Master Thesis: **MA Cultural Economics & Cultural Entrepreneurship.**

Title: **Fostering Innovative Capacity: How can cultural institutions that merge media, contemporary art and technology, cultivate creativity and the skills, competences and dispositions necessary for innovation in young learners.**

Student: **Georgios Papadakis**

Student number: **363114**

Supervisor: **Hans Abbing**

Second reader: **Mariangela Lavanga**

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ABSTRACT

It is now almost a cliché - schools are educating kids for jobs that don't exist yet, so the focus needs to be more on skills rather than on content. Can the educational programmes of contemporary cultural institutions supplement schooling and help foster the creativity, innovation capacity and '21st century skills' of young learners? If so, in what ways can they do that, and what challenges do they face in making their work more effective? Drawing on ten semi-structured interviews with workshop organisers working in institutions that merge media, contemporary art and technology, this research identifies six ways in which competence cultivation takes place and five major problems that hinder efforts. The results offer a classification of the possible effects of this form of education and identify policy steps that might improve the outcomes of such educational activities.

FORWARD

Like many researchers, my inquiry for this thesis derived from personal experiences and interest. I cannot recall when exactly my attraction for contemporary art started, but do I remember that during one of my initial explorations, I came across an exhibition with interactive and generative works. The works were very intriguing to me, and what was more, the gallery had lectures and creative workshops by the artists for the length of the exhibition. The medium might be the message, but in the "new" media (that got very accessible to creators during the 90's and 00's), the message to a newly art-illuminated youngster, had the frenzy of expressive possibilities that the futurist artists might have felt, a century earlier.

Since then, I have attended dozens of creative workshops and have been captivated by the spectrum of knowledge that is entailed in them. Artistic processes contain and spawn universes of thought. They require that the maker feels the materials and learns how to use them through experimentation. They introduce themselves in one setting but get combined, mutated and materialised later and elsewhere. Many contemporary artists also push the boundaries of technology, hacking equipment and software, trying new combinations, placing it in new contexts and offering new concepts on what these products and processes are for. And these are not solely star artists, but foremost ordinary contemporary media artists associated with ordinary contemporary cultural institutions. They present their works in these institutions and they facilitated workshops for young and old, professionals and amateurs.

My interest in this research subject was further spurred by the emergence of the terms creativity and innovation in the public discourse, especially after the economic crisis that started in 2008. It appeared to me (and still does) that the invocation of the terms was either used as a chant that created economic growth or as a justification panacea for many public funding appeals, including that of cultural institutions.

Is it just to claim that modern cultural institutions support the "creativity" of people and their ability to innovate? If so, in what way does this happen and are there any research validations for this? Any significant political confirmations that the importance is being understood? And what do these two terms really mean in the first place?

These were the questions that drove my initial inquiry in this field and led my literature review. And once I had some fuzzy answers to them, I formulated the two inquiries that drove the research.

This thesis attempts to answer to these inquiries, while the literature review might shed light to a few important concepts for the uninformed reader. For me, this research was a set of short trips in a multitude of notions, scientific topics and methods to procedural matters.

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Dedicated to my missed and late father.

All images are courtesy of the researched institutions.

TABLE OF CONTENTS

INTRODUCTION

The notion of creativity and that of innovation, constitute recurrent themes in modern discourses over businesses, public affairs, the economy, education and social structures. There are many reasons for this emergence, but we can trace a major one to the ascendancy of neoliberalism over the political economy discourse of our day. This ascendancy, contributes to the placing of the concepts of creativity and innovation in the political agenda, having considerable consequent effects on policy formation but also on polity and the quest of citizens for self-actualisation.

For David Harvey, neoliberalism is "in the first instance a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedom and skills within an institutional framework characterised by strong private property rights, free markets and free trade" (Harvey, 2005, p. 2). It is in the key concepts of this definition -"well-being", "liberating", "freedom" and "skills" that we can trace the concept of creativity as it occurs in the modern political economy discourse.

In the age of networked information, contemporary capitalism operates in an environment of vast information generation and perpetually accelerating change. These two elements benefit businesses and individuals that are able to absorb and create innovative developments in an uninterrupted fashion. Therefore, the new requirement for educational institutions is to prepare a labour force that is first and foremost creative and adaptable, i.e. capable to continuously obtain new knowledge and to know how to use it in different contexts.

This is not to say that creativity, innovation, or the skills that they entail in their contemporary conceptualisations, serve solely the neoliberal promise. A secondary but very significant economic discourse - although there is no established term to refer to it - also benefits immensely from people that have the drive and skills to disrupt, whether in terms of economy, technology, science or the social structures. This is the field of open source, of the creative commons, of crowd-sourcing and an array of other phenomena where collectivity and diversity allow for rapid, bottom-up and more multifaceted creation and adoption, and practically challenge the rational choice axiom of the neoclassical economics. These aspects of economic life were perhaps always present. Yet, the arrival of the networked information age has transformed their expression in the socioeconomic spheres and enabled unprecedented growth in volume and diversity of participation, the improvement of effectiveness and efficiency of systems and the generation of alternative structures.

In either case, it is now common-place that these developments require citizens with a different set of skills and personal traits. This, in turn necessitates learning environments that reform the current-yet-very-old model of mainstream education. This model is based on lessons that are subject specific, take place in discrete time-slots and in which the assessment of the learner is largely performed through quantitative standards. In this model, knowledge is most often presented out of its context and the need for the ability to productively use obtained knowledge and experience in new ways -creativity- is

rather neglected. This is not to suggest that schooling as a system should be replaced, but rather that it needs to be reformed and supplemented. Creativity - and to a lesser extend innovation - have long been connotated with the arts and culture. And even though the meaning of the terms has changed, contemporary cultural institutions offer considerable opportunities to enhance the formal education system.

This research is concerned with how can contemporary cultural institutions that merge media, contemporary art and technology, support the cultivation of creativity and the skills for innovation, in activities that take place in their premises, such as workshops and tours. Additionally it is concerned with the challenges that these institutions face in making their education programmes more effective. Yet, in order to examine these two questions, we first need to create a context in which to examine these inquiries.

The thesis is structured as follows: Chapter one, places education in the economic and development perspectives, reviewing concepts such as the knowledge economy and human capital. Chapter two examines innovation, creativity and the necessary skills for them, as they appear in the cultural policies of the European Union. Chapter three, reviews theories and research perspectives on creativity. Chapter four examines innovation, its meaning, its various phases and types. Chapter five examines what skills are considered necessary for individuals that are innovative and can respond productively to the challenges of the 21st century. Chapter six reviews the benefits of education in and through the arts. Chapter seven is concerned with the methodology and inquiries of this research. Chapter eight hosts the findings of the research and their interpretation. Finally chapter nine hosts the conclusions of the research.


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CHAPTER ONE. **Overview of Concepts and Theories on the Economic Effects of Education.**

This chapter reviews how major economic theories relate education to economic growth, civic virtue, well-being and innovation. The purpose is to set an economic basis for the exploration of creativity and innovation as they manifest through arts and cultural education.

Education has long been considered as a crucial determinant for economic welfare and growth. Theories of economic growth, identify four broad types of ways in which education affects the economy.

- Firstly, education cultivates and increases human capital which in turn increases productivity of the labour force and hence economic output. In other words, education as a factor of production.
- Secondly, it affects the capacity of the labour to generate and absorb novelty in knowledge and technology in the form of new products, processes and organisational structures and facilitates its transmission and diffusion.
- Thirdly, education affects the economy indirectly. It increases social cohesion and reduces allocation of funds for other sectors such as the juridical and health systems or for crime prevention.

A significant number of economic models have attempted to calculate the effects of knowledge and education, or to use education and training indicators to predict innovation, employment or returns on investment. The standard approach in macroeconomic literature for measuring the development of human capital has taken place with proxies, such as educational attainment or experience. Obviously, such measures do not take into account the quality of education, nor the accelerating pace with which specialised knowledge becomes obsolete. I hold firmly the view that indicators, however painstakingly constructed, will always be insufficient in capturing, mapping and pricing knowledge, neither will they ever be able of translating inputs of knowledge, to units of knowledge creation, and that into measurable economic and social outputs. Therefore, the following investigation of education in economic theory is restricted to the broader view of each theory on its role.

Education, together with health and moral values, has been central to the concept of **Human Capital** which was brought to the center of economic analysis by Gary Becker, from the Chicago School of Economics. Becker viewed Human Capital as similar to physical means of production, where accumulation of knowledge and skills increases productivity, efficiency and capacity of the workforce. Individuals invest in education as companies do in physical capital, seeking optimised returns on investment. He sees investment in education as mainly comprised by job education (as investment by company), and schooling (either for general or specialised knowledge) and his concerns were based around the effects of education on personal income. More recent views of human capital take into

consideration the impact of social constructions to a person's capital but also traits of the person themselves, such as their habits. Moreover, recent approaches highlight the cumulative nature of Human Capital, both for the individual and for a region.

The hypothesis behind **Endogenous Growth theory** (or New Growth theory) is that endogenous factors, such as human capital, innovation and knowledge are the primary forces behind economic growth, rather than external factors. The theory stresses the role of education in increasing the innovative capacity of the economy through the developing of novel knowledge and technologies. Important to the theory is that knowledge and education have positive externalities and exhibit spillover effects which has been largely used for the support of state funding of education. Moreover, even the most advanced economies need to constantly invest to their human capital and the availability of skilled labour, in order to maintain their position and competitiveness. The works of Lucas (1988), Romer (1990), and Aghion and Howitt (1998) have been central contributions to this theory.

Another view of education in production and growth focuses on how knowledge enables technological diffusion. It has been initiated by Nelson and Phelps (1966) and Welch (1970), and has been advanced by Benhabib and Spiegel (2005). This view stresses that education may facilitate the transmission of knowledge needed to implement new technologies, and that human capital plays a positive role in the rates of productivity growth and the rate of catch-up between developing and developed economies.

New Economic Geography, places importance on tacit knowledge for regional growth. Tacit knowledge is not codifiable. It refers know-how that is hard describe in text and is better transmitted via verbal communication or training by observation. In new economic geography, education is conceived as a crucial factor for creating workforce who is capable to receive and transmit knowledge and who is able to maintain a social system that facilitates the necessary interactions for the spillover of knowledge.

Theories of economic evolution, use the notions of path-dependency, selection, increasing returns and chance to focus on non equilibrium processes that shape the economy from within. Education plays a crucial role in the capacity of regional economies to deal with accelerating variation of specialisation and of new technologies and in addressing collective learning processes and economic adaptability. Furthermore education is a key axis for explaining sustainable development in **Triple** and **Quadruple Helix** systems, where knowledge and innovation is the outcome of co-evolution of the states, firms, education institutions and the civil society.

Although, not a clearly economic theory, the **Human Development** theory (HD) views economic growth only as a mean to human development. Developed and popularised by Amartya Sen and Mahbub-ul Haq, Human Development theory seeks to create a model of combinations of human, social and institutional capital that is optimal for the welfare. The theory is concerned with health, environment, social justice and sustainability issues amongst others and uses four indices of

development, where the education index has increased importance. Since the 1990, the concept of human development has been central to the United Nation's policies and the HD indices have been used to create the HD reports (1990-2011). In comparison to the notion of human capital, human development addresses the need for the empowerment of people and the importance of broad participation in the development process.

The concept of the **Knowledge Economy** results from a the developed awareness of the effects of knowledge and technology in economic growth. The concept of the knowledge economy takes into consideration the benefaction of R&D on productivity growth, the network effects and increasing returns of technological and information networks, the role of non-formal and informal education and the acquisition of tacit knowledge.

The concept of **Cultural Capital** has been developed by sociologist Pierre Bourdieu, in an attempt to explain why economic obstacles were insufficient to explain differences of performance in educational attainment. Cultural capital consists of the education, knowledge, skills, dispositions, competences and habits that a person has. According to Bourdieu (1986), cultural capital exists in three distinct forms. Of interest here is its "embodied" form, which signifies personality traits that cannot be separated from their bearer. Embodied cultural capital comprises of both the consciously obtained and the passively "inherited" attributes . Embodied cultural capital is acquired over time, rather than instantly and forms a person's 'habitus' (i.e character and mindset) and 'field' (any structure of social relations). Bourdieu held the opinion that cultural habits and dispositions encompass a resource capable of generating profit, are potentially subject to monopolisation and can be transmitted from one generation to the next. Table one, is adopted by Osmankovic et al (2011).

	Economic growth theory	Human capital theory	Human development approach
Role of people	Production factor	Production and development factor (intellect, health, knowledge); labor is in the centre of concept named knowledge - based economy	Real wealth of nation
Final goal	Improvement of life conditions	Increase of productivity and sustainable economic growth as a result of knowledge and education process of the working age population	Creating an environment in which individuals can develop their potential and creativity to their own interests and needs, increasing choices
Measurement	GDP growth	Returns on investment and efficiency of investment	HDI, IHDI, MPI, GEM

Table 1. Overview of major theoretical approaches to development.

CHAPTER TWO. **Creativity and Innovation in the Cultural Policies of the European Union**

This chapter outlines the development the frameworks and tools of the European Union that relate culture to economic growth, creativity and skills for innovation. It further reports EU's initial steps in connecting participation in cultural activities with transversal skills and competences. Purpose of this chapter is to exemplify the gradual rise of significance of creativity and innovation, through the cultural sector, in EU policies and enable a comparison to its perception by agents working in the field (see subsection 8.2.6)

Especially since the late 1990's, there has been increasing interest in the role and relevance of creativity and skills for innovation amongst policymakers and advisory centres from around of the world. Many countries have developed frameworks and support mechanisms for fostering creativity and the skills of innovation and a significant number of them have done so through culture. Focus of this chapter are the frameworks and tools of the European Union. Aim of this chapter is to delineate the gradual connection between the arts and culture on one side, and creativity, the skills for innovation and economic growth on the other, as they appear in the interest of the EU policies. In appendix:EU_cultural_programmes, the cultural programmes of the EU are discussed in further detail. The relation of each programme to the concept of innovation is included, together with reviews of programme assessment and critique.

The EU policy directions on the connection of culture to creativity, innovation and growth derive largely from the recognition and popularisation of the idea that innovation is a crucial factor for retaining the European competitiveness. In the year 2000, the European council set in its decade strategic goals that Europe should "become the most competitive and dynamic knowledge-based economy in the world" (Council of the European Union, 2000, p. 12) This goal has also been central to the Lisbon strategy, which focuses on growth, employment and competitiveness in the European economy and recognises innovation and knowledge as some of the most valuable resources of the EU. The Spring European Council of 2006 renewed the Lisbon objectives and identified education and training as crucial elements for an innovative Europe (Council of the European Union, 2006), while 2009 was designated as "European Year of Creativity and Innovation".

2.1 Innovation in the EU policy

Innovation has been for a long time an objective for the EU and a key policy area of the Lisbon strategy. The European Commission (2006) communication on "Putting knowledge into practice: A broad-based innovation strategy for the EU" recognises that education at all appropriate levels needs

to successfully provide key competences that are supportive of innovation. Moreover the EC calls for policy measures covering research and entrepreneurship as well as fostering the innovation culture. Innovation is conceived as having several forms, all of which "need to be promoted, for innovation comes in many forms other than technological innovation, including organisational innovation and innovation in services" (ibid. p. 4). This conceptualisation is in accordance with the Oslo Manual, published by the OECD with the cooperation of the European Commission and Eurostat. The Manual defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations." (OECD, 2005b, p. 17) The manual stresses that innovation can occur in any sector of the economy and underlines the importance of a sufficient education system for the supply of skills.

2.2 Creativity in the EU policy

Contrary to innovation, the importance of creativity has gained broader recognition more recently. The first policy document that acknowledges the transversal value of creativity is the Commission's 2005 proposal for a recommendation on key competences for lifelong learning (European Commission, 2005). It recommends the incorporation of creativity, critical thinking, problem-solving, initiative taking, risk assessment and decision taking across the learning framework. The proposal draws the initial links between culture and creativity and recognises that the role of the arts in supporting creativity.

In the EU policy documents, creativity is conceived as being the "infinite source of innovation" (European Commission, 2008, p. 4) and is recognised as a "key factor for the development of personal, occupational, entrepreneurial and social competences and the well-being of all individuals in society" (European Commission, 2008b, p. 2). It enables individuals to generate and evaluate new ideas and solutions and see things from different perspectives, stimulating innovation and entrepreneurship. Creativity has been recognised as being fostered by education and training and in need of support from the initial educational stages (Council of the European Union, 2006b). Moreover, the European Commission not only suggests that education and creativity are critical for raising the capacities of students but also recognises that innovation is needed to improve training and education. In order to achieve this, extended programmes of teacher support, re-training and empowerment, as well as school cooperation across countries have been deployed under the lifelong learning programme.

2.3 Skills and key competences

There have been numerous EU programmes and frameworks concerned with the skills and competences necessary for personal fulfilment, civic engagement, social cohesion and inclusion and employability. The Framework for Key Competences for Lifelong Learning identifies and defines eight competences. These are cited epigrammatically here and in more detail in chapter five:

1) Communication in the mother tongue; 2) Communication in foreign languages; 3) Mathematical competence and basic competences in science and technology; 4) Digital competence; 5) Learning to learn; 6) Social and civic competences; 7) Sense of initiative and entrepreneurship; 8) Cultural awareness and expression.

The EU further stresses that formal, non-formal and informal education opportunities are needed to cultivate a curiosity-driven search for new knowledge (Council of the European Union, 2009) critical thinking, a learning ethos (European Commission, 2009) The Commission, further recognises that the potential of new technologies for enhancing innovation and creativity, needs to be better exploited and encourages teachers to develop their digital competences (ibid). It moreover suggests an update in the assessment methods including peer assessments, portfolios, individual learning and project based assessments.

2.3.1 Innovation skills and competences through culture

So far, the European Union has displayed rather limited focus on the links between culture and the skills and competences for innovation through culture. Fifteen documents have been identified by this research that explicitly recognise such a relationship and call for the commission and member states to take appropriate steps. For a full list of these documents, please see Appendix:Skills_Culture_EU.

Perhaps the most detailed of these was the Official Journal of the European union of November 27th 2009, which published the conclusions of the Council on "promoting a Creative Generation: developing the creativity and innovative capacity of children and young people through cultural expression and access to culture" (Council of the European Union, 2009b, p. 9).

In these conclusions, the council connects cultural expression and access to culture, with the need for Europe to remain globally competitive in a sustainable and socially inclusive manner. It points out that access and exposure to diverse cultural expressions, artistic practices and works of art from an early age is important for the learners' personal development, identity and for equipping them with intercultural competences and other skills important for future employability. It further notes that participation in cultural activities promotes the creative and innovative potential of all young people through stimulating creative thinking, imagination and self expression. In addition, it holds the position that activities connecting multidisciplinary fields of knowledge contributes to motivation, improved learning and to the development of creativity and capacity for innovation. Finally, the European council

recognises that these positions are not sufficiently based on evidence and urges for the development of an 'evidence base' of knowledge in the field.

2.4 Creativity and innovation in cultural policy

Initial cultural programmes of the European Union, such as the European Capital of Culture that runs since the 1980's and the Kaleidoscope, Ariane and Raphael programmes that run in the 1990's, had no references to creativity or innovation. The first programme to address creativity and innovation was the **Culture 2000** programme. In terms of creativity and other capacities deemed important for innovation, the programme set explicit objectives to promote inter alia; creativity and the creation of new forms of cultural expression, dissemination of know-how and good practices and the broadest possible access and participation. Moreover it explicitly recognised culture as an economic factor and considered its role in socio-economic development.

In 2007, the European Commission proposed the **Agenda for Culture** (European Commission, 2007). The agenda was prepared through a public on-line consultation and was approved by the Council in its Resolution of November 2007 (Council of the European Union, 2007) and its conclusions of 2007 (Council of the European Union, 2007b). The Agenda was founded on three sets of objectives, the second set of which, regards culture as a imperative component for creativity and supports its promotion in the framework of the Lisbon Strategy for growth and jobs.

The agenda stresses the substantial contribution of the cultural industries and the creative sector to the European GDP, growth and employment and recognises that creative entrepreneurs and a vibrant cultural industries enhance the attractiveness of regions and generate both social and technological innovations. The commission suggests a stronger involvement of the cultural sector in the promotion of creativity as a key instrument for effective education and life-long learning as it can promote capacity building by supporting training in entrepreneurship, managerial skills, the understanding of the European dimension developing innovative market activities and sources of funding.

Similarly to its predecessor, the current **Culture programme (2007-2013)** aims to promote the transnational mobility of cultural players, to encourage the transnational circulation of works and cultural products and to encourage intercultural dialogue. Nevertheless, the relatively recent shift towards recognising the potential of culture to impact the knowledge economy has affected the essence of the current Culture programme. In this respect, it differs significantly from its predecessor in that it incorporates the guidelines for growth and jobs of the renewed Lisbon agenda.

The Programme states exclusively that priority for its support shall be given to creativity and innovation (Council of the European Union, 2006c) and this objective has been followed on all three strands of the programme, with debatable effectiveness nonetheless. For example, beneficiary

projects of the first and second strands, support substantial aspects of the innovation cycle either through creation projects (artistic exchanges, joint cultural creation) either through support activities (exchanges of experience, information dissemination, practical support for operators, education and research). The nature of transnational cultural exchanges, supports extensively the spillover information, skills and tacit knowledge, fostering the proficiency of co-operating parties and to an extend their local economies.

The Creative Europe Framework Programme. As the Culture Programme 2007-2013 was designed in accordance to the strategic vision set out by the Lisbon strategy, the Creative Europe Framework Programme supports the goals of the Europe 2020, Europe's growth strategy for the decade. In comparison to the preceding Culture programmes, creativity and innovation are frequently linked to entrepreneurship and economic growth. The proposal for Creative Europe is highly focused on the fostering of competences and transversal skills. Creativity is strongly viewed in the context of capacity building, while its potential to contribute to an environment favourable to growth and jobs remains under the proposal's spotlight.

2.5 Culture in the Europe 2020 strategic Framework.

The Creative Europe framework is largely in line with the "Europe 2020" strategy and its seven flagship initiatives proposed by the Commission. The Council of the European Union (2011) recognises that culture has imperative contribution to the strategy. In particular, culture is seen as contributing to:

a) Smart Growth: the Cultural and Creative Industries present major employment potential and produce high quality services and goods, while they are also linked to education and the acquaintance of skills.

b) Sustainable Growth: Culture utilises sustainable cutting-edge technologies, fosters environmentally friendly mobility, while the sector promotes environmental conscience to the public.

c) Inclusive Growth: Cultural activities support social cohesion, participation and civic engagement. They celebrate and protect cultural diversity and promote the intercultural dialogue.

Out of the seven flagship initiative that constitute the Europe 2020 strategy, culture plays a significant role in initiatives such as the 'Innovation Union' (fostering creative ecologies and non-technological innovation), the 'Digital Agenda for Europe' (media literacy, new environment for cultural creation and access), the 'Youth on the move' initiative (enhancing the performance of education systems), as well as on the 'New Skills for New Jobs' initiative (building intercultural competences and transversal skills).

Creativity and innovation are most significant in the strategic framework for European cooperation in Education and Training ('ET 2020'), in which the fourth strategic objective is exclusively devoted to

"Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training". The objective proclaims creativity as engendering personal fulfilment and as the prime source of innovation. According the strategic objective, creativity and innovation are crucial to Europe's international competitiveness and to enterprise development. The objective identifies two key challenges: Firstly, to equip all citizens with the transversal key competences that are necessary for the enhancement of creativity and innovation. These include, but are not limited to, digital competences, learning to learn, a sense of initiative and entrepreneurship, and cultural awareness. The second challenge is to establish a fully functioning knowledge triangle of education, research and innovation. This entails partnerships between education, training and research institutions, the learning communities, enterprises as well as the civil society and other stakeholders.

Chapter three. **Creativity: Definitions, Descriptions and Scientific Approaches**

This section reviews the literature on creativity, its various approaches and the epistemological and ontological assumptions. The aim is to offer a multi-faceted view on what creativity is, what it entails and the differences between scientific approaches and implicit surmises and connotations.

Dictionary definitions of creativity emphasise the production of original ideas and finding new solutions to problems, in ways where the creative individual uses their imagination and inventiveness. Other definitions and common connotations relate creativity to the visual arts, music and artistic performance. More elaborate efforts to define creativity, stress the ability of thinking, knowing and making in uncommon ways. Creativity is characterised by heuristic, open-ended or divergent thinking, which suggest unpredictability and instability of the creative process. Nevertheless, a clear and over-arching definition of creativity is rather impossible. Hayes and Stratton assess the current state of creativity research from a psychological viewpoint stating that "we have no plausible theory of how creativity happens, no reliable way of measuring the creativity of a person, and no real idea of whether creativity happens because of characteristics of the individual, or because of particular kinds of circumstances" (Hayes & Stratton, 2003, p. 70).

Not only there is no standard definition, but the concept of creativity has vastly different descriptions between research fields. Its notion evolves with time and across countries and its investigation requires a comprehension on cultural, individual and social levels. The conceptualisation of creativity is largely affected by a general implicit knowledge of it. (Runco, M. A. 1999). Esquivel (1995) describes creativity as the critical process of generating new ideas, solutions to problems and connects it to the self-actualisation of individuals. Sternberg and Lubart see creativity as the "ability to produce work that is both novel and appropriate" (Sternberg & Lubart, 1999, p. 3) while Craft regards creativity as the capacity to identify possibilities that others have not yet contemplated (Craft, 2005).

Other scholars use metaphors to describe creativity. Bannerman et al. describe artistic creativity as "navigating the unknown" while Csikszentmihalyi (1996) uses the notion of the experience of "flow" during creative production. Craft (2008) described creativity as a voyage of discovery, while Bryant and Throsby relate it to the "capacity of individuals to think inventively and imaginatively and to go beyond traditional ways of solving problems" (Bryant & Throsby, 2006, 508). Keith Sawyer argues that an idea must be appropriate and "recognised as socially valuable in some way to some community" in order to be considered creative (Sawyer, 2006, p. 27) and maintains that for creative achievement to occur, both divergent and convergent thinking is needed.

Research on creativity demonstrates a range of views deriving from:

- **The epistemological and ontological norms that inform the enquiry.**

The positions of whether creativity can be objectively measured and thus subject to a positivist and quantitative approach is incongruent to the exploration of creativity from an interpretivist tradition which views creativity as "interpreted" or "situated" and thus uses qualitative methodologies.

- **The discipline of the field of enquiry**

For example, the arts, cultural studies, economics, philosophy, biology, sociology, psychology and psychoanalysis. Each of these disciplines bears its own epistemological and ontological positions as do the interests within each discipline.

- **the research focus**

such as focus on artistic production, pedagogy, organisation studies, the economy, employment, businesses etc.

- **the cultural context of the research**

The study of creativity demonstrate cultural constraints. A great deal of the most significant literature on creativity has been conducted in a Western context, although inter-cultural work demonstrates substantial differences between approaches.

As creativity is such a complex phenomenon, its description or definition depends on the aims and assumptions of each academic field and particular inquiry. Thus there are several approaches that nonetheless bear prominent conceptualisations. A number of researchers (329, 333, Sternberg & Lubart, 1999; Taylor, 1988; Villalba, 2008) have attempted to group these approaches either through a personal-psychological view of creativity, or through a more socio-cultural perspective. Given that creativity can be beneficial to all areas of knowledge and thus education, the classification proposed below aims to present relevant perspectives for creativity in education. The classification is divided as follows:

3.1 Psychoanalytic perspective

The psychoanalytic perspective has influenced the common and scientific vocabulary regarding creativity. It has its origins at the work of Sigmund Freud and has linked creativity with unconscious modes of thought. His approach was interpretative in the sense that he saw symbolic forms of expression as sublimations defending against and revealing hidden fantasies and wishes. Moreover Freud maintained that creativity takes place when reason ceases to constraint the imagination, and artists allow themselves to embrace the spontaneous generation of ideas (Gray, n.d.).

Jerome Oremland (1997) relates creativity to the status of complex developmental accomplishments that result to a higher level of human experience. Heilman et al (2003) relate the creative 'Aha' experience to day-dreaming, drugs and mental illnesses, while Eigen connects pre-conscious thinking to 'creative sparkle'. Ego psychologist, Ernst Kris (1952) suggested that creative expression was the result of the ego harnessing earlier forms of mentation and instinctual life (regressions in the service of the ego) and which temporarily surface to consciousness, and allowing aesthetic expression for the purpose of mastery. Contrary to Kris, Gilbert Rose (as cited in Hagman, 2010) supported the notion that regressive processes are actually capacities which, have creative potential themselves, instead of only being at the service of the ego. Daniel Stern (as cited in Hagman, 2010) suggested that creativity requires the operation of archaic affective states and cross-modal perception.

For Kligerman (1980) the artist that is confronted with self-object failure, has "the need to regain a lost paradise - the original bliss of perfection - to overcome the empty feeling of self-depletion and to recover self-esteem. in the metapsychology of the self this would amount to healing the threatened fragmentation and restoring self-cohesion through a merger with the self-object – the work of art – and a bid for mirroring approval of the world" (as cited in Hagman, 2005).

Finally, more recent approached connect creative expression to different dimensions of subjectivity, idealisation, beauty and ugliness, as well as the experience of the Sublime and its affect, awe (Hagman, 2010).

3.2 Cognitive Psychology approach

Cognitive psychology is a sub-discipline of psychology that investigates mental processes. It seeks to understand the way people perceive, remember, think, speak, and solve problems. It accepts the existence of internal mental states and generally considers self-observation as an invalid method of investigation of one's thoughts and feelings. This approach sees creativity as being a cognitive and thinking skill or procedure and investigates the processes of creative thought. It is one of the most important disciplines in the research of creativity and is comprised of several distinct fields, that share the view of creativity as a process and mental representation. These fields include the *phase-oriented studies*, *pragmatic methods*, *thinking theories*. The cognitive approach accepts that creativity is dependant upon familiarity with prior works, and "the internalising of the symbols and conventions of the domain" (KEA, 2009, p. 166). Creativity is then the outcome of a combination of existing elements of someone's culture and the generation of a new combination. It expands on the ability to interpret prior conventions in new ways and is the result of conscious, deliberate, rational thinking, while it is also informed by the irrational and emotional aspects of the individual.

3.2.1 Phase-oriented studies: The stages of the creative processes.

In 1926, Graham Wallas and Richard Smith, presented one of the first models of the creative processes. Their model consists of four stages: during the preparation stage the focus is on the problem at hand, the incubation stage involves the internalisation of the problem, the illumination involves the insight and idea generation, while the verification stage involves the confirmation of appropriateness of the idea and its refinement (as cited in Simonton, 1999). A few years later, Joseph Rossman surveyed more than 700 inventors of devices who have obtained patents and extended Wallas's model into seven phases: 1. observation of a need; 2. analysis of the need; 3. survey of all available information; 4. formulation of all objective solutions; 5. critical analysis of these solutions; 6. birth of the new idea; 7. experimentation to test, develop and refine the solution (as cited in Ferrari et al, 2009) . These models incorporate a balance between analytical thinking and imagination. Their advantage is the descriptive structuring of the creative process which might bring the thinker back to the learning phases and excludes the mystical aspects that creativity has largely been associated with.

The Geneplore model illustrated below, is adapted by (Finke et al, 1992) and distinguishes between the generative and exploratory phases of creativity. In the generative phase, the individual constructs mental representations, thoughts and concepts, called pre-inventive structures. These pre-inventive structures can be thought of as internal predecessors of the final creative product.

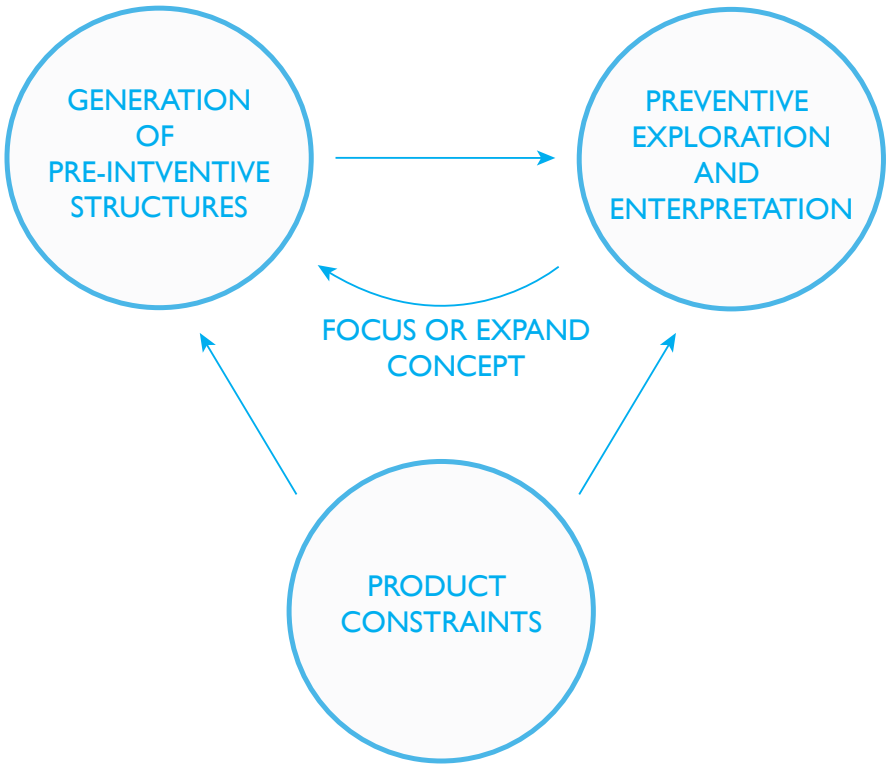


Figure 1. The Geneplore model, adopted by Finke (1992).

Fundamental types of the generative phase consist of the retrieval of existing structures from memory and the formation of associations among them. This results to a richer variety of structures since single

concepts combine to form more complex ones and initial structures are re-examined and altered as a result. The generative phase also involves the analogical transfer (a projection of a set of relationships from one context to another) and the categorical reduction (the reduction of elements to more primitive categorical descriptions) (Sim & Duffy, 2004).

In the explorative or elaboration phase, creative ideas are spawned by the interpretation and validation of these constructions. The explorative phase includes processes such as attribute finding (identification of emergent features in the pre-inventive structures), functional inference (exploration of the potential uses or functions of pre-inventive structures), contextual shifting (the consideration of pre-inventive structures in different contexts), hypothesis testing (the interpretation of structures as possible solutions to a problem) and searching for limitations (Sim & Duffy, 2004). In turn, an unsatisfactory outcome of the second phase will lead the process back to the generative phase through a re-examination and expansion of the original representational structures. Lastly, evidence from laboratory research conducted by Ward, indicates that when new ideas emerge, they are structured in predictable ways by the properties of existing concepts - what Ward called "structured imagination" (Ward, 1995).

3.2.2 Pragmatic Approach

The pragmatic approach, often referred to as the pragmatic methods, to creativity is not focused on scientific research. Its main concern is the development of creative thinking and skills, followed by understanding it (Sternberg, 2003). With the pragmatic approach, people are taught how to be more creative in a variety of ways by exercising creativity techniques. These are replicable methods that foster creativity in a person or in a group of people. Some of the most prominent techniques are lateral thinking, brainstorming, synectics, TRIZ tools, removing mental blocks and the roles of explorer, artist, judge, and warrior. Some of these methods are explored in index:Pragmatic_Approach

3.3 Psychometric approach

The psychometric approach accepts that creativity is a measurable quality. Various reasons have lead to such approaches, not least as a tool of self awareness and personal development which can relate to the educational and employment pathways of young people and their effective handling of increasingly complex socio-economic environments. Moreover Chell and Athayde view such tools as relevant from a policy perspective, as they "help address the issue of long term innovative capacity building" (Chell & Athayde, 2009, p. 17).

American psychologist Joy Paul Guilford initiated this stream of research with a set of tools, similar to tests of intelligence, that aimed to measuring the capacity of people to think creatively. He suggested that creativity is a quality that every person possesses and that it is part of one's personality. He

further supported that people with creative thinking capacity are sensitive to problems, have fluency of thought, are flexible thinkers and produce original ideas (Guilford, 1950 as cited in KEA, 2009). Sensitivity to problems is the recognition of inefficient aspects of the subject at hand and is the necessary step for the initiation of the creative process. Fluency of thought refers to the capacity of the thinker to produce a large number of ideas that are relevant to the situation in a given time-frame. A flexible thinker is able to escape habitual ways of thinking and switch between categories when generating ideas. Lastly, originality of ideas refers to an idea that has not been commonly generated amongst a large group of people (Guilford, 1950, as cited in Weisberg, 2006). Guilford combined the measures of fluency, flexibility, and originality into the notion of divergent thinking, which contrasts to that of convergent thinking, which approaches solutions to a problem by the confluence of available information. The confluence approach has stimulated several models of creativity, deriving from divergent research fields. These, largely combine components from the personality and cognitive approaches to define and investigate the characteristics of the creative person and create the distinction between genius and non-genius types of people (Weisberg, 2010). For example, the confluence approach of Sternberg & Lubart (1996) identifies six resources that combine interactively in creative performance: aspects of intelligence, knowledge, thinking styles, personality, motivation, and environment. In Simonton's model of creativity, divergent thinking is directly affected by personality characteristics. People that are particularly creative have a wide range of interests and thus are more likely to provide unusual responses. They are more open to novel experiences and are usually cognitively and behaviourally flexible, which results to novel connections among ideas. Moreover their independent, autonomous, and unconventional aspects of their character pose fewer restrains to the ideas that they are prepared to consider compared to people who rank lower in their model. Robert Weisberg (2006) provides an extensive review of confluence models.

Despite the long efforts on testing for creative-thinking capacity and creative personality, significant doubts have been raised about the validity and results of the approach. Using a number of examples, Weisberg (2010) questions whether "out-of-the-box" thinking is actually related to creativity and whether creative personalities, differ in systematic ways from their non-creative peers. Importantly, Weisberg also stresses that although the correlation between certain personality traits and creativity can be drawn confidently, causality and directionality have not been sufficiently supported.

3.4 Cultural Domain and the Creative Environment

The connection between culture and creativity might at first appear easy to approach, as implicit understandings of creativity link it to artistic production and processes. Nevertheless, investigating cultural creativity for its relation to education, economic development and social innovation requires an understanding of the overall intellectual environment in the time and place of the investigated case. Creativity can be thought of being linked to the cultural domain in three main ways: firstly, the

understanding of what creativity means, is being shaped by culture; secondly, an idea can only be considered as being creative in comparison to previous practices and is depended upon context; thirdly, certain environments attract and maintain creative people and nourish the creativity of the local population.

Otto Laske states that creativity is a concept "by which a culture reflects upon itself, and thus transcends itself" (Laske, 1993, p. 21) and suggests that the concept of creativity cannot be defined or sufficiently described, but only be exemplified in terms of what culture has judged as creative in the past, celebrates as creative in the present and envisions as creative in the future. Thus, creativity is a speculative concept which "surpasses 'what is' in search of a way to characterise what, at the time of writing, makes certain ideas or products seem revolutionary within a particular domain, or even the entire culture" (Laske, 1993, p. 21). This then, brings forward the importance of value in the understanding of creativity and formulates it as an axiological concept, rather than an empirical or a scientific one.

American historian and philosopher of science Thomas Kuhn, used the term 'paradigm' to describe the underlying approach to science. In periods of paradigm change, vast and abrupt evolutions in thought and culture modified the underlying approach to science and thus the procedures of problem-solving, leading to periods of "extraordinary science" (Kuhn, 1996). For Ken Robinson (2001), eras of scientific revolution are characterised by intense creativity and intellectual development. He links the creativity of a culture to social openness, access to information and the strength of collaborative spirit within the society. Laske (1993) investigated how aspects of the social environment shape the production and perception of creative output, while Feldman et al (1994, as cited in Runco, 2010), have focused on the role of the Zeitgeist and the cultural communication to the individual via strands, norms and values to explore society's appreciation of talent and prodigies. Cultures that are affected by a pluralism of ideas and beliefs are more likely to develop new 'memes' (Csikszentmihalyi, 2004). Richard Dawkins coined the term 'meme' in his acclaimed book, the Selfish Gene (Dawkins, 1976), to describe the building blocks of culture. Memes are communicated through imitative procedures and transmit cultural constructs such as ideas, behaviours, symbols or practices. Csikszentmihalyi (2004) invites us to think of creativity as evolving memes that have social value. He also maintains that creativity is affected by the general availability of meme adoption through the accessibility to information and the protective barriers imposed by the people who hold expertise.

Moreover, Csikszentmihalyi has investigated the benefits of operating within an environment where other individuals work in related creative activities and suggested that creativity is as much a social and cultural phenomenon as it is a psychological one. He proposed a systemic approach to creativity and has researched the social contexts in which creativity and innovation flourish; "There is no way to know whether a thought is new except with reference to some standards, and there is no way to tell whether it is valuable until it passes social evaluation. Therefore, creativity does not happen inside people's heads, but in the interaction between a person's thoughts and a socio-cultural context. It is a

systemic rather an individual phenomenon" (Csikszentmihalyi, 1996, p. 24). For him, creativity emerges in the interplay between individuals, field and domain. Since creativity is seen as something novel and of value, it has to have a domain of reference: an existing pattern in which to introduce the novelty or the variation. It also needs a gatekeeper establishment: a field of experts who sanction a particular idea or creative endeavour as new and valuable. Thus, for the occurrence of creativity, rules and practices need to me transferred from the domain to the individual, who in turn produces a novel alternative of content of the domain. This alternative then needs to be approved for inclusion in the domain by the experts in the field (Csikszentmihalyi, 2004).

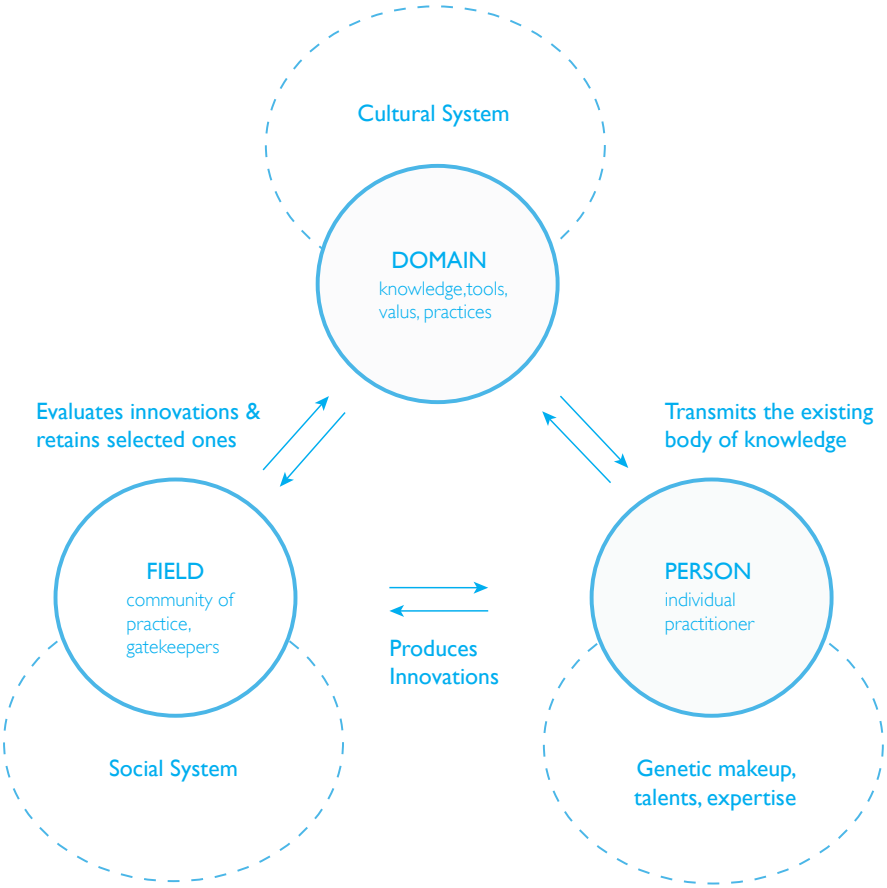


Figure 2. A systems model of creativity adopted by Csikszentmihalyi (2004).

Correspondingly, for Teresa Amabile "a product is creative when experts in the domain agree it is creative" (Amabile, 1983, p. 33), highlighting that the relevance is defined by social groups, and that it is determined both by culture and history.

A great deal of significant literature on creativity has been conducted in a Western context, although inter-cultural work demonstrates substantial differences between approaches. Albert and Runco (1999b) describe that in the western world, creativity has traditionally been perceived as a a divine attribute, whereas oriental cultures (Hindu, Taoist and Buddhist), viewed creativity as processes of imitation and discovery. According to Lubart (1999) western culture considers creativity as "product-oriented and a originality-based phenomenon aimed at solving problems", while Gorny (n.d.) stresses

the effects on the conceptualisation, deriving from the western work ethics, notions of progress and individualism. By contrast, Runco and Pritzker stress that the "emotional, personal and intra- psychic elements that are present in the Oriental definition of creativity also dominate the Oriental view of the creative process"(Runco & Pritzer, 1999, p. 456). Ng and Smith (2004) differentiate between what Eastern and Western cultures discern as the origins of success: Eastern cultures impute success to persistence and effort, while Western cultures impute success to ability. Notable attempts to describe the creative process, approach it through native myths, religion and metaphors of the Orient. In general, it can be said that Eastern philosophies tend to be more intuitive with regards to the conceptualisation of creativity and maintain more spiritual views, considering creativity as revealing the nature of the self, an object or an event rather than as a part of the innovation process.

The wider cultural background affects the perception and production of creative output. Societal liberalism is strongly conductive to creativity (Pratt, 2011). Albert and Runco, (1999) argued that suppressive cultures impede creativity, as also does its extreme opposite; total luck of structure and constraint. In the same line, Simonton (1990) investigated the tendency of inventiveness according to the political context, including authoritarian regimes. Craft (2005) brought into focus how creativity is affected by the attitudes towards it. She also suggested that the presence of pluralism, which is more eminent in cities, enables divergence from the norms. Cities and regions are frequently the centres of creative activity, since they generate innovations and knowledge, as well as new perceptions and movements (Hall, 1998). Moreover, regional density of creative people supports multi-faceted interactions and enable specific forms of learning and innovation (Storper and Scott, 2009). Florida (2002) argued that human creativity is a driver for contemporary economy, and that attracting and retaining creative people is imperative the economic growth of cities and regions. He initiated a passionate dialogue with the 3T model (Technology, Talent and Tolerance) that indicated that the existence of a tolerant milieu, partly explained regional growth.

3.5 The Personality Traits of Creative People

The study of the personality traits of prominent artists, inventors and scientists has provided invaluable outcomes to the research of creativity. There are several character attributes that have been identified in people of distinguished genius and which indicate how creativity might express or be cultivated in other people. In their extensive review, Sternberg and Lubart (1999) conclude that "confluence approaches", which put together multiple views on creativity are advisable for fruitful research. They refer to the work of researchers such as Amabile, Gruber and Davis, Csikszentmihalyi, as well as their own "investment theory of creativity" as important parts of the confluence approach. Their "investment theory of creativity", identifies six elements which are necessary for creativity. These are: intellectual abilities, knowledge, specific styles of thinking, personality, motivation and environment (Sternberg and Lubart, 1991). The authors place these elements in a complex system where they

need to be in an appropriate equilibrium, while each of these elements has its own sub-system. In the case of the 'intellectual abilities' for example, they identify three abilities that are particularly important:

- the synthetic ability relates to the ability to generate novel ideas and to see problems in new ways,
- the analytic ability relates to the ability to think critically, and evaluate ideas, and
- the practical-contextual ability to put abstract ideas into practice and to know how to persuade the others that ideas are worthy.

The authors emphasise that the three need to occur together for creative results to emerge. The presence of only a synthetic ability would not produce actual results. In turn, only an analytic ability would produce critical but not creative thinking, while a practical-contextual ability might produce results, only because of powerful idea conveyance and interpretation and not as a result of creative thinking. Similarly, the rest of the six elements, also require the appropriate equilibrium. In addition, the authors find that creative people are always in search of novelty and are not discouraged to invest in seemingly unpopular ideas.

In his meta-analysis of personality in artistic and scientific creativity, Gregory Feist (1998) finds that creative people are autonomous, introverted, open to new experiences, norm-doubting, self-confident, self-accepting, driven, ambitious, dominant, hostile, and impulsive. Yet he finds that compared to scientists, artists are "distinguished more by their emotional instability, coldness and their rejecting group-norms than are scientists" (Feist, 1998, 299). For Edward de Bono, confidence is a core element of the creative effort. People are more willing to engage in their endeavours creatively if they have had euphoric past experiences of successfully putting forward creative ideas. Ng and Smith (2004) maintain that creative people do not easily get along with others, neither that they easily agree with the group, but instead defend their ideas and might be considered as dogmatic. For Sharp (2004), intelligence and talent are distinct constructs to creativity. She relates talent to a high degree of aptitude in a given area (such as skills in music or mathematics), which does not imply originality neither it demonstrates creativity in a different area. She also notes that children with high achievements on intelligence tests are not necessarily very creative. Gardner (1999, p. 120), finds that creative people have a "desire to be creative, to leave a mark on the world" and certain personality traits such as self-confidence, ambition, and passion about their work. He argues that these traits are not inborn, contrary to temperaments such as being energetic and tolerant of stress. In her model of affect and creativity, Russ (1996) identifies openness to affect states; tolerance of ambiguity; independence of judgement ; unconventional wisdom; curiosity and preference for challenge and complexity, as being personality traits of creative individuals. Csikszentmihalyi (1996) finds that most creative individuals are very passionate about their work, but can also be extremely objective about it. Passion is required to endure interest in challenging task, although the lack of objectivity might restrict the credibility of the work. He also recognises the trait of openness as being important and stresses the sensitivity of creative individuals which makes them subject to "suffering and pain, yet also a great

deal of enjoyment" Csikszentmihalyi (1996, pp 4). Csikszentmihalyi's theory of 'flow' is the result of his long research into the mental states of deep concentration and deep enjoyment. At moments of flow, people feel exhilaration, have effortless control, forget the worries of everyday life and are alert, feel strong and at the peak of their abilities. What places flow in the realm of personality traits is the ability to control or cause flow as Csikszentmihalyi elaborated in his work "flow: the psychology of optimal experience" (Csikszentmihalyi, 1990).

Creativity and Intelligence

For the greater part of research on creativity, intelligence has been considered a core element of creative people. This is illustrated by the long tradition of relating creativity with geniuses or the gifted. For instance, in their review of neurobiological theories of creativity, Heilman et al (2003) find that a high level of general intelligence and divergent thinking are necessary components of a creative personality, yet insufficient on their own to constitute creativity. This view is in accordance with the 'Threshold Theory' of Runco & Albert (1986) which suggests that a minimum level of intelligence is required for creative thinking, but that not all intelligent people are creative. Kim (2005) finds that for groups of older people, IQ scores have a higher correlation with creativity scores that groups of young people. Of course, drawing the connection between creativity and intelligence is affected by what is meant by 'intelligence'. Barron and Harrington (1981) note that investigators of creativity use the term intelligence to refer to (a) that which IQ tests measure; (b) the entire multifactorial domain of human cognitive abilities (divergent thinking, problem-finding, musical and artistic abilities among others) and (c) what qualified observers (peers, teachers, etc) describe as "intelligence" on the basis of repeated observations of behaviour in various situations. In his "Multiple Intelligence Theory", Howard Gardner (1983) distinguishes between eight kinds of intelligence: linguistic; logical-mathematical; musical; bodily-kinaesthetic; spatial; interpersonal; intrapersonal; and naturalist. He not only identifies many forms of intelligence, but maintains that there are different forms of creativity, which requires mastery of a domain and clash with it and is depended more on personality rather than sheer intellectual power (Gardner, 2006). The influential Cattell–Horn–Carroll (CHC) theory of cognitive abilities, has strong similarities with the Gardner model and identifies ten forms of intelligence. These forms are briefly reviewed in index:CHC. Some forms of CHC have been strongly linked to creativity. According to McGrew, Creativity is related to long-term storage and retrieval (Glr) of information: "Some Glr narrow abilities have been prominent in creativity research (e.g., production, ideational fluency, or associative fluency)" (404_ 2006 p.6). Newton and McGrew (2010, p. 627) define Originality/ Creativity (FO) as the "ability to rapidly produce unusual, original, clever, divergent, or uncommon responses (expressions, interpretations) to a given topic, situation, or task" and focus on the quality of responses rather than the number of different ones.

Sternberg (1999b) reviews the research on the relation of creativity and intelligence. He concludes that creativity involves synthetic, analytical and practical aspects of intelligence and that researchers have not reached a consensus on what creativity or intelligence are, neither on the relation between the two. Table three below presents an overview of Sternberg's review and is adopted by Ferrari et al. (2009).

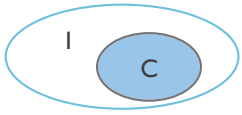
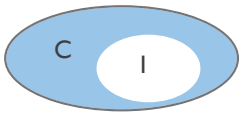
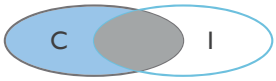
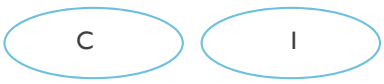
RELATIONSHIP	MAIN POINT	MAIN AUTHORS OR REFERENCES
Creativity as a subset of intelligence 	Guilford: creativity involves some aspects of intelligence, i.e. divergent thinking. Gardner (multiple intelligences): intelligences can be used in a variety of ways, including fostering creative outcomes.	(Guilford, 1950) (Gardner, 1983)
Intelligence as a subset of creativity 	For cognitive processes, creative ability is required more then intellectual ability. Creativity necessitates and involves intelligence and other attributes; therefore intelligence is partof a complex and multi-faceted creative process.	Leon Smith (in Sternberg & O'Hara, 1999) (Sternberg & Lubart, 1993)
Creativity and intelligence as apping sets 	Creativity and intelligence are similar in some ways, but different in others. Similaritiesinclude problem-solving abilities. Differences embrace logical attributes of intelligence opposed to illogical modes of thought for creativity.	IQ tests Implicit theories (Roe, 1976)
Creativity and intelligence as coincident sets 	The mechanism underlying creativity are the same that are requested for intelligence. What is judged as creative is simply an extraordinary outcome of a process that involved intelligence.	(Weisberg, 1993)
Creativity and intelligence as disjointed sets 	Creativity is not an ability but the result of constant and deliberate practice in a domain. In this view, intelligence has no impact on creative performance.	Anders Ericsson (in Sternberg, 1999b)

Table 2. A systems model of creativity adopted by Ferrari et al. (2009)

Creativity and Knowledge

Another research topic that has been thoroughly investigated is the relation of creativity to knowledge, and in particular to domain-specific knowledge. Many of the theories which discuss this relation, take one of two positions on the nature and functioning of such knowledge in creative thinking: They either view domain-specific 'knowledge as necessary' for the development of novel responses or they view 'knowledge as sufficient'. Briefly, arguments for the first view are that knowledge: (a) clarifies what has been tried in order to solve a problem, (b) contextualises the problem and (c) delineates the available methods and instruments to address it. Supporters of the second view argue that in creative products may be produced in more than one way. Then, if multiple paths can lead to identical, similar or comparable outcomes, then flexibility in thinking is more important than detailed knowledge. Thus, detailed knowledge is sufficient and useful, but not necessary. (Scott, 1999). Boden (2001) sees multiple modes of creativity, each one having different relations with knowledge. She maintains that combinational creativity requires the thinker to have knowledge of 'disparate' things, and sensitivity to relatively subtle similarities, while exploratory and transformational creativity require knowledge arising out of "some culturally accepted style of thinking, or structured conceptual space, that the person has learnt - and, to some extent, mastered" (Boden, 2001, p. 96). Thus, exploratory, combinational and transformational creativity use and encourage knowledge in different ways, whether this is subject knowledge, awareness and know-how or a combination of the two. Yet, and as has been mentioned earlier in this chapter, creativity also produces knowledge as it requires the connection between different knowledge fields.

Creativity and Motivation

Hill and Amabile find that intrinsic motivation, i.e. engagement in an activity for its own sake, out of passion and interest, is an imperative requirement for creativity. They find that the opposite is true for "extrinsic motivators in the social environment (evaluation pressure, rewards and competition) [which] can undermine motivation and creativity" (Hill & Amabile, 1993, p. 406). Albert Einstein held a similar view, famously stating: "It is a very grave mistake to think that the enjoyment of seeing and searching can be promoted by means of coercion and a sense of duty" (Einstein, 1949, p. 19). Later in her work, Amabile further studied motivation an placed it as one of the three components of creativity, together with expertise and creative thinking skills (Amabile, 1998). Having the work environment in mind, she argues that all three components can be improved, yet the employee's motivation is affected by being given the right challenge, having freedom and appropriate resources, the features of the work-group, encouragement by supervisors, and the organisational support. Thus motivation is influenced more directly by the others.

The practical or scholarly approaches reviewed here, only exemplify the complexity of the notion of creativity. These need not to be seen uni-dimensionally, but complimentarily, illuminating aspects of a multifaceted notion. As Csikszentmihalyi (1988, p. 338), pointed out, "[...] perhaps even more than new research, what we need now is an effort to synthesise the various approaches of the past into an integrated theory. [...] The systems approach demands that we become versed in the skills of more than one discipline. The returns in knowledge, however, are well worth the effort." The research of Panagiotis Kampylis has been in this line. He developed coined the term for 'creativity metascience', a framework that integrates the findings offered by a number of existing independent disciplines. The framework is composed of contrasting features of creativity aiming to incorporate independent comprehensive inquiry disciplines, as well as synthetic schemata between them. Figure 4 below, is adopted from Kampylis (2010).

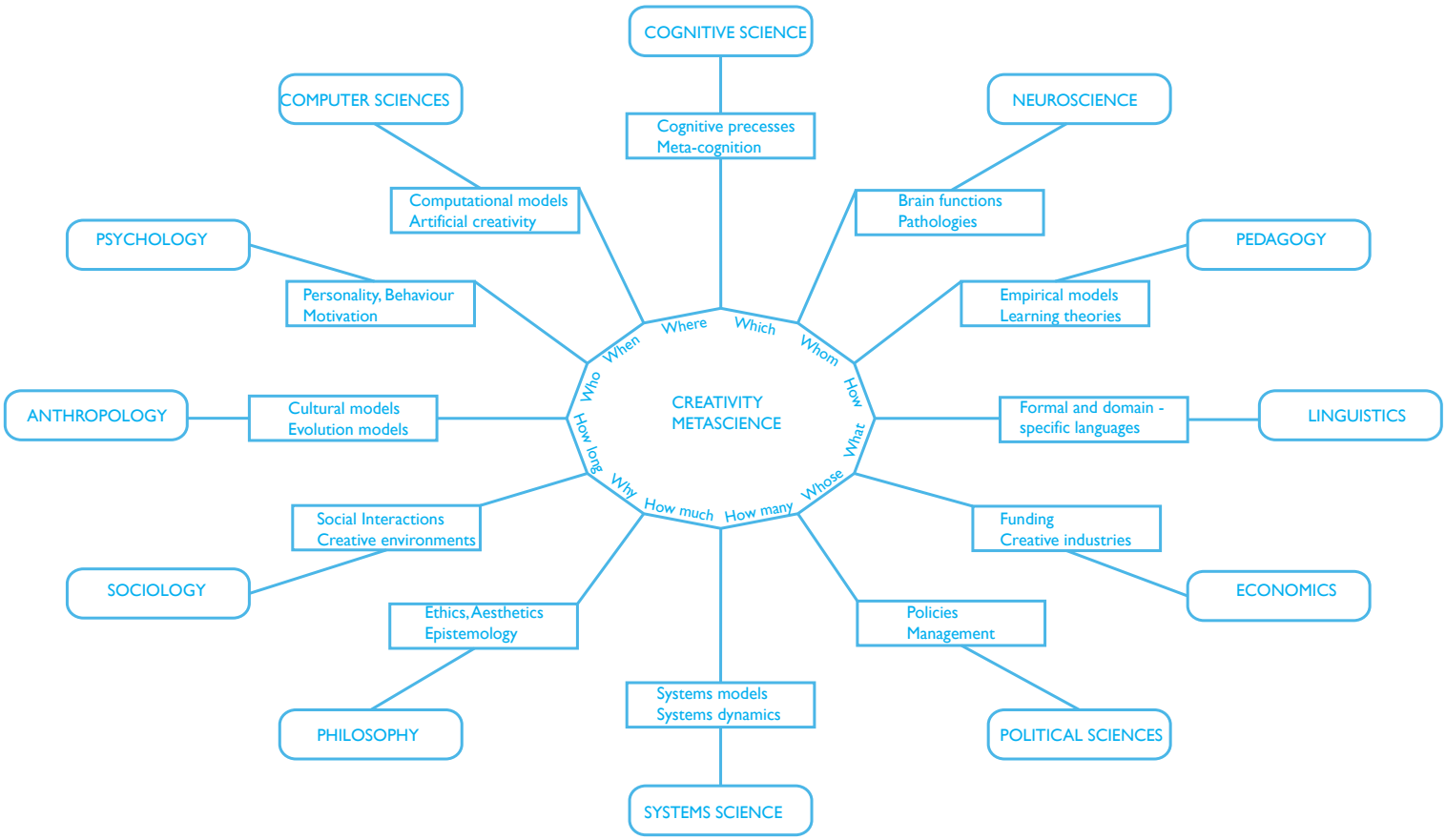


Figure 3. Creativity meta-science, adopted from Kampylis (2010)

Creativity can be seen as the ability to create work that has value and is novel, either for the creative person themselves or on societal levels. Creativity is a concept of wide scope, and as such, it has been approached in a multitude of disciplines and scientific fields. These approaches differ on their focus, axioms, ontological stand points and cultural contexts and thus provide several conceptualisations. These approaches need not to be seen as antagonistic, but rather as complimentarily, illuminating aspects of a multifaceted notion.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Chapter Four. A Review of Concepts of Innovation

Innovation has become a rather recurrent term. Yet, observing the public and political dialogue, it becomes evident that the term's use bears multiple connotations and misconceptions. This section establishes a broad background for contemplating what is meant by the term, aiming to form a basis for discussing what skills and competences are necessary for an individual in order to produce innovative outcomes.

Especially since the beginning of the twentieth century, public interest in the concept of innovation has grown exponentially with a co-evolutionary development of innovation practice, theory and policy. Innovation defines our era and is currently conceived almost as a panacea for the resolution of economic bottlenecks and the challenges of the world at large. The term has become a modern watchword and politicians and policymakers have discovered its "political" value. Quentin Skinner (1988) has suggested that words are markers of social understanding of the world, while the emergence of new words is a marker of changes in the values of society. Similarly, for Logan Pearsall Smith, a new word "marks the moment when change had become obvious enough to need a term to express it" (Smith, 1925, pp. 69-70). Innovation has become an emblematic term for the modern society, yet the meaning, representation and associations of the word were not always positive.

The etymology of the word expresses the idea of novelty. The word "innovation" derives from the noun of the Latin verb innovare which means "to renew or change" and stems from the parts in —"into" + novus—"new" ("Innovation," 2012). Originally, the term "novation" was introduced in the 13th century and described changes in legal contracts of debt. However, the concept dates back to ancient Greece and Rome, in which it had an extremely negative meaning. Novelty in science, technology, gymnastics and the arts, naturally were a matter of course and the benefits were well acknowledged. Nevertheless, novation and innovation referred to substantial, non-trivial changes to the established customs. Plato and Aristotle see the benefits of change as long as it does not interfere with tradition or governance and declared innovation as forbidden. Similarly, Roman historians, poets and moralists also saw innovation as evil. "let no innovation be established contrary to precedents" wrote Cicero (as cited in Godin, 2011). The concept remained pejorative for centuries. In 1548, the King of England Edward VI, declared "*Against Those That Doeth Innouate*". In the 17th century, King Charles I, outcried against innovations in polity and declared that he had never innovated. In the 19th century the phrase "Renovation yes, but no innovation" recurred often, while educational reformists and political economists that supported social welfare, were accused of being extremists and innovators. Reformation was seen as slow and positive revision, while innovation was instead seen as change that is abrupt and radical. From the mid-nineteenth century, the meaning of the word gradually

develops from describing changes in customs and institutions, to positively referring to any type of novelty and its productive outcomes. To a large extend, this change in the meaning of the word came about by the industrial revolution and the change in the significance and the perception of the inventor. During the twentieth century, the relation of innovation to invention became well established and innovation came to be thought of in purely instrumentalist terms: it was broadly conceived as organisationally managed and commercially useful technological change. According to Godin (2008), the understanding of innovation as evolving solely around commercialisation and technology derived from the gradual conjunction of two factors: firstly, the material culture "and its capitalistic corollary: industrial development through technology" and secondly, the academia and "the conceptual frameworks [...] for policies in science and economic growth" (Godin, 2008, p. 8). This connotation of innovation with technology is well illustrated from its long-lasting and still dominant connection to inventions, patents and other utilitarian values.

Yet, the contemporary conceptualisation of innovation has become related to a far broader cluster of notions, all of which "need to be promoted, for innovation comes in many forms other than technological innovation, including organisational innovation and innovation in services", as the European Commission (2006, p. 4) puts it. This conceptualisation is in accordance with the broadly accepted definition of the OECD, published in its Oslo Manual of 2005. The Manual defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD, 2005b, p. 17).

It is worth noting here the use of the word 'implementation'. Innovation is not a single act but a process, the so-called 'cycle of innovation' or 'innovation cycle'. The cycle of innovation involves the generation, utilisation and dissemination of the respective knowledge or idea. The cycle of innovation is fostered by the 'innovation system', which is highly influenced by the broader educational and cultural milieu of the society and includes a multi-nodal network of people, organisations and policies. Goal of the policies that support and lead the innovation activity, is to increase the capacity of the innovation system so that actors and agencies can be more innovative, more of the time. This means not only finding new and efficient ways to solve challenges, but also fostering the spirit and capabilities to pursue new opportunities, as individuals, teams or communities.

Within the bounds of such a broad notion, there is a range of definitions and descriptions that apply to the different types and styles of innovation, along with the values it produces, the sectors that might be involved, the degrees of novelty that comprise it, its sources, its visibility and indicators. At this point it is useful to draw a conceptual overview of innovation, in order to better describe what fostering the innovative capacity of people might mean. The overview below derives from the basic concepts that comprise contemporary innovation theory.

An overview of innovation concepts.

As the public and academic interest in the concept of innovation has grown, the understandings about its nature have developed substantially. Although the concept has traditionally been connected to technological R&D, it has expanded to include more domains, people and dynamics and has put them in relation to innovation ecologies. Its contemporary conceptualisations refer to positive change and its driving forces but also, to the values it produces for individuals and societies. The various definitions of the term refer to different types and styles of innovation as well as its contexts, values, sources and perceptions:

4.1 Principal types of innovation

Although there is a variety of elaborate innovation classifications, there is broad consensus on four types of innovation;

- **Product innovation** is concerned with new or significantly improved goods and services.

  - In the case of goods, this means not only newly introduced goods, but also changes in the design of established goods, use of new materials or components and enhanced performance.

  - A service innovation is a new or substantially enhanced service concept that is put into practice. A service innovation includes replicable elements such as an outcome or process that can systematically reproduced in other cases or environments.

- **Process innovation** refers to the ways the goods and services are produced. This means the adoption of new or significantly improved production methods, which may involve changes in equipment or production organisation or both. The methods may enable the production of new or improved products, or increase the production efficiency of existing products (goods or services, see above).

- **Organisational innovation** denotes the implementation of a new organisational method of for organisations' practices and structures, along with their intra- and inter- relations. Organisational innovation involves hierarchies, decision making processes, leadership styles, responsibility distribution, the management of human resources and the structuring of activities as well as issues of the organisations' culture and shared values.

- **Market innovation** is related to the formation, appeal and delivery to new markets or the modification of existing ones. It involves novelty or significant modifications in product design, packaging, placement, promotion, pricing, or delivery method. Market innovations usually implement a new marketing concept or strategy, significantly different from existing methods.

4.2 Principal styles of innovation

Technological product and process (TPP) innovation regards innovation deriving from the science and technology domains. TTP has been the most enduring style of innovation perception, which comes as a reflection of the focus on businesses' new products and new production techniques as well as their diffusion to other firms. In contrast, Soft innovation considers economically significant changes of an aesthetic nature, such as art, design, cultural products, various fashions and consumption trends, the cultural and creative industries and a number of similar topics (Stoneman, 2010). Finally, Social Innovation is concerned with social change and the related strategies, concepts and ideas. It can concern both social processes of innovation as well as innovations with a social purpose. In either case it is a collective innovation involving many players: service users, social enterprises, funders, politicians and regulators (Murray et al., 2010).

4.3 Innovation in organisational contexts, including:

business enterprises and industry, the government, public services (see for example Abreu et al., 2010) and social welfare, universities, non-governmental organisations and the not-for-profit sector, database and archival institutions, social enterprises as well as other civil society entities, institutions, and stakeholders. Within these contexts, innovation creates **different kinds of value** including commercial, environmental, social and cultural values.

Degrees of change: Radical vs Incremental Innovation. The concept of innovation disruptiveness focuses on the impact of innovations rather than their novelty.

- **Radical, (systemic) innovation** regards fundamental changes that create significant discontinuity with the established technological, scientific or economic regime. Usually the outcome of exploratory research with high risk and uncertainty, this type of innovation is often complex and involves non-technological change and diverse actors. Radical innovations might introduce vastly different principles and create major disruptions in the respective fields, thus rendering outdated the production techniques, knowledge and technologies of established organisations and sectors.
- **Incremental innovation** relates to gradual or subtle changes that take place in a continuous manner and regard developments in existing products and processes. They may also involve reconfigurations so that the product and process may serve a different purpose. Incremental innovations usually emerge from practice, rather than R&D and are characterised by the enhancement of core qualities of the object of innovation, or the improvement of the production efficiency. The benefits of incremental innovations, involve more predictable developments, with lower risks and an extension of the life-cycle of the good or service.

4.4 Novelty and Diffusion: New to the Market vs New to the World.

The impact of an innovation depends on its adoption by others. The locality of novelty diffusion concerns whether the innovator is the first to have implemented it in their geographical region or in the world at large.

- **Local innovation** (adopted for the first time by a person or group in the particular sector or area). Innovations are new to the market when the organisation is the first to introduce the innovation on its sector. A sector is defined as the market or field of operation that the organisation and its competitors operate in and may include a geographic area or a market section such as a product line. The geographical aspect of novelty is thus depended upon the innovator's own view of its operations.
- **Global innovation (new to the world).** In contrast, an innovation is new to the world when the innovator is the first to introduce the innovation for all sectors or markets, whether domestic or international. Thus, new to the world signifies a qualitatively greater degree of novelty than new to the market.

4.5 Driving forces of innovation, amongst others include: research-led, market-led, user-led and culture-led innovation. These are the result of scientific or technological R&D, changes in market or industry structure, work with customers (user-centred approaches), demographical changes, up-skilling of employees, emergence or strengthening of networks etc. Moreover, innovations might derive from individuals and specific teams (individuals innovation) or via connected, open, and collaborative processes (collective/open innovation) that might operate in proprietary or open source principles or a combination of the two).

4.6 Visibility and quantification of innovation

Traditionally, innovation performance and the innovative capacity of a nation or region, have been measured by quantifiable means, such as the number of patents or the amount of R&D investment (usually as a percentage of GDP). This kind of innovation surveys fail to capture what NESTA has come to name as "hidden innovation" which, according to Harris and Halkett "often represents the innovation that matters—the innovation that most directly contributes to the real practice and performance of a sector" (NESTA, 2007, p. 4). The concept of hidden innovation is more concerned with the adoption and adaptation of ideas and the creation of new ones, and is highly influenced by policies that are not considered innovation related.

The established innovation research practice for both academia and policy-makers, has been concerned with disruptive, individual, research-led innovation of technological nature that is easily captured by indicators and is therefore more clearly quantifiable. Nevertheless, with the recent developments in the conceptualisation of innovation, they tend to also focus on innovation that is difficult to measure, hidden, collective, user-led and incremental, as well as innovation that is not of technological nature. It is then obvious that innovation has evolved into a complicated notion and that it thrives in complex ecologies that comprise people, institutions, the social milieu, as well as various support mechanisms.

4.7 The cycle of innovation

As already mentioned, innovation does not happen in an instant. The concept of the 'cycle of innovation' derives from the theory of business cycles, in the work of economist Joseph Schumpeter (1983). The basic conceptualisation of the 'cycle of innovation' involves three stages:

The Generation Phase. The generation of the respective idea, knowledge or process.

The Application Phase. The practical application of the knowledge and the utilisation of the results

The Diffusion Phase. The diffusion of the innovation and its adoption by others or the dissemination of necessary information.

The disseminated ideas then are adapted in different settings or circumstances and are combined with other ideas, consequently leading to the first step in the cycle of innovation. Schumpeter's concept was initially applied in industrial economics, although it has been applied to almost all aspects of innovation. Below, we see the three phases in more detail.

The Generation Phase. With regards to the broader notion of innovation, we can think that 'research' is the knowledge generation phase of the cycle of innovation. We can consider research as investigation and experimentation in a field of endeavour, driven either from curiosity and internal reasons (concept of 'pure research') or from practical needs (concept of 'applied research'). In either case the result is a discovery of a novel concept, idea, process or phenomenon.

The Application Phase. The application phase involves the effectuation of the discovery. In this phase, the focus shifts to the adaptation of the research results for commercial exploitation or the production of non-economic values. For the Commonwealth of Australia, applications for the

production of economic values are forms of 'commercialisation' while applications that aim in otherwise values have been labelled 'utilisation' (as cited in Robson & Jaaniste, 2010).

The Diffusion Phase. Finally, the dissemination or diffusion phase also applies to both economic and social styles and values of innovation. This, means that if the result of the practical application is compatible with the existing systems, values and past experiences of the likely adopters, then it is more likely to be tried. The speed and manner that the innovation is absorbed, adapted and integrated depends on a multitude of interrelated factors. According to Rogers (2003), these include:

- the **relative advantage** of the new over the old practice,
- its **compatibility** with organisations, value systems and cultures,
- its **complexity** and the difficulties to adopt and/or adapt,
- its **trialability** i.e. how easy it to test it and the associated risks
- its **observability** i.e. how perceivable are the advantages to its adopters.

The rate of adoption of the novelty, its areal diffusion, the kind of its adopters and its patterns of adaptation, are all contingent on these factors. Thus the diffusion might be rapid or take years, it might happen in limited, broad or diverse geographical areas, it might be adopted by certain sectors or cultures and with varying patterns of adaptation. Diffusion takes place through three types of external linkages: open information sources, acquired knowledge and technology and innovation co-operation (OECD, 2005b). According to Rogers's 'diffusion of innovation' theory, (Rogers, 2003) the innovation itself, the communication channels, the time factor and the social system are the four main components that affect the spread of a new idea, while there individuals go through five stages of adoption: knowledge, persuasion, decision, implementation, and confirmation.

4.8 Innovation Models The above model of generation, implementation, diffusion is a predominant concept of innovation that presents a rather linear innovation model. More elaborate models that take systems and dynamics into consideration have been developed. The coupling model for example, accounts for Interaction between different elements and feedback loops between them. The parallel lines model, incorporates the integration of key suppliers and active customers within the organisation, emphasising on linkages and alliances. Newer models integrate systems and extensive networking, flexible and customised response as well as continuous and discontinuous innovation (Tidd, 2006).

4.9 Innovation Ecosystems

The 'cycle of innovation' is supported by the 'innovation system', which is the pluralistic, diverse and complex nexus of individuals, organisations and policies. This system is dynamic and organic, forming an **innovation ecosystem** where knowledge and ideas flow, interact and mutate being supported by culture, skills and facilities. We can think of the ecosystem as a "multi-level, multi-modal, multi-nodal and multi-agent system of systems" (Gleick, 1987 as cited in Carayannis & Campbell, 2009, p. 206), which includes innovation networks and knowledge clusters within agglomerations of stocks and flows of human, social, cultural and financial capital. This ecosystem fosters creative thinking, catalyses productivity and precipitates inventions across principal styles of innovation in diverse social, economic, political, technological and institutional domains. Epigrammatically, the innovation ecosystem consists of:

Agents	Agencies	Infrastructure
researchers, inventors and innovators, entrepreneurs, managerial staff and workers, intermediaries, policy-makers, civil servants, educators, consumers and citizens.	small-medium enterprises and major corporations in products and services, training and academic institutions, research centres, the various levels of government, public services, NGOs and not-for-profit enterprises, cultural institutions, archival centres (libraries, museums etc), media, civil society entities.	Hard infrastructure: venues, equipment and tools roads and bridges, ports, railway, power networks, telecommunications etc. Soft infrastructure: digital and communication networks, databases, as well as legal and political context
Policies	**Educational system**	**Culture**
Policies, regulations and support programs: research and innovation policies, incentives, intellectual property laws and the respective registration and enforcement mechanisms, venture capital, funding schemes and programmes.	Various levels of schools, vocational training, skills and competences development, universities and specialist tertiary education. Non-formal and informal education, 'lifelong' and 'life-wide' learning including conferences, workshops and seminars as well as practical and project-based education.	Organisational and/or societal environment and culture that is conductive to innovation: see 'innovation culture' (Gee & Miles, 2007), 'climate of creativity' (Australia Council for the Arts, 2005) or the 'ideas culture' (Innovation Summit Implementation Group, 2000) 'corporate culture' (Killman, R. 1985) and 'organisational culture' (Asheim, 2006)

Table 3: Elements of the innovation ecosystem

4.10 Innovation policies

Innovation policies largely set the framework for the workings of the ecosystem. The overarching objective of innovation policies is to foster the capacities and the potential of the ecosystem and its parts. Policies cannot regulate people in being more innovative but they can enable and encourage individuals and organisations to work more efficiently and strengthen the connections between them. Amongst other means, this can happen through programmes of direct funding, information campaigns, legislative reforms, the provision of skills through the education system and by the state and public services producing and adopting innovative systems and methods. Moreover, the predominance of the innovation system concept has shifted the focus of innovation policy towards the interaction of institutions and the creation and dissemination of knowledge. The term "national innovation system" in policy and academic research, represents this set of institutions and the associated flows of knowledge that exist on a national level.

Chapter Five. Innovation: review of frameworks of the necessary skills, competences and dispositions.

This section reviews eight frameworks of skills and competences necessary for producing innovative work and being successful in the society and workplace of the twenty-first century. Purpose for this section is to lay out a broad viewpoint of what different agencies conceive as the necessary personal attributes and relate these to cultural education in later sections.

Future generations need to be provided with the skills, knowledge, beliefs, attitudes and values that will enable them to make sense of the world, to adapt to its rapid change, to achieve their self-actualisation and to supply the radical solutions necessary for the challenges of the future: The accelerating climate aggravation; the demographic change and massive immigration movements; the need for resource management and of the consequences of technological development.

Education systems demonstrate the values of the societies that employ them, through the knowledge they teach and through the skills they select to cultivate. Thus they have a tremendous role to play by fostering the culture and skills needed for a creative and innovative society: the confidence and intuition to generate novel ideas; the motivation and strength to pursue them; the skills to communicate them and create the necessary shared vision; and the leadership to transform them into reality.

Education and training, are obviously not the single factor that shapes the competences and value systems of societies, however formal, non-formal and informal education opportunities for lifelong and life-wide learning can stimulate the development of human, cultural, social and economic capital. Therefore, the education system needs to adjust to the elements of innovation and to facilitate and nurture talents effectively.

A number of recent studies on the future of education share the overarching vision of a more personalised, collaborative and informal education, that is shaped by and incorporates contemporary technologies, in order to provide the skills, habits and values of innovation for the learners. This is turn, will only be possible by developing the appropriate learning content, assessment methods and delivery systems, which need to be combined with corresponding pedagogies, flexible curricula, validation mechanisms for non-formal learning. In order to be successful, a reform of such scale must take place in close collaboration with societal partners other than the education institutions and requires a new role for the teacher and parent.

5.1 Competences, dispositions and skills for innovation.

Innovation skills are complex, interrelated and interdependent. But what is meant by 'skills'? A useful definition is that of Tether et al. (2005), who define 'skills' as "an ability or proficiency at a task that is normally acquired through education, training and/or experience" (Tether et al., 2005, p. 5) In its broadest sense, a skill is a learned capacity to perform a useful task. Thus, skills can be very specific, (e.g. tying one's own shoelaces), or much more complex, such as the ability to control an unexpected situation or to calm another person down. The first example refers to technical and impersonal capabilities, while the second involves attitudes and values and requires personal and intricate sensibilities. For this chapter and for the whole thesis, the concern (unless otherwise stated) is for the later type of skill. I also refer to 'competences' and 'dispositions'. The term disposition refers to realising when to make use of a skill, instead of simply possessing it. For simple or technical skills, dispositions are straightforward: a person will tie their own shoe when it is undone. But for more complex situations, such as empathising, accepting criticism positively, motivating oneself or recognising and grasping opportunities, a person needs not only the appropriate skills, but also the readiness to put them to practice. I use the term disposition in this sense.

With the term 'competence' I refer to its meaning as defined by Rychen and Salganik in the DeSeCo for the OECD (2005). For them, a competence is "the ability to successfully meet complex demands in a particular context through the mobilisation of psychosocial prerequisites (including cognitive and noncognitive aspects)" (OECD, 2005, p. 4) and as the "internal mental structures in the sense of abilities, dispositions or resources embedded in the individual" in interaction with a "specific real world task or demand" (Rychen, 2003, 43). They moreover describe the internal structures of a competence as including dimensions of "knowledge, cognitive skills, practical skills, attitudes, emotions, values and ethics and motivation" (Rychen, 2003, 44). This conceptualisation takes a strong functional approach and thus describes agency and action, while the complex context relates to complex perspectives of the ability, which in turn implies a sense of value.

5.2 Selecting and defining key skills: An array of attempts

There has been a plethora of attempts to define and describe the skills, competences and dispositions that are necessary for the modern learner. They derive from the educational departments of local and national governments, research institutions, the third sector as well as commercial enterprises. Indexnumber has a list of such frameworks. Focus of many of these is the ability to innovate, while the scope of others varies: from competences for the 21st century, to economic growth and the labour marker, to life-long personal development and well-being. Below I summarise eight frameworks. The first four have been selected for their relation to the cultivation of skills through culture and technology mediated art. The last four have been selected because of the political importance of the publishing organisations and their relevance to the research questions of this thesis.

5.2.1. Soft Skills

Soft skills are personality traits related to attitude and emotional intelligence. They include social capabilities, interpersonal and communication skills, personal habits and positive thinking. These emotional aptitudes substantiate in meta-abilities such as motivation, adaptability, problem solving, decisiveness, abilities to network and collaborate. Soft skills are classified as a higher level of skills, as compared to basic skills which are foundational literacy and numeracy capabilities and hard skills which are disciplinary-specific competences. (*Robson* & *Jaaniste*, 2010)

5.2.2. Wider Skills for Learning

The study for the 'wider skills' has been developed by Lucas and Claxton for the Centre for real World Learning of the University of Winchester and NESTA. The idea of 'wider skills' points to great gap between the skills provided by school and the 'life skills'. Wider skills are related to the skills and dispositions needed for innovative people but are also connected to the achievement and well-being of the learners. Wider skills "are not merely cognitive. Explicit, rational, deliberate thinking is a powerful tool, but so are the skills of sophisticated practising, of learning from one's mistakes, of mental rehearsal and dreamy visualisation, and of reading one's own and other people's emotional signals" (Lucas & Claxton, 2009, P. 9).

The wider skills study, avoids presenting a list and instead reviews a number of frameworks, standing critically to the assumptions, incoherencies and policy recommendations proposed by some acclaimed initiatives. The study stresses time and again that innovation is a hard and complicated process which is harmed by the promoted view that it is fun and easy and that the skills for innovation are a matter of mindset that needs to be systematically cultivated through a strenuous process, rather that a wish-list of skills as it appears in many studies and reports. Innovators need to be sensitive in identifying and understanding problems (problem-finders) and to solving problems. They need to be resilient patient and determined. They state: "Problem solving starts with a well-defined predicament: creativity and innovation start with sensitivity to currents, details, patterns and often obscure dissatisfactions. Innovators heed that faint itch, even when no one else around seems to be feeling it." (Lucas & Claxton, 2009, P. 26). The study concludes with recommending to schools to promote the attitudes of effective learning and to include students in the assessment strategies amongst others.

5.2.3. Innovative Characteristics of Young People

In their acclaimed work, Professors Chell and Athayde (2009) draw upon the social cognition approach and uses psychometric analysis to create a measurement instrument of the innovation skills

of young people. The tool is intended to help young people with their personal development, to evaluate curricular and extra-curricular activities and to draw comparisons between pedagogical styles and other features of educational programmes. They identified five generic skills that underpin innovation. These are:

- Creativity (imagination, connecting ideas, tackling and solving problems, curiosity);
- Self-efficacy (self belief, self assurance, self awareness, feelings of empowerment, social confidence);
- Energy (drive, enthusiasm, motivation, hard work, persistence and commitment);
- Risk-propensity (a combination of risk tolerance and the ability to take calculated risks); and
- Leadership (vision and the ability to mobilise commitment).

Chell and Athayde support that formal and especially informal educational activities that are curiosity-driven, and multi-disciplinary enable young people to be more creative and adventurous in their thinking, particularly where they are not formally assessed. This goes in line with their strong recommendation that risk-propensity should be taught and that young people should be given permission occasionally to get things wrong. They moreover recommend offering wide opportunities to innovate and the provision of challenging extracurricular activities, on which the arts have an important role to play. The authors do mention resilience and intuition as important characteristics for innovation, nevertheless their limited reference seems to undermine them. Finally, an similarly to the case of creativity, the authors find that innovation skills can also be fostered in every individual as "the more academically gifted students were no more likely to develop innovative capability then those who were less academic" (Chell & Athayde, 2009, p. 22).

5.2.4. Partnership for 21st Century Skills (P21)

The Partnership for 21st Century Skills (P21) was established in 2002 by the U.S. Department of Education and has almost twenty well known technology-related enterprises as its strategic council members. It is one of the most prominent attempts in the United States, to advocate preparation of every student for the 21st century with a view to an economically competitive and innovative country (The Partnership for 21st Century Skills, n.d.). P21 provides tools and resources to assist the US education system to nourish skills for critical thinking, problem solving, communication, collaboration, creativity and innovation and advocates for local, state and federal policies that support this approach for every school. It offers resources such as advocacy toolkits, assessment methods, innovation milestones, to educators, policymakers and parents and communities. The framework states: "Learning

and innovation skills increasingly are being recognized as the skills that separate students who are prepared for increasingly complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future" (Learning and Innovation Skills - The Partnership for 21st Century Skills, n.d.).

The framework aims to foster five content areas and outlines three sets of wider skills

Five content areas	Three sets of wider skills
• Global awareness • Financial, economic, business and entrepreneurial literacy • Civic literacy • Health and wellness awareness • Environmental literacy	**Learning and innovation skills:** •Creativity and innovation •Critical thinking and problem solving •Communication and collaboration **Information, media and technology skills** •Information literacy •Media literacy •ICT literacy **Life and career skills** •Flexibility and adaptability •Initiative and self-direction •Social and cross-cultural skills •Productivity and accountability •Leadership and responsibility

Table 4: the Partnership for 21st Century Skills (P21) framework.

Although P21 is one of the more internationally recognised attempts for innovation skills through education, the resources it provides are limited as they do not recognise the complexity of the needed skills, neither they take a practical approach into cultivating them.

5.2.5. The 21st Century Sills List by Twente Universiteit & Kennisnet

In the Netherlands, the Kennisnet foundation, together with the Twente University also created a list of skills for the 21st century. They focused on innovation and through expert meetings and a literature review, and compiled a list of seven skills that are important for modern education. The white paper, produced for this study by Voogt and Roblin (2010) goes sufficiently into detail over the skills and why they are important, as well as on implementation and assessment issues. Moreover, a series of videos, hosted at the kennisnet (21st century skills - Kennisnet, n.d.) and the Leraar24 websites (Vaardigheden van de 21ste eeuw, n.d.) show practical yet limited implementation of the report the in the classroom.

The 21st Century Skills list of Twente University/ Kennisnet

- communication
- teamwork
- ICT literacy
- creativity
- critical thinking
- problem solving
- Social and cultural awareness

5.2.6. Key Competences for Lifelong Learning

In 2006, the European Council and the European Parliament published a recommendation of key competences for lifelong learning (Council of the European Union, 2006b). They identified eight key competences that European citizens should be equipped with, in order to have a successful life in a knowledge society. The competences are considered equally important and as interacting and interlocking.

The identified competences are:

- communication in the mother tongue
- communication in foreign languages
- mathematical competence and basic competences in science and technology
- digital competence
- learning to learn
- social and civic competences
- sense of initiative and entrepreneurship
- cultural awareness and expression

The recommendation also lists other themes important for all key competences which it finds that play a role in all eight competences mentioned above. These are: critical thinking, creativity, initiative, problem solving, risk assessment, decision taking, and constructive management of feelings.

The recommendation links innovation with the digital competence and skills in the Information Society Technology (IST). It also links innovation to the sense of initiative and entrepreneurship since "an

entrepreneurial attitude is characterised by initiative, pro-activity, independence and innovation in personal and social life, as much as at work. It also includes motivation and determination to meet objectives, whether personal goals, or aims held in common with others, including at work" (Council of the European Union, 2006b, p. 9).

The recommendation's list includes both particular competences as well as 'wider skills', although the complexity of these competences is not acknowledged, neither is the complication of their development. Nevertheless, it is worth remembering that such documents derive from a consensus between very different countries with disparate world-views, and as such in depth analysis and recommendations are slow and painstaking processes.

5.2.7. Lifelong Learning for Creativity and Innovation - A Background Paper - Slovenian EU council Presidency.

The 2008 Slovenian presidency of the EU Council published a background paper in order to contribute to the discussion on how to improve the contribution of lifelong learning in creativity and innovation in society. The presidency retains a broad concept of innovation and sees knowledge, as the major value-creating factor in modern society. For it, creativity and innovation should be a tool for economic growth and societal well-being and cohesion. It suggests a schematic, in which "creativity connects the education triangle with the knowledge triangle and puts them into mutual interaction, contributing to innovations in society and economy"(European Commission, 2008, p. 3).

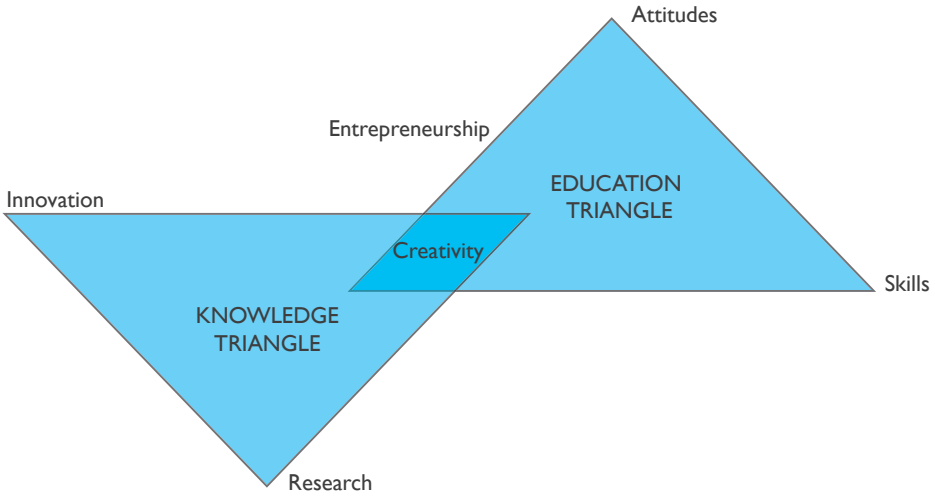


Figure 4: Knowledge and education triangles adopted by (European Commission,

The presidency maintains that innovation skills are contextual and recognises the importance of 'learning to learn skills' and 'soft skills'. It underlines the importance of creative problem solving and the entrepreneurial mindset for innovation-friendly societies. It moreover stresses the importance of the 'absorptive capacity' which defines as "the ability to recognise the value of new, external information, to assimilate it, and to apply it" (European Commission, 2008, p. 5).

The authors support the placement of creativity in key objectives of the school will increase the motivation and confidence of pupils and contribute to increased innovativeness in society. Additionally they maintain that creativity can be taught at school as creative skills can be improved by practice and that creativity -that is complementary and not competing to school subjects- can be applied to learning of all of them.

The authors find extremely important the cooperation of teachers and people of different backgrounds and the exchange of ideas, good practices and experiences that go with it. They also support that during the early stages in education, the attention needs to be on fostering motivation, learning-to-learn skills and other key competences, while at later stages the focus needs to be on skills and competences specific to a field. Moreover they find that user-driven innovation may also be applied to a school class or a teacher group.

5.2.8. OECD DeSeCo

Definition and Selection of Key Competences - OECD (2005)

Initiated in 1997, the DeSeCo project has been developed as complementary to the PISA programme of the OECD. For the DeSeCo development, the OECD has brought together a number of experts and stakeholders who use a demand-led approach to define the key competences needed in the modern world.

For the DeSeCo, a competence is "the ability to successfully meet complex demands in a particular context through the mobilisation of psychosocial prerequisites (including cognitive and noncognitive aspects)" and as the "internal mental structures in the sense of abilities, dispositions or resources embedded in the individual' in interaction with a 'specific real world task or demand". Yet, in order to define the key competences, they focused on those of particular value, that have application to a wide variety of contexts and that are needed by all individuals instead of just specialists.

Although previous approaches of the OECD focused more on the skills to achieve economic prosperity, the approach of DeSeCo maintains a wider view of well-being and social capital. The programme is concerned with the definition and selection of the competences and thus does not elaborate on their cultivation.

1. *Using tools interactively*. The ability to use, understand and adapt a wide range of tools for interacting effectively with the environment, whether these tools are physical, digital or socio-cultural.

a. The ability to use language, symbols and text interactively.

b. The ability to use knowledge and information interactively.

c. The ability to use technology interactively.

2. *Interacting in heterogeneous groups*. The ability to engage with others and work into heterogeneous groups.

a. The ability to relate well to others.

b. The ability to cooperate.

c. The ability to manage and resolve conflicts.

3. *Acting autonomously*. Ability of individuals to understand their life in a broad social context, act autonomously and be responsible for managing their lives.

a. The ability to act within the big picture.

b. The ability to form and conduct life plans and personal projects.

c. The ability to assert rights, interests, limits and needs.

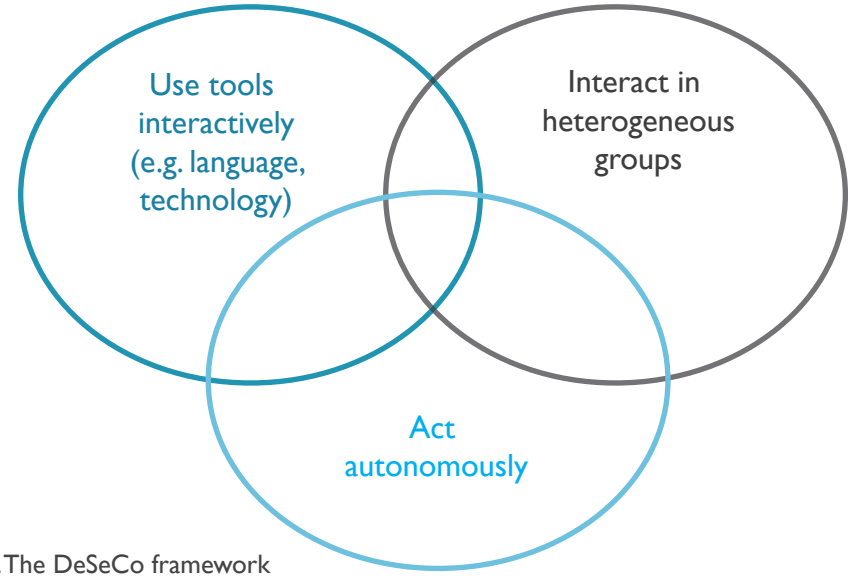
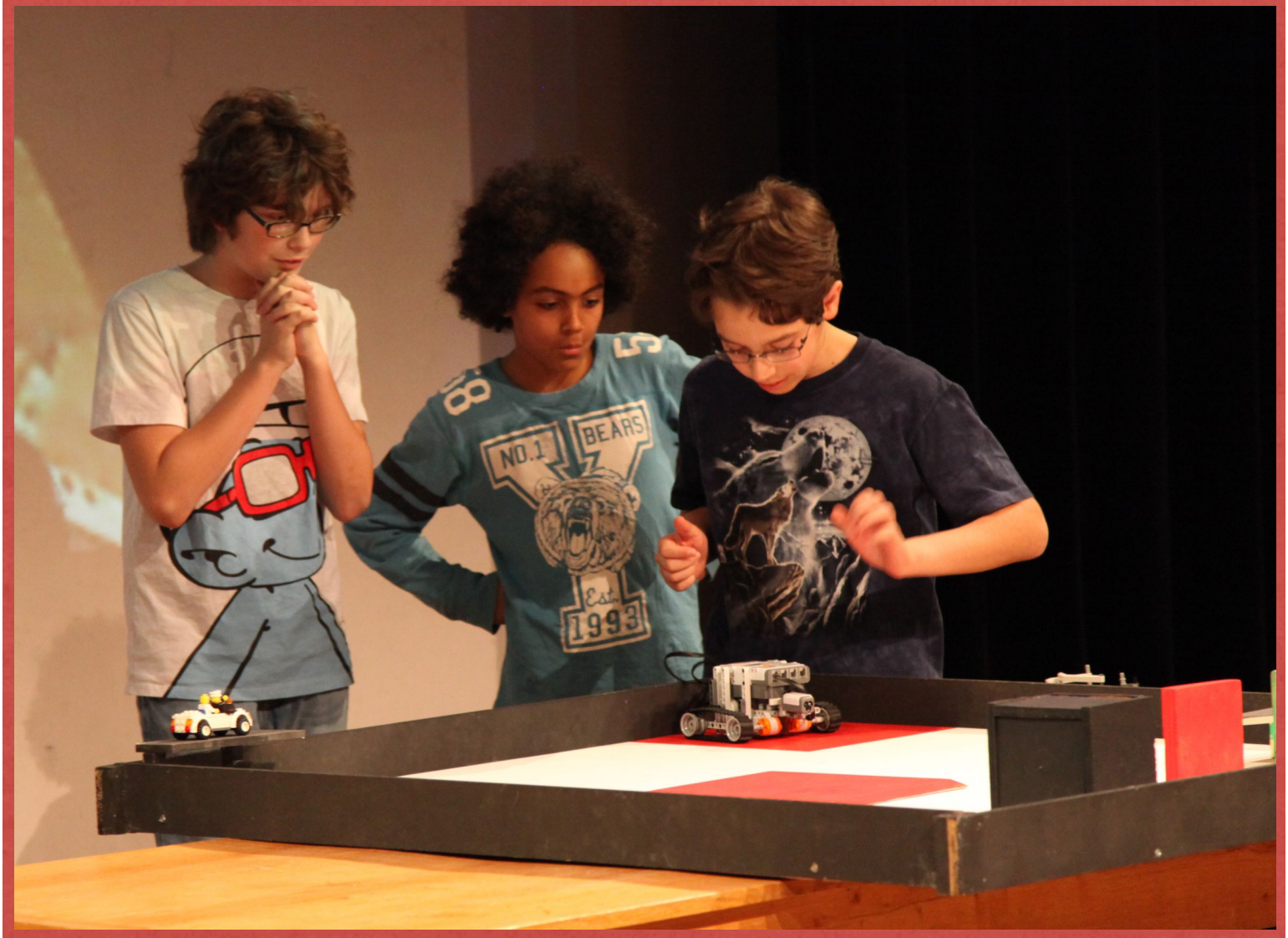


Figure 5. The DeSeCo framework

The report stresses that in any one situation, more than one of these competences are to be combined and at different extends and configured in different ways.

The review of the above frameworks reflects the increasing anxieties of societies to face the global challenges coming ahead, to shape confident and creative individuals, to improve their social and community structures and of course to increase their competitive edge in the globalised marketplace. These frameworks mostly create lists of innovation skills, and sometimes descriptions or even definitions them, but there remains a tremendous field of research on how these skills can actually be cultivated and how their delivery, assessment and measurement are going to be designed and implemented.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Chapter Six. Benefits of Education In and Through the Arts

This section underlines the reinforcement of the educational programmes of cultural institutions during the last decades and examines how education in the arts and through the arts fosters transversal competences, dispositions and skills.

It is important to begin with the distinction between education in the arts and education through the arts. The first refers to instruction in the theory and practice of the various art disciplines. This form of education cultivates not only the technical skills for art production, but also enables one to form their aesthetic judgement and the related critical skills. In contrast, education through the arts, takes an instrumental approach to arts teaching, using it for the development of communication skills, problem solving, collaborating and others. The potential for conveyance of skills and knowledge obtained through the arts, to other disciplines has been subject to elaborate examination. Nevertheless, there is continuing debate about the appropriate methodologies for identifying and measuring such transfer.

6.1 The emergence of education in cultural institutions

During the last few decades, cultural institutions have increasingly modified their role, to include the more instrumental function of offering educational activities. This is not to say that education was out of the scope of a cultural institution, but instead that the educational activities have markedly replaced art's intrinsic values in the political justifications for funding. This is intensification of educational programme developments becomes apparent from the new role that educational departments of cultural institutes. They have had significant improvement in their funding, human resources and facilities, while their programmes have been increasingly elaborate. Cultural economics as well as museological studies have documented this shift rather sufficiently. This change has been well described by Eile Hooper-Greenhill (2007, p. 1):

"At the beginning of the twenty-first century, museums are re-orienting themselves through imagining afresh what they can become; familiar practices are being reassessed and tired philosophies are being overturned. New ideas about culture, society and new policy initiatives challenge museums to rethink their purposes, to account for their performance and to redesign their pedagogies... One of the key dimensions of the emerging 'post-museum' is a more sophisticated understanding of the complex relationships between culture, communication, learning and identity that will support a new approach to museum audiences; a second basic element is the promotion of a more egalitarian and just society; and linked to these is an acceptance that culture works to represent, reproduce and constitute self- identities and that this entails a sense of social and ethical responsibility".

6.2 Arts education and educational attainment

An enormous volume of both quantitative and qualitative research has investigated the relationship of educational achievement to art programme attainment. A comprehensive search for all related studies from 1950-1999 conducted by Hetland and Winner (2001), located 11,467 studies that tested the correlation between studying the arts and some form of academic improvement. The authors found that the majority of the claims for causation did not have sufficient empirical evidence and stress that correlation is not causation and indicate a number of reasons for this failure.

The influential study by Harland et al. (2000) proposed a model for arts education outcomes. Its typology concluded that the effects of arts education on pupils was of seven types: (1) intrinsic and immediate effects, (2) arts knowledge and skills, (3) knowledge in the social and cultural domain, (4) creativity and thinking skills, (5) communication and expressive skills, (6) personal and social development and (7) extrinsic transfer skills.

The compendium Champions of Change, edited by Edward Fiske (1999) has been an influential study in the field. The work reported on seven correlative studies which demonstrated the correlation between increased arts participation and higher grades in mathematics and literacy. The studies examined a variety of arts education programmes using a diverse methodologies. Qualitative studies used arts programmes of excellence that had significant impact on the students' lives, while the quantitative studies of the report, used very large research samples. The report identified seven causes why the arts transform the learning experience. These are: (1) the arts reach students who are not otherwise being reached; (2) the arts reach students in ways that they are not otherwise being reached; (3) the arts connect students to themselves and each other; (4) the arts transform the environment for learning; (5) the arts provide learning opportunities for the adults in the lives of young people; (6) the arts pr o vide new challenges for those students already considered successful; (7) the arts connect learning experiences to the world of real work. Moreover, the report identified seven ways in which arts education programmes transform the learning experience. In particular, they: (1) enable young people to have direct involvement with the arts and artists; (2) require significant staff development; (3) support extended engagement in the artistic process; (4) encourage self-directed learning; (5) promote complexity in the learning experience; (6) allow management of risk by the learners and; (7) engage community leaders and resources.

6.3 Arts education and the skills for innovation

Another influential report has been edited by Richard Deasy. Critical Links: Learning in the Arts and Student Academic and Social Development (Deasy, 2002), covered 62 separate research studies, including several meta-analyses. The studies focused on art forms such as the visual arts, dance, drama, music as well as multi-arts and aimed to identify how learning in the arts transforms in learning in other subject areas. Table [Catterall-Deasy] presents and summarising inventory of the transfer findings of the compendium. The compendium's overview clarifies that not all the correlations presented in

the table are of equal strength. The table demonstrates the wide variety of academic and social competences associated with engagement in the arts. The strict quality criteria that the compendium followed is also able to make causal suggestions.

A number of studies have related student engagement and motivation with engagement with the arts. A study by Douglas Israel (Israel, 2009) for the U.S. department of justice which examined New York state schools, reported that participation in arts programmes led to decreased use of drugs and law disobedience, increased self-esteem, increased access to culture and more positive interactions with peers and adults. It moreover found that students who experience success in artistic activities value effort and persistence, and are more motivated to apply themselves to other learning tasks.

Kate Oakley (Oakley, 2007), in a report produced for the ARC centre of Australia, reviewed case studies, evidence based studies and research strategies. With a focus on the workplace and innovation policy, she concludes that prolonged or habitual interaction with the arts has extrinsic benefits, such as the cultivation of non-cognitive skills, including stability, dependability and interpretative abilities. These skills are necessary for innovation in the workplace and especially at the service sector. She urges for policy intervention within and outside of school, to stimulate the development of the dispositions associated with artistic creativity, which she finds a vital, yet neglected element of the current innovation policies.

The study "Growing Future Innovators" produced by Robson and Jaaniste aimed to identify and evaluate mechanisms for the promotion of innovation to young people and teachers in primary and secondary education across arts and non-arts disciplines. The researchers conducted interviews with educators working at ten cultural institutions and identified seven ways in which art institutions connect schools with innovation. In short, contemporary arts institutions can: "1) connect schools to artistic innovators and innovations (content about innovation); 2) provide schools with access to, and experimentation with, new media technologies and a range of other innovative products and processes (methods for innovation); 3) help schools to cultivate innovation attitudes and competencies such as creativity, self-efficacy, energy, risk-propensity and leadership (the dispositions of innovation); 4) develop innovative and arts-integrated approaches to teaching and learning that energize and expand curricula and pedagogies (pedagogies for innovation); 5) broker and build partners and relationships for supporting innovation that are long-term, reciprocal and personalized (partnerships for innovation); 6) embody and exemplify innovative practice through organisational management and business operations (institutional practices of innovation); 7) critically frame arts and cultural activity within the context of wider innovation contexts and philosophies of change (the contexts of innovation)" (Robson & Jaaniste, 2010. p. 2).

A decade-long study by a multi-disciplinary team, lead by anthropologist Shirley Heath examined 120 community-based organisations inquiring into what students did in their non-school hours and determine the difference this attendance might make in students' educational outcomes. The team

found that students that attended non-school art-based programmes were more than twice as likely to have parents who divorced or lost their jobs during the past two years, and over five times as likely to live in a family involved with the welfare system in the past two years. Yet these students showed stronger capacity for self-assessment, heightened academic results and increased school attendance. They were more motivated, co-operative and willing to take risks. Being involved in artistic environments increased the possibility of the students to practice critical judgement and systematic reasoning and deal with abstract concepts (Heath et al., 1998).

6.4 Correlation, not proved causation.

The methodologies of these studies and the findings that derive from them, support sufficiently the correlation between education in and through the arts and the cultivation of skills for innovation. Yet causation is far more difficult to establish. There are several reasons for this. Firstly, as we have already seen in chapter three, the identification and measurement of innovation is a complex task. Secondly, the concept of innovation as it applies to cultural institutions and as conceived by the actors in the educational programmes, is far from being clearly defined. This is consistent with the unclear view of what innovation entails from the interviewees of this research (see subsection 8.1.5). Thirdly, research within cultural institutions suffers from validity, transferability and generalisability issues. This is the result of severe research flaws in the field, as methodological procedures remain vastly unresolved, terminology is undefined and inconsistent, samples are small and control-groups are absent. Finally, conducting robust research and evaluation of the educational activities requires time resources and expertise that internal organisation staff do not have. This element has been a consistent finding with the interviewees of this thesis as well as on other publications, such as the reader by Xanthoudaki et al (2003, pp. 2-3) who finds that "largely because of lack of time and resources, in the rush for lively programming which is often imposed as a result of institutional pressure or expectations, a great deal of innovative practice goes unreported and many educational issues do not get adequately debated in the wider world". All these issues described above, yield longitudinal studies that credibly explain the causal relationship, a very strenuous task.

The connection between education in the arts and enhanced skills and competences in non-art contexts has been examined strenuously. Numerous studies have provided strong evidence of correlation between artistic engagement and improvements in important personality traits and increased educational performance. Yet, causal relationships between engagement and benefits have yet to be proved, not the least because of the complexity of measurement and the ongoing vagueness of terminology between the variety of actors involved in the field.

Chapter Seven. Research Questions, Methodology and Interviewees

7.1 RESEARCH QUESTIONS

Is it just to claim that modern cultural institutions support the "creativity" of people and their ability to innovate? If so, in what way does this happen and are there any research validations for this? Any significant political confirmations that the importance is being understood? And what do these two terms really mean in the first place?

These were the questions that drove my initial inquiry in this field and led my literature review. And once I had some fuzzy answers to them, I formulated the two main questions that drove the research.

1. In which ways do the educational programmes of contemporary cultural institutions assist in building the innovative capacity of young learners? And how do they connect the school with aspects of innovation?
2. What challenges do the educational departments of contemporary cultural institutions face and what are possible policy implications?

I also had secondary inquiries on other issues, such as:

• What challenges do institutions face with disseminating their workshop materials and best practices?

• How do partnerships with schools initiate?

• What media do interviewees use to get inspired about their educational activities?

Secondary questions were second in priority and did not form consistent research threads. Findings from these questions do not appear in coherent ways in the research outcomes.

7.2 RESEARCH METHODOLOGY

This section has a quadruple purpose. Firstly, it presents the philosophical assumptions that underpin this research. Secondly, it presents the research strategy and methodology chosen, as well as the rationale behind these choices. Thirdly, it describes the specification of the research sample and transcription details. Finally, it describes the limitations of the research design in terms of validity, reliability, replication and their relationship to the selected research strategy and method.

Purpose of this research is to investigate the challenges that educators and organisers of educational activities face, as well as to identify ways to enable them to be more effective in their work. My interest then is in exploring the views and concerns of the social actors, in examining and interpreting their subjective meaning of the constructs that their institutions constitute, their interactions with

members of other organisations and of the interactions between them and the learners. This purpose prescribes for subjective epistemology and an interpretivist view of the social world, as well as for a constructivist position on ontology, since it accepts the axiom that reality is a social construction and that social properties are outcomes of the interactions between individuals.

7.2.1 The epistemological approach – Interpretivism.

Epistemology is concerned with the nature of knowledge. In the social sciences, the two main axioms of epistemology, positivism and interpretivism differ on what they deem as acceptable knowledge in a discipline. **Positivist** views apply the methods of the natural sciences to understand the social world. The phenomenalism principle of positivism accepts that only phenomena perceived by the senses can produce legitimate knowledge. This distinguishes scientific knowledge from normative statements which cannot be confirmed by the senses. Positivism accepts that scientific knowledge can and must be created objectively, free of the values of the social actors that collect the facts and induce them into theory and laws. Contrary to positivism, **interpretivism** accepts that the subject of the social sciences - people, institutions and their interactions - are subject to understanding and interpretation. Thus, interpretivist research is concerned with accessing people's thinking while eliminating preconceptions (phenomenology) and interpreting their point of view and behaviour (hermeneutics). The research conducted for this thesis is concerned with the views of the interviewees, their interactions, experiences, values and aims and hence follows the interpretivist approach.

7.2.2 The Ontological approach – Constructivism.

Ontology is concerned with whether social entities are objective structures that are independent from the particular social actors that comprise them, or whether social structures are constructed or affected from the views and actions of the social actors. The two main strands of ontology in social research, objectivism and constructivism refer to these two approaches respectively. **Objectivism** views social phenomena as beyond the reach and influence of the social actors. It considers social entities such as organisations as clear structures with distinct objectives, hierarchies and procedures and therefore impervious to the people that occupy its positions, whom it constraints. This is strongly contrary to the fuzzy nature of the institutions researched for this thesis and the initiative and experienced based positions that the interviewees occupied. Consequently, the ontological approach that is relevant to the matter of this thesis is **constructivism**, which "asserts that social phenomena and their meanings are continually being accomplished by social actors" (Bryman, 2008, p.19). In the case of constructivism, social entities are constructed by social interactions and are in a perpetual state of flux. For the constantly updated field of fostering skills for innovation through the educational programmes of cultural institutions, the constructivist view of organisations is far more relevant.

7.2.3 Research Strategy – Qualitative research.

The research strategy of choice is that of qualitative research. This selection derives not only from the nature of my research questions, but also from my epistemological and ontological assumptions of interpretivism and constructivism respectively. Qualitative research maintains an inductive view of theory as it relates to research. In the case of the research at hand, the purpose is not a formation or development of theory, but the identification of issues and challenges faced by employees in cultural education, as well as the identification of ways with which education through contemporary cultural institutions, fosters the skills and competences for innovation. This non theory inductive aim of this research, rather places it within the postmodernist tradition of qualitative research.

7.2.4 The postmodernist tradition of qualitative research.

Even though the dividing lines between the different traditions in qualitative research are not always clear, this research largely follows the postmodernist tradition. This is for several reasons. Firstly, as mentioned in the previous paragraph, aim of this research is not to induce theory out of the findings, but to offer a description of the interviewees' experience. In fact, I do not consider the outcomes of my research as findings but rather as interpretations - the account offers provisional readings of the interview outcomes rather than distinct observations in any definitive version of reality. This tentativeness is a major factor for associating this research in the postmodernist tradition.

A second factor is the realisation that in the process of interviewing, I unintentionally brought in my own values, ideas, cultural and political inclinations as well as opinions on the subject matter, informed by my own experience of working in the field and from conducting the literature review for the thesis. The choice of words for my questions, my facial expressions and body language certainly affected the answers of the interviewees. Moreover, and despite of my attempt to be as neutral as possible, my interpretation of the interview transcripts and choice of language for these interpretations, further reflect my own personality and experience. This certainly needs to be acknowledged, but also places this research within the postmodernist tradition.

The third and final factor for the relation to postmodernism, is that the research is focused on agents within institutions that operate in the contemporary edge of art, technology and practices, thus accounting on the nature of the modern society and culture.

7.2.5 Research method – semi-structured interviews.

By default, the research strategy of choice calls for qualitative interviews rather than structured interviews. Qualitative interviews focus on each interviewee's point of view, leaving space to them to

derive from the question and further describe the areas that they find relevant and important. The question then on the adopted research method is on the selection between semi-structured interviews and unstructured interviews. These two methods share a lot of similarities and the separating line between them is not very distinct. Both semi-structured and unstructured interviews use an interview guide with topics to be covered. For both types, the order of posing the questions is open, while they both allow for freedom to the interviewee in terms of forming their reply. The main difference between the two, is that the unstructured interview takes rather the form of discussion and the interviewer rather prompts to subjects rather than asking specific questions. In the case of this research, the adopted method is rather that of the semi-structured interview. That is because my interview format did not have a prominent form of discussion although there were points of constructive investigation, or of clarifying dialogue. Moreover, I did have a rather specific series of topics that I wanted to cover and although I allowed for derivation from the questions, I returned to the topic if I felt that the interviewee had forgotten about it or that the derivation could provide further insights to the subject at hand.

7.2.6 Sampling.

Naturally, as the aim for this research was to examine cases that relate substantially to the research questions, I opted for **purposive** rather than probability sampling. The sample consisted of education coordinators from ten institutions who were interviewed in a semi-structured interview fashion. I first did a thorough search for Netherlands-based institutions that are relevant to my research question. These are (a) Cultural institutions that exhibit technology mediated contemporary art, or (b) educational institutions focusing on fostering the innovation capacity and skills of students, by using technology in an 'arts and culture relevant way'. After this search I compiled a list and made a shortlist of fifteen institutions that were of interest to me. The institutions were selected on a number of criteria:

- Their explicit addressing of innovation in education through culture, in their mission statements or on the description of their educational programmes.
- Their contemporariness: whether in terms of media, design and contemporary art, in the adopted methods or contemporariness in the technology used in the education process.
- Their reputation in the respective field in the Netherlands and their apparent professionalism.
- The selected institutions have a yearly audience of at least one hundred students/ learners.

There was one exception to this selection. Kennisnet, a public educational organisation which supports and inspires effective use of ICT in Dutch primary, secondary and vocational institutions, was selected as the only organisation that has attempted to systematically test the cultivation of the '21st Century skills' framework with students.

To ensure that the recruited interviewees had appropriate experience, the following criteria were specified:

- The interviewees needed to have experience of at least three years in organising educational programmes, whether in the institution they worked at the time of the interview or elsewhere.
- The interviewees should hold a position of responsibility in the educational project: either project manager, developer or coordinator in the institution.

The institutions were approached via email. Prior to my email contact, I researched the person of the institution that seemed most suitable for the interview. Five institutions did not reply to my message and ten did. Out of the ten institutions that replied, in two cases the interviewee I opted for was not available for an interview and a replacement was suggested by the institution. I did not pay considerable attention to the issue of practicality in terms of location for the selection of the sample. The sampled institutions are based on seven different cities around the Netherlands and an estimation of six hundred kilometres was covered for conducting the interviews. To ensure that the sample represented diverse practice, the selected institutions approach innovation in cultural education from varied perspectives: from graphic design and contemporary art to media education, 3D printing and electronics. All of the institutions employ multifaceted approaches to their practice, while four of them were particularly multi-disciplinary, not only in terms of their selected content and delivery methods, but also in the kinds of partners they engage in.

The research sample consisted of nine women and two men. All interviews were conducted with one interviewee, apart from one interview where two coordinators from the same institution were present. One of the ten interviews was not taken into account as the interviewee was considered insincere. She appeared to overemphasise the positive effects of her work, to undermine the challenges she faced and appeared to consider the interview as a way to advertise the work of her institution. As a result the research is based on nine interviews, taken from eight women and two men. The interviews took part between March and May 2012 and a research diary was kept to assist in the improvement of the process and the questions. The interviews lasted between forty five minutes and two hours with a total duration of twelve hours. The interviewees number of years of post-qualifying experience varied (Range= 3-17 years; Mean= 7.0).

7.2.7 Interview recording and transcription.

The interviews took place at the offices of each institution. They were sound recorded with a Zoom H2 recorder in mp3 192kbps quality. The audio files can be found on the compact disc attached on

the hard copies of the thesis, while more compressed mp3 versions can be found online on **https://www.dropbox.com/sh/ijoud2x2xun8dgw/GECcIna70M** .The transcription was performed by me, with the use of a midi device for assistance in scrolling the audio and changing its playback speed. The transcription process lasted between August and November 2012. The vast majority of the interview parts were transcribed, but segments that are not related to the research questions were left out. The interview transcriptions can be found on appendix:Interviews as well as on the link above.

7.2.8 Limitations.

In comparison to quantitative research, qualitative approaches suffer on the issue of **replication**. Qualitative researches rely on the researcher's ingenuity and the procedures are non standardised. It is thus very improbable that if an identical research was conducted, the same answers would be given from the interviewees.

The findings of qualitative researches are also problematic in terms of **generalisation**. The research sample is not representative of the general population and the research strategy rejects objectivism. Thus the observations of this research cannot be said to apply to the broader field of employees in the sector at large, while the interpretative and constructivist positions of the researcher further poses limitations to the research's generalisability. This limitation is to a large extend the result of the limited number of the sample. Yet qualitative researches opt for depth in the responses rather than width. This depth provides other researchers with a detailed account of the issue at hand, leaving them with the option to judge whether these issues are applicable to other social environments. Thus, instead of generalisability, qualitative researchers often adopt the criterion of **transferability**.

The issue of research **validity** refers to whether the research actually investigates what it says it does. In qualitative research, the criteria for this is the research's internal validity. My prolonged experience in educational projects in cultural institutions, either from the side of organiser or facilitator, or as a student, suggests increased internal validity. Moreover, the many impulsive and positive comments of the interviewees on the appropriateness of the questions do provide respondent validation, which supports the **credibility** of the research.

Finally, in order to support **dependability,** the qualitative equivalent of reliability in quantitative research, I have included detailed accounts of both my research questions formulation, details on the selection of the research participants as well as the interview transcripts. To a certain extend, these enable peer researchers to review whether the procedures followed have been appropriate.

7. 3 LIST OF INTERVIEWEE NAMES AND INSTITUTION DESCRIPTIONS

Anouk la Verge

Institution: **NIMK** **Nederlands Instituut voor MediaKunst**

Location: Amsterdam

website: www.nimk.nl

The Netherlands Media Art Institute (NIMk) promotes the wide development, application and distribution of, and reflection on new technologies in the visual arts. The Netherlands Media Art Institute supports media art in three core areas: presentation, research and collection, and through its facilities provides extensive services for artists and art institutions. Associated with this are educational programmes, which are developed for all activities.

Meia Wippoo

Institution: **Waag Society**

Location: Amsterdam

Website: www.waag.org

Waag Society, institute for art, science and technology, develops creative technology for social innovation. The foundation researches, develops concepts, pilots and prototypes and acts as an intermediate between the arts, science and the media. Waag Society cooperates with cultural, public and private parties.

Karin Schipper

Institution: **Witte de With**

Location: Rotterdam

Website: www.wdw.nl

Our position in the cultural field is unique. Witte de With is an alternative to the more traditional museums of modern and contemporary art, to artists' initiatives and to commercial galleries. Our dynamic team enables our institution to be current, innovative, experimental and flexible. The center often serves as a springboard to a professional career for many beginning curators, critics, scholars and educators. For over 20 years Witte de With has been recognized as one of the world's most influential and prestigious exhibition spaces where there is a place for innovation and quality.

Simone Dresens

Institution: **MU**

Location: Eindhoven

Website: www.mu.nl

MU zooms in on the hybrid here, now, and later of visual culture. MU is an adventurous guide to all art lovers with a keen interest in the energetic mix of design, fashion, music, architecture, and new media that contemporary art is. Attracting a wide audience, MU is a meeting place and inspirational breeding ground for creative Eindhoven, the Netherlands, and the world. MU initiates and co-produces. MU regularly challenges international artists to realise their dreams, or to stage their first large presentation, solo, or in a group.

Erwin Bomas

Institution: **Kennisnet**

Location: Zoetermeer

Website: www.kennisnet.nl

Kennisnet is the public educational organisation which supports and inspires Dutch primary, secondary and vocational institutions in the effective use of ict. Kennisnet ensures that educational institutions are aware and take advantage of the opportunities offered by ict. Research has shown that, for the use of ict for educational purposes, a balanced and coherent use of four building blocks is essential. These blocks are: vision, expertise, digital learning materials and ict infrastructure. Kennisnet facilitates the schools to achieve this. Barriers are removed and the strengths of the educational sector are bundled together.

Hans Visser

Institution: **LeX** **Leonardo Experience**

Location: Dordrecht

Website: www.leonardo-experience.nl

LeX (afkorting van Leonardo Experience) is een experimenteer-Lab voor onderwijs, bedrijfsleven en particulieren in Leerpark Dordrecht. LeX heeft 3 taken: Het geven van techniekworkshops aan primair en voortgezet onderwijs, innovatieprojecten geinitieerd door bedrijven i.s.m. studenten MBO, HBO en TU en als derde prototyping voor bedrijven en studenten. Kortom, LeX wil op allerlei manieren innovatie & techniektalent bevorderen in de regio.

Andrea Knols and Suzanne Jansen

Institution: **SKVR**

Location: Rotterdam

Website: www.skvr.nl

Stichting Kunstzinnige Vorming Rotterdam (SKVR) verbindt zoveel mogelijk (jonge) Rotterdammers met kunst en cultuur. Of dat nu in de eigen gebouwen, op scholen of in de wijken gebeurt, het stimuleren van enthousiasme in (de beoefening van) kunst en het ontwikkelen van creatief talent is alles waar het om draait.
Ruim 250 medewerkers zorgen jaarlijks voor het tot stand komen van een zeer gevarieerd kunstaanbod, waar meer dan 100.000 cursisten, leerlingen, docenten en wijkbewoners aan deelnemen. Iedereen in de Rotterdamse regio loopt SKVR vroeg of laat tegen het lijf.

Loes Bogers

Institution: **DIGITAL ART LAB CKC**

Location: Zoetermeer

website: http://digitalartlab.nl/

Het Digital Art Lab is een werkplek waar jongeren samen met kunstenaars en kunstdocenten onderzoek doen naar de creatieve mogelijkheden van digitale technologie. Je volgt hier geen cursus of workshop van de docenten, maar je bedenkt en onderzoekt samen wat voor coole dingen je met de geavanceerde digitale technieken kunt doen: ontwikkel een interactieve theater- of dansvoorstelling, organiseer een robotwedstrijd, help mee bij de bouw van een 3D printer, start een VJ collectief, bedenk een virale cross-media campagne voor bands, noem maar op!

kristina andersen

Institution: **STEIM**

Website: www.tinything.nl

is researcher and storyteller at STEIM (Studio for Electro-Instrumental Music) in Amsterdam. She works with electronics and reclaimed materials to create unusual objects and experiences. She holds a Cand. Arch. [wearable computers], a M.Sc [tangible objects in virtual spaces], and was a research fellow at the Interaction Design Institute Ivrea (IT). She is a Founding Research Fellow of the Research

Institute in the Converging Arts & Sciences (ICAS) at the University of Greenwich. She has been a mentor at DasArts, a thematic project leader at the Piet Zwart Institute/ MA in Media Design, an honorary visiting design fellow at the University of York and she has designed and hosted countless workshops. She is mentor and senior researcher at the Patchingzone and teaches the combined MA between STEIM and Sonology in Den Haag as well as maintaining her own practise.


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Chapter Eight: **Research Findings and Interpretations**

This research has one main and one secondary inquiry fields, which have been laid out in chapter seven. In short, these are:

1. In which ways do the educational programmes of contemporary cultural institutions assist in building the innovative capacity of young learners? And how do they connect the school with aspects of innovation?
2. What challenges do the educational departments of contemporary cultural institutions face and what are possible policy implications?

In what follows, the research outcomes are presented and interpreted in accordance to the methodology of choice (see chapter seven). Every subsection has its own appendix, where interview excerpts that support each outcome are cited.

It is worth noting however that not all findings and interpretations were included in this document. There was a significant number of excerpts that showed more types of advantages, as well as many problems internal to the institutions. These were excluded, because either they were out of the research questions or in order to keep the outcomes more concentrated.

8.1 Ways in which the educational programmes of contemporary cultural institutions assist in building the innovative capacity of young learners.

The main topic of this research has been on how the educational programmes of contemporary cultural institutions foster the skills, competences and dispositions necessary for innovation. In this perspective, the findings are multidimensional and ample.

The findings and interpretations are divided into six subsections:

The first subsection examines the relation of institutional practice to innovation. This subsection is accompanied by appendix 8.1.1
The second subsection examines how these programmes provide innovative content. This subsection is accompanied by appendix 8.1. 2
The third subsection examines how the institutions acquaint learners to abstract ideas. This subsection is accompanied by appendix 8.1. 3
The fourth subsection reviews how these programmes provide learners and schools with innovative methods. This subsection is accompanied by appendix 8.1. 4
The fifth subsection summarises the interviewee references to the skills, competences and disposition

that are necessary for innovation. This subsection is accompanied by appendix 8.1.5
Finally, the seventh subsection considers how the researched institutions introduce learners to new pedagogies and learning partnerships. This subsection is accompanied by appendix 8.1.6

8.1.1 Institutional Practice and Innovation

Interviewees see the institutions as forward looking environments for creation and play. Their strong networks in the contemporary art sector enables them to present contemporary technology in accessible ways. Moreover, they strive to adapt and expand their educational programmes to the interests of visiting learners.

To a large extend, the interviewees perceive their institutions as playful environments where collaboration and exchange thrive. They strive to make students feel unencumbered from criticism and free to explore. Moreover, they earnestly cherish creative work from the learners, which in turns stimulates a learners' sense of purpose and autonomy. These are imperative qualities in spaces where creativity thrives as we have seen in the third chapter.

The researched institutions appear to be particularly attentive and adaptable to the interests of the younger generations. They are open to trying new ideas and to modifying their programmes in order to facilitate the interests of their educational programme audiences. This adaptable approach turns learners intro stakeholders of the institutions and the educational processes.

For Loes Bogers, strategic changes of institutional practice are necessary. Reflecting on the process as it takes place at CKC, she describes:

"[...] we have to go out and see our customers and ask them what is it that they want to do and how they want to do it. So instead of just putting stuff out there and offering it to the world we have to go to the world and ask what they want us to do. How can we make it the most interesting to you. And this is a mentality shift that we try to make it happen with the people who work there."

Indeed, developing programmes together with the users often characterises practice of such institutions. Meia Wippoo describes the mentality driving the Creative Learning Lab of Waag Society, noting:

"[...]we try to be as much forward as possible. With our developments we are not exactly were education is now, but we look ahead to where education might be going. For us, this means that we have to be in contact with a lot of educators. We always keep them in the loop."

It is fairly commonplace that there is a growing digital gap between young people and educational institutions. It lowers expectations from education and disengages learners from the education experience. Young people have increasing access to sophisticated technology and are apt in using it. In contrast, their schools are slower to renew their equipment and their teachers slower to update their

technological skills. The educational programmes of contemporary cultural institutions are largely in tune with process and technological innovations in their application and early diffusion phases. This pursue for contemporariness by cultural institutions can partly make up for this digital gap. Anouk la Verge explains:

"Some of the teachers are also quite old and they get very nervous when they see the electronics, but the kids are in such a different world, so this gap between the teacher and the student is huge and this is why the kids like it here so much. It is close to their own world."

As one would expect, the interviewees are well networked with artists, curators and technical people working in the arts. These networks provide them with knowledge and labour in delivering educational programmes that are novel to the institution and most often, also novel to the learners. As Simone Dresens puts it:

"[...] that is something I wanted to say earlier. Which is the additional value. I can add my network of people with these skills - with skills in art, with skills in design, in gaming or whatever. So I can give more depth to the subject."

As we have seen in chapter four, a rich network is an important factor for creating innovative work. It provides access to novel ideas, to people with skills that are needed to produce creative work. A rich network also allows the individual to test their ideas and prototypes through peer valuation and access to potential markets. Under this angle, the network can be considered as a driving force of innovation.

8.1.2 Content in Context

In the established classroom setting, the subject matter of the taught topics, is typically provided out of its context. Yet, the ability of creating solutions to a variety of types of challenges, develops advantageously when methods for approaching the problem, are presented in a frame of experiential reference. The educational activities in question, are consistently of experiential nature, which substantially advances their effectiveness.

The previous subsections supported that the educational programmes in question, provide opportunities for acquaintance with diverse media and methods, and the development of skills. Yet what makes such programmes significantly more effective, is the context in which they present their content. The interviews offered several examples through which this "process and content to context" relation can be viewed.

The institutional context.

Considering institutional practice at MU, Simone Dresens reflects on the benefits of realising workshops in an institutional context:

"[...] I did a lot of workshops as a freelancer, but I really think that it is of additional value to do something in an institution or with an institution, because then you have a context. I did graphic deign workshops, but if I could have combined that -and I did before- with an exhibition about graphic design, like in a museum or a festival for graphic design, then it has more value. To combine things. [...] And that is what I am looking for here as well."

The aesthetic context.

The creative experience is at the core of most of the educational programmes in question. During these programmes, the act of creation on the one hand, and multidisciplinary knowledge on the other, are mutually underpinned. Thus, at least in a sense, the students conceive the offered knowledge in the context of creating an aesthetically pleasing or conceptually challenging work. They learn what creation with contemporary means entails.

The possible future employment context.

The variety of skills, competences and conceptual developments that are possible through the examined kind of activities, reveal to learners a range of fields in which they could be occupied in the future. Erwin Bomas formulated pertinently the importance of this to the emerging labour market:

"Creativity had always been important, but now it is more important because we don't have standard jobs anymore. [...] Take for example 3D printing. Before you needed machines and factories and workers and compartments just to create a product. Now you only need a laptop and a printer to make a product. This is a good example of why you need these skills now".

This has larger implications. In a world that is changing with accelerating speed, the capacity to adapt and be resilient will be crucial. Erwin later resumes:

"it is now almost a cliché - we are educating kids for jobs that don't exist yet, so you have to focus more on skills rather than content. The world and technology are changing fast and you need the skills not only to deal with the problems, but also to create new opportunities".

The curriculum context.

Principally, all of the educational programmes in question connect in some way to a range of knowledge fields. Many of these connections are practice based, others are rather conceptual, yet all of them are contextual, in the sense that they present the relevance of the knowledge to a problem at hand. These connections can be used to link school curriculum knowledge to actual contexts that the learners have been acquainted with.

This connection to the curriculum is already taking place, yet to a very limited degree. All of the interviewees suggested that they try to work with schools and to connect their content to school curricula. Hans Visser explained that LEx often collaborates with teachers from a variety of fields such

as physics and mathematics, while Loes Bogers gave a more distinctive example: An educational activity which included programming skills and was developed at CKC, is now taught in class by the school teacher – a direct introduction of workshop material and practice to the school curriculum. Yet, as we will see at the next section of findings, this connection to the school is most often non existent or very problematic, which constitutes a grave missed opportunity.

8.1.3 Ideas and Concepts

Having been tremendously transformed by conceptual art, institutionalised contemporary culture stimulates contemplation on notions and their relation to modern life. The educational activities of researched institutions, present remarkable ways to acquaint students with abstract ideas, which they relate to the students' personal experiences.

Interviewees referred to workshop examples where students were confronted with referents such as post-digital design; systems and interactions; and the consequences of technological development. Kristina Andersen describes the concept of privacy of digital data behind a workshop of disguising personal usb sticks:

"[...] in the USB workshops we talk a lot about secrets. We talk about particular ways of thinking about secrets. So the emotional and the artistic contexts of these workshops are actually quite heavy. Particularly for someone who hasn't agreed to be in an artistic process. So they're heavy subjects, but in the meantime, there some stuff that needs to be glued together, and "here's a bit of tape!", and "can I have the scissors?". So, I use this idea of embodied making. The way that these things are allowed to express themselves without feeling crushing, heavy or difficult. [...] It was very interesting to see how this fourteen year olds deal with how to keep a secret. And then the idea is that through doing this, you start thinking about your privacy. And you start thinking about the nature of the staff that you leave on the cloud."

After an art class and a guided tour, students participating in workshops at MU, have been engaged in team-based presentations of contemporary artworks. Interpreting artworks and the artists' intentions, they were stimulated to discuss over the nature of art, what it entails and why.

The "art confrontation" tours of the Witte de With, take a contrasting approach to engaging learners in discussions about art. Karin Schipper recounts:

"[...] we confront them with contemporary art, so we do not explain the works. It is an invitation to talk about art, to talk about society, their interests... So they feel really welcome - that art isn't really something unreachable. It is made by people and discussed by people and these are not strange people, but normal people."

In workshops organised by NiMK, students were challenged with the idea of hacking as research of inaccessible internal workings of everyday functions such as processing of food and data manipulation. Anouk la Verge recalls:

"Jeromil talked about what is a hacker, what does he do and in what field. It is not only about the computer. It is about opening a black box. And it also happens with food, or gardening. And then we talk about it and we ask students "what is a black box for you? What do you want to research"? That was a really nice workshop, [...] because we also showed them some examples with food. They all eat - everybody has to eat, so it is connected to everybody. And this is also important. That you talk about something that is connected to our daily lives."

8.1.4 Media and Methods

Contemporary cultural institutions convey to learners, new interdisciplinary methods for using technologies, materials and processes . They further design and implement their educational activities, by employing modern methodologies that adhere to the cycle of innovation and related concepts.

The educational programmes of the selected institutions present practical applications of new and established innovations. They familiarise learners and schools with modern technological means and their potential, while the workshop methods support learners to conceive and apply this knowledge.

Leonardo Experience (LEx) for instance, hosts creative workshops over the use of 3D-printers and laser-cutters. Managing director Hans Visser, finds that technical education is gravely missing from schools and that institutions like LEx can supplement for this lack.

Other workshops were more over technical skills, rather than acquaintance with technologies. Some examples were over video mapping and image manipulation, while others instructed the making of simple electronics. In a workshop that took place at CKC, students learned how to make a computer programme that run an interactive artwork in their own school. A similar example with students learning programming through creating an artwork, run at NIMK. In this case, students saw and discussed the artwork and then created similar generative programmes, together with the artists. As may students do not know that they can make a programme by themselves, such workshops introduce basic programming principles in a very accessible way. As Loes Bogers commented, young people need to know how computers work.

"Not only as a graphical user interface, but how it actually calculates, what it does, how it works. You can't see it from the outside anymore. You have to just learn it, because otherwise you will never be confronted with it" she concludes.

This kind of educational programmes, further provide training in a variety of less technical, but also very important, topics. Photography, game design, coordination of cultural events and typography were

only some of related examples. Karin Schipper narrated how the documentation of a multidisciplinary project at first involved blogging, but soon evolved into documenting peer education that takes place through cultural institutions. This evolvement required from the learners to develop their documentation skills, but also to learn how to conduct interviews.

"[...] then they got interested in putting the article on their website as well, which creates a conversation through written articles about what we do. [...] otherwise it stays behind the doors of the institution and I would like to open this up" she added.

Moreover, these programmes help demystify technology to learners by utilising highly accessible everyday objects or by employing ordinary or obsolete technologies. Anouk la Verge shares an example of a workshop over making artistic films with the cameras of mobile phones:

"They all have mobile phones [...] but we show them that they can also use it in an other, artistic way. [...] So we give them good examples and then they think about "how can I make an artistic film with my mobile phone?""

Yet the workshop is not only about making expressive videos, but the importance of the phone to the lives of individuals and too society.

"Because sometimes you see films in the news - there is accidents or bombings and there is always someone who filmed this and you see the shaking image. So we talk about this also. Citizen journalism. So, the workshop is not only about making a film, but using the camera in a creative way."

What Anouk finds also important in this, is that because of mobile phone ubiquitousness, students can use what they learned out of the workshop. In a similar approach, Kristina Andersen recounted the core elements of a simple electronics workshop and described that almost all necessary materials came from a well known chain-store. Their aim was *"just to completely disqualify the though that in this workshop there is something unachievable otherwise"*. Such aspects of the educational activity, empower learners by demonstrating ways to engage with modern and accessible means in a creative way.

In addition, the programmes often exemplify reuse of obsolete equipment. The interviewees referred to examples of hacking old game-boys to make animations and modification of electronic toys to transform them into musical instruments. These examples go further that acquaintance with skills through aesthetic experiences. They present new conceptualisations of what a technology can be for, and create fertile ground for conceptual associations and divergent thinking.

The importance of these projects to innovation resides not only in the methods that they demonstrate, but also on the methodology that they follow. Some of the researched institutions design and realise their educational projects by employing modern methodologies and concepts such as embodied learning, or the design cycle.

In a related example, Meia Wippoo explains the importance of designing with the students and the teachers: *"One of the main systems that Waag Society works with, is the "user as a designer" that we place the end user in our design. We ask them for their input, because otherwise you are developing for someone that might not use it. So we very much keep in mind the end user of the development."* These methods adhere to and expand upon key concepts of innovation and acquaint the schools with their use.

8.1.5 Cultivation of Skills Competences and Dispositions

Contemporary cultural institutions offer authentic examples of fostering skills, dispositions and competences that are necessary for producing innovative work and being successful in the society and workplace of the 21st century, as examined in the eight frameworks that were reviewed in the chapter five.

When asked what skills and competences they try to foster, or what skills are necessary for a person's innovative capacity, the interviewees had very little to say and appeared to consider the question irrelevant. On the other hand, when they recounted the methods, aims and values of the educational projects they design, they either explicitly or implicitly described skills, competences and dispositions that are part of the reviewed frameworks.

Andrea Knols and Suzanne Jansen for example, equate talent to hard work, resembling Chateaubriand's infamous maxim that "talent is nothing more than long patience. Go and work" and Csikszentmihalyi's views on Flow and the psychology of optimal experience.

In a comment that approximates the disposition of risk propensity, Kristina Andersen describes the importance of the workshop facilitator, taking responsibility of the creative process. This transfer of responsibility, enriches the creative experience by liberating learners from averting the critique of their peers and of themselves.

Another comment by Kristina echoes the idea of empowerment, that is an principal part of self efficacy, as examined in the 'Innovative Behaviour of Young People' framework. She states:

"*What we care about is feeling ownership. That there is ownership to the things that you have. And if you can built this, you can build anything and if you can build anything, you can be a player in the world of things".*

Self efficacy is also reverberates in comments of Anouk la Verge. For instance, she stated:

"Fifteen year old girls can make these small circuits even though they are not technical at all. So don't make it too difficult, but neither too easy. You really need to take them seriously and never underestimate them."

Erwin Bomas, reflecting on working with twenty-one young learners on 21st century skills, reflects on the importance of thinking skills, including:

"... the critical thinking and communication and the social part - seeing yourself as part of the global village. That we as individual have impact on the whole and that asks for an ethical attitude and more engagement."

Other examples referred to citizenship, mastery, autonomy and collaboration. They can be found in appendix 8_1.5

These findings lead to several interpretations: Firstly, they signify that such educational activities can be highly suitable for the cultivation of the attributes that are considered important as discussed in chapter five. Secondly, their fragmented referral to the attributes, signifies that have rather insufficient theoretical background of what skills are considered necessary, of systematic ways to cultivate them and of the role that their institutions could play in this cultivation. It further denotes that both umbrella cultural agencies and policy institutions fail to educate the cultural educators on this perspective. Finally, it suggests that the cultural institutions might miss a important element for justifying their economic significance.

8.1.6 Pedagogies and Learning Partnerships

The educational programmes of contemporary cultural institutions employ vastly different pedagogical paradigms compared to that of the school classroom. They exemplify new learning systems, offer personalisation opportunities and create new hierarchies and structures in learning.

Amongst others, interviewees referred to examples of student co-creation with artists; making together with people from different backgrounds; adaptation of learning material to students' interests; and approaching the same project from a variety of perspectives.

These instances illustrate learning strategies that are collaborative, flexible and informal. They exemplify pedagogies that enable the exchange of methods, tacit knowledge and ideas, where each individual can be both a teacher and a learner.

Meia Wippoo explained that children are often very skilled with new technologies, while some of their teachers are intimidated by computers in general.

"So that's also a thing we try to use [at the creative Learning Lab], in a way that children can teach the teachers as well" she concluded.

In a similar spirit, Karin Schipper recalls a collaboration between young people that with varying relations to art and creation:

"It was a very diverse group. Some of them were a bit afraid of making an artwork, but they all ended up performing. The performance also took place during museum night and their friends and peers took a different view on the artworks of Angela Bullock."

Describing processes of teaching and learning between student peers Andrea Knols remarks:

"[...] the teaching between students is something that they both learn a lot from. It is a different kind of learning, especially for the one who knows a lot, but it also makes a very nice teaching environment and that really helps."

When asked about her collaboration with teachers during workshops, Kristina Andersen stresses the importance of the deconstruction of the teacher authority during such situations:

"If the teachers are there we make them participate on equal footing with the children. It's very important to destroy the teacher authority for a successful workshop to take place. [...] We see huge differences group by group in terms of who the teacher is. The hardest thing I had to learn when I started doing this was that you have to stop the teacher thing, just because if you go there and you are a teacher you're gonna fall into a well established patter and you're gonna be the new guy."

Such educational activities offer new examples of who we might learn from, and how we do so. To a certain extend, the partnerships between the institutions and schools also legitimise these educational processes and help establish more diverse learning approaches.

8.2 Challenges that the educational departments of contemporary cultural institutions face and policy implications.

The secondary topic of this research has been on the challenges that the educational departments of contemporary cultural institutions face. It glances over the relation of the institutions with schools, the perceived ability of the institutions' employees to educate, the challenging of disseminating best practices, the missed opportunities to connect activities to school curricula and their knowledge and perception of the related EU policy framework. This section is accompanied by appendix 8.2 where all interview excerpts that support the findings below are cited.

8.2.1 Time and labour-force restrictions

A significant number of the interviewees mentioned the lack of time and labour power to perform their educational service adequately. The organisation of high quality, multidisciplinary educational activities comprises of planning, promotion, realisation, documentation and dissemination phases and each of these requires communication with various partners. Karin Schipper stresses that institutions with limited labour power have limited options. The same issue is also stressed by Simone Dresens:

"In bigger institutions, you have ten people working there, [you can] pair two people [in educational activities] and the other people can work on the rest. But here [at MU] if we pair two people that is the whole team. [...] I am educational manager but I am also a communication manager and a programme manager..."

The lack of labour force - and thus labour time - is maybe the most important challenge that the educational departments of the cultural institutions face. When asked what would enable them to offer a more effective set of workshops, several interviewees referred exactly to this. Loes Bogers for instance mentioned that she would have her colleagues working full-time, Karin Schipper that she would have more colleagues, Kristina Andersen that she would have more workshop facilitators to deal with the excessive amount of participants. Similarly, Hans Visser stresses the need for a stronger labour force and deduces the problem to money.

8.2.2 Economic restrictions

Labour force limitations is seen as a main challenge for the institutions and that this limitation is often deduced to economic restrictions. But economic restrictions does not translate only to problems with the personnel. Meia Wippoo explains the money problem from a school perspective:

"The main problem we face is money. All the schools and groups of schools, just don't have enough money to spend. So when you want to incorporate new innovations, they always look for the cheapest way to do that. And that doesn't always mean that they get the best developments. That also doesn't mean that they make the smartest moves."

Highlighting a different perspective on this, Anouk la Verge stresses that the recent cuts in structural funds for cultural institutions, force them to reduce their activities or even close down despite the educational services that take place in them.

Simone Dresens, finds that not only funds are limited for small institutions, but also that the allocation of funds towards small institutions takes place very late, which has consequent effects on programming:

"It works like this. In September we make a programme for next year, so then I know largely what the exhibitions will be in 2013. So, then we give that plan to the funders and in October or November we know if we have money to do that programme. But in a bigger institution they know two years upfront. [...] they start working on a project at least a year upfront. So that gives them time to do it."

8.2.3 Collaboration with schools

Employees at the educational departments consider that their cooperation with schools is often problematic but that it also has considerable potential. The preparation of the class before the visit to the cultural institution is considered almost always insufficient.

When asked about whether schools come prepared for the workshops, Anouk la Verge replied:

"No, not really. Of course it really depends, because I always send them a kind of package with exercises that they can do in class to prepare and talk about it. And they [teachers] always ask for this package, but they almost never do it! It's really a pity."

In a similar line, Hans Visser stresses that schools go unprepared. He considers that the reason for this is the lack of technical knowledge from the teachers' side. Suzanne Jansen and Andrea Knols also consider that schools go unprepared but deem that this sometimes is due to the absence of interest from the teacher side:

AK: "I think that the most important part of art education is that it has to be embedded in the school. That is at first. Then, we as SKVR we can try to further educate the kids and get deeper into the matter".

SJ: "Yes, I think that's the most important thing. That it isn't just an hour and nobody looks - the teachers think "Hey, that's my smoking hour now, this is the key to my room, go do your thing!"

Other interviewees, such as Simone Dresens, Anouk la Verge and Karin Schipper, find that the cause for this lack of preparation is the lack of time rather than the lack of interest. In Simone's words:

"I don't know if it is a lack of interest. It probably is the lack of time and the schools that come here they come more ad hoc."

Whether teachers have inadequate time, insufficient interest or a lack of understanding, better student preparation before the workshop and a follow up after it, are regarded crucial. This is not only because the students will be able to better comprehend and respond to the workshop activity, but also because the workshop knowledge can then connect to the school curriculum - a subject that we will see next. In any case, institutions responsible for educational policy need to ensure that these activities are fully taken advantage of - otherwise significant potential is lost.

8.2.4 Connection to the school curricula

There are at least two ways in which the educational activities of cultural institutions can be connected to school curricula: The first, as already mentioned, is for teachers to prepare students for the visit and find links between the workshop material and the school curriculum. The second, is for the umbrella organisations for education and culture, to inform the cultural institutions of the material that is being covered at each school level. This way, the institutions can connect the material of their activities to what is being covered at school, thus providing relevance to the taught content. In Simone Dresens' words:

"I think that is something that cultural institutions should research, or should be provided with. There is for example the cultuurstation, which is an intermediate between schools and institutions... on provisional level you have kunstbalie... around Rotterdam there is SKVR... [...] they think that they know about didactics and there is a lack of that in the institutions, but what I think they should do is that they should teach the institutions the didactics. What do the schools want. Not just practical stuff, [...] but the next step which is to talk about what are the themes that schools are working with. They can provide us with that."

8.2.5 Teacher skills

In the previous section of the findings, in the subsection of institutional practice and innovation, we saw that some teachers find it hard to work with modern technology - four interviewees referred to this issue. Yet the problem is not limited in technical skills - teachers and the school community need to have a better understanding of the framework of skills, competences and dispositions for innovation. In the Netherlands, the framework that is most commonly discussed is that of the 21st Century Skills. In our discussion over this framework, Erwin Bomas gives an additional perspective:

"Let's start with the schools themselves. In Holland we are privileged to have so much freedom in the school to do what we want to do. [...] But the 21 Century Skills is not so much about the content, but more about the ways in which content is taught. So, I think that schools can already start [....] but then you have to ask yourselves in what way can we teach these skills to children - and this is needs a different approach from the teacher. So, the teacher has to have these skills first and there also needs to be a consensus that these skills need to be part of the teachers qualifications."

8.2.6 Understanding of the European Union policy interest

As we saw in chapter two, the EU cultural programmes have increasingly been related to the concept of innovation, while the European commission has created a framework of competences and commissioned several studies over creativity, its relation to innovation and culture. It was then also of interest to examine the knowledge of interviewees of this interest, their perception of it, if they had any participation or related experience and how accessible did it appear to them.

"No. I know nothing at all about it"

"I have no idea about it. I think it's really bad!"

These expressions, by Erwin Bomas and Anouk la Verge summarise the general reaction to the interviewee's awareness of EU policy interest in the field. None of the interviewees claimed any meaningful understanding of the programmes or the competences framework, while the vast majority claimed no awareness of the programmes or EU policy interest in general.

In another instance, when discussing about dissemination of best practices, Anouk expressed her disappointment that there is no platform to host such things - yet the European Commission has established EVE "a tool for the dissemination and exploitation of results of projects supported by programmes managed by the European Commission" in the fields of culture, education, citizenship and youth.

This can be interpreted as multiple failures of the EU communication in the field, especially since many of its cultural programmes -with budgets of billions of euros in summation- addressed innovation and creativity in particular. This can be seen as a result of the superficiality that the commission deals with creativity and the innovations skills through culture, even if they have recognised in various occasions

that this could pave a better way towards employment, entrepreneurship and growth. Another way that this can be seen, is the ineffectiveness of bureaucratic structures into actively engaging with the public sphere. This is not to judge the scope and effectiveness of public funding in the field, but rather the effectiveness of public bureau management.

In either case -and despite the plausible claims that instrumental justifications for arts participation are detrimental to the arts' wondrous intrinsic qualities- if policy institutions of such levels of importance as the European Commission recognise the effectiveness of cultural education in non-cultural outcomes, the most apparent implication is that action needs to be faster and far better organised. Research that the Commission embraces, such as the various reports on the subject and the competences framework need to be introduced to cultural institutions, schools and educational policy agencies alike. At different points, interviewees stressed their fragmented access to research and their eagerness to participate in related research. Effective steps to this direction is a straightforward policy recommendation.

Chapter Nine. **Conclusion**

Creativity and innovation are recurrent themes in modern day discourse over economy, business, politics, technology, science and education. They both carry connotations and are often used interchangeably, yet they are very separate notions that have linked aspects. The idea that people in the future need to be more creative and more able to innovate, has gained recognition in various fields of research and -to a lesser but significant extend- in policy formation. The educational programmes of contemporary cultural institutions have considerable potential in supplementing school environments in fostering those capacities.

Through a series of semi-structured interviews, this research identifies some of these potentials, but also some challenges that these institutions face in order to make their work more effective. In short, the institutions were found to support innovation in the following ways:

- Contemporary cultural institutions offer authentic examples of fostering skills, dispositions and competences that are necessary for producing innovative work and being successful in the society and workplace of the 21st century. They do so by empowering their learners, cherishing creativity and cultivating such traits as critical thinking, risk propensity, self efficacy and autonomy.
- The educational activities of researched institutions, present remarkable ways to acquaint students with abstract ideas, which they relate to the students' personal experiences.
- As such institutions work with very diverse artistic material, they familiarise learners with multidisciplinary methods for using technologies, materials and processes.
- Typically, schools present knowledge out of its practical context. In contrast, cultural institutions offer experiential acquaintance to manifold subjects, placing knowledge into concrete contexts. These contexts connect practical knowledge examples to school curricula; they present learners with an array of possibilities for future occupations and; they familiarise the learners with alternative educational structures that can complement their knowledge.
- The educational departments in question, employ vastly different pedagogical paradigms compared to that of the school classroom. They exemplify new learning systems, offer personalisation opportunities and create new structures and hierarchies in learning.
- The organisational practices of these institutions are very adaptable to themes that learners find interesting and place play in the context of learning. Actors in such institutions maintain strong professional networks which enable them to present advanced technological and process developments in accessible ways.

Nonetheless, these educational departments also face impeding difficulties. These are largely of economic nature and of restricted labour force. These difficulties limit the dissemination and communication capacity of the educational programmes but also restrain some of their important qualities.

Other difficulties are found in the collaboration with the schools, as interviewees consider that some teachers do not have the time, the interest or technical ability to prepare the students' visit to the cultural institution. As a result the potential of these programmes is far from being fully harvested.

A related challenge is the inability of the educational departments to establish a good connection of their activities with the school curricula. This has been related to the unresponsiveness of schools and intermediary organisations on the matter.

As there is expressed recognition from policy making institutions and policy advising agencies that skills and competences deriving from such programmes are of considerable socioeconomic importance, these findings and their interpretation, lead to several and related policy implications. There is a great need for better collaboration between the cultural institutions and schools. Both parties need to be better informed of the importance and the potential of their partnerships and of methods to make them more effective. This would further need intense involvement of researchers and far more serious coordination efforts from policymakers.

The importance of better communication of the related funding programmes, research reports and political decisions cannot be stressed enough. In the context of the European Union which was examined in this study, such educational programmes are considered as supporting sustainable and inclusive growth; fostering all forms of innovation; developing spill-over effects and; contributing towards achieving the objectives of manifold policies. Yet, the enactment of these recognitions is very poor. Many examples can be given to support this claim, not the least being that interviewees for this research hardly had even a vague idea of the interest that European Union policy institutions have on the field and its potential.

This research has considerable limitations. It is based on a small research sample and the examined institutions are of rather small scale. The EU policy framework was examined, but all researched institutions are based in the Netherlands. Finally, the literature review is of usual length for a master thesis, yet a study thoroughly examining this broad subject would need a far more rigorous review.

There are several paths for future research. Firstly, there are other studies that share similarities to mine as we saw in chapter six. Yet they typically have small research samples, are usually conducted through interviews and are conducted by researchers of similar disciplines. Thus their results are usually hermeneutical, they suffer from generalisability issues, they fail to find implications deriving from other fields of inquiry and they fail to demonstrate causation. Future researchers might wish to avoid these problems by using mixed research methodologies, including participant observation and quantitative techniques. They might also wish to examine the views of learners on such programmes.

Web logs (blogs) of learners about the activities in question can also provide very rich material. Finally there is a strong lack of meta-analyses of studies on the field.

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Appendix: EU_cultural_programmes

Culture in EU policy.

At the initial stages of the European Economic Community (EEC)[1] no actions in the field culture have been provided for. The first substantial measures in the field were the European City of Culture[2], the establishment of trans-national cultural itineraries [3] and the special entry conditions for young people to museums and cultural events.[4]

Culture, as well as education, have been integrated into the scope of the EC/EU through the Treaty of establishing the European community[5]. They are both principal responsibilities of the Member States, while role of the Community is to encourage cooperation and exchange between Member States and if necessary, to support and supplement their actions. In this direction, a number of initiatives were deployed to support education and culture.

Aim of the common cultural policy is not the harmonisation of the cultural identities of the citizens, but on the contrary, as explained in its founding Treaty, the European Union "shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced."[6]
Cultural co-operation became a recognised aim of EU action with the Treaty of Maastricht, which included a respective new article[7] and the accompanying legal basis. In the years following a series of pilot programmes were initiated, leading to a number of sectoral programmes.

The initial European Union cultural programmes

In 1990 the Commission published the criteria and conditions for participation in the Platform Europe programme which a year later became the first **Kaleidoscope programme**, aiming to support projects with a European dimension, by financing artistic and cultural events that involved at least three Member States. The programme involved the performing, plastic and visual arts as well as the applied arts and multimedia. In 1996, the European Parliament and the Council of Ministers adopted the Kaleidoscope programme for a period of 3 years, augmenting its budget to a total of €37.2 million[8]. Kaleidoscope funded more that 500 projects, while programmes such as The European City of Culture, the European Cultural Month, as well as the European Union orchestras were supported.

The **Ariane programme** (1997-1999) aimed to support cooperation between Member States in the book sector and to expand knowledge and dissemination European literature and history by funding a

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[1] Treaty of Rome: Treaty Establishing the European Economic Community, 25.03.1957.

[2] Resolution of the Ministers responsible for Cultural Affairs, meeting within the Council, of 13 June 1985 concerning the annual event 'European City of Culture'. Official Journal C 153 , 22/06/1985 P. 0002 - 0002

[3] Resolution of the Ministers responsible for Cultural Affairs, meeting within the Council, of 17 February 1986 on the establishment of transnational cultural itineraries. Official Journal C 044 , 26/02/1986

[4] Resolution of the Ministers responsible for Cultural Affairs, meeting within the Council, of 20 December 1985 on special conditions of admission for young people to museums and cultural events. Official Journal C 348 , 31/12/1985

[5] Treaty of Establishing the European Community: Maastricht

[6] article 3. Treaty of the EU. 30.3.2010 Official Journal of the European Union C 83/17. eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:0013:0046:EN:PDF Accessed 02/03/2012

[7] Article 167, Treaty of Maastricht

[8] Decision 719/96 of 29 March 1996 (recital 11) establishing a programme to support artistic and cultural activities having a European dimension (Kaleidoscope).

variety of projects, including translations and professional training projects. In three years it supported 767 projects with a budget of €11.1 million.[9]

The **Raphael programme** (1997-1999) equipped with a budget of €30 million aimed at the field of heritage. Its supported more than 350 cooperation projects for the conservation and enhancement of a broad range of cultural heritage and citizens' access to it.[10]

The Culture 2000 programme

Culture 2000 was built upon the Commission's experience with the preceding programmes. It lasted a total of seven years (2000 - 2006) and had a total budget of €236.5 million. The Culture 2000 was the main financing and programming instrument, supporting a variety of projects with three types of action. The annual[11] and multi-annual cultural activities [12] and special cultural events[13]. Apart from the substantially increased budget, it differed from the aforementioned programmes in terms of scope, as it funded cultural cooperation projects in all artistic and cultural fields. It aimed to support a shared cultural area that celebrated its cultural diversity and common cultural heritage.
Implemented by the European Commission, Culture 2000 provided grants to a total of 1509 projects and sought to foster co-operative cultural creation and related mobility, as well as broader participation, with a particular intention for young people. Supported parties were encouraged to document and disseminate the projects' outcomes and create multimedia and other digital content.

[9] Ariane Programme. http://ec.europa.eu/culture/archive/culture2000/historique/ariane_en.html Accessed 20/02/2012

[10] Raphael Programme http://ec.europa.eu/culture/archive/culture2000/historique/raphael_en.html Accessed 20/02/2012

[11] Specific innovative and/or experimental actions. http://ec.europa.eu/culture/archive/culture2000/project_annuel/proj_an_en.html Accessed 23/02/2012

[12] Structured and Multiannual Cooperation Agreements. http://ec.europa.eu/culture/archive/culture2000/pluriannuel/proj_pluri_en.html Accessed 23/02/2012

[13] Special cultural events. http://ec.europa.eu/culture/archive/culture2000/special_events/events_en.html Accessed 20/03/2012

Appendix:Skills_Culture_EU

- Council Decision of 21 October 2010 on guidelines for the employment policies of the Member States4, especially the 8th guideline — OJ L 308 24.11.2010, p. 46.
- the Council conclusions on Europe 2020 flagship initiative "Innovation Union": Accelerating the transformation of Europe through innovation in a fast changing world (2010) — 17165/10.
- Council conclusions of 22 May 2008 on Intercultural Competences — OJ C 141 7.6.2008, p. 14.,
- Work Plan for Culture 2011-2014 - Conclusions of the Council and of the representatives of the governments of the member states, meeting within the Council. Available at http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/117795.pdf Accessed: 26/12/2012.
- Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training ('ET 2020') — OJ C 119, 28.5.2009.
- Council Recommendation of 13 July 2010 on broad guidelines for the economic policies of the Member States and of the Union especially the 4th guideline — OJ L 191, 23.7.2010, p. 28.
- Conclusions of the Council and the Representatives of the Governments of the Member States, meeting within the Council, on the Work Plan for Culture 2011-2014 — OJ C 325, 2.12.2010, p.1.
- Council conclusions of 19 November 2010 on access of young people to culture — OJ C 326, 3.12.2010, p. 2.
- Council Resolution of 21 November 2008 on a European strategy for multilingualism — OJ C 320, 16.12.2008.
- Council conclusions of 12 May 2009 on Culture as a Catalyst for Creativity and Innovation — Doc. 8749/1/09 REV 1.
- Council Resolution of 27 November 2009 on a renewed framework for European cooperation in the youth field (2010-2018) — OJ C 311, 19.12.2009.
- Final report of the Working Group on developing synergies with education, especially arts education and culture — available at http://ec.europa.eu/culture/key-documents/doc/MOCedu_final_report_en.pdf, accessed 26/12/2012
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the Europe 2020 Flagship Initiative - Innovation Union — 14035/10.
- Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - An Agenda for new skills and jobs: A European contribution towards full employment — 17066/1/10 REV 1.

Appendix:CHC[14]

- Fluid Intelligence (Gf): includes the broad ability to reason, form concepts, and solve problems using unfamiliar information or novel procedures.
- Crystallised Intelligence (Gc): includes the breadth and depth of a person's acquired knowledge, the ability to communicate one's knowledge, and the ability to reason using previously learned experiences or procedures.
- Quantitative Reasoning (Gq): the ability to comprehend quantitative concepts and relationships and to manipulate numerical symbols.
- Reading & Writing Ability (Grw): includes basic reading and writing skills.
- Short-Term Memory (Gsm): is the ability to apprehend and hold information in immediate awareness and then use it within a few seconds.
- Long-Term Storage and Retrieval (Glr): is the ability to store information and fluently retrieve it later in the process of thinking.
- Visual Processing (Gv): is the ability to perceive, analyse, synthesise, and think with visual patterns, including the ability to store and recall visual representations.
- Auditory Processing (Ga): is the ability to analyse, synthesise, and discriminate auditory stimuli, including the ability to process and discriminate speech sounds that may be presented under distorted conditions.
- Processing Speed (Gs): is the ability to perform automatic cognitive tasks, particularly when measured under pressure to maintain focused attention.
- Decision/Reaction Time/Speed (Gt): reflect the immediacy with which an individual can react to stimuli or a task (typically measured in seconds or fractions of seconds; not to be confused with Gs, which typically is measured in intervals of 2–3 minutes).

[14] Adapted by Kevin McGrew, available at http://www.iapsych.com/CHCPP/CHCPP.HTML, accessed on 01 December 2012

Appendix:Pragmatic_Approach

The pragmatic approach, often referred to as the pragmatic methods, to creativity is not focused on scientific research. Its main concern is the development of creative thinking and skills, followed by understanding it[15]. With the pragmatic approach, people are taught how to be more creative in a variety of ways by exercising creativity techniques. These are replicable methods that foster creativity in a person or in a group of people. Some of the most prominent techniques are lateral thinking, brainstorming, synectics, TRIZ tools, removing mental blocks and the roles of explorer, artist, judge, and warrior. Some of these methods are explored below.

Brainstorming

One of the first examples of the pragmatic approach has been the brainstorming technique, proposed by Alex Osborn in 1953. This technique aims at group generation of a large number of ideas and accepts that a constructive environment fosters the forming of new ideas and solutions. George Gamez[16] (1996) identified four basic rules in brainstorming: Focus on quantity, No criticism, Unusual ideas are welcome, Combine and improve ideas. These rules aim to reduce the reservation that occurs in group processes and thus stimulate synergies. The concept behind brainstorming is for the group to think of as many ideas as possible, without being critical to their plausibility at the first stage. Later on, the ideas are judged, modified or combined leading to feasible and appropriate solutions. This technique of differentiated judgement increases the individual's synthesis capabilities by releasing the human mind from the analysis mode of thinking[17]. Critics of the brainstorming technique mention that the process is incomplete since it lacks preparation stages and does not provide tools for coming up with ideas at the initial stages.

Lateral Thinking

One of the most known advocates of pragmatic approaches to creativity is certainly Edward de Bono. In his writings, de Bono attempts to create tools and methods that redirect the thinker from analytical and critical viewpoints towards a development of a wider perception and of lateral thinking skills. Lateral thinking is a means to restructure thinking patterns and has two main aspects: on the one hand there is provocative use of information, on the other the thinker is challenged to reconsider accepted concepts. De Bono's widely acknowledged Six Thinking Hats method involves a process of "parallel thinking", and like brainstorming, it is most appropriate for group discussions. The method provides a way to organise a cohesive thinking processes, raising the effectiveness of group thinking. The method can be best understood as a practical alternative to adversarial thinking and argument

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[15] Sternberg, R. J. (2003). Wisdom, intelligence, and creativity synthesized. New York: Cambridge University Press.

[16] Gamez, G. (1996). Creativity – How to catch lightning in a bottle. Los Angeles: Peak.

[17] Lin, H.F. (2012). A review on the pragmatic approaches in educating and learning creativity. International Journal of Research Studies in Educational Technology. 2012 April, Volume 1 Number 1, 13-24.

practice, in which each side of the argument attempts to prove that the other side is wrong. With the Six Thinking Hats method all members of the group are thinking in parallel, each pursuing one line of thought or one aspect of the matter at a time[18]. The hats are colour-coded and each one represents a specific line of thought and the participants "wear a hat" pursuing this line. The Six Thinking Hats method encourages cooperation and exploration and can provide a more balanced and objective view of the task at hand.

De Bono has also devised other methods that foster lateral thinking, including the linguistic tool "PO" (Provocative Operation) and the Random Input Method. PO aims to restructure the issues at hand and destabilise assumptions by making a statement and seeing where it leads to. The initial PO statement might be highly invalid or naive, but its further development might lead to a good idea that otherwise would not be discovered. The idea behind Random Input method is that chance events allow people to break their existing patterns of thinking by connecting a random word to a new out of context situation, thus generating new connections and metaphors.

Synectics

Synectics is a problem solving method that has been largely developed by William Gordon[19]. Its central principle is: Trust things that are alien, and alienate things that are trusted. Synectics can be thought of as a rational way to approach the creative process in vivo, while it takes place. Synectics encourage the analysis of the original problem as well as the alienation from it through the creation of analogies. It accepts that irrelevancy is an important component of creativity and the higher significance of emotion over rationality and intellect in the creative thought. Synectics practices and meeting structures ensure that the creative intentions of meeting participants are experienced by one another in a positive and constructive way, which also makes Synectics appropriate for resolution of conflict.

The Springboarding tool of synectics initiates with a brainstorming session, which later deepens and widens through application of metaphors. It later incorporates an important evaluation process for idea development, which takes rudimentary ideas and develops them in courses of action that enjoy the commitment of their implementers.

TRIZ

Other pragmatic methods for the idea development include the TRIZ tool which is "a problem-solving, analysis and forecasting tool derived from the study of patterns of invention in the global

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[18] De Bono, E. (1985). Six thinking hats. Boston: Little Brown.

[19] Gordon, William J.J. Synectics: The Development of Creative Capacity. (New York: Harper and row, Publishers, 1961),

patent literature"[20]. TRIZ was developed in the 1940's by Genrich Altshuller, a Soviet author and inventor. The acronym of TRIZ[21] usually translates in English as "the theory of inventive problem solving" The supporting theory of TRIZ has developed through extensive research of thousands of inventions across disparate fields in order to identify generalisable patterns of the inventive solutions as well as the key elements of the problems that these inventions have solved. These theories behind TRIZ have lead to the development of algorithmic approaches to the creation of new inventions and the optimisation of existing ones. The foundation of TRIZ is based upon the following observations[22]:

- Problems and solutions were repeated across industries and sciences.
- Patterns of technical evolution were repeated across industries and sciences.
- Innovations used scientific effects outside the field where they were developed.

In short, a typical TRIZ process for creative problem solving would transfer a specific problem to an abstract domain, then apply inventive principles to it in order to find an abstract solution, that in turn would be translated to a specific solution to the initial problem. The TRIZ tool is being used for a variety of purposes including the improvement of products, services, systems and processes and the identification of alternatives.

[20] Hua, Z.; Yang, J., Coulibaly, S. and Zhang, B. (2006). "Integration TRIZ with problem-solving tools: a literature review from 1995 to 2006". International Journal of Business Innovation and Research 1 (1-2): 111–128. Retrieved 2 October 2010.

[21] теория решения изобретательских задач on wikipedia http://en.wikipedia.org/wiki/TRIZ#cite_note-Hua-0

[22] Triz and axiomatic design: a review of case-studies and a proposed synergistic use 371_

SD:...that is something I wanted to say earlier. Which is the additional value. I can add my network of people with these skills - with skills in art, with skills in design, in gaming or whatever. So I can give more depth to the subject.

LB: For example there is a ceramics and sculpture teacher who suggested we should try to do something with 3D printing, so we went to TU Delft and we got in touch with some people who were into prototyping and that kind of stuff and she just got some information together and some ideas and some inspiration... and that's gonna be the start of a new design cycle.

SD: That you would loose yourself in a collaboration. When it is not clear who is organising it, who is doing what.

MW: I think the way that Waag society works and the CLL with that, we try to be as much forward as possible. With our developments we are not exactly were education is now, but we look ahead to where education might be going. For us, this means that we have to be in contact with a lot of educators. We always keep them in the loop.

LB: It is more about having fun [while] expressing yourself, making things that are pretty, or you think are interesting. I think it is a kind of playful learning environment.

LB: And the idea right now is that kids might not be interested to learn how to play the violin in that way. They have other interests. So we have to go out and see our customers and ask them what is it that they want to do and how they want to do it. So instead of just putting stuff out there and offering it to the world we have to go to the world and ask what they want us to do. How can we make it the most interesting to you. And this is a mentality shift that we try to make it happen with the people who work there.

KS: With the free-time projects for example, we invite a group of around eight people to work in WdW for a couple of months. We share with them our knowledge, but also the team of WdW learns a lot about things they are interested in, what they really want to know about the art-world.

KS: Often a book for young people is designed in a very colourful way, images and strange connections. they didn't want that. they wanted a clear white book. It was interesting to learn that from them and about them. Often people think that youngsters are only playing games and not reading but that is not really true. Maybe this is shifting in percentages, but the group we found was really up for books - and they wanted to share it with their friends and their age group.

AV: Some of the teachers are also quite old and they get very nervous when they see the electronics, but the kids are in such a different world, so this gap between the teacher and the student is huge and this is why the kids like it here so much. It is close to their own world.

EB: Creativity had always been important, but now it is more important because we don't have standard jobs anymore. And with technology we can start a company from our apartment. So we have everything in our hands to make a living. Take for example 3D printing. Before you needed machines and factories and workers and compartments just to create a product. Now you only need a laptop and a printer to make a product. This is a good example of why you need these skills now. And there is something else that is also important, we've seen that many of the problems that we face now in the world, cannot be sold with technology alone. You need a new way of thinking. A more global way of thinking and these are important parts of the 21CS - the critical thinking and communication and the social part - seeing yourself as part of the global village. That we as individual have impact on the whole and that asks for an ethical attitude and more engagement.

KS: We have the mission to share our knowledge and give young people the tools to survive in the artworld which is a very tough world. And I think one keyword is "working together", bundle your

powers and work together on projects. We train them to learn this, because often this is not offered in schooling environments. So we see this as part our mission to create this environment.

KS: If you make a project for high school kids, I think it is very important that they have the feeling that this is a safe place that they can say everything that they want. So, creating this good atmosphere is very important and I learn this by doing. I started eight years ago and of course making mistakes - you can not do everything right from the first moment - and you have to challenge yourself.

MW: A lot of the policy things are very much segregated between all the different skills and a wide range of arts. I think a lot of policy makers think that these are different skills, but art and creativity are universal. You can apply creativity to any other subject as well, so...

MW: [...] But also culture is very much a personal thing. Culture is something you have to enjoy. It does have to do a lot with skills and also with talent, but in the educational sense, it is more a way of approaching your agenda rather than having a separate skill for it.

Appendix:8.1. 2

SD: Because I worked as a freelancer as well, I did a lot of workshops as a freelancer, but I really think that it is of additional value to do something in an institution or with an institution, because then you have a context. I did graphic deign workshops, but if I could have combined that -and I did before- with an exhibition about graphic design, like in a museum or a festival for graphic design, then it has more value. To combine things

LB: For example there is this one school [called] the Erasmus College and they have like a celebration because the school was twenty-five years old, or something like that. And they asked a visual artist to make a sculpture on a wall, and this guy came up with the idea to make an interactive wall that responds to sound. He had the idea but he didn't have the production skills to make it himself, so they were looking for partners to do it and the school came to us and asked "can you help make something and build this interface" like this piece of software and maybe also make kind of workshop out of it so that the kids can learn how to programme". And this was completely custom made to what they wanted and what they had in mind and they're actually teaching it now, so they are teaching this at the school and one of the teachers knows how to do it.

KS: This is the map we used with the kids [...]. In the first meeting they brought in a book they really loved. So we studied a lot of books and talked about art. And every time we took this map every time we went to the studio, or to the printer, or the graphic designer and said "this is what we are doing". And we made a lot of mind maps [...]. They also got trained by a journalist [on] how to make an interview - there are interviews in the book.

EB: I think one of the most essential things is that you have to be prepared for a very changing world. The changes are happening faster and faster and - it is now almost a cliché - we are educating kids for jobs that don't exist yet, so you have to focus more on skills rather than content. The world and technology are changing fast and you need the skills not only to deal with the problems, but also to create new opportunities.

HV: Yes. We are part of the FabLab concept. So, there is an open-source sharing principle. We work with other FabLabs. For instance in Rotterdam, the Hague, Amsterdam, Utrecht. We are working with FabLab Utrecht on making your own 3D printing. We work there with teachers in mathematics, teachers in physics and in chemistry.

AV: We asked Aymeric Mansoux end Marloes de Valk. They work on a computer system and they are creating a kind of system which is evolving all the time [...] and they use this system for their artworks and they try to explain this system to the kids. And the kids start to make this system by themselves.

And they explain the computer programme and the code. Lots of students don't really know that you can make a programme yourself. They explain the steps in a very simple way, creating an evolving system [...], which is similar to their installation in the exhibition.

Appendix:8.1. 3

SD:[...] The exhibition was about post-digital design, so that's quite a difficult term for these kids, so I went to the school and I showed a lot of examples from the development of mobile phones and computers. I explained the terms that were in the exhibition, like post-digital, analogue and digital, so that I didn't have to explain anymore during the tour - we could focus on the tour. That went really well, they were very enthusiastic and I showed them pictures of a moving robot and they really liked it. That turns on their imagination.

SD: I separate them in groups of three students and I assign each group with one work [...]. So they had to read the description... the assignment was to make a presentation of that work and talk about who made it, what is it, the facts, what do I see, what is it made of, and then what is my interpretation of it, what does the group think that the piece is about, what is my opinion about that, what do I think that the artist wants to tell me... And then you get discussions like "but I don't think it's art" and then I say "fine, that is your opinion, but tell me why you don't think it's art". They have to really think about their presentation.

SD: We are showing what art can be and not what art is, we are in the suburbs of the artworld and not in the centre. But that is art talk and I have to translate it to school level and to students that maybe know Van Gogh or maybe know Rembrandt, although mostly they don't [...] Mostly what I can do is to relate it to themes they [the students] are working with. What is today? What is technological development? Or the stories about the end of the world. Try to link it to something outside of the artworld or art that they know. You can talk about graffiti or urban things...

KS: [...]we call our tours "art confrontation", so we confront them with contemporary art, so we do not explain the works. It is an invitation to talk about art, to talk about society, their interests... So they feel really welcome - that art isn't really something unreachable. It is made by people and discussed by people and these are not strange people, but normal people.

KA: It was very interesting to see how this fourteen year olds deal with how to keep a secret. And then the idea is that through doing this, you start thinking about your privacy. And you start thinking about the nature of the staff that you leave on the cloud.

AV: The exhibition title was the art of hacking and we did a workshop together with Jaromill, who is an open source developer. We also invited [incomprehensible] who is a food designer and we did it together. Jeromil really talked about what is a hacker, what does he do and in what field. It is not only about the computer. It is about opening a black box. And it also happens with food, or gardening. And then we talk about it and we ask students "what is a black box for you? What do you want to research"? That was a really nice workshop, especially because it was a theory workshop

GP: So what reactions did you have from the students?

AV: The reactions were good. This was because we also showed them some examples with food. They all eat - everybody has to eat, so it is connected to everybody. And this is also important. That you talk about something that is connected to our daily lives. And we show them some kind of very weird mushrooms from the biological market. And they also had to taste the karnemilk which also is changing after a few days. So we talked about where does our food come from. The workshop was about questioning, how does it grow, but also about how systems work. This was a very crucial word in the workshop. The system. It was a bit difficult for them at first but later they started discussing this

with each other and they had to talk about their own black box and they really did. So the workshop was a success.

Appendix:8.1. 4

MW: One of the main systems that Waag Society works with, is the "user as a designer" that we place the end user in our design. We ask them for their input, because otherwise you are developing for someone that might not use it. So we very much keep in mind the end user of the development.

GP: So this is both the student and the teacher?

MW: Yes.

KA: I put these Easter egg-words in there. I put words that act as subliminal primers. I am very very careful with the words I use, and the words will trigger certain kinds of emotional responses. I use the word robot. These things are vibrating motors! Why is that a robot? We could have called it a machine, or an engine. It's called a robot, because a robot references a hundred year long dream of technology. Human beings have feared and worshipped and wished for a robot for a hundred year. It's a shorthand for "technology" and its promises and its fears and its possibilities. And wouldn't it be great if I hadn't have to brush my own teeth. So this is an example of that [priming]. Similarly in the USB workshops we talk a lot about secrets. We talk about particular ways of thinking about secrets. So the emotional and the artistic contexts of these workshops are actually quite heavy. Particularly for someone who hasn't agreed to be in an artistic process. So they're heavy subjects, but in the meantime, there some stuff that needs to be glued together, and "here's a bit of tape!", and "can I have the scissors?".

MW: Every year we have two research themes. This year the two themes are embodied learning and citizen science. With these themes we try to develop new educational appliances with the knowledge we have at the labs

KA: So, I use this idea of embodied making. The way that these things are allowed to express themselves without feeling crushing, heavy or difficult.

HV. Also, if you have many ideas, then how to [conclude] to one idea? that is a process - it is called the design circle. It's cyclic thinking - that is very important for innovation and it is very new for education.

GP: Can you explain how the design circle develops in the class?

HV: So at first everybody thinks what they would like to make. That is of a big scope. It's actually too big. But we want the children to release their fantasy. So with the help of our staff, who are designers. The next time they come they have something more concrete and they develop their design further. And the third time they come, their design has evolved into a final and more advanced design and idea.

AV: That what happens every time. They work with the students. They try to explain the basics of their works and then they are creating together with the students too.

AV: So we give them good examples and then they think about "how can I make an artistic film with my mobile phone"? What we like about this, is that when they go home they can do it by themselves too. And we also ask them to upload it to the internet. It's not about making this film, but also what role and how important is this mobile phone nowadays in your own life, but also in the society.

KA: I try to make a format where any teaching that has to happen, has to happen very fast. In a fast and concrete way because I want there to be space in which the insights can happen, the moment of "oh! right! that happened", and that's the kind of thing I'm looking for.

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AV: Also another workshop that is really great is the electronic jewellery workshop, which is about making a wearable. And we do that with a LED or a buzzer and we have a resistor and conductive thread. So, you learn these simple electronics and then you have to think: 'what do I want to make with this'? and "What do I want to communicate with it"? For example you can make something together with another person and you express your friendship. You touch the other person and the lights go on et cetera. [...] The basis is very simple and then the design is as complex as you want. And then everybody can do it and they also don't stress out when they see some electronics. Also for the girls. Fifteen year old girls can make these small circuits even though they are not technical at all.

AV: Another example is a very basic workshop I think, is how to make your own film with your mobile phone and it is always kind os success, because it is so close to them. They all have mobile phones and lots of students already have a camera in it, but they only use it in a very simple way. But we show them that they can also use it in an other, artistic way. We start by showing them some films made with a mobile phone by artists. So we give them good examples and then they think about "how can I make an artistic film with my mobile phone"? What we like about this, is that when they go home they can do it by themselves too. And we also ask them to upload it to the internet. It's not about making this film, but also what role and how important is this mobile phone nowadays in your own life, but also in the society. Because sometimes you see films in the news - there is accidents or bombings and there is always someone who filmed this and you see the shaking image. So we talk about this also. Citizen journalism. So, the workshop is not only about making a film, but using the camera in a creative way.

AV: Another example is a workshop we did with circuit bending, with the Dutch artist Gijs Gieskes. He bought very cheap plastic toy guns and the students had to open them and out of the circuit had to make their own instrument.

AV: They work on a computer system and they are creating a kind of system which is evolving all the time [...] and they use this system for their artworks and they try to explain this system to the kids. And the kids start to make this system by themselves. And they explain the computer programme and the code. Lots of students don't really know that you can make a programme yourself.

KS: For example in the performance project, we started with one girl and I gave her an assignment to write a weekly update about the project, so people could read what we were doing. And there was one girl who took photographs, so we had a short of documentation. And the second question to the "writing" girl was to make a summary after the project, so that you learn that too and get some

experience. And then my colleague responsible for the internet was also involved in this project and thought that this would connect nicely with peer education and [that we could] make an article about the theory behind peer education and our [WdW] experiences, but also the experiences of other institutions such as FOAM and the Stedelijk museum. So they interviewed many education employees and then they got interested in putting the article on their website as well, which creates a conversation through written articles about what we do. Because otherwise it stays behind the doors of the institution and I would like to open this up.

KA: The Vibrobot is a collaboration between me an Audrey Samson. Me and Audrey, we don't care about Robots in particular. What we care about is feeling ownership. That there is ownership to the things that you have. And if you can built this, you can build anything and if you can build anything, you can be a player in the world of things.

KA: We, on principle, got all the branded HEMA stuff just to completely disqualify the though that in this workshop there is something unachievable otherwise.

LB: It is mostly looking out our media consumption a bit more critically and in very simple forms, it is the question: what is an image and why does this image say this story and why if you change one element is says something completely different [...] why the same video with different sound with it says something completely different. It is this kind of stuff. I think it is great and I think it is very useful to teach in schools and it is good to make them aware of how this works, why stories are told and why you understand them as such, but I think you can take it much further. I think it is good for kids to know how the computer works. Not only as a graphical user interface, but how it actually calculates, what it does, how it works. You can't see it from the outside anymore. You have to just learn it, because otherwise you will never be confronted with it.

SD: I would still do things [workshops] that are in the context of the exhibition that we do. On the other hand is to collaborate more with people that have other skills. I can use what we have hear to provide content for a workshop that somebody else has developed, about game-design for example. He had a workshop about game-design and I can say that the exhibition is about the future of the city and game-designers work with drawing architectural futures, so the future of the city is the theme for this workshop.

Appendix:8.1. 5

AK: The Vibrobot is a collaboration between me an Audrey Samson. Me and Audrey, we don't care about Robots in particular. What we care about is feeling ownership. That there is ownership to the things that you have. And if you can built this, you can build anything and if you can build anything, you can be a player in the world of things.

AV: Fifteen year old girls can make these small circuits even though they are not technical at all. So don't make it too difficult, but neither too easy. You really need to take them seriously and never underestimate them.

SJ: And not only talent of course but also interest.

AK: Yes, also interest, you don't really need to have a talent just to do that, of course. I mean with hard work you can do anything.

SJ: Talent <u>is</u> hard work [laughs]

GP: Exactly. This is what [François-René de] Chateaubriand used to say. "Talent is nothing more than long patience. Go and work."

KA: One thing that is very important to me when you do these experiences is that I have to take responsibility for the situation. I am asking them to do something crazy, from their point of view. I am

asking them to do something that is way out their creative comfort zone. And in order to do so, I have to take responsibility. I go in there - I am the mad lady who asks the thing - and because it's my responsibility, they dare to do it.

KA: And then we ask them to design the robot. And this again is for teenagers. And it is shocking how they have this moment when they go: "but how should it look?" and I go: "I don't know. What do you think?" and they suddenly realise that it has been a long time since someone asked them a question like that. These are kids that are in these kinds of schools where they're never really asked to create anything.

AV: So we give them good examples and then they think about "how can I make an artistic film with my mobile phone"? What we like about this, is that when they go home they can do it by themselves too. And we also ask them to upload it to the internet. It's not about making this film, but also what role and how important is this mobile phone nowadays in your own life, but also in the society.

SJ: Citizenship! So if you are a good citizen you take care of yourself and your own health, mentally and physically. And how do you do that? So we used arts, for instance we did a dance project with modern dance but also with street dance, but also they had lessons on "what's a healthy lifestyle" while other projects were about how to be a critical consumer".

A.K: Education is the most important thing there is in the world. Because you want to educate yourself all the time. It doesn't stop at the end of school, it goes on and on. If you don't get a good basis in school and make education something that you really would like to do for the rest of your life, you can miss out on so much.

KA: I try to make a format where any teaching that has to happen, has to happen very fast. In a fast and concrete way because I want there to be space in which the insights can happen, the moment of "oh! right! that happened", and that's the kind of thing I'm looking for.

GP: All of the events that you have described to be, extend in time - they are not one-off events. Ok, the tours around the museum are short, but you have so far told me about projects that last for four seeks, for sex weeks, for six months, for two years. Why? Why is that? I like it personally, but it is rare for such projects to extend for so long.

KS: We have the mission to share our knowledge and give young people the tools to survive in the artworld which is a very tough world. And I think one keyword is "working together", bundle your powers and work together on projects. We train them to learn this, because often this is not offered in schooling environments. So we see this as part our mission to create this environment.

Appendix:8.1. 6

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GP: and how about your collaboration with the teachers?

KA: If the teachers are there we make them participate on equal footing with the children. It's very important to destroy the teacher authority for a successful workshop to take place. [...] We see huge

differences group by group in terms of who the teacher is. The hardest thing I had to learn when I started doing this was that you have to stop the teacher thing, just because if you go there and you are a teacher you're gonna fall into a well established patter and you're gonna be the new guy.

AV: That what happens every time. They work with the students. They try to explain the basics of their works and then they are creating together with the students too.

KS: Yes. We did a performance project. It was during the Angela Bullock Exhibition. There was a group of people invited and they developed a performance together with the artist in eight weeks. The youngest girl was eighteen and the oldest was twenty six. They were from different backgrounds, some from the fine arts - making things was very normal for them but we also had a girl from music theatre, photography, three people studying art history. So it was a very diverse group. Some of them were a bit afraid of making an artwork, but they all ended up performing. The performance also took place during museum night and their friends and peers took a different view on the artworks of Angela Bullock.

So we have created books, but also events with young people, such as the Exiting Museum and the event before called "Where Do We Go From Here" which was organised by a group called "Speak Out" and we invited young people to work here for four or five months to create an event or a project.

LB: And the idea right now is that kids might not be interested to learn how to play the violin in that way. They have other interests. So we have to go out and see our customers and ask them what is it that they want to do and how they want to do it. So instead of just putting stuff out there and offering it to the world we have to go to the world and ask what they want us to do. How can we make it the most interesting to you. And this is a mentality shift that we try to make it happen with the people who work there.

KS: With the free-time projects for example, we invite a group of around eight people to work in WdW for a couple of months. We share with them our knowledge, but also the team of WdW learns a lot about things they are interested in, what they really want to know about the art-world.

KS: Often a book for young people is designed in a very colourful way, images and strange connections. they didn't want that. they wanted a clear white book. It was interesting to learn that from them and about them. Often people think that youngsters are only playing games and not reading but that is not really true. Maybe this is shifting in percentages, but the group we found was really up for books - and they wanted to share it with their friends and their age group.

AV: Some of the teachers are also quite old and they get very nervous when they see the electronics, but the kids are in such a different world, so this gap between the teacher and the student is huge and this is why the kids like it here so much. It is close to their own world.

AK: In my experience as a teacher, what I try to do when I notice that a student has a lot more experience with a programme [...] and they're really smart with photoshop for example. I always try to get them together with another student, who is not that easy with the computer and then try to make a partnership between the two, just to help along. And of course you try to give the kid who is further along, also more information because they also want to learn something. But the teaching between students is something that they both learn a lot from. It is a different kind of learning, especially for the one who knows a lot, but it also makes a very nice teaching environment and that really helps.

MW: It very much depends because a lot of teachers have very much invested in developing their own technical skills, but there are teachers whoa are starting to teach and are very much educated with the new technologies themselves. And there are teachers who are in their fifties and get intimidated by computers in general. So it very much depends, and the children nowadays are the

ones who are the most forward in this part. So that's also a thing we try to use, in a way that children can teach the teachers as well. It's very different and depends on the teachers.

AV: They work with the students. They try to explain the basics of their works and then they are creating together with the students too.

LB: It is more about having fun [while] expressing yourself, making things that are pretty, or you think are interesting. I think it is a kind of playful learning environment.

Appendix:8.2

SD: I definitely need more time to prepare though. It is about communicating what you are doing, or what you have to offer. Then I need more time to get it through to the teachers and the schools. So now, all of a sudden, I have a few schools coming and they only apply for the tour and workshop, but the workshop that I am doing now is more a reflective workshop, so I am not giving them a tour but I let them make the tour themselves.

LB: Ideally, I would have all these colleagues working full time.

KS: Ok, so the ideal situation is that I get at least two colleagues for doing this, so we have more time [...]. And a lot of personal contact.... I wouldn't increase the numbers [of visitors], but I would increase the contact time with [the] audience.

MW: Educational systems are well known to be very slow and backward in development, especially when you talk about technology. The main problem we face is money. All the schools and groups of schools, just don't have enough money to spend. So when you want to incorporate new innovations, they always look for the cheapest way to do that. And that doesn't always mean that they get the best developments. That also doesn't mean that they make the smartest moves.

HV: The biggest problem is money. [laughs]. Because we have to train people, people who are able to "translate" a 3D printer to secondary education, and that takes development time, and yeah, you need money for that.

AV: Yes... Yes. It is kind of...there ... stored in a computer somewhere [laughs]. What the thing is, is that it is difficult to pass it through. It is complicated. [...]

SD: [...] and then we can talk about "what is the level of your students? and what are the themes that you are working on", but mostly, if I ask them, teachers don't answer to me.

SD: I don't know if it is a lack of interest. It probably is the lack of time and the schools that come here they come more ad hoc.

SD: [...] of course I want to get feedback from the teacher as well. And normally they say "oh, I really liked it, I think my students learnt from it, I'll talk with them about it afterwards", but I never get that feedback.

LB: Well, [we only sometimes get feedback] because people are busy, or they can be a bit reluctant to say when something is not completely as they wanted it, so sometimes you have to call a few times and say - "hey, let us know what you thought, and we would much appreciate it", so we have to actively look for it [laughs].

HV: No! [pause] We communicate with the teachers before they come. But what we do is very modern and the teachers in this region do not have the technical skills to prepare the students.

AV: No, not really. Of course it really depends, because I always send them a kind of package with exercises that they can do in class to prepare and talk about it. And they [teachers] always ask for this package, but they almost never do it! It's really a pity. It is that they do not have time for art. There are

of course classes, but time is always the problem. Some classes do the package, but often the teacher doesn't even know the title of the exhibition, while others really read the package, so it really depends.

AV: To instruct the teachers more. It is a pity that it doesn't happen. The teachers don't instruct the class [over the workshop subjects] after the visits. Maybe not only one class, but a few more.

SJ: Yes, I think that's the most important thing. That it isn't just an hour and nobody looks - the teachers think hey that's my smoking hour now, this is the key to my room, go do your thing.

EB: We also looked for schools that were explicitly, or implicitly but could make a direct link to the 21CS, but there were not many schools we could find, only a few.

EB: I think that the schools should prepare the teachers for the 21CS. And there also needs to be a consensus that these skills need to be part of the teachers qualifications.

MW: It very much depends because a lot of teachers have very much invested in developing their own technical skills, but there are teachers who are starting to teach and are very much educated with the new technologies themselves. And there are teachers who are in their fifties and get intimidated by computers in general. So it very much depends, and the children nowadays are the ones who are the most forward in this part. So that's also a thing we try to use, in a way that children can teach the teachers as well. It's very different and depends on the teachers.

EB: If you compare how things were two years ago with now, now you hear everywhere about 21CS. Everybody talks about it and knows what it is, but when we started the programme, this was not the case. [...] The problem with 21CS is that it is a wide field. It doesn't have a very focused meaning.

SD: Now the local politics is saying that every arts institutions has to do education, and it wasn't that way before. So there are institutions that never did things for primary schools or high-schools. I think it is crazy to cut the budget and then say [to the institutions] you have to do things for schools. Because then you don't have people that are able to do that, you are going to do something that you don't want to do.

SD: With cultuurstation or other institutions that are there, I would love to do research. I can provide a laboratory for researchers - tell me what you've been researching and we'll try it here. That would be really interesting. [...] For myself I read a lot about different things, not being focused on one development. But [research with institution like cultuurstation] handles a lot of issues. It is about collaborations between schools and institutions, it is about implementing technology, it is about changing roles, it is about getting money to do it and what are different sources for doing that. [...] For me it would be really interesting to collaborate because I know there are initiatives in universities and different departments of other institutions that are researching this. But they do not come to us. They research by reading literature or by talking to people that are in the bigger institutions because they have more power to do things. But I think it's really interesting to look at the smaller institutions as well.

SD: But I think that institutions like MU, like V2, like Mediamatic or NIMK. These are institutions that are already looking at that development and there's something to learn. Maybe they don't have a very educational focus on children but rather on young professionals but it would be really interesting to see with them what can we do in schools.

EB: The ministry is also looking internationally to the PISA scores and they focus on literacy and mathematics, and then you have all kinds of other problems in society that education has to solve. And then they see this [21CS] as another problem that we have to deal with. And thus 21CS are not placed in a context. So, I think we need to place it better in the context, that it becomes the essence of education.

GP: You mentioned earlier research that has been conducted in terms of skills by the European Union. Are you also aware of any of its aims, or policy?

EB: To be honest, no. I know nothing at all about it. I know from the research of Joke Voogt, she also shows the EU key competences - so I know that they have done research into it. But I didn't find anything actual at that moment

MW: I think there is a lot of policy around education, but cultural education has been the least of their priorities and that's how it is. But I think - and that's not so much a policy thing but on initiative from schools and municipalities- there is a very heavy emphasis on language and math skills right now. I think that schools themselves should incorporate these things with each other. So math is not just math, but you can use it in a cultural setting. Language is not only developing a vocabulary but you can also go to the theatre.

GP: ...but my question is more directed with the EU experience.

HV: That went via a management bureau and that bureau has made the application.

GP: Is this a private or public office?

HV: The Leonardo experience is a public entity. The institution that made the application is a private, commercial institute.

GP: ...so they helped you make the application et cetera.

HV: That's very ease for us. Because [otherwise] it's very difficult! [...] that's a lot of work. You need a specialist for that kind of project [laughs]

HV: A lot of companies don't think in the long term. No no. It's short term targets. I want to have people with technical skills now! I want to pay for it now! They are not looking forward.

AV: No, I don't know about that. Do you have information about it? I have no idea about it. I think it's really bad.

SD: I think that is something that cultural institutions should research, or should be provided with. There is for example the cultuurstation, which is an intermediate between schools and institutions... on provisional level you have kunstbalie... around Rotterdam there is SKVR... I see them as intermediaries, but what they tend to do, they develop their own programme. Fine! Because they think that they know about didactics and there is a lack of that in the institutions, but what I think they should do is that they should teach the institutions the didactics. What do the schools want. Not just practical stuff, like one hour workshops or providing transport for a big group -this is also important- but the next step which is to talk about what are the themes that schools are working with. They can provide us with that.

Appendix:Interview_Transcripts

INTERVIEW Simone Dressens - MU, Eindhoven

SD: I started working here in September last year [2011], so I haven't been here that long and MU has sort of a reputation for having a good educational programme. They are active to get young people here to teach them what are the developments in art and design at the moment.

SD: [...] and then we can talk about "what is the level of your students? and what are the themes that you are working on", but mostly, if I ask them, teachers don't answer to me. They say "no, we just want to come and we'll see and we know that you provide a good workshop and a good tour, so we will just come and observe"

GP: Do you see this as a problem? That they don't try to merge it...

SD: I don't know if it is a lack of interest. It probably is the lack of time and the schools that come here they come more ad hoc. Last week I had two schools calling me [and saying] "We want to come next week", so they come last minute. If they want to do a bigger project, we say that we can offer that, but probably they go to bigger institutions first.

SD:[...] The exhibition was about post digital design, so that's quite a difficult term for these kids, so I went to the school and I showed a lot of examples from the development of mobile phones and computers. I explained the terms that were in the exhibition, like post-digital, analogue and digital, so that I didn't have to explain anymore during the tour - we could focus on the tour. That went really well, they were very enthusiastic and I showed them pictures of a moving robot and they really liked it. That turns on their imagination.

GP: You said that some of the schools come back [for more workshops]. Is this an evolving process usually? I understand that these are one-off events. It is now and then maybe one year later. But does the collaboration between a school and the organisation, evolve in the long term?

SD: [...] of course I want to get feedback from the teacher as well. And normally they say "oh, I really liked it, I think my students learnt from it, I'll talk with them about it afterwards", but I never get that feedback. I do always email them, because I take pictures and send them and then I get some comments [...] they are mostly positive.

GP: Is there a preparation period before a workshop? and how do you prepare?

SD: Definitely there is preparation [...] I definetly need more time to prepare though. It is about communicating what you are doing, or what you have to offer. Then I need more time to get it through to the teachers and the schools. So now, all of a sudden, I have a few schools coming and they only apply for the tour and workshop, but the workshop that I am doing now is more a reflective workshop, so I am not giving them a tour but I let them make the tour themselves. I separate them in groups of three students and I assign each group with one work [...]. SO they had to read the description... the assignment was to make a presentation of that work and talk about who made it, what is it, the facts, what do I see, what is it made of and then what is my interpretation of it, what does the group think that the piece is about, what is my opinion about that, what do I think that the artist wants to tell me... And then you get discussions like "but I don't think it's art" and then I say "fine, that is your opinion, but tell me why you don't think it's art". They have to really think about their presentation. And their third assignment was the end of the world. How do you think that the world will end. I gave them a big paper and they can write on it and they can draw on it and that is their presentation. Then we go with the whole group to do the tour and the group that prepared that work they have to tell about it.

GP: My next chapter is about best practices and dissemination. Firstly, is it easy for you and how do you learn what other institutions do, or get inspiration from them. And secondly if it is easy for you to present what you have done here and what you have learnt during the process?

SD: Here at MU I am still kind of looking for the best way I can present MU in educational offers we do. I think we have a good basis but we can do more - if I can take the time for that. Because I worked as a freelancer as well, I did a lot of workshops as a freelancer, but I really think that it is of additional value to do something in an institution or with an institution, because then you have a context. I did graphic design workshops, but if I could have combined that -and I did before- with an exhibition about graphic design, like in a museum or a festival for graphic design, then it has more value. To combine things. And that is what I am looking for here as well. That is a really big value. That you can do a guest lesson, or a theoretical lesson but it so much more interesting when you can do a tour, or when you can do a workshop. You need to combine these things, it is more effective. For me it is always a learning process. I mostly do things intuitively because that works best for me. Of course I think about a structure and what do I want to talk about, but you have to be flexible.

SD: I am still looking, how can I talk about what we are doing here besides the content of one exhibition. And of course we have a red thread, our theme is contemporary art, international art and design. We are showing what art can be and not what art is. We are in the suburbs of the artworld and not in the centre. But that is art talk and I have to translate it to school level and to students that maybe know Van Gogh or maybe know Rembrandt, although mostly they don't [...] Mostly what I can do is to relate it to themes they [the students] are working with. What is today? What is technological development? Or the stories about the end of the world. Try to link it to something outside of the artworld or art that they know. You can talk about graffiti or urban things...

GP: But your experience being a teacher I guess helps into knowing what kind of material they are doing at school.

SD: True. I think that is something that cultural institutions should research, or should be provided with. There is for example the cultuurstation, which is an intermediate between schools and institutions... on provisional level you have kunstbalie... around Rotterdam there is SKVR... I see them as intermediaries, but what they tend to do, they develop their own programme. Fine! Because they think that they know about didactics and there is a lack of that in the institutions, but what I think they should do is that they should teach the institutions the didactics. What do the schools want. Not just practical stuff, like one hour workshops or providing transport for a big group -this is also important- but the next step which is to talk about what are the themes that schools are working with. They can provide us with that.

SD: Now the local politics is saying that every arts institutions has to do education, and it wasn't that way before. So there are institutions that never did things for primary schools or high-schools. I think it is crazy to cut the budget and then say [to the institutions] you have to do things for schools. Because then you don't have people that are able to do that, you are going to do something that you don't want to do. If you get a group of kids [that are] ten years old, it can be really annoying and if you don't know how to handle that, you cannot do education. You need the passion to do that. Then the local politics should look at every institution and see what can you do, instead of just saying you have to do this.

GP: I wonder about you awareness about policy interest in educating kids and fostering their innovation skills, or their 21st century skills -there are a lot of different descriptions. Do you know about this interest? Do you think that the funding and the applications are accessible for MU or for similar organisations

SD: I think that I don't know a lot about it. I am aware of the discussions, I read articles about the changing landscape for education, the questions about how can we combine education with technological developments.

SD:...that is something I wanted to say earlier. What is the additional value I can add my network of people with these skills - with skills in art, with skills in design, in gaming or whatever. So I can give more depth to the subject. I think institutions now tend to be superficial - we tend to make in comprehensible for everybody. I think we should take it a step further and make it challenging. They come and they have to take the steps, so we have to provide something that they are willing to see, we have to make it accessible - but then you have to challenge it. The teacher has to be open to outside knowledge.

GP: If you would like to think about future developments - how you would like this to evolve. What would it be like?

SD: I would still do things [workshops] that are in the context of the exhibition that we do. On the other hand is to collaborate more with people that have other skills. I can use what we have hear to provide content for a workshop that somebody else has developed, about game-design for example. He had a workshop about game-design and I can say that the exhibition is about the future of the city and game-designers work with drawing architectural futures, so the future of the city is the theme for this workshop. I think that then we can add value. I think that this is a practical form of collaboration but there is more. With cultuurstation or other institutions that are there, I would love to do research. I can provide a laboratory for researchers - tell me what you've been researching and we'll try it here. That would be really interesting. [...] For myself I read a lot about different things, not being focused on one development. But [research with institution like cultuurstation] handles a lot of issues. It is about collaborations between schools and institutions, it is about implementing technology, it is about changing roles, it is about getting money to do it and what are different sources for doing that. There are so much that you can focus on. But I cannot focus [on research]. I just have to do it. Now. So that would be really interesting to do. For me it would be really interesting to collaborate because I know there are initiatives in universities and different departments of other institutions that are researching this. But they do not come to us. They research by reading literature or by talking to people that are in the bigger institutions because they have more power to do things. But I think it's really interesting to look at the smaller institutions as well.

GP: Especially with the large ones, it happens on such a massive scale that you don't have the personal connection.

SD: FOAM, the photography museum, they have really interesting educational programmes, or probably Stadelijk [museum] will have when they open again. But I think that institutions like MU, like V2, like Mediamatic or NIMK. These are institutions that are already looking at that development and there's something to learn. Maybe they don't have a very educational focus on children but rather on young professionals but it would be really interesting to see with them what can we do in schools.

GP: You said before that institutions might be afraid to collaborate. Afraid of what?

SD: It is about egos. I am making this up, but I've thought about it and talked about it before. Ten years ago as an institution, the trend was branding. You have to set your institution as a brand, because they have to know what MU is. You had to define yourself first and you had to stick to that. And I now think that there is an anxiety of loosing that. That you would loose yourself in a collaboration. When it is not clear who is organising it, who is doing what. I am not sure about it, I am brainstorming with you. It is just something that I feel.

SD:... It works like this. In September we make a programme for next year, so then I know largely what the exhibitions will be in 2013. So, then we give that plan to the funders and in October or November we know if we have money to do that programme. But in a bigger institution they know two years upfront. [...] they start working on a project at least a year upfront. So that gives them time to do it. Especially if you have ten people working there, pair two people and the other people can work on the rest. But here [at MU] if we pair two people that is the whole team... We could still do things like that. We can collaborate a lit more as well, but you do what you can. But I am educational

manager but I am also a communication manager and a programme manager... The director and the production manager too [also have many responsibilities].

SD: ..I am really glad you are doing this. It was in a good time, because I actually said I wanted to do more with education. So I have been working here for half a year and I am reflecting on what I am doing and I think I a doing too much with not enough outcome because I am doing all sorts of little things - and of course we need to do those. But I want to focus on the educational programme because there are a lot of things we can improve and there's a lot of things we can add. So it is in a good time that you came and I could reflect on it. Thanks.

INTERVIEW Loes Bogers - CKC, Zoetermeer

GP: So, why don't we start by you telling me how long have you been working there and what is it that you do.

LB: I've been working at the CKC Digital Art Lab as the lab manager since November, so that is six months now, and before that I worked there as production coordinator, so I was doing more production work. The Digital Art Lab [DAL] is an R&D space inside CKC - CKC is a school for amateur arts - and the DAL is a place for people researching arts eduction involving digital technologies.

GP: What does your new role involve?

LB: Things are constantly changing because we have to invent the best structure for the process in a sense. Right now I am working with eight arts teachers from different disciplines and being their manager basically means that I make sure that they have a space, and the space works, and the people work, and there is time-space, and there is equipment to experiment with. So I organise design cycles and design cycles is what defines the research process. It starts with a content injection - We get people from outside like media experts to come in and give two-day workshops - and masterclasses are their practice, so that can be an artform or technique or... could be anything, but the last time there were two people coming in and they taught us video mapping and VJing, so video mixing skills. There are new themes every now and then. After these workshops we have these brainstorm sessions and out of the brainstorms come new ideas and then we turn ideas into activities, events or what CKC calls products.

GP: How do you choose what kind of content, or what kind of artists will you put [in the programmes] what are the criteria.

LB: There are no criteria I suppose. Sometimes I come with something and I ask the team if there is something they are interested in and they say yes or no and usually they say yes, luckily! and the teachers they express an interest in something. For example there is a ceramics and sculpture teacher who suggested we should try to do something with 3D printing, so we went to TU Delft and we got in touch with some people who were into prototyping and that kind of stuff and she just got some information together and some ideas and some inspiration... and that's gonna be the start of a new design cycle.

GP: How long do they [design cycles] last?

LB: They do not really have a precise end point, this is something I would like to have more, because sometimes things can just fizzle out.

GP: And you would like to have more of an end point.

LB: Yeah, So there is stuff for working towards and then we do it until it has some kind of finishness in a way, but because there was a lot of unfinished stuff that we had to finish. But the idea is that a design cycle should last for around three to six months.

GP: So then you have the artists and they give a couple of workshops at first to the teachers and from then on the teachers pick up and they use the equipment and they are able to tech that stuff?

LB: Yeah. And they are able to combine it with what they do. So somebody who is a sculpturing teacher and they learn video-mapping, they want to make living sculptures, but a dance teacher wants to make more theatrical performances with it, this kind of stuff. So they come up with new workshops, new courses, new activities for students.

GP: So, I have to questions here. Let's say that someone comes and they do video mapping or whatever. How does the technique stay there? Do you have a technician that maintains and is able later on to give feedback, or help the teachers?

LB: Well, we do have a systems administrator and he is an artist, so he knows a lot of the software that we use, or he is kind of familiar with this kind of things. He mostly does maintenance - he doesn't really support the teachers, but only once every so often that they have a specific question. But they [teachers] are kind of taught to do it themselves afterwards - so they do some auto-didactic training and they just get on with it basically

GP: And do you thing that the two days [that workshops usually last] are enough, or three or whatever it is? How does that go?

LB: Well, it is also a matter of time, because teachers have to come over for two days and learn this stuff. We can do it for a week, we can do it for two weeks, but they also have to do their own work. So, I don't think that two days are enough to learn anything in full, but I also think that it is short of the mentality that comes with D.I.Y [Do It Yourself], digital media, electronic stuff - You just have to figure it out, go online, go on the forums and... you know... figure it out yourself, after you've learnt the basics. So this is also something that I encourage them to do - Don't keep asking for expert help, but just try to figure it out yourself... and they are getting pretty good at it too. It took some adjusting I must say - In the beginning they were eager to have the teachers come back [...]

GP: I want to know your opinion about the kind of skills that you teach the kids. How do you see what you offer. What is the meaning of it.

LB: ...the most important thing is that the kids who come in, they learn something but they learn how to just do something where they do express themselves - Just make something, do something and have a little fan as you go. It is not super strict as if "you have to know this and you have to know that, because this is important and dah-dih-dah" It is more about having fun [while] expressing yourself, making things that are pretty, or you think are interesting. I think it is a kind of playful learning environment.

GP: I guess that many kids come on their own, or through their parents, or do you usually work with schools?

LB: Well, every now and then we work with schools... actually, it is both. So kids just come in, because we put out a call that we have an activity, and you should come, and it's gonna be great... and we have a tryout and then people come and test the workshop - that is basically what we do. They come test the workshop, we try to make it better and then we form it into a product and when the product is finished it goes out of the DAL and into the CKC.

GP: and now with the schools. I guess many of them know you already, or do you have new schools that approach you often?

LB: In the first year [of the DAL] we were really active in approaching the schools and saying "we have a thing, do you have an occasion we can test it out with your school kids?" So we did that in the first year. We are not so active at it anymore at the moment, but every now and then they come to us, because they have a thing and want to have an activity.

GP: ... and how does this work? I want to know if you keep working with the same schools and also the feedback process. How do you find out if it worked, if the teachers there learnt something, if they incorporated it in their curriculum, or if you speak with them in advance and try to see how you can connect.

LB: Right. So we do stuff to measure every now and then. For example there is this one school [called] the Erasmus College and they have like a celebration because the school was twenty-five years old of something like that. And they asked a visual artist to make a sculpture on a wall, and this guy came up with the idea to make an interactive wall that responds to sound. He had the idea but he didn't have the production skills to make it himself, so they were looking for partners to do it and the school came to us and asked "can you help make something and build this interface – like this piece of software and maybe also make kind of workshop out of it so that the kids can learn how to programme". And this was completely custom made to what they wanted and what they had in mind and they're actually teaching it now, so they are teaching this at the school and one of the teachers knows how to do it. But in other occasions they come because they have a "practice-based-week" and instead of just being in school they learn how to do stuff. So they cook, or they do sports or they do a little project or theatre show... and for this week they came to the CKC last year and we run some workshops and then they leave - that's it. It is not always the goal to make them incorporate it in their curriculum. It s more that we want them to come to us for these kinds of things - but we do both.

GP: Do you deliberately ask for feedback, or for communication after [the workshop]

LB: Yes.

GP: And do they give it to you?

LB: Well, sometimes, because people are busy, they can be a bit reluctant to say when something is not completely as they wanted it, so sometimes you have to call a few times and say - "hey, let us know what you thought, and we would much appreciate it", so we have to actively look for it [laughs].

GP: Now that you have been working there for a while – I guess everybody devices their own method of working – is there a method that you have developed and suits you? And the reason that I am asking is that you start developing some manners in operating in a job, but this is because the institution or the job, or the system more broadly, has some inefficiencies and you find ways to work around them.

LB: Our bigger inefficiency were how do we get from a really cool idea that people have, and they make a little project around it and it's great - how do you get from that point into having a feasible product that will also survive. And this process – going from A to B – was really hard. We didn't know how to do it. It was like we were speaking different languages - from the sales department - the head of the school etc. So we had to develop a system where we knew what kind of information they wanted and how we can work this in a format that everybody understands in their language and the information is all there. And then how we can sort of judge whether there will be a living product that is cost efficient and that kind of stuff. Because most arts teachers have never thought about their ideas that way - it is a really commercial way of thinking and there was much resistance, so we had to work out how to get these parties together and explain that if you have an idea for something, this is the format in which I need to be able to see it, otherwise I cannot judge it for its worth. So, we developed a process for this...

GP: ...to communicate between all the different departments

LB: Yes. And to work together, to go it though it also. If we do the whole process from A to B and then at point B there is all these other people standing and they say "No, you have to go back", that is really frustrating, so now we try to involve them along the way and get to that point together.

GP: In trying to make your work better, having it be more effective what do you think would enable you to do a better job, or a more effective set of workshops [...]

LB: Ideally, I would have all these people working full time - and we would have full time fun doing cool stuff

GP: you mean your colleagues?

LB: Yes, my team, my team of teachers. But only have a limited amount of hours per year and I have to work within the hours that I have and I would always like to have more. But it's funny you should ask because the last six months... My personal way of working is like making personal agreements and we say that next Monday you will have this and I will have this and we will exchange and go to the next point. So this is how I like to work when doing projects with whoever. But it turned out that that was not really a way of working with the people I have to work with. They can be a bit unorganised, a bit chaotic - they don't really live on their calendars in that way, so I spend a lot of my time calling them and asking "hey, did you do this? cause I didn't get anything etcetera" and it just didn't work, so just this week I had a discussion with my director and I said that I think that I must be on the floor with them more. Like do stuff together and not do them separately then talk about them. We just have to be there, sit there and do it. So that is what I want to go towards more. But so we should have less people at the same time, because we have eight people working with me now and it is too much - maybe it is better to work with three or four people at once but then have like an afternoon where you just sit and work it out instead of having to cram everything into one hour and then having to do the rest at home. Because 'at-home' stuff doesn't work - it is like homework - better to do it 'in-class' and then it is more effective.

GP: Is there pressure to work with more schools or to develop product that are going to be more successful or is this out of the table?

LB: I don't really have set goals with numbers attached. Thank god. The people that decide how the place will be run, they see the value of experimenting and to having failed experiments there as well. They just see the intrinsic value of having a place where you can experiment and play and do research. Because they think that it is an in-depth investment so it doesn't directly have to result in more people coming in or more money coming in. They say that it's good that people come and see it and it's good when you sell a project because people want to pay for it - that's great- but it is also really important that the stuff you do makes the teachers think more like entrepreneurs - and this also spreads to other people in the organisation and they see that as being of value. It is good for the organisation and they see this so that takes a lot of the pressure of.

GP: You said that you want teachers to have a more entrepreneurial thinking. Can you describe what you mean by that and how it is achieved?

LB: Well, if you look at amateur arts education, people in this country have been doing the same thing for many years. The system hasn't change, the way of offering courses and stuff is the same. Like you learn music by something really easy and then you practice every week And the idea right now is that kids might not be interested to learn how to play the violin in that way. They have other interests. So we have to go out and see our customers and ask them what is it that they want to do and how they want to do it. So instead of just putting stuff out there and offering it to the world we have to go to the world and ask what they want us to do. How can we make it the most interesting to you. And this is a mentality shift that we try to make it happen with the people who work there.

GP: How would you like to see this evolving? If you stay in this field how would you like to see in in four or five years? What would be an ambition?

LB: Well, I think it would be nice if we would be the go to place for media competences. And this [media wijsheid] is like a hot topic. So is FaceBook scary or why is it not so scary, what is editing, it is actually very basic skills and knowledge about media production, communication and this stuff.

GP: What do you see in media competences?

LB: It is mostly looking out our media consumption a bit more critically and in very simple forms, it is the question: what is an image and why does this image say this story and why if you change one element is says something completely different [...] why the same video with different sound with it says something completely different. It is this kind of stuff. I think it is great and I think it is very useful to teach in schools and it is good to make them aware of how this works, why stories are told and why you understand them as such, but I think you can take it much further. I think it is good for kids to know how computer works. Not only as a graphical user interface, but how it actually calculates, what it does, how it works. You can't see it from the outside anymore. You have to just learn it, because otherwise you will never be confronted with it.

INTERVIEW Karin Schipper - WdW, Rotterdam

GP: Firstly, what is your job title?

KS: It is called curator for educational programmes. But in practice it is projects for high-schools, also for HBO schools, art academies - students between 18 to 30, but also the PABO in which they learn how to teach kids in the primary school. Our main focus with education is people between 14-15 year olds until 26. This is partly decided for practical reasons [...] so we have projects for schools and we also have programmes for the free-time. We call them more experimental projects. We are the only institution in Rotterdam offering workshops, masterclasses, free-time projects in universities.

GP: I was looking at your activities programme and I though that you are quite focused on teenagers and young people. I don't see many contemporary institutions addressing this in particular - Not only here [Rotterdam] but in the Netherlands in general. Bigger institutions have this kind of focus, but smaller institutions, not really.

KS: Yes, but the big institutions like Boijmans for example, have six education employees and a planner. And you make different decisions when you have staff like this. Our main focus is to share the knowledge we have about contemporary art [...] and also learn from these youngsters. With the free-time projects for example, we invite a group of around eight people to work in WdW for a couple of months. We share with them our knowledge, but also the team of WdW learns a lot about things they are interested in, what they really want to know about the art-world.

GP: That's very interesting, and I have many many questions, but I'd like to know what are the aims of your educational programmes, what are the qualities that you are most interested in?

KS: That's a question to which there is not one answer. I think that when a high-school comes in, the aim is to provide learning about contemporary art in a nice way. It is always mixing their interests with the interests and information that the artists shares with that [particular] exhibition. Contemporary art is so different from a museum showing a collection with old works. Sometimes they are surprised with an installation showing Meriç Algün Ringborg [Exhibition name: Prompts & Triggers] for example. It is only text on a wall and they are really surprised, but this is the secondary schools, so between 14 and 17 years of age.

GP: Yes, that is also the age that I am interested in.

KS: So, we call our tours "art confrontation", so we confront them with contemporary art, so we do not explain the works. It is an invitation to talk about art, to talk about society, their interests... So they feel really welcome - that art isn't really something unreachable. It is made by people and discussed by people and these are not strange people, but normal people. Sometimes that is very important to start with.

GP:...to familiarise them

KS: Yes. We did a projects with six kids, in the age between 14 till 17 and we wanted to make a book about contemporary art, made by youngsters, for youngsters. And then we thought at the start of the project that this will take a year. But then it ended up taking two years - so they were getting older and older and when we ended, the youngest girl was 16 and the oldest boy was 19. It is called JET - the JET book [Junior Editorial Team]. So this project was a learning school for WdW and of course for them - they didn't know so much about art. We wanted to know what they would ask an artist, what would they read about art. So all the ideas that are in the book are made by them. Of course we had a training programme, we met a couple of artists, we visited them in their studios - we went to a printer and a graphic designer to teach them what is a book. Of course we discussed [whether] should it be a book or a website and they were very convinced that this should be a book. In a way you expect them to be digital kids, but it is not always true. Often a book for young people is designed in a very colourful way, images and strange connections. they didn't want that. they wanted a clear white book. It was interesting to learn that from them and about them. Often people think that youngsters are only playing games and not reading but that is not really true. Maybe this is shifting in percentages, but the group we found was really up for books - and they wanted to share it with their friends and their age group.

GP: Now that you mention it, how did you get these students?

KS: To start with, we have during these art confrontations contact with the teacher. Sometimes we know teachers very well from high-schools. And there is always one boy or girl in the group that is more interested in art than the rest. So when we started this project there was a project before JET which as ten workshops on a Saturday for the same target group [14-17 year olds]. So this was a pre-project, testing them on what they found interesting in the arts. This was a larger group with twelve people and then we invited them to work in a book and four of them stayed to work on the book - and then we found two more people because we wanted around six, but ended up with five because ine of them had no time.

I think that when you are 13-14 years old, you are more focused on the group and when you are fifteen or later you are more focused on your individual qualities. So, getting the right students depends a lot on teachers and "right-time right-place". Maybe nowadays you can do more things with social media - then Facebook didn't exist.

GP: Can you tell me more about the workshops that you organise?

KS: The ARTVIPS were a lot of workshops. They went to see graffiti pieces in the city centre, then they visited Mocca in Antwerp, they met artist Jesper Joest, they met a curator, took pictures on the street. It was very diverse.

Then we had the JET book. After JET there was this artist called William Hunt who gave two workshops - one was for the Willem de Koning academy, so it was for a different audience and the other was open, so some younger people joined it - it was a performance workshop where he

challenged them to perform something they invented in a day. His own performances are very physically challenging - he played a song hanging upside down - you see his face turning red, red, red and by the time he finished you were aahh [makes relieved sound] thank god!

And he is nice to work with and not arrogant. Sometimes this is hard. As an educator, I am trying to work together with an open artists - some artists are often only interested to the director and curator - not open for the public - this is not going to work.

Some curators are focused very much on concept. They develop it perfectly into an exhibition show and they think about the audience only for one minute. And then you have curators that think of the whole package - you have the artists, his works and the public. And how are you going to explain his work to the public. Actually how you reveal the work. It is a better term. So, I also see my job not only as educating the public, but also educating my colleagues, so that they are more aware of the public.

GP: Can you maybe tell more about the 'making' workshops that you have? Workshops where people create things?

KS: Yes. We did a performance project. It was during the Angela Bullock Exhibition. There was a group of people invited and they developed a performance together with the artist in eight weeks. The youngest girl was eighteen and the oldest was twenty six. They were from different backgrounds, some from the fine arts - making things was very normal for them but we also had a girl from music theatre, photography, three people studying art history. So it was a very diverse group. Some of them were a bit afraid of making an artwork, but they all ended up performing. The performance also took place during museum night and their friends and peers took a different view on the artworks of Angela Bullock.

So we have created books, but also events with young people, such as the Exiting Museum and the event before called "Where Do We Go From Here" which was organised by a group called "Speak Out" and we invited young people to work here for four or five months to create an event or a project.

GP: All of the events that you have described to be, extend in time - they are not one-off events. Ok, the tours around the museum are short, but you have so far told me about projects that last for four seeks, for sex weeks, for six months, for two years. Why? Why is that? I like it personally, but it is rare for such projects to extend for so long.

KS: We have the mission to share our knowledge and give young people the tools to survive in the artworld which is a very tough world. And I think one keyword is "working together", bundle your powers and work together on projects. We train them to learn this, because often this is not offered in schooling environments. So we see this as part our mission to create this environment.

Sometimes they have the idea that the WdW is very elite and that they cannot talk about conceptual art and minimal art, but we want to show that this is not true.

GP: The next subject I would like to ask you about is learning. You, or the educational department, but especially you as an organiser - where do you get information, or ideas or practices for educational projects.

KS: Of course I read and I have some main interests that I am following. Philosophy is something that I follow. I am also interested in community art projects, or some artists whose work I like, some musea. That I find very good. And I use my own creativity. I am trained as a fine artist and at a certain point after I graduated I started giving workshops. So from my own creative background I started

working with people. I use a lot the way that I work a an artist, the process of creating something. I use a lot the artistic process.

If you make a project for high school kids, I think it is very important that they have the feeling that this is a safe place that they can say everything that they want. So, creating this good atmosphere is very important and I learn this by doing. I started eight years ago and of course making mistakes - you can not do everything right from the first moment - and you have to challenge yourself.

GP: You told me that sometimes you work with schools. My question is how partnerships between WdW and schools start, how do they continue, how regular they are.

KS: I have more personal contact with teachers from art academies than from schools, but what you see with the high-schools is that they experience something positive and then they come back. Most of the times they come in a certain period - they are not attracted by an exhibition. It is more like that they always plan a trip in May. We try to organise these tours for teachers so they get to know us and we offer them background information. But the thing is that they do not have time to come - it is not the lack of interest, but it is the time. So we offer an education newsletter that we send out and most of the high-school teachers they are signed up for this newsletter. [...] And every two years we have the cultuurtraject and more schools in Rotterdam are connected through this programme and then we have in a certain period around three to four weeks, every day a different school-group coming in. And then they have an "art confrontation" [programme] and a workshop. So they get acquainted through an extra large programme. We also have a teachers' hand guide that they can read for their visits and hopefully they prepare their school class by using this guidebook but it's tricky, it is not always working.

GP: What is it that you think is not working and what is it that you think that can make it work?

KS: ...of course it will work if the government shrunk the size of the school classes and gave the teachers more hours for preparation and research, but this is a fairy-tale. You see, a lot of teachers will burn out - they are really motivated teachers and they work day and night and weekends and on holiday [...] and they get lousy paid.

Visiting students in their school could be nice, but you also have this project called "kunstenaar in de klass" [artist in the classroom] - mostly it is for primary schools, but what the difference is, is that it is always in the school - it is important for kids to go out. The moment that they get out of the system is very powerful and important. So, going to the school is not a [sufficient] replacement.

GP: My next question is about sharing your knowledge. You learn some things from the workshops that your create or the educational programmes - how do you share that knowledge?

KS: I want to share this more than we did in the past. For example in the performance project, we started with one girl and I gave her an assignment to write a weekly update about the project, so people could read what we were doing. And there was one girl who took photographs, so we had a short of documentation. And the second question to the "writing" girl was to make a summary after the project, so that you learn that too and get some experience. And then my colleague responsible for the internet was also involved in this project and thought that this would connect nicely with peer education and [that we could] make an article about the theory behind peer education and our [WdW] experiences, but also the experiences of other institutions such as FOAM and the Stedelijk museum. So they interviewed many education employees and then they got interested in putting the

article on their website as well, which creates a conversation through written articles about what we do. Because otherwise it stays behind the doors of the institution and I would like to open this up. Maybe in a couple of years some students investigated peer education and find our article.

GP: Are you aware of European Union interest on creativity, innovation or skills through cultural education?

KS: I know, not European interest, but I have read the cultural plan for the city - I do not know if this are European rules or ideas, but I know by this cultuur plan that education and "talent development" which is a new keyword...

GP: Ok, last question, I want to see your vision about how would you like this to develop. Without thinking of constraints, the optimal thing, the best case scenario for doing these programmes - and what difficulties are there stopping this.

KS: Ok, so the ideal situation is that I get at least two colleagues for doing this, so we have more time [...]. I think that free-time projects should be very experimental - not like this dull - that you have these free-time things in musea, like the atelier, the studio workspace and there they do nothing. This could be very better. And a lot of personal contact.... I wouldn't increase the numbers, but I would increase the contact time with [the] audience.

GP: So you also think you would like students to be here for a longer time

KS: Yeah, yeah! And maybe also - that is also a thing that happens in England - I find it very interesting that by creating these networks they provide people [with] a job. And not like three people but fifty people. And not only curator jobs but they create jobs for all kinds of different people, form the cleaner to the director and everything in between.

KS: I will go get the JET BOOK and show you some things [...]. So this is the book. It is hard to get funds for a book that is not ready. The funds like to see the end result and then fund it. So we got some money from the Mondriaan for the process and in the end we got some money from the FSB funds to print it. This is the map we used with the kids [...]. In the first meeting they brought in a book they really loved. So we studied a lot of books and talked about art. And every time we took this map every time we went to the studio, or to the printer, or the graphic designer and said "this is what we are doing". And we made a lot of mind maps [...]. They also got trained by a journalist [on] how to make an interview - there are interviews in the book.

GP: It is very multidisciplinary!

KS: [...] After the whole process they were arty-farty [laughs]. But you can see that the book is not screaming they wanted a normal, wide, not so heavy book.

GP: It is nice because it has interviews and it has stories and also these artworks. And also as a book is a collection of all the steps that they went through!

INTERVIEW Erwin Bomas - Kennisnet, Zoetermeer

EB: I have done a project last year about 21st Century Skills (21CS) and that was based on a research by Twente University and Joke Voogt. So that was an assignment from Kennisnet but there wasn't so much interest yet, because we just delivered a report. The goal of my role was to get more interest from schools for 21CS. What we have done was the project 21 learners, so we selected 21 young people that were either in school or they had just graduated from school and we gave them

assignments to show to them why the 21CS are important. We also looked for schools that were explicitly, or implicitly but could make a direct link to the 21CS, but there were not many schools we could find, only a few. We made some videos with two schools in primary education and two schools in secondary education, but some of the 21CS aren't that new - they are not "21st Century" at all. There are some directions in education, like Montessori, or the Steiner schools, which address skills like creativity and such. So we didn't do any research into that. We also did not do any research into how could create programmes to address 21CS. We brainstormed about it but there were not any concrete results.

In the schools we visited, I have seen some examples of how 21CS can be taught. And it is more in the method. For instance in primary education there was a school using OGO, that is a research driven education and a lot of ICT tools are used to do research by the students themselves. And that was a good example.

If you compare how things were two years ago with now, now you hear everywhere about 21CS. Everybody talks about it and knows what it is, but when we started the programme, this was not the case. [...] The problem with 21CS is that it is a wide field. It doesn't have a very focused meaning.

GP: But do you think that the fact that it doesn't have a focused meaning makes hard the dissemination?

EB: Yes, of course. This is also what we found out. It is very hard to explain why it is important, since there are so many different aspects with the 21CS. I think one of the most essential things is that you have to be prepared for a very changing world. The changes are happening faster and faster and - it is now almost a cliché - we are educating kids for jobs that don't exist yet, so you have to focus more on skills rather than content. The world and technology are changing fast and you need the skills not only to deal with the problems, but also to create new opportunities.

GP: If change is necessary, how do you think that the schools can be prepared and how can we prepare the teachers?

EB: It is a mindset. So the first thing is that you have to make people conscious that there is such a change. That they have to be prepared for it and that they have to prepare children for it. I think most people in education are conscious, but they are not always acting as if they are conscious. So, I still think it needs more attention, but I see that it is being picked up quickly.

The thing is, that education has to solve many things! The ministry is also looking internationally to the PISA scores and they focus on literacy and mathematics, and then you have all kinds of other problems in society that education has to solve. And then they see this [21CS] as another problem that we have to deal with. And thus 21CS are not placed in a context. So, I think we need to place it better in the context, that it becomes the essence of education. And this of course needs in the end support by institutions such as the ministry of education. Moreover, 21CS from a kennisnet perspective, still lacks a research perception. But there is not so much expertise on what it is exactly and why it is important and how you can learn it.

I think that measurement tools need to be developed from research institutions, there is much work on this in Australia and other countries. Then it will be easier to spread it and convince school leaders and teachers for addressing these skills.

GP: In the future, if we project 10 years later. what are the steps that you think need to be taken in order to fully implement this effectively

EB: Let's start with the schools themselves. In Holland we are privileged to have so much freedom in the school to do what we want to do. We have certain criteria for the exams and those are fixed - But 21CS is not so much about the content, but more about the ways in which content is taught. So, I think that schools can already start and we don't need to have the ministry of education change the criteria for exams. but then you have to ask yourselves in what way can we teach these skills to children - and this is needs a different approach from the teacher. So, the teacher has to have this skills first. I think that the schools should prepare the teachers for the 21CS. And there also needs to be a consensus that these skills need to be part of the teachers qualifications.

Some of the 21CS have always been important. Creativity had always been important, but now it is more important because we don't have standard jobs anymore. And with technology we can start a company from our apartment. So we have everything in our hands to make a living. Take for example 3D printing. Before you needed machines and factories and workers and compartments just to create a product. Now you only need a laptop and a printer to make a product. This is a good example of why you need these skills now. And there is something else that is also important, we've seen that many of the problems that we face now in the world, cannot be sold with technology alone. You need a new way of thinking. A more global way of thinking and these are important parts of the 21CS - the critical thinking and communication and the social part - seeing yourself as part of the global village. That we as individual have impact on the whole and that asks for an ethical attitude and more engagement. That is not directly part of the 21CS, but it is close.

GP: You mentioned before the Dutch ministry of Education. How do you perceive their engagement with the 21CS so far?

EB: I know they are researching it and that they are absolutely open, but I think that -and this is also affected by the current political situation- the focus is more on literacy and numeracy. There is focus on PISA scores - sometimes I think that there is also an obsession with measurement. [..] But this is my perception of it, I do not know in detail what goes on in there. I also think that the ministry is focused on what has to be learned and not on how, but the 21CS are somewhere in the middle - it is partly what and partly how.

GP: You mentioned earlier research that has been conducted in terms of skills by the European Union. Are you also aware of any of its aims, or policy?

EB: To be honest, no. I know nothing at all about it. I know from the research of Joke Voogt, she also shows the EU key competences - so I know that they have done research into it. But I didn't find anything actual at that moment.

INTERVIEW Meia Wippoo - Waag Society, Amsterdam

GP: So firstly, can you describe to me what is it that you do at Waag?

MW: I am an educational developer, which in my case means that I help develop new technology for educational purposes. With that I am also sort of a concept developer with an educational view as well. My background is of a concept developer and film-maker.

GP: I see that you talk a lot about innovation on the CLL's website, but also on your personal page on Waag's website. I was wonder how you define innovation, or how you describe it, both in terms of what in entails and also on the necessary skills for it.

MW: I think the way that Waag society works and the CLL with that, we try to be as much forward as possible. With our developments we are not exactly were education is now, but we look ahead to where education might be going. For us, this means that we have to be in contact with a lot of educators. We always keep them in the loop. One of the main systems that Waag Society works with, is the "user as a designer" that we place the end user in our design. We ask them for their input, because otherwise you are developing for someone that might not use it. So we very much keep in mind the end user of the development.

GP: So this is both the student and the teacher?

MW: Yes. It all depends because there are a lot of educational systems in the Netherlands. Primary education, secondary and also universities, art schools...

GP: But you are more involved with secondary education?

MW: We have a lot of projects on primary education and secondary. A bit less on university levels.

GP: And how does it go with your communication with the educators?

MW: We are building a name right now, that we are the front-runners of education and we do know that we are very far ahead of the education system right now. Educational systems are well known to be very slow and backward in development, especially when you talk about technology. The main problem we face is money. All the schools and groups of schools, just don't have enough money to spend. So when you want to incorporate new innovations, they always look for the cheapest way to do that. And that doesn't always mean that they get the best developments. That also doesn't mean that they make the smartest moves. I think we can gain a lot on that part still, because we are very much an experimental lab, which we should be because we are on that front. But it also takes a lot of time before the things we develop are incorporated in the education.

GP: When you have activities with the schools, do you think that the teachers or the class is prepared in terms of their background skills?

MW: It very much depends because a lot of teachers have very much invested in developing their own technical skills, but there are teachers whoa are starting to teach and are very much educated with the new technologies themselves. And there are teachers who are in their fifties and get intimidated by computers in general. So it very much depends, and the children nowadays are the ones who are the most forward in this part. So that's also a thing we try to use, in a way that children can teach the teachers as well. It's very different and depends on the teachers.

GP: So, when you have developed a programme, do you communicate with the school the things that need to happen in class in advance, as a preparation for the programme?

MW: Most of the projects we try to have the school as a partner, very much involved in the development. As I said, it's the "user as designer" principle. The concept development starts with us, but in a very early stage we involve the users in the development of the game or the technology, so we can hear what they face, what is useful for them. There is a lot of technology which has been developed and doesn't mean anything and is not actually very useful in the education.

GP: And then do you get feedback from the teachers after you finish it. But if you have a workshop, does feedback change what you do drastically or is it more or less set and you take feedback in consideration for projects in the future projects?

MW: There is never a project that we test just once, we always have multiple moments to change and to adapt and do iterative design. But it could take a while before it is a product that you can put forward. Bear in mind that waag is very much a prototype organisation. We create prototypes, we test them and then there is another organisation that brings it to the market. So we are not very much working on the end product, but on a well used and well tested prototype, which is the reason why we are at the forefront of educational development. But this means we do not deliver finished products that often.

We develop workshops but we don't give them to students anymore, we give them to teachers, to let them give them to students as well.

GP: But does the school have the technology to use these things?

MW: It depends, the workshops we give, and study-days are more from back of the current state of the schools. So we very much look at the situation in schools right now - some schools have twenty computers in the school right now, but most of them have only one - some schools allow external applications to be added to the computer some schools really don't. So every situation is different. We try to work with every situation that we get.

GP: In the CCL what kind of research is it that you do? I understand you do technological developments, but what is the actual research?

MW: Well, at the CLL we do not do as much technological development because we have a separate lab with all the technical people. So, every year we have two research themes. This year the two themes are embodied learning and citizen science. With these themes we try to develop new educational appliances with the knowledge we have at the labs.

GP: My next question is on dissemination: So you develop a workshop and you give the workshop to the teachers. But are these things collected and disseminated further?

MW: Yes, we have a publication at least once a year. It all depends where we are are with the research. If it is an open research, or a very new research, we do not publish soon, but we do publish. We do visit a lot of expositions and school specific expo's and we do a lot of presentations where we bring across our vision on these themes. So that is the way it goes and we have a very strong communications department which sends out pretty much everything that happens. But we could be doing a lot more. We still have a lot of people to reach.

GP: In what sense? If you could do more, what would it be?

MW: We are being found by a lot of people, but these are people who are already interested in new developments. But we also need to reach people who are not there yet, but could be interested

in these developments. There are a lot of channels in which we can do that but we haven't explored all of it yet.

GP: How do you think that this could or should develop in the coming years? If this could be the way that you wished in the coming years, how would it be different? The work that you do and the activities of the CLL.

MW: I do think that a lot of people are coming around. Technology has been a dirty word in education for a long time. And I also think that at the other end of the spectrum technology or ICT in education has been solely working in a computer, which for me is the worst that could happen. So, technology and not so much ICT -ICT is a bad word for it- technology and new ways of education are mixed together in a way that enhances the education system and not so much changes what is already there. You can replace a book with an iPad, but the iPad can do so many more things. It should be richer other than just switching things up. Also bear in mind that there are a lot of learning systems and ways to learn and not everybody is well-suited for the technology steps and not everybody is well suited for a very rigid school system. There are a lot of children and a lot of people who learn in very different ways, so there should be very differentiated ways for education. This is a very difficult thing to achieve especially since in the Netherlands they tried to incorporate type of student back into one classroom, which means that it is very difficult for a teacher to differentiate between needs of every individual child.

GP: My last part is about policy and I was wondering what is your opinion about what steps can be taken to have better integration of these innovative activities of cultural education in schools.

MW: First of all we are a cultural organisation but still we work on a very general level on education, we don't develop specifically for culture. I think there is a lot of policy around education, but cultural education has been the least of their priorities and that's how it is. But I think - and that's not so much a policy thing but on initiative from schools and municipalities- there is a very heavy emphasis on language and math skills right now. I think that schools themselves should incorporate these things with each other. So math is not just math, but you can use it in a cultural setting. Language is not only developing a vocabulary but you can also go to the theatre. So I don't think it should be much of a policy thing from the government - it is not possible. And of course there is a big difference between students in cities in which half of the students don't speak Dutch very well so there should be a greater emphasis on developing these skills, or students in more rural areas of the Netherlands in which they have more time to spear actually, because they already have the language skills. So, it is more difficult to do that form a national level and also form a governmental level. But there should be an incentive for the local people to incorporate the culture with language and math, geography and history and all those things.

GP: And are you aware of the European Union policy on skills and culture.

MW: I am not that aware. I haven't dived into the European policy yet.

GP: I am asking because much of it now is being directed towards innovative projects and the work that you do. But I think it is unclear for the cultural organisations what happens and they are not included in the dialogue and they are not even aware of the focus

MW: I guess a lot of it is because this is policy and cultural organisations have their own agendas and policy is usually a lot of paperwork and reading, and writing towards a policy institutions. I think especially cultural organisations are very creative in making their own things and doing it their own way, so working around a policy is almost a contradiction.

GP: What do you mean?

MW: It is not very creative to follow a specific guideline. But, again I am not very much aware what the policies are right now and I think that it is very good that on a European level there is attention to it. but I do think it should be more open and better communicated. Also, I think there is a lot of separation between all the different cultural skills, but it is pretty much the same - I mean, I am a film maker but I also work in design. The essence of making a great concept is something universal for a cultural organisation. A lot of the policy things are very much segregated between all the different skills and a wide range of arts. I think a lot of policy makers think that these are different skills, but art and creativity are universal. You can apply creativity to any other subject as well, so...

[...] But also culture is very much a personal thing. Culture is something you have to enjoy. It does have to do a lot with skills and also with talent, but in the educational sense, it is more a way of approaching your agenda rather than having a separate skill for it.

INTERVIEW Hans Visser - LeX, Dordrecht

GP: What do you think that your role is?

HV: We see what we do as technical education. Very contemporary. And it has to happen in an institution like ours because the 3D printers and the laser-cutters are too expensive for schools. [...]

[We help develop] innovation skills. To learn to think out of the box. Out of the box thinking is very important. Also, if you have many ideas, then how to [conclude] to one idea? that is a process - it is called the design circle. It's cyclic thinking - that is very important for innovation and it is very new for education.

GP: Can you explain how the design circle develops in the class?

HV: So at first everybody thinks what they would like to make. That is of a big scope. It's actually too big. But we want the children to release their fantasy. So with the help of our staff, who are designers. The next time they come they have something more concrete and they develop their design further. And the third time they come, their design has evolved into a final and more advanced design and idea.

GP: When the students come here with the school, are they prepared?

HV: No! [pause] We communicate with the teachers before they come. But what we do is very modern and the teachers in this region do not have the technical skills to prepare the students.

[...] We invite the teacher to come and see what is it that we do. They see what material is there for a class and if they like it, then they bring their class over for the workshops. And this is our marketing principle: have a showcase and experience for teachers.

[...] For secondary students the workshops last a total of nine hours - that's three day for 3 hours per day. For universities it's usually three or five hours.

GP: Do you communicate after the class with the teachers? What do they tell you.

HV: The children find it very nice. Especially because they don't get any technical education at school. Yet it is not clear for the teachers. They don't understand our profile. They don't see additive manufacturing or laser-cutting as technical - but it is very technical.

GP: Do you so the children how the machines work?

HV: No. We show them how to manage it. How it works is very simple. For us it is only the "print button".

GP: Do you disseminate your findings? Do you share outcomes of teaching to schools or other organisations?

HV: Yes. We are part of the FabLab concept. So, there is an open-source sharing principle. We work with other FabLabs. For instance in Rotterdam, the Hague, Amsterdam, Utrecht. We are working with FabLab Utrecht on making your own 3D printing. We work there with teachers in mathematics, teachers in physics and in chemistry.

GP: And then what you learn here goes through the FabLabs?

HV: Yes. It is open source. that's the new world, it is open source. We have no secrets at all. We also said other schools and other organisations that want to use 3D printers in education. Come and see and share and...

GP: Do they come?

HV: Yeah, yeah! A lot of. I think about two [or] three time per month they come from all over the Netherlands to see here how we are using 3D printers and laser-cutters in education. Because they are coming and we get in a dialogue, we also become smarter with our processes and education.

GP: ...because you see what they do?

HV: No. It's because they ask questions and because we have to answer it we are used to thinking about our process. It's a reflective method when people are coming. For new people who are coming, we get new questions from all kinds of people. And it's the dialogue. We are becoming smarter.

GP: L-Ex is a rather new institution. How do you think it could evolve in the future? How would you like to see it?

HV: Hmm, that's a good question. With many more innovations. Not just [the] 3D printer or laser cutter or vinyl cutter, but also for instance with robots. Robotics are very important. We want primary school kids to encounter robots, to learn about robots, that's something that still has to come, so every time the society has something new, like a 3d printer, a laser-cutter, or robot controls, we want to implement that as quick as possible in education.

GP: Apart from technology. In the way that you operate. Would you like to only see more schools coming or...

HV: Yes, more schools but also more individuals. That's very important. You have to approach them I think with internet, social media, and we want to do that, but we didn't so far. Eh, just a little bit, just a little bit.

GP: ...but if you look in the future and you want to achieve this, and make it with more technology and bigger and with individuals. What do you think is needed? What steps do you need to take and what are the problems you think you will face.

HV: The biggest problem is money. [laughs]. Because we have to train people, people who are able to "translate" a 3D printer to secondary education, and that takes development time, and yeah, you need money for that. And you also need money for example to get young people enthusiastic through social media and have them talk on social media about robots, inventions, technical findings, and I mean, you also need people, time and money to get that rolling. Money, development money is a bit of a problem.

GP: I see that Leonardo Experience has been funded also by the regional development programme of the European Union. Would you like to tell me about it. How has it gone so far? The application process, accessibility, the communication et cetera.

HV: It's complicated. We received money from the province, from the Netherlands ministry of finance and we have received money from the European Commission. Then we have money from schools. They pay for the workshops. This are the four sources.

GP: ...but my question is more directed with the EU experience.

HV: That went via a management bureau and that bureau has made the application.

GP: Is this a private or public office?

HV: The Leonardo experience is a public entity. The institution that made the application is a private, commercial institute.

GP: ...so they helped you make the application et cetera.

HV: That's very ease for us. Because [otherwise] it's very difficult! [...] that's a lot of work. You need a specialist for that kind of project [laughs]

GP: Do you know the political interest for development of skills? [...] Are you aware of policies for creativity and innovation and skills?

HV: From next year we will ask the regional government to take a greater part of the costs. Only for the first year, had the politicians of the region to pay. Then Leonardo found its other subsidies on its own. Bit now we want to go forward and bring new products so wee need extra money which we are going to ask from the local political bodies. We ask for money from the regional policy, we ask from money from the companies and we ask for money from the schools. And these three together must cover the cost

GP: What kind of companies?

HV: Technical. Technical companies look for technical personnel. It is important for companies to come in contact with talented young people. there is great need in this region for technical employees. It is a technical region. We have here a lot of maritime industries. Especially the "making" industry is very big and traditional. And 3D printing is a great part of the engineering process. And that is the reason we are starting with L-Ex. To teach young people to deal with CAD, Computer aided design. [...] The reason we founded L-Ex is Economic [...]. Our main target is to begin as young as possible with developing the new skills and that's why we work a lot with primary schools. But it costs a lot. That's the problem.

The main problem that we face with L-Ex is that we work with primary schools. A lot of companies don't think in the long term. No no. It's short term targets. I want to have people with technical skills now! I want to pay for it now! They are not looking forward.

GP: ... and this is I think why the regional politics is involved.

HV: Yes. For the long term. Politicians are looking with a more long term vision, but companies is the main problem. they are thinking with a short-term vision.

GP: Do companies send their employees here?

HV: Yes. There is this building in front of here. [In there] there are a lot of new companies and all are busy with innovations. Diesel engineering, technical installations, fluid techniques, all kinds of innovation.

GP: I don't have anymore questions. Is there anything you want to add?

HV: Yes. Everyone is responsible - politicians, companies, schools, individuals. We are all responsible for our future. For teaching new skills, new tools. We need more collaboration. Especially between politicians, companies and schools. They have to feel it by their own.

INTERVIEW Anouk la Verge - NIMK, Amsterdam

AV: I work here for six years. I started in 2006. I am involved in the educational department and I always talk with the curator. When there is a new show, we start to talk and we invite an artist and we asks artists to work together with us. So we try to develop programmes for different schools and also for different ages. But most schools are interested for ages between 12 and 16-17 years old. [...] We always do a kind of programme which is only for two hours and one hour is at the show, so that's more a theoretical part and one hour we do a workshop which is the more practical part. And then we change the group.

AV: When they come, we give an introduction about the institute and we ask them if they know what media art is and what it means to them, if they work with new technology and also if they can give some examples of media art they saw. So we always start by discussing the term "media art" and the theme of the exhibition and we then divide the class in two. We start with the tour which is interactive and we continue with the workshop, which is practical.

For the workshops we always work with artist, because we thing that is the most interesting part, they have the creativity. We always talk about it because they sometimes have a concept which is too difficult or which you can only do in a few hours, but we always do workshops of one hour. And this is because of schools. They don't have the time to stay longer.

GP: Let's go to the artists first. You said you work with the curator and then I guess you choose what artists is going to work with the students?

AV: Yeah

GP: But you give to the artists some guidelines? How do you choose what kind of workshop is going to be given?

AV: We start by talking together. Sometimes we ask them to use their own work as a starting point, which is very logical. That what happens every time. They work with the students. They try to explain the basics of their works and then they are creating together with the students too. Let me give you an example. We asked Aymeric Mansoux end Marloes de Valk. They work on a computer system and they are creating a kind of system which is evolving all the time [...] and they use this system for their artworks and they try to explain this system to the kids. And the kids start to make this system by themselves. And they explain the computer programme and the code. Lots of students don't really know that you can make a programme yourself. They explain the steps in a very simple way, creating an evolving system [...], which is similar to their installation in the exhibition.

Another example is a workshop we did with circuit bending, with the Dutch artist Gijs Gieskes. He bought very cheap plastic toy guns and the students had to open them and out of the circuit had to make their own instrument. Gijs Gieskes did also a game-boy workshop, where they made some music with old game-boys. And they also did a camera-game-boy workshop where they modified the game-boy and made some GIF animations. The workshop is very simple, but the game-boy is already old-fashioned. So it was very funny for the students to work with it and to work with a camera on this game-boy. So we are talking about the device itself and also about technology and its very fast developments. Also on what you can do with this. There is already a camera [on it], so we don't need to buy cameras, we just use this camera on this device in a way that it was not supposed to be used. And then we make a short, thirty-second movie out of this.

Another example is a very basic workshop I think, is how to make your own film with your mobile phone and it is always kind of success, because it is so close to them. They all have mobile phones and lots of students already have a camera in it, but they only use it in a very simple way. But we show

them that they can also use it in an other, artistic way. We start by showing them some films made with a mobile phone by artists. So we give them good examples and then they think about "how can I make an artistic film with my mobile phone"? What we like about this, is that when they go home they can do it by themselves too. And we also ask them to upload it to the internet. It's not about making this film, but also what role and how important is this mobile phone nowadays in your own life, but also in the society. Because sometimes you see films in the news - there is accidents or bombings and there is always someone who filmed this and you see the shaking image. So we talk about this also. Citizen journalism. So, the workshop is not only about making a film, but using the camera in a creative way.

...another workshop is the vibrobot. It is really nice. We are now doing it at the DEAF [Dutch Electronics Art Festival], but we have done it here at NIMK a number of times. That's for all ages. Everybody can do it. You have a pair of batteries and a motor which sets it out of balance and causes it to move. So the basic is very simple, so they then have to design their own robot. Also another workshop that is really great is the electronic jewellery workshop, which is about making a wearable. And we do that with a LED or a buzzer and we have a resistor and conductive thread. So, you learn these simple electronics and then you have to think: 'what do I want to make with this"? and "What do I want to communicate with it"? For example you can make something together with another person and you express your friendship. You touch the other person and the lights go on et cetera.

...I want to give you one more example, because all the examples I have given you have been practical examples, but last year we also did a theoretical workshop and it was also very interesting. The exhibition title was the art of hacking and we did a workshop together with Jaromill, who is an open source developer. We also invited [incomprehensible] who is a food designer and we did it together. Jeromil really talked about what is a hacker, what does he do and in what field. It is not only about the computer. It is about opening a black box. And it also happens with food, or gardening. And then we talk about it and we ask students "what is a black box for you? what do you want to research"? That was a really nice workshop, especially because it was a theory workshop

GP: So what reactions did you have from the students?

AV: The reactions were good. This was because we also showed them some examples with food. They all eat - everybody has to eat, so it is connected to everybody. And this is also important. That you talk about something that is connected to our daily lives. And we show them some kind of very weird mushrooms from the biological market. And they also had to taste the karnemilk which also is changing after a few days. So we talked about where does our food come from. The workshop was about questioning, how does it grow, but also about how systems work. This was a very crucial word in the workshop. The system. It was a bit difficult for them at first but later they started discussing this with each other and they had to talk about their own black box and they really did. So the workshop was a success.

GP: I would like to talk about schools. When a school comes, what kind of size is the class?

AV: Around twenty students.

GP: And they come with the teacher?

AV: Yes. There is always at least one teacher. We always ask for that.

GP: And do the teachers know in detail what the workshop is about? Have they gone over it in detail?

AV: No, not really. Of course it really depends, because I always send them a kind of package with exercises that they can do in class to prepare and talk about it. And they [teachers] always ask for this package, but they almost never do it! It's really a pity. It is that they do not have time for art. There are of course classes, but time is always the problem. Some classes do the package, but often the teacher doesn't even know the title of the exhibition, while others really read the package, so it really depends.

GP: And how about feedback from the teachers.

AV: They are always really enthusiastic.

GP: But do they go in detail? About what they likes? What could have worked better? Is the feedback constructive?

AV: Yes! The feedback is constructive. Sometimes I send them a list of ten questions and they reply [to] them. And I ask a few things, including "what can we do better the next time"? And we always ask the students too. What is their idea. and most of the time they like the workshop more than the exhibition and a few weeks later I send [the questionnaire to] the teachers.

GP: You have been at NIMK for a while, so you might tell me, how do the partnerships initiate? Did they come to NIMK mostly out of chance? Did they know you? Did they know the artists? How did they choose to come here and not go to NEMO or wherever else?

AV: It depends on the interest of the teacher. There is also once a year a kind of market and all institutes go there and you present your institute there, but also what you can do with the students. It is organised by MOCCA, CCA. So teachers know us by this. But sometimes the teachers find us online. Also sometimes they propose projects themselves and then we make a plan and we do it. We are really open to that.

GP: I saw on NIMK's website that it is going to close and that you want to preserve and disseminate its collection and that is great. When you do workshops with schools do you make records of what happened? What went good or bad, or maybe the feedback from the teachers?

AV: Yes... Yes. It is kind of ... there ... stored in a computer somewhere [laughs]. What the thing is, is that it is difficult to pass it through. It is complicated. [...] I know well how to organise the workshop and the exhibition visit, but I do not really put these things online. It would be great if there was a platform for this. There are some simple rules that we follow like do not work in too big groups because the interaction between the students is really important. And don't tell them what is happening here, but ask them what they think that is happening, so the have to think themselves. Also what I like is when they create something and they take it home. And they can show it to their parents and brothers and sisters. Kristina [Andersen] is really good about this. Because the basis is very simple and then the design is as complex as you want. And then everybody can do it and they also don't stress out when they see some electronics. Also for the girls. Fifteen year old girls can make these small circuits even though they are not technical at all. So don't make it too difficult, but neither too easy. You really need to take them seriously and never underestimate them. [...] Kristina made a very efficient documentation for the teachers and this is really great. We kind of bought her concept. And what is very important is that she gives us this whole shopping list and we can order all the materials.

GP: But other workshop facilitators don't do that.

AV: No

GP: And what is the reason for this?

AV: Well, the circuit bending workshop for example is too complex to communicate, but also the artists want to give the workshop themselves and don't want to spread it for this reason.

GP: It's what they sell, right?

AV: Yeah, exactly.

GP: We have referred to this in small parts in this interview, still, I want to ask you what could be made to make your workshops more effective. What do you think is needed? Both for schools and for the cultural organisations to get the most out of what they do?

AV: To instruct the teachers more. It is a pity that it doesn't happen. The teachers don't instruct the class [over the workshop subjects] after the visits. Maybe not only one class, but a few more. That is really important. Sometimes they have prepared something before they come to class, but they do not talk about it later. So I think that as an institute we should develop a better class for the teachers. To give them some instructions, or tools, or artworks on a DVD or some internet sites that they can show in a follow-up.

Also, we have to educate more teachers in school because lots of teachers don't know anything about media art. It is still new. It is already there for forty years but the teachers never saw video-artwork and they never saw a walking robot.

Some of the teachers are also quite old and they get very nervous when they see the electronics, but the kids are in such a different world, so this gap between the teacher and the student is huge and this is why the kids like it here so much. It is close to their own world.

GP: Are you aware of the educational policy and how it involves culture? And what is your perception of it?

AV: Of course I read the magazines such as the digischool and the websites and the mailing lists that they inform you about the cultuurkaart for example, which the government just decided that will be there the coming year. And this is an important thing for the students. So, I follow this, yes. But of course I think they have to invest lots more. The government is focussed on talent development, sometimes I think this is too specific.

GP: Too specific?

AV: Yes. [...] Sometimes I think, it is also very important to give them an introduction. Students don't know what media art is. And if they visit this space, they know it when they get out. And this has nothing to do with talent development. Talent is I think for a smaller group. The expectations are too high. And I don't get so much the word talent. Everybody has talents. Hmm. That's a hard question for me to give a good answer.

GP: Does the ministry of culture education contact NIMK about the educational programmes that you do, or about its targets for this year?

AV: Yes. I think I had once a questionnaire. I think we are a little bit too small for this. The whole policy is that they want to have more people visiting the institutions. More, more, more... But small institutes, with their specific thing? There are no rows of people here, in front of the door like there are at the Van Gogh museum and that will never happen, because this [media art] is a specific field. So for education, you also have to support it too. For years and years they talked about media literacy - that the kids need to understand how media work, it was a real focus point. But you can also learn how media work, through art and not just the basic principles. The government is not thinking in a creative way.

The government thinks that education is very important. But now they are closing this institute and I have to do my work in this institute. I need it as a basic. I cannot do education without a basis, without a shop. They are so focused on education and talent development and media literacy, but how can you do it without an institute. They are separating things and I think this is really not good.

GP: Yes, I know this from other institutions too. They cut the structural funds and they only want to pay for projects, but when you don't have a structure, how on earth will you do a project?

AV: Exactly, that is a good point

GP: Is the European cultural education policy understood by you? What do you think about it?

AV: No, I don't know about that. Do you have information about it? I have no idea about it. I think it's really bad.

INTERVIEW Andrea Knols and Suzanne Jansen - SKVR, Rotterdam

AK: We work with the "Bureau of Education and Innovation". I've just started work here and Suzanne has been working here for a little bit less than a year. The department though has been operating for years: Education in Schools.

SJ: I did the projects with the MBO schools for three years and MBO is the Dutch vocational School. And for the last year I am also doing Voortgezet onderwijs [Secondary Education] and my function is Project Coordinator for Education. So I coordinate all sorts of projects for in-school. Sometimes it's one big day, with a theme and sometimes it's lessons through a hole year. Sometimes it's education in the arts and sometimes it's education through the arts,

GP: I like the distinction that you do things "in school" and "with the school". Would you like to clarify a bit what you mean by that?

AK: (referring to Suzanne) That's the difference between what you did at the MBO.

SJ: Yes. Zadkine (a secondary education school in the Netherlands) had a department with with employees [...] who work at cultural education department. And SKVR was a partner. So together we made programmes for burgschap. We used art to educate on how to be a good citizen. Citizenship! So if you are a good citizen you take care of yourself and your own health, mentally and physically. And how do you do that? So we used arts, for instance we did a dance project with modern dance but also with street dance, but also they had lessons on "what's a healthy lifestyle" while other projects were about how to be a critical consumer". Because the media and all the commercials [...] make you want to buy things. But if you are seventeen you don't have the money. And they had lessons on how to debate and how to make sure that you don't spend more money than you have. We gave for instance rap lessons; make a rap about media and how media influences you.

And the things we do "in schools" they say, ok do something

AK: yes. Sometimes schools say "We don't know exactly what we want to do, but do you have any ideas? And so then we brainstorm with the school and we bring something into the school.

SJ: Or they say: we have a language day. We have four hundred students. We want to give them art lessons to practice their Dutch language. So we say "I think you can practice your language with all kinds of different arts". Through dance and also theater and writing workshops are more common. So we made a programme for that.

GP: I was wondering, what is your perception of innovation, the skills for innovation, or how innovation and education connect. ow do you perceive the field. How would you describe it.

SJ: It is through two different departments but most of our innovation projects are about education, because that [education] is what needs more innovation.

AK: We have different art schools and they work on their programming every single year, so they try to innovate as well in their art school.

GP: I would like to know how you see your roles as educators. The requirements for education change. [to Suzanne] You have been here for a while. Have requirements changed and what is your role in this change

AK: The school is actually the party [...] that asks. And we actually try to provide for the school.

GP: So what is it that they usually ask for?

SJ: Oh, it differs. Sometimes they say "We want to give our children another art-day, what would you advice [for us] to do? They are a lot of girls, a few boys and they've already have art and [...] theater, so we want to have a day with music and dance because that's what they haven't had yet". Or, they say "We have this kind of money. What can you do for us?". Or they say "We have this kind of goal and what can you do for us? We want them to present themselves better

GP: And what kind of projects do you usually suggest when it comes to an art-day? Do you focus on dance and music or?...

SJ: We also do media, also theatre, also writing.

AK: It depends on the question of the school. If they ask for multi-disciplinary: "we want as many different things as you can offer", [then] we try to make it really diverse. And if they say "We've already had drama in our school", so we really want

SJ: [...] something urban. We already had high culture

AK: ..and we now want low-brow

GP: But then it is not always very clear what they ask for.

AK & SJ: No, no!

SJ: We have to have teachers that are able to connect with these students. Not every artist is a teacher who can connect to those [3rd year VMBO] students. There has to be a very clear beginning and a very clear end of the project. Of course in the end we always like a presentation but for some of the students a presentation is too confrontational. And the only think we want therefore is that they reflect on themselves. Through the arts you can reflect on yourself [...] so at the end of the five weeks programme there is a talk show and if you want to show your presentation, you can show it, but more important is to sit together and talk together with the teacher and the students [and discuss]. "What did you do? How did that make you feel? How did you feel before the lessons about playing in a band and how do you feel now?" [...] "Why did you choose that? - you wrote a song about [something]. How did that make you feel or why did you choose for that side of love?"

GP: I wonder what can be done to make your work more effective - this can be from a school perspective, from the SKVR perspective, or even from a governmental perspective.

AK: I think that the most important part of art education is that it has to be embedded in the school. That is at first. Then, we as SKVR we can try to further educate the kids and get deeper into the matter.

SJ: Yes, I think that's the most important thing. That it isn't just an hour and nobody looks - the teachers think hey that's my smoking hour now, this is the key to my room, go do your thing.

AK: I think it is really important that that when we, as SKVR, are in a school that does something different for the students, that is not just a lesson that they get into it, that they get interested into what they can actually can do with their talents and trigger their own creativity. That is really important.

GP: And how about cooperation with the school? Engaging the students is one part but how about the communication? What is missing between you and the school in order to bring a programme that is more solid?

AK: That's actually I think more practical. It's mostly a question about money and time. [...] the teachers and the school need the time to really connect with us and be able to build a programme that is durable. But if they don't have the time because there is no money then it's like quicksand. Of course we would love it if it was really part of the school.

GP: So, you also feel that you could benefit from longer communication with the school.

AK: Yes definitely, to build a steady bond.

GP: And when you do and event, like what you did with the arts education or the presentation skills, or with dance. Do you feel that the time that you have for the programme is enough, or do you think that you have to shove too much in a little time?

Ak: It depends on what the question is. So, next Thursday we are going to a school and we really want the kids just to make an acquaintance with dance. So we have an hour and a half for each class and that is enough.

SJ: Yes. It is just to let them know that this is existing. Just to trigger they minds.

AK: With some schools if the programmes are longer you try to figure out if there are children with talent here? Do we see children who would really love to do this out of school?

SJ: And not only talent of course but also interest.

AK: Yes, also interest, you don't really need to have a talent just to do that of course. I mean with hard work you can do anything.

SJ: Talent IS hard work [laughs]

GP: Exactly, this is what [François-René de] Chateaubriand used to say. "Talent is nothing more than long patience. Go and work."

SJ: Yes! I have met so many talented people who are never going to make it, but I also met a lot of hard working people with less talent than the other ones, but [because] they're hard workers, they get there [...].

AK: That's also interesting because I am doing another master at the HKU [Hogeschool voor de Kunsten, Utrecht] a master in arts and education and we had to write a small piece about creativity and I really got into Ken Robinson, I think you know him, and he's really my guru on education. I really love his way. He say's creativity is so important and schools try to knock out all the creativity that there is in children just by by getting them into "you have to do your languages, you have to do your mathematics, you just have to work work work, but no creativity. You have to do what is in the book and if you do that, and do that well, and then it is ok". But he says that you really need creativity, you need to let the kids go and do other stuff and let them see different things and get into contact with different things. Because if you work out of a book, you can do the book and that's really good but if you can;t go out of that compartment of the book, you also have to kind of do stuff and if you can't do that, then that's a problem.

GP: And have you seen this working in the programmes that you do out with SKVR? Bending the rules or not having any? How does the idea of creativity work out in what you do?

AK: It depends on the children and what their background is. Because if you have children that are especially at VMBO, they really get knocked down a lot. They have been knocked down in primary school and also in the secondary school. They hear: "No, you can't do this and you can't do that". If you go to the VMBO, a lot of the children there, they don't have any self-esteem, and because of that, they don't even dare to do something different. It is hard sometimes in workshops we give, to get these children out of the zone of "you can't do that" because we say "you might [do that], but if you don't try you will never know if you can do it or not". So that is hard sometimes.

AK: [...] If you can start directly with what they have to do, and they just follow you, that's a plus because then they're like "oh, ok!". They start because they don't have time to think about it. If they have time to think about it before they start, then you see hesitation, or "I can't do this".

SJ: or "I don't want to do this".

[...]

SJ: The size of the class is very important. We of course would like to work with maximum fifteen students, but nowadays with the lack of money, we have to sometimes work with classes that are twenty-five [students in each]. And for a teacher that you have only once, or twice or three times, it not possible. if you have a teacher every day and the class is twenty-five, that is also big but a teacher knows how to control it.

AK: Yes. You build it. I was a reacher before I did this [SKVR]. You see what you have at the beginning of the year. you try to figure out your children, but you have a couple of hours in a week to do that. So around Christmas time all the teachers are like "now I know what I have to do".

AK: In my experience as a teacher, what I try to do when I notice that a student has a lot more experience with a programme [...] and they're really smart with photoshop for example. I always try to get them together with another student, who is not that easy with the computer and then try to make a partnership between the two, just to help along. And of course you try to give the kid who is further along, also more information because they also want to learn something. But the teaching between students is something that they both learn a lot from. It is a different kind of learning, especially for the one who knows a lot, but it also makes a very nice teaching environment and that really helps.

GP: My next question is about how you update your knowledge, how do you learn new things and how to teach them. Is that that you read research, or go you go to events or mostly with partners

SJ: You read all you can read. I go to festivals and events to know what is happening in Rotterdam but we also have the art schools around us - we work at the education department [of SKVR] but we also have a music school, a theater school and they have to provide us with more information about their discipline.

AK: And we try to know what is going on in education-land...

GP: ...where from?

AK: Government websites, there is the Kenniscentrum, the CultuurNetwerk, the cultuurplein. That's a lot of information. And I try to keep with my own creativity, I also like to go to festivals and stuff but also I really like TED. I really do. Because they are so inspirational and I watch at least once a week just a couple and it keeps me up with what is happening around the world.

GP: The last question is about your knowledge and perception of educational policy. So when things are happening on a Dutch governmental level, either through a local policy or through the ministry of education. Do you get informed about these things? Do you have enough information on what is happening?

AK: Just watching the news gives you enough information already but if you want to get into it, CultuurNetwerk is a good tool because they keep up with everything and they actually explain what it means for the arts if this or that happens in the policy land.

And of course we are now into a very big change, especially in Rotterdam, which changes the perspectives of schools on what they want to do with their students and where they want to give their money to. And then we try to get all the information we can from Rotterdam, from the gemeente [i.e. municipality]. that works because you can get everything actually. The city website has all the policy so whatever you want on policy, you can get it from there.

SJ: We also get it from our meetings with our colleagues...

AK: ...or with the schools. The schools also explain what is happening. Because you never know if there is a policy what it means for the school, because you don't know what the school does with its money. Anyway [...] you have to have your ears and eyes open all the time.

GP: But I understand that you are quite aware and satisfied of the information that you get.

AK: Yes.

GP: Is it the same with European Union policy on education and culture?

SJ: No.

AK: No.

SJ: I don't know anything about European policy.

AK: I did a couple of years ago, when I wrote my thesis. then I knew a little. It just feels like it doesn't effect what the government does. If in Holland the government say "that's all nice and dandy but we are going to do this and it doesn't matter what the European Union thinks".

GP: Do you keep records of the processes and the aims of your programmes? And do these get out of SKVR usually?

AK: We just had a discussion about this actually. That it's really hard. to now who has ownership of something like that. You know. if you make a programme together, who has the ownership, where does it lye. And that really depends as well. It is like the methodology we did for the school. We wrote it but

it is part of the school, so it belongs to the school. We collect as much information as possible, but we just don't spread it out.

GP: Yes. I know. Why I am asking is that when you look at innovation, a big part of it is disseminating. You might device a programme and find some effective ways to teach something but if it's only you that knows it, then it doesn't fill its full potential. but this is quite hard. Very few organisations manage to do this, so I am trying to find out why. What are the problems of that.

SJ: I don't think that we are not doing that.

AK: No, but we are not actively doing it. And I think that's something that happens in a lot of places, especially in places that work with education [...]. Of course if it happened and you could build upon something good and improve it, that would be the ideal world. But it doesn't work like that and one reason for that is ownership. In the past ownership was really important. Everybody always wanted their name at the bottom. But now, my feeling is that nothing is only from me because I get all these information from everywhere and then you create something. I would really love it if you could work together with a lot of people and create programmes and make them better and better and I really don't mind if people take my part of it, because it is the biggest compliment you can get. If you make something and people want to use it.

GP: I am done with my questions. Is there something you would like to add? Some comment you want to make, or an important remark?

AK: I think our work would be better if the government tried to make policies and tried to do them for longer than two or three years because the government changes as quickly as it does [refers to the recently broken governmental coalition of the Netherlands]. I think it is very important to make things durable. Not to start something up and after three years say "well, that didn't work so we're gonna try something else", but see what did work and what didn't and try to build on and not just say, "ok now we just throw it all and start again"...

GP: I think actually that also connects to the idea of ownership. Politicians just want to put their name to a new breed of policy...

AK: Yes! [...] Don't do this. It's not good for the children, it's not good for the schools, it doesn't make education durable. Education is the most important thing there is in the world. Because you want to educate yourself all the time. It doesn't stop at the end of school, it goes on and on. If you don't get a good basis in school and make education something that you really would like to do for the rest of your life, you can miss out on so much.

INTERVIEW Kristina Andersen - STEIM. Amsterdam

GP: What are the core elements of your teaching?

KA: I want to mark that a lot of my workshop experiences are done for kids, but I don't actually make a very deep distinction between doing them for adults and doing them for children. There are some practical things: rhetorics, danger [...] you have differences [...] but content-wise I don't make a

big distinction. Because it is my belief, and to a certain extend my experience, that children are able to handle conceptual challenges sometimes even better than adults. They are open to being told that the world might be slightly different than they used to think - in a way that adults might not always be.

That can be change in terms of feeling ownership over a new area of technology, or feeling different about something you weren't maybe using words to express yourself around before.

[...]

KA: I made another workshop with NIMK in which we made little USB sticks. We bought little USB sticks and we struck them from their cover, so there's just the metal bit and then we asked the kids to consider secrets. Kids of the particular group we were working with don't have their own computers. They have the school computer and they have home computers. So where do you put your secrets? Where do you put your bad poetry? Where do you put the things that are yours? The pictures of that guy you fancy? So what do you do?. The whole exercise for that particular workshop is not very technical, besides understanding what a USB stick is and what it can do for you. It can be that thing that YOU carry with you, on your body, from computer to computer. And that becomes your place. And then we asked them to decorate them. [...] We had some guy who glued needles, so you could hardly hold it. It was very clear that he didn't want anybody to hold it. We had someone that incorporated it into his clothes. We had this guy who made a T-Coy. He got a USB stick and then he made another one, out of the garbage that was in the room, and he made it look the same. So there was a fake USB stick and a real USB stick.

It was very interesting to see how this fourteen year olds deal with how to keep a secret. And then the idea is through doing this, you start thinking about your privacy. And you start thinking about the nature of the stuff that you leave on the cloud. On FaceBook or whatever. You've had a beginning of a thought about that.

If you look at the Vibrobot workshop that I did for NIMK too, it's a more practical thing, which is to build the simplest robot in the universe. We didn't invent this thing. We modified it slightly to make it cheaper, in terms of technical design. We are not using battery tips for example - because they are expensive. If we have used them we couldn't have done the workshop. When you do workshops with schools there's a pain-threshold of money and if you go over it, you cannot do it. So instead of using battery tips, we used paperclips and tape. So, when we do this workshops we have motors - and the motors are unusual to the kids, they have never seen one before [...]. But everything else comes from HEMA. On principle. We, on principle, got all the branded HEMA stuff just to completely disqualify the though that in this workshop there is something unachievable otherwise.

So we teach the what the battery is and we teach them what the motor is, but we do it like this (snaps her fingers). It's crazy fast pace. In max twenty minutes they learn all this. They've already build the technical backbone of the robot in twenty minutes - and it works. And then we ask them to design the robot. And this again is for teenagers. And it is shocking how they have this moment when they go: "but how should it look?" and I go: "I don't know. What do you think?" and you suddenly realise and they suddenly realise that it has been a long time since someone asked them a question like that. These are kids that are these kinds of schools where they're never really asked to create anything.

We only have one rule for the second part of the workshop and that is that you are not allowed to copy someone else's design. We on purpose actually have limited materials on the table. We are looking to have them design not from abundance, but from lack.

The Vibrobot is a collaboration between me an Audrey Samson. Me and Audrey, we don't care about Robots in particular. What we care about is feeling ownership. That there is ownership to the things that you have. And if you can built this, you can build anything and if you can build anything, you can be a player in the world of things.

GP: and how about your collaboration with the teachers?

KA: If the teachers are there we make them participate on equal footing with the children. It's very important to destroy the teacher authority for a successful workshop to take place. [...] We see huge differences group by group in terms of who the teacher is. The hardest thing I had to learn when I started doing this was that you have to stop the teacher thing, just because if you go there and you are a teacher you're gonna fall into a well established patter and you're gonna be the new guy.

One thing that is very important to me when you do these experiences is that I have to take responsibility for the situation. I am asking them to do something crazy, from their point of view. I am asking them to do something that is way out their creative comfort zone. And in order to do so, I have to take responsibility. I go in there - I am the mad lady who asks the thing - and because it's my responsibility, they dare to do it.

By the time you leave, you have a working Vibrobot. We never had any failures. And also we could never make them leave (the kids). This is what I mean about taking responsibility. It's a little bit performative. If you are a musician, it's the same thing. Imagine a musician who doesn't take responsibility for a performance. That's a bad performance, no matter how it goes.

Whenever we do building workshops, the thing that we build can never fail. There is never failure. If a robot doesn't work we can fix it. If you're trying to stick something to a USB stick and it doesn't stick, we'll put more glue on it. So, it is hard to fail. The thing that is challenging is the expression.

I put these Easter egg-words in there. I put words that act as subliminal primers. I am very very careful with the words I use, and the words will trigger certain kinds of emotional responses. I use the word robot. These things are vibrating motors! Why is that a robot? We could have called it a machine, or an engine. It's called a robot, because a robot references a hundred year long dream of technology. Human beings have feared and worshipped and wished for a robot for a hundred year. It's a shorthand for "technology" and its promises and its fears and its possibilities. And wouldn't it be great if I hadn't have to brush my own teeth. So this is an example of that [priming]. Similarly in the USB workshops we talk a lot about secrets. We talk about particular ways of thinking about secrets. So the emotional and the artistic contexts of these workshops are actually quite heavy. Particularly for someone who hasn't agreed to be in an artistic process. So they're heavy subjects, but in the meantime, there some stuff that needs to be glued together, and "here's a bit of tape!", and "can I have the scissors?".

So, I use this idea of embodied making. The way that these things are allowed to express themselves without feeling crushing, heavy or difficult.

GP: What do you think would make your workshops more effective. Or, what is disabling you from doing more elaborate things?

KA: For me the best situation is when people [organisers] provide me with a prompt. A prompt is always nice. Sometimes I can provide the prompt myself.

To have open minded organisations around me, who are aware that this will be live. That know that this will probably fly, but they're taking the same type of risk that the kids are taking. It has to be open-minded. I don't ever want to be involved in workshops that are restrictive in nature. I am not in the business of educating anybody. I'm in the business of trying to blow their minds, if I can do that. With permission obviously.

[...]

KA: I have a hard time with organisations and festival that say, can you do this but in half the time, with twice the amount of kids. Some of the festivals are used to programme children's concerts, where they can fill the room with two hundred people, and they have a really hard time with the fact that "No, we cannot do this with two hundred people". So Volume is a problem, because I am doing a very personal experience, I can't do high volume.

This is also very important: sometimes it's hard to explain. There are places like NEMO, where you can go and do very lovely experiences. You know: "today we'll build a rocket". And all it is, is a table with materials and you're gonna build a rocket. And then you're going to leave. That is not what I do. It looks on the surface like what I do, but I am not interested unless it has the mind blowing component. So sometimes I have to translate that. Why is this not a NEMO workshop. And how can we structurally go into a festival situation and allow these things to happen with enough attention

It's also a bit of an attitude change, that is happening, but it has taken a lot of time to happen. Particularly festivals are use to scheduling stuff for more or less passive audiences. And you're gonna do something for active audiences, it's simply different.

GP: You mentioned a couple of times that you want things to happen fast. But would you use twice as much time if you had the chance?

KA: It depends on what you want to do. If you have more time, you'd go for something technically more challenging.

GP: Are you aware of policy interest towards creativity and skills for innovation?

KA: There's absolutely interest for this. I have completely failed to make this pay. If you figure it out, you tell me. I understand that we are on the edge of being able to do this in a really interesting fashion, and with interesting roles for us. I understand that. I just haven't made it work yet.