rather determinist attitude of proprietary software (determinist in a sense of creating end-products for final consumption) but takes inspiration from its users on an ongoing basis. It is interested in the process of making and developing products which are open to constant change and adjustments. Bazaar development model offers ' . . . open socio-technical environments evolvable by their users and by individual who act as active contributors. This approach creates a culture that is fundamentally different from professionally dominated cultures . . .' (Fischer, 2005b). From the social perspective the behavior of users of open source software is radically different to the consumers of proprietary products. Voluntary contributions to the commons signify a change of users' behavior from being consumers to becoming contributors. 'Reciprocal exchange is a highly specialized brain function critical to the rise of identity, community and culture.' (Clippinger and Bollier in Ghosh, 2005, p. 267). The identities of individual users in dependence of such reciprocal exchange accumulate into a common identity which is a component of overall culture.

The underlying general message of the Bazaar development model can be seen in treating its users as co-creators of products. Users' realization of becoming a part of the creative process and their active involvement means a shift from seeing products as items for final consumption towards understanding them as works in progress which can be used and/or contributed to. Fisher claims that appropriate socio-technological environments provide a platform for peoples' expression of ' . . . personally meaningful activities [which allows the emergence of] new cultures and new mindsets.' (Fischer, 2005b). The understanding of FLOSS communities as open and organic platforms for communication, creation and sharing means a shift in the perception of consumerism as a norm. The concept of sharing is however not new in the society and its communities. As Boyle suggests, ' . . . this method of production is far more common than we realize.' (Boyle in Ghosh, p. 246). Many industries such as music, education and others employ this concept. "'The marketplace of ideas" [. . .] owes much more to the distributed, nonproprietary model than it does to the special case of commodified innovation that we regulate through intellectual-property law.' (Boyle in Ghosh, p. 246).

The *new* culture of sharing should not be understood as completely new but rather modified or *redefined* by open sourcing and by the mediated environment of the Global Village. Clippinger and

Bollier refer to the *resurrection of the commons* (Ghosh, 2005, p. 265) which describes a return of values of sharing and a common purpose to the communities.

4.3 Interactive art and cultural norms

Creativity which is able to grow and spread thanks to FLOSS communities also applies to the character of collaborative creation of interactive artworks and can be indeed multiplied by experimental processes that the art world embodies. Yet, it would be difficult to completely separate ‘. . . artistically orchestrated and “everyday” aesthetic experiences. . .’ (Kwastek, 2013, p. 40). As technology is used in art and society alike, Interactive art becomes a perfect platform for sampling and testing the phenomena of aesthetic experiences and interactions.

With the development of digital technology towards the future ‘. . . we may see art forms become increasingly interactive, letting audiences influence and even determine the outcome or results.’ (Jewell, 2016). Interactive art is therefore an open and ongoing platform where recipients can meet with new technologies as well as related concepts. The efforts of interactive artworks are directed towards supporting experimental processes and therefore to further creativity and innovation stemming from experiences that recipients encounter. ‘One purpose of the art/technology interface is therefore related to innovation . . .’ (Haahr, 2004). Kwastek claims that ‘. . . exerting a creative influence on the information society is still often seen as the primary task of media art. . .’ (Kwastek, 2013, p, 41). The artists’ participation in provoking creative processes (Haahr, 2004) and potentially their contributions to individual and social creativity as a whole cannot be denied.

4.4 Contradiction in social creativity

As Kwastek (2013) suggests, the value of artistic experimentation which can act as an aggravator of creativity has been overlooked by the *Creative Industries Mapping Document* (1998). ‘[A]rt is now understood either directly in market terms, or indirectly in other neoliberal terms, as a measurable instrument for the amelioration of social ills . . .’ (Jelinek, 2013, p. 119). Drawing from Jelinek’s quote, the policy seems to understand art as an instrument that raises fiscal prospects for future economies through generating creativity. Garnham (2005) denounces the policy makers for treating artists as creative workers which, again points to the policy’s intentions of using creatives and creativity for profit and competitiveness on markets. In order to be competitive on markets the Cathedral model of development uses copyright which contradicts the concept of sharing and subsequently the social and economic development of FLOSS and its communities. If sharing means innovation then the policy also

contradicts innovation for which it publicly calls. Innovation should not be understood in a sense of market competition but in a sense of social development (Garnham, 2005).

What the *Mapping Document* creates is a blurred understanding of the term *creativity* (Garnham, 2005). As argued previously in this thesis through Interactive art, which uses technology as a contemporary tool for creation or expression, creativity is triggered by play and experimentation. The creativity as understood by proprietary software is used in connotation with product (software) development where technology is used as a means to augment prospects of commercial viability of product and their future. That is not to say that creativity in the sense of inventiveness doesn't exist in the world of proprietary software as the educated specialists contributing to proprietary products have an enormous impact on development processes. Neither do the copyrighted licenses completely diminish the existence of creativity which is supplied by professional developers. Yet, '... it would be wrong to see them as the only engine of innovation.' (Boyle in Ghosh, 2006, p. 246).

The fact that Creative Industries encompass a number of industries which weren't labeled as creative in the past suggests that we as a society are becoming somehow more creative. If we are indeed becoming more creative then it is not caused by political connotations of the term *creativity* stemming from the *Mapping Document*. As concluded in chapter 2.1, copyright licenses don't support open collaboration which leads to a passive consumption of products on behalf of users/consumers, decreasing as such their motivation to perform the creative processes. If creativity means employing and combining things in new ways then the rise of creativity in contemporary society has occurred thanks to the technological opportunities of the Global Village. This environment itself is facilitated by the political structure of intellectual property as well as a result of an accumulation of communal knowledge gathered over generations (Boyle in Ghosh, 2006). Global Village facilitates open forms of communication and the creation of Boyle's *commons of the mind*.

Social creativity comes from new collaborative platforms which enable creative people to broaden their circles of co-workers and expand the pools of knowledge and resources which can be used. Yet, only using those platforms doesn't guarantee that social creativity will spread, grow and secure a social development towards a more creative future. Open source software together with the emphasis on the process of creation and active participation as discussed in chapter 2.2, suggest a model of social development which manifests itself by increased involvement, changes in perceptions and potentially cultural norms. One part of the efforts to employ creativity has to therefore come from the initiative of individuals. Nonetheless, the means of expression (technologies) are created by our largely mediated environment which is a hybrid of proprietary and open source products (Boyle in Ghosh, 2006), each of them in their own right inserting underlying messages and co-creating our culture and its norms. The

reciprocal relationship between individuals and the inputs of their political and cultural environment are the defining ingredients of the process of social creativity.

Chapter 5 – Case study

The Universal Construction Kit (2012)

This chapter presents a case study related to the open source software philosophy of sharing and free distribution of products and knowledge as well as examining the market values of common and popular products. The following case study is one of a revolutionary open sourced product concerning the toy industry. The product was developed in collaboration between two Labs interested in cross-platform, multidisciplinary projects; F.A.T. Lab represented by then Virtual Research Fellow Golan Levin and Sy-Lab represented and directed by Shawn Sims. *The Universal Construction Kit (2012)* was created in response to the need for a flexible kit of components which would make well known, mainstream children’s sets compatible.

The *Universal Construction Kit* is a matrix of adapter bricks for children’s construction sets that are produced by various manufacturers. The connections of the different brands were engineered in separate in-house environments and are therefore incompatible to one another. The *Universal Construction Kit* includes over 80 adapter bricks which allow joining of various types of the existing play systems together. It allows for flexibility and interoperability amongst (so far) 10 popular children’s construction sets. The original products of concern were branded construction sets manufactured by Lego, Duplo, Fischertechnik, Gears! Gears! Gears!, K’Nex and other major players on toy markets (Sy-Lab, 2016).



Figure 3: *The Universal Construction Kit*, set of adapter bricks

The whole project was inspired by the needs of Levin's 5 year old son. As the compatibility issues of the original sets emerged in Levin's immediate surroundings, identifying and reacting to the problem was in his personal interest. From the perspective of a user of the future product the direct confrontation with the problem provided intrinsic motivation to solve it. From his perspective as an artist and programmer the problem raised a creative and technological challenge. The open and experimental attitude of the team members created a pool of knowledge and creativity for the discussion and development of the project, each of them contributing their own perspective and expertise.

With relation to the proprietary manufacturers of the original brand construction sets and the markets themselves, the legalities related to the creation and release of the *Universal Construction Kit* were an important aspect. The above mentioned manufacturers release their products with appropriate patents restricting anybody else in using the patented design and engineering model. 'Today's manufacturers have little or no intrinsic motivation to make their products compatible with anyone else's.' (Aksioma, 2015a). The cross-brand compatibility is not in their interests as it wouldn't protect the uniqueness and competitiveness of the different sets on the market. The related issues with interoperability amongst the original brands are induced because of those patents. However, because of their limited duration the imposed legal restrictions have run out and those designs are now free to be reused (Wired, 2016) by the commons. The *Universal Construction Kit* team designed and released their product with a different set of ' . . . proprietary protocols in order to provide a public service unmet — or unmeetable — by commercial interests.' (Studio for Creative Inquiry, 2012).

The Free Universal Construction Kit and its associated media are licensed under and subject to the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License [. . .]. You are free to copy, distribute and transmit the Kit, and to remix and/or adapt the Kit [. . .]. We especially welcome extensions to the Kit which provide compatibility with as-yet-unsupported play systems. Please note that extensions to the Kit require the same or similar license.

(F.A.T. LAB, 2015).

The *Kit* was created with the sharing culture in mind. The team refers to their product as ' . . . the VLC of children's play sets.' (F.A.T. LAB, 2015) as the *Kit* is, similarly to VLC, downloadable, sharable and free to be used. All the bricks can be freely downloaded from <www.thingiverse.com> and several other webpages and fabricated on a 3D printer by the users. As the development team doesn't actually physically fabricate the product and because of online distribution, the costs of the dissemination of the product are close to zero. Thanks to the minimal costs of voluntary contributions, time, knowledge

and copyleft licensing the product bypasses traditional market paths of the Cathedral development model while at the same time providing a fast solution to an immediate problem.

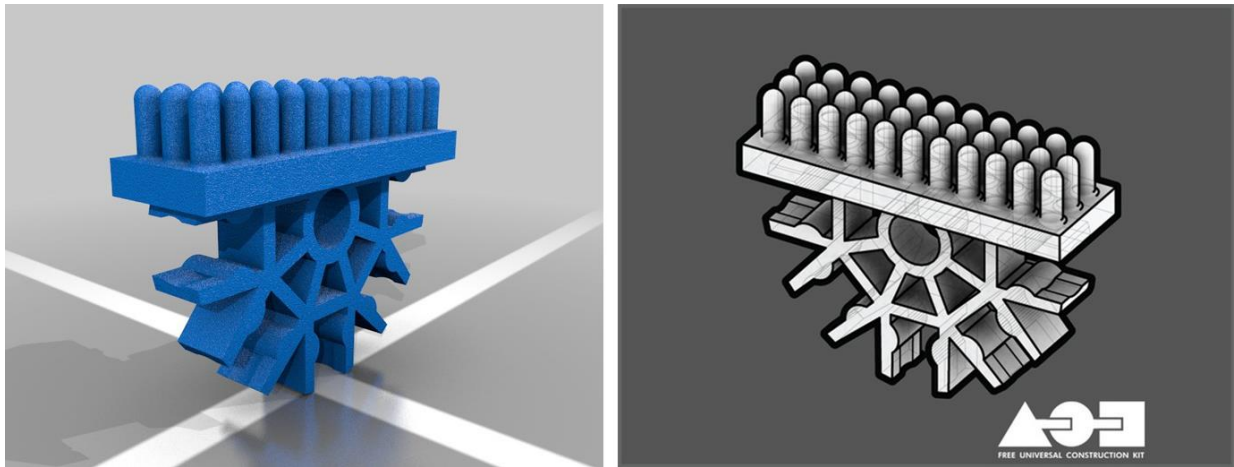


Figure 4: *The Universal Construction Kit.* K'Nex to Krinkles adapter brick

Apart from the *Kit* being free to use and distribute, the open sourced code provides an opportunity for users to add or adapt the bricks to their own needs which may be in the interest of other users and communities. The implied knowledge of those contributions is significant for the development of concepts of sharing and creativity in our culture.

All the above mentioned original brand construction sets are directed mainly towards children consumers and the development of their skills in building, combination thinking etc. What the *Universal Construction Kit* offers is a stimulation of other cognitive processes related to cross-platform thinking. 'By allowing any piece to join to any other, the Kit encourages totally new forms of dialog between otherwise closed systems — enabling radically hybrid constructive play, the creation of previously impossible designs, and ultimately, more creative opportunities for kids.' (Studio for Creative Inquiry, 2012). The *Universal Construction Kit* supports children's creativity, problem solving and combinational thinking; it encourages the type of thinking which is required now, and more so in the future, to cope with the complexity of the multi-level communication/existence in the Global Village.

Chapter 5 – Conclusion

The amount of information that we as a society perceive is due to the growing reach of digital technologies. We are subjects of a constant and mediated information flow which inevitably influences our way of perceiving the world; it changes our associations and actions and subsequently our understanding of what is considered as a norm and what is not. Through the simulated environment of a computer the Internet environment co-creates and shapes our thinking patterns and behavior. At the same time, we are individual parts of the culture which creates those media. The way in which media are designed is a ‘. . . crucial building block of human culture.’ (Murray, 2012, p. 23).

Interactive art is in this paper presented as one of the contemporary art forms which is influential in activating gallery visitors and can have further impact on processes of creativity in wider society. The art’s enquiry into social encounters has evolved as Burnham envisioned into the communication between technology and society. ‘In Burnham’s view, the computer dissolved the boundary between art and the environment and that between the observer and the observed.’ Burnham in (Kwastek, 2013, p. 57).

In its essence, Interactive art is a culmination of inputs and contributions (each of entirely different character) of three entities and their reciprocal interaction; computer, artist and recipient. The collaborative techniques through which artworks can be created allow for the expansion of concepts and knowledge which artists can use and become inspired by. Reciprocally, the artworks themselves communicate the artistic vision and experimentation back to communities. The social aspect which is present during collaboration then extends to the exhibition spaces which act as artificial socio-technological environments. The results of interactive artworks as investigated by this thesis lie in the process of creating and recipients’ understanding of the works functioning and concepts as well as their active participation in the realization of the artworks. The concepts in Interactive art involve enquiries into socio-technological spheres which can permeate into the thinking patterns and actions of recipients. The recipients’ involvement in the creative process defines the levels of triggered cognitive processes and creativity. In being considered as co-creators of the artworks the recipients can gain a sense of necessity which is likely to stimulate them towards further creativity and exploration of different environments in art as well as outside of it. For artists and recipients alike such models allow for novel approaches to the contextualizing and reflecting on digital media and their impact to the society and its communities. The artists whether they use technologies, comment on it or become researchers (Wilson in Harris, 1999) have an important role in facilitating orchestrated

environments which allow for exploration of socio-technological relations where the recipients' creativity is exercised and inspired.

The socio-economic argument of this research paper is developed through an analysis of two opposing software development models; the Cathedral and the Bazaar, as proposed by Raymond (1999). The full complexity of the relations between the two models would be beyond the scope of this paper. The distinctive characteristics that are used for the discussion involve the legal issues concerning product licensing. The *closed-off* Cathedral development model used by proprietary software entities provides its products with copyright licenses. Such licenses restrict the users in contributing to products in a form of ideas or software development with two main resulting effects. Firstly, the design procedures are less effective in a sense of development time and the diversity of potential contributions of the users. Secondly, it leads to a rather passive attitude on behalf of the users as they are regarded as the end-product consumers. Copyright licenses in general don't encourage the end-users to take part in creative processes and therefore in the hands-on co-creating of culture. Copyright licenses which protect fiscal values of products are a result of the competitive position of proprietary entities on markets to which the collaborative character of open source software takes a different stand. Copyleft licenses attached to FLOSS products protect and encourage values of knowledge sharing and collaboration during developmental processes. Open socio-technical environments (Fischer, 2005b) create a new form of interactions in our culture evolving around participation, diversity and the direct contributions of users regardless of their professional qualifications. Shirky's vision of *cognitive surplus* (2010), the vision of donating people's time and knowledge to the commons, is being materialized through FLOSS communities. The sustainability of the Bazaar model is proved by the existence of many successful FLOSS projects.

The *Universal Construction Kit* is brought forward as a show case of a product which was able to be conceived, designed and distributed thanks to the creativity stemming from art experimentation together with the collaborative practices of open source software. It shows that the culmination of creativity and the concept of process triggered by art practices together with an appropriate social, economic and technological environment that was facilitated by open sourcing can create an innovative product which would be impossible to produce within a proprietary environment. The emphasis on the processuality in Interactive art (Kwastek, 2013) reveals or at least comments on the character of the Information society. Burnham talks about the constantly changing and evolving processes in socio-technological relations. The concept of perpetual never-ending changes in those relations is also reflected in Auge's metaphysical space of computer networks. Our society with all its elements is also continuously and organically evolving.

As the development of technology has an immense economic potential (Candy and Edmonds, 2001) the different stands between the philosophies of the proprietary environment and the one of the open source became a concern of the whole society and its politics. The hybrid of the two developments models lead to changing cultural concepts and norms. However, to think that cultural norms could change at the same speed as the development of technology would be utopia. Research, experimentation and participation in creative processes are ongoing becoming a part of the Global Village. 'We should exploit the power of a concept like the public domain both to clarify and to reshape perceptions of self-interest.' (Boyle Ghosh, 2006, p. 250). Open sourcing the technological resources gives us a larger podium, a wider area of tools and connections to be explored. It is therefore another dimension in our social environment in need of investigation and incorporation into the existing culture. The inquiries of this paper into the meaning of the term *creativity* led to the investigation into the different value systems which co-exist in our society. The hybrid of the two co-existing philosophies which combined, create our cultural norms.

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