New Ways of Working in the Creative Environment of netWork Oasis.

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Abstract

In this research we analyze the current situation in modern working environments. There are different ways in which they can be developed in the nearest future according to the recent tendencies in creative society growth. The basics for this research are educational technology and the idea to give food for computer science specialists for further creativity supporting projects.

In this research we analyze factors that attract creative class and conditions that stimulate creativity in working environments. We describe organizational knowledge creation processes and the most important factors for knowledge conversions. Networks are viewed from the knowledge-producing perspective. The idea of virtual knowledge networks via online communities and its application for the netWork Oasis project is given.

Problem solving approach and collective knowledge construction are seen as ways of working. Thus we suggest ICT tools that support interactions and ubiquitous learning. We describe an idea of physical spaces that support different mental and communicational needs, and a variety of working processes. Main principles of building mental structure of spaces in future working environment are analyzed and suggestions for the development of the netWork Oasis are given.

ACM-class (ACM Computing Classification System, 1998 version): K.4.3, J.4

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Foreword

The first time I've heard about the netWork Oasis project was January 2004. Gaetano La Russa invited me to talk about possible solutions to make working and learning process more effective, compared to what we have recently in the University of Joensuu. I had no idea what kind of another environment it could be. I just thought that we could use less paper in our everyday work and make interior more home-like. Then I met Ilkka Kakko and Jaana Puhakka. They told me about the idea of creating such kind of an office, where Interior and Instruments will support Interactions between people. The idea seemed great to me and I started to read more about new ways of organizing working culture in offices.

After one month, the first kick-off meeting with absolutely different people had happened. We were discussing the basic ideas that should be on the foundation of this project. It is interesting how our group participants' opinions changed during the next five months. At the beginning it was quite difficult for some people to believe that it is realistic to keep this project alive, as it needs to change our minds in the very deep roots. But later, as we continued to work, everybody got inspired. The project is very challenging and needs a lot to be done; multi-disciplinary and multi-cultural experts give their knowledge to do everything in the best way. Group working is highly appreciated and personal individuality is much valued. These are the bases for a successful teamwork.

This project deeply affected all my understanding of ways how we work and learn. Any kind of even routine job can be easily done, if it inspires with a possibility to open the person's talents and can be done in a more creative way. Supportive and stimulating creativity environment – that is the most important in our jobs now.

The main purpose of this research is to describe how to stimulate creativity in different ways. The idea is not so new in Educational Technology, as it is in the development of working environments.

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Contents

1. Introduction

Imagine a person from a traditional modern company. What is a usual working day of this person? In the morning she or he arrives at the office, probably takes a cup of coffee and works till the end of the day with lunch-break. What does she or he see at the working place? Normally, table and chair, telephone, probably, computer and lots of paper. We may continue with walls all around, windows with jalousie and fluorescent lamps on the ceiling. It might be that some colleagues are in the same office. But! What can inspire creativity in this kind of "normal" working place? Is there any possibility that this day will differ from the previous one and the next one? We need to search for other types of working environment, which makes us more mobile in our time and space location, which is flexible to different kinds of people and their habits, which gives us a stimulus to think in a different way. An environment that allows us to easily communicate with different people – real and virtual, that supports creative uncertainty and makes a challenge to our usual way of life.

Most of the modern researchers of this field tend to have similar opinions. According to Florida (2004), the new age of creative economy is coming, changing a lot in our everyday life. People are willing to work in an environment that supports their creative capabilities, offers learning occurring everywhere, allows the use of varied human networks and gives them freedom in choosing time and place to work and relax. Places with diverse cultural, recreational, scientific and technological background are the most successful in attracting new individuals and tend to do well in new economy.

This research will concentrate on the idea of the creation of such an environment that will help people to do their best, exchange ideas and produce new knowledge. The working name of the project is netWork Oasis, but I'll call it shortly Oasis in most cases.

This research is divided into seven main chapters. The first one is Introduction. The second – "New trends in work and leisure" – describes the main tendencies in changing the way of working in today's world. The importance of attracting and retaining Creative Class is stressed and the ways of how to do it in general are discussed. The Csikszentmihalyi's idea of Flow is described and the main goals of today's working environment are set.

The third chapter “Oasis Knowledge Creation” is based on Nonaka theory of organizational knowledge creation and Japanese concept ‘Ba’. It gives the description of knowledge conversions and supportive Ba for each of them. Some new ideas created in Oasis project are also described.

Next chapter, number four, “Principles” describes the principles that should be taken into consideration from the Educational point of view: ubiquitous learning, smooth combination of learning, working and playing, use of new technologies, and inspiring environment.

The fifth chapter “Supporting tools, e-Learning” is dedicated to the Virtual ways of working and learning. Ideas for developing new supportive tools are given, Basic possibilities of available e-Learning tools are discussed, the use of Multimedia in e-Learning is discussed and opportunities of Web-technologies for online communities are analyzed. Oasis Garden role in networking will be discussed as well.

netWork Oasis team originally was around 50 people. What I’ve been doing during our group-meetings – collecting ideas, analyzing them and adding some theoretical and philosophical background. I’ve made a theoretical research on creativity facilitating environments, organizational knowledge creation, virtual environments and their abilities to speed up the knowledge convergences.

The project is developing very rapidly and new subprojects appeared. The first one, the most close to Computer Science, was Oasis Garden – virtual environment for collaborative work, knowledge storage, exchange, etc. But after some time Oasis team got a new idea of combining virtual and real in a unique mixture. The new subproject is called Glow. Evgenia Chernenko and me are developing environment for work in Oasis through Glow distantly. Currently this is a web-based application, but in the future we propose to develop applications for mobile devices as well.

As a new tool, mixed reality, or we call it hybrid space, requires a lot of theoretical research. There are no such working projects yet in the world, thus there a lot of challenges and questions. I’d like to mention that we are not talking about augmented reality that is provided though devices that a person needs to wear on the head, hands, etc. But we are talking here about a blend of virtual and real, where one stays in reality without any gadgets. And at the same time has easy access to the virtual world, distantly working people, stored somewhere information and knowledge and services.

More about Glow is written in Chapter 6.

The last chapter is “Summary”, where results are described and some ideas for future work are given.

1.1. Research problems

i. The main question, which we would like to answer in this research, is *how information and communication technology could help in facilitating creativity?* In today’s world a huge amount of different high-technological tools appear everyday, but the lack of creativity supporting tools is obvious. The structure of these tools is rather complicated, thus we need to make the analysis of creativity itself and the ways how it could be facilitated.

ii. Accordingly to the main question several subtopics will be considered. The first sub-question is *how creative people could be attracted and what is the most effective way of working creatively?* In order to construct tools to facilitate creativity and interactions we need to know what creative people expect from the environment and how we could attract them.

iii. Then we shall give an answer to the question *how knowledge is built in the community?* To offer proper tools to facilitate creative thinking we need to know what kind of processes are happening during the knowledge creation.

iv. After finding answers to these basic questions we shall consider the problem of defining *the principles of building the mental structure of Oasis spaces and activities*. This would give us the idea of how to divide or combine different interaction processes. A research on the tools supporting different interactions should also be done here and we shall answer the question what kind of topics are the most important to test beforehand.

v. At the end we’ll find out *what are the possibilities to support creativity with modern technologies like e-working tools?* We shall make a research on the requirements for e-learning and e-working tools and propose a solution for Oasis.

1.2. Inspiring previous projects

Some of the ideas in the area of new way of working in offices have already been realized. *Office21, eOffice, DEGW* offer working environments that combine real face-to-face work with possibilities of distant communications in a new working atmosphere with good realization for ergonomics and interior design, as well as the use of modern instruments.

1.3. Methodology

This is a multidisciplinary research on the new creative working environments and ways of working and learning in the Information society. The case study is netWork Oasis by Joensuu Science Park. This project concerns the development of collaborative working environment. Innovation and human factors are the main points here. New methods of group working have been successfully tested in this team. The found focal points and areas changed several times from seminar to seminar. First we started with Interior, Instruments and Interactions groups, then changed the structure to a set of Planning groups and finally came to the subprojects. One of them is Oasis Visitors' Garden and another Glow, both will be described in this research.

Generally, there are empirical and non-empirical sciences (Hempel, 1966). While the latter one includes logic and pure mathematics, the first one is almost all the rest. Empirical sciences are those that require experiments and tests to prove their correctness or they appear from a collection of tests using some methods. Empirical sciences can be divided as well into natural sciences (physics, chemistry, biology, etc.) and social. Psychology deals with both branches of empirical sciences. Further we shall talk about empirical sciences.

Hempel suggests that scientific knowledge creation requires two steps: invention and test. The first one means formulation a hypothesis and we'll talk later about it. And the latter one is a method for the rejection of the hypothesis if tests do not validate it.

Why only rejection? First, we consider so-called "modus tollens" in logic. Let H be our hypothesis and I its implication.

If H is true, then so is I.

<u>But (as the evidence shows) I is not true.</u>

H is not true.

This method is used to check if theory is not correct. But what if we consider the opposite situation?

If H is true, then so is I.

(As the evidence shows) I is true.

H is true.

This is called “the fallacy of affirming the consequent” and is deductively invalid method. Even in case if many implications have been took into consideration and careful tests have been done, the hypothesis still may be false:

If H is true, then so are I_1, I_2, …, I_n.

(As the evidence shows) I_1, I_2, …, I_n. are all true.

H is true.

This method doesn’t work! In empirical sciences we cannot consider all cases in all situations, thus there is still a chance that in some conditions the theory will fail.

Now we shall turn to the process of hypothesis invention. There are several ways how to come to this invention. One possibility is to get it from collected data by means of inductive inference.

Then we need to apply deductive method: the conclusion is related to the premises in such a way, that if the premises are true, then conclusion is true as well. It means as well:

If p, then q.

It is not the case that q.

It is not the case that p.

Deductive approach can be describes as from the general to the particular. On the other side, inductive inferences are often such that they lead from premises about the particular parts to the conclusion about general principles. But in this case we cannot guarantee the truth of the principle even if all the premises are true. Because of these features, it is said that the premises of inductive inference lead to conclusion with more or less high probability, while deductive – with certainty.

According to Hempel, ideal scientific inquiry includes four steps:

1. observation and recording of all facts
2. analysis and classification of these facts
3. inductive derivation of generalizations from them
4. further testing and generalization

But already the first step would be impossible to make in real life, otherwise it would take time till the end of the world. Thus we make a suggestion that only all relevant facts should be collected. This is also a challenge, but more possible than ideal case.

The next issue is how do we keep scientific objectivity? Hypotheses can be freely invented and proposed in science, but then they have to pass critical scrutiny – the checking of suitable test implications by careful observation or experiment.

Usually theories appear as a result of a system of uniformities of previously studied data. Two kinds of principles require being satisfied, when theory is formulated. On kind are internal principles that form the basic entities and processes invoked in the theory. Another one kind are bridge principles, that indicate how the processes envisaged in the theory are related to the empirical phenomena, that is known and that the theory can explain, predict or retrofit.

Peirce (Giere R. et al., 1974) distinguished three types of induction – crude, quantitative and qualitative. Crude induction deals with universal (as opposed to statical) hypotheses. The satisfaction of only one condition is required to make a crude induction: "All A are B" is true, if there are no (known) evidence of the contrary. This kind of induction play insignificant role in science.

Quantitative induction is induction by simple enumeration of in its most literal sense. The conclusions of quantitative inductions always concern probability. According to Peirce, this kind of induction is used in a limited extent in science.

Qualitative induction corresponds to the so-called hypothetico-deductive method. Scientists deduce predictions from hypothesis and perform experiments to check the predictions. In case of all predictions are confirmed, the hypothesis can be tentatively adopted. If any of the predictions fail, then hypothesis should be changed. Thus this induction is self-corrected.

Taking into consideration deductive and qualitative inductive approaches we can test our hypotheses. The last step, or actually the first one to be, is to ask how to propose the hypothesis? Peirce suggests that the first step should be abductive. When some unexpected, curious phenomenon is discovered then in order to find some law or rule to explain the appearance f the phenomenon in question.

The second step is deductive approach, which is used to find possible consequences. The last step – inductive – is testing if the consequences inferred by deduction are in fact present.

This is a general method for creation of new experimental theories. As this research concerns empirical sciences like educational technology, computer science, sociology, psychology, etc.

The tools and methods used in this research are the following ones:

Reading books. This material forms a background theory and hypotheses as well.

Seminars and workshops with netWork Oasis development team. People working on this project are experts in different fields. What is important in these seminars is that we followed the principles of diversity of people and opinions, keeping strong individuality and working in collaboration. After the seminars ideas and their further development have been given to the groups and the results then stored in the Internet-based working environment.

Use of Internet-based working environment. We use in netWork Oasis Discendum Optima virtual learning tool. Most effectively we used some facilities of this environment like document storage, discussion forum and chat. The benefit of usage this tool in work is that everyone can contribute, learn and exchange their knowledge and ideas. Then I've been doing content analysis of documents and proposals, as well as collected ideas from discussion forums.

Mind mapping. Mind Mapping is a good tool to put main ideas, concepts and their relations and interdependencies on paper. This makes easy understanding of general line and allows skipping details if they are not needed at this step.

2. New trends in work and leisure

Being innovative is what parents want to see in their children, directors want from their companies and governors from their countries. But what makes innovation happen? Nicholas Negroponte (2003) writes about the basics of a good innovative system. It's a good education culture, variety of viewpoints and encouraging collaboration. In this chapter we'll discuss the importance of creativity in our work and some meaningful points on the way to it. Ideas about what kind of environment attracts creative people and how Creative Capital can be built will be considered and what are the necessary features of the constructive atmosphere.

2.1. Why creativity is important?

As we live in the new age of quickly developing high technology, one of the most important features of the employees is their creative capability. According to Richard Florida (2002) more and more business' heads understand that they need to make necessary for attracting creative class employees' adaptations. It includes everything from relaxed dress codes, flexible schedules, and new working rules in the office. Why is it so? The answer is simple – places that manage to attract and keep creative and talented people succeed in today's world's development, the others fail.

Talent attracts high-technology industry and together they generate positive regional economic outcome, as mentioned in "The Economic Geography of Talent" by R. Florida (September 2002). Thus the ability to catch the attention of talent is one of the major priorities in city and region policy and defines its ability to grow further. Companies and cities should create an environment that attracts or generates talent and retains it. Florida writes how we can tempt new creative people to the particular places, what are the necessary factors needed and what are the weaknesses of modern society which fails to do so.

The most obvious representatives of creative class can be found in science: scientists, engineers, university professors; literature: poets and novelists, non-fiction writers, editors; arts: actors, designers, artists, architects, cultural figures, entertainers; as well as in other spheres where personal opinion is of high value (Florida, 2002). These people deal with solving specific problems every day and create their own new ways of thinking, acquiring knowledge, representing the information and doing the

job. They contribute even more to the progress then just intelligence; they bring new ideas and creativity to everything – working, learning or just relaxing.

Lucas (1988) claims that regional growth arises from the accumulation of human capital in particular places. If the concentration of talent is high enough then it allows to accumulate new knowledge effectively and reduces the price of its transmitting. This increases the productivity of individuals, firms and regions as well.

On the other hand Mihaly Csikszentmihalyi writes how we can improve the current situation in our working places to develop the creativity of individuals and reach the "Flow" state that he describes. According to him a flow-type experience is a state of happiness that includes a way of enjoying the working process with clear and challenging goals within the capabilities of a person and has several features. Some of them are:

- a person is completely concentrated, involved in a process
- a task is possible to complete
- a person knows what should be done and get immediate feedback
- a person feels like outside the everyday reality
- a person has the sense of control of the situation
- a person feels stronger after the flow experience
- the sense of time passing disappears.

The design of such an environment, which includes all the features that raise the creativity, is an important and challenging task. This work will include analysis of necessary features, their use in the context of Oasis project and practical advices on the applied techniques.

2.2. What kind of environment attracts creative people?

Richard Florida (2000) gives some particular traits of the places that attract creative persons. We can divide them into several groups. First of all it is the quality of place or amenities, which the environment provides to the individual. According to him the areas with higher than average level of amenities have more people with higher level of skills. The reverse is also true for lower than average amenity areas. In areas with broader amenities we have a greater number of companies that require higher level of education and skills from their employees. The findings in Florida's (2000) article confirm that amenities attract high-skilled people and companies not depending on the primary availability of these resources in the amenity located areas.

According to Places Rated Almanac (Savageau, 1989) we consider Culture, Recreation and Climate as such amenities. Florida suggests some other additional amenities in his research, thus we'll try to combine all of them somehow.

We can classify the factors that attract creative people in the following way:

1. Market factors:
    a. Thick labor market
    b. High probability to find a good job
    c. High variety of available jobs in high technology sphere
2. Non-market factors:
    a. Other talented people
    b. High level of quality of place
        - Culture
        - Recreation
        - Climate
        - "Coolness"
        - High technology
        - Median house value
    c. Diversity

Now we'll define all these factors more clearly so that they could be used in further analysis and recommendations for Oasis project.

2.2.1. Market factors

All the Market factors can be considered together as they have strong correlation between them. People migrate to jobs and human capital will never be located in the area with low opportunity to find a job. As mobility is seen as career path, and people expect to shift from one job to another quite often then places with thick labor market win in the war of attracting creative class. At the same time high technology industry plays a significant role in attracting such individuals and thus it is an important employer and should widely represent job opportunities. However, the market factors are not enough to attract human capital.

2.2.2. Non-market factors

First of all talent attracts talent and vice versa – talent is attracted by talent. Areas with higher number of creative class representatives seem to be more suitable for other ingenious persons to move to.

Quality of place implies several quite complicated characteristics. In general, it can be defined as cultural and recreational amenities, uniqueness of places, "urban" amenities, high-level consumer services, etc. Due to the long working hours, tight work and deadlines in high-technology sphere it is required that amenities could be accessed at any time on demand (Florida, January 2000).

Cultural amenities attract creative people more than recreational or climate. According to Florida (September 2002) it is also true for professionals and technical workers, but not for scientists and engineers. Cultural amenities can be described as existing art galleries, non-profit museums, theatre performances and musical events, public libraries and access to the culture of surrounding areas. The places should be stimulating and dynamic, with high level of cultural interplay.

By *Recreation* we should understand mostly active, participatory amenities, which in our case attract creative, non-passive, individuals. It varies from high quality restaurants to quiet bistros and sidewalk cafes; it is "street" art and music, open-air theatres and small galleries, where everyone feels involved in performing. We add here active outdoor recreation from traditional like jogging and bicycling to extreme like snowboarding and windsurfing. It includes bowling lanes, wall-climbing rooms, swimming pools and gyms; it can be automobile racetracks and parachute jumping schools. Not less mean surroundings – national parks, lakes, rivers and coastline area, and all the other high quality manifold experiences.

Climate, according to Savageau (1989), is defined by the number of very hot/cold days, seasonal temperature variation, heating and cooling days, freezing days, zero-degree days, etc. As we cannot do anything with climate then we'll leave this factor out of our consideration.

"Coolness" factor is characterized by the percent of young population; diversity of nightlife (night bars, clubs, etc.) and culture (art galleries, museums, etc.). It doesn't mean that creative people can be only youth, as talented persons are always younger then their ordinary coevals and can enjoy the life in the way like other young people. We can include here all "urban" amenities: "rivers, ports, uneven topography,

roads, bridges, water supply and sewer systems, parks open spaces, historical ruins, buildings, street landscapes, houses, hospitals, schools, hotels, stores, temples and shrines, underground shopping centers, roadside trees, electric light poles, street furniture, monuments, signs, signboards, neon signs, street lamps, show windows, automobiles, bicycles, and so forth" (Harumoto, 1993). It is important that city looks attractive and unique in its own style, as a mixture of old edifices and new high-tech companies' buildings, roads, etc. Everything that stresses authenticity appeals to non-ordinary individuals: historical building, established neighborhoods, unique music scenes, specific cultural attributes, and combination of different lifestyles, people and experiences.

High technology companies appear in the places abundant in talent. The availability of talent is a decisive factor for high-tech firms to choose their location. In highly innovative and mobile companies where the speed to market is a critical factor fast access to creative human capital is extremely important. Florida showed in "The Economic Geography of Talent" (September 2002) high correlation between high-technology industry and talent as well as its high correlation with diversity. As knowledge workers reside in the universities' districts then it is important for high-technology industry to develop various amenities in these regions.

If we consider *Median house value* as another amenity of area, then we can say that with higher level of quality of place we always have higher median houses prices. Florida showed in his article (September 2002) that median house value is highly correlated with talent, as well as with professional and technical workers, but not with scientists and engineers. Substantially, talent is ready to pay more for quality of place.

Diversity is one of the main features of the best places to live and work, which is given by creative persons. It characterizes the openness of the place to new life, ideas, technology and people. Diversity means willingness of the society to accept individuals from different background; it implies low entry barriers for newcomers like "plug-and-play" community where the adaptation period takes just a week or less; and it presents tolerance to disparateness. It includes a variety of lifestyles, kinds of music and food, mix of cultures, options, events and experiences. According to Florida's research (September 2002) talent is highly correlated with diversity, and we can suppose diversity as fundamental feature of creative class values.

Nicholas Negroponte (2003) also writes about *diversity* as one of the basis for innovative environment. Any society that has a strong culture and homogeneity is most likely to be far from stimulating any innovative thinking. On the other hand heterogeneous culture produces the bloom of innovation by feeding it with a variety of opinions and viewpoints. There are two good points to start in Negroponte's article – celebrating wrong answers to remember mistakes, and listening to youth to favor imagination.

Encouraging *multiple points of view* is another crucial and challenging factor of creative culture. The problem here is that educational system rewards going into depth, not width. Thus expertise is bred with experts who work with their own kind (Negroponte, 2003). And even though the need of interdisciplinary labs and labs themselves emerged in the 1960's, but only recently people realized the importance of interdisciplinary environment in increasing creativity. And two more elements are needed, both concern maximizing *serendipity*. One is the encouragement of people for *risk* and the other is the support for *openness* and *idea sharing*. Both seem to be nearly impossible in modern inter-organizational structures, but particularly these features give the nourishment of different viewpoints and ability to make big leaps of thought (Negroponte, 2003).

We can say that when creating a place to work and live we should take at least all these factors into consideration. This will provide us with income of talent, which brings ideas, high technology, and after all increases the average income of the whole region.

2.3. Building Creative Capital

The process of transformation from a usual place with traditional values and norms of work to the place where creative people reside is not so easy and one-step only. It requires some particular features from the place itself and people who already work and live there. Some of these features can be hard to overcome as they break previously constructed relations and habits, some of them are rather natural, but in any case we should remember that new creative economy brings us new trends and values as well as new opportunities and directions. We'll discuss the background of new tendencies, the process of building Creative Capital and chances of Finland to succeed in this advance.

2.3.1. What are the Social Capital and the Creative Capital?

The relations inside society can be considered from the strength of ties between its members. Places with dense ties provide advantages to insiders and thus promote stability. While places with looser networks and weaker ties are more open to newcomers and thus promote novel combinations of resources and ideas (Florida, 2004, p. 273). The first one is the main idea of Social Capital, the latter – of Creative. If we take a closer look on the differences between them, then we can say that *Social capital* means strong ties, membership in groups, reciprocity, and trustfulness (Florida, 2004, p. 267 – 268). While *Creative capital* gives us weak ties, quasi-anonymity, low-entry barriers, diversity and individualistic pursuits (Florida, 2004, p. 269, 273 – 282). Creative communities are centers of innovation and economic growth; social capitals are not (Florida, 2004, p. 273).

Florida in his research proves the crucial importance of weak ties between people for creative collaboration (2004, p. 276 – 280), but still we need to remember that life cannot consist only of weak ties. Creative class people maintain some strong ties – with close friends and parents; but these relations do not dominate in their life. Max Weber, George Simmel and Emile Durkheim already a century ago identified the fact of shifting from small strong-tied communities to more heterogeneous communities of weak ties (Florida, 2004, p. 278), but now it has become even more important.

Oasis can easily provide these weak ties for visitors. And actually this is one of the reasons for what it will be created. As Richard Florida stressed (2004, p. 281) Creative Class people yearn new kind of community, which allows them to be themselves, it is connecting and at the same time tolerant and open. Oasis should be an environment that is flexible and open to any kind of creativity, anyone should feel himself here as a part of community but with strong individual identity. If one comes here for a short period of time then there is no opportunity to get used to people and environment, everyone and everything from the very beginning should be ready to accept newcomer with his own view of life, habits, talents and ideas. It probably concerns not only Oasis where these absolutely different people will be offered to come, but also the surroundings – Joensuu, Karelia, Finland, even Europe. But this is much wider question.

The idea for Oasis is that it should support old strong ties – with friends and parents and provide secure and comfortable communication with them. But at the same time, it should be open to new weak non-stable relations for exchanging ideas and experiences – either real or virtual.

2.3.2. Networks

Castells in "The End of Millennium" (1998) says that the global economy will expand in the twenty-first century, using substantial increases in the power of telecommunications and information processing. It will penetrate all countries, cultures, economies, communication flows and financial networks scanning the planet for profit-making opportunities. Mental work will replace physical in the most effective sectors of economy. Valuable locals and people will be found everywhere, but at the same time there will be places switched-off from this process.

Castells describes the culture of real virtuality as a system in which reality itself is fully immersed in a virtual image setting, in the world of make believe, in which symbols are not just metaphors but comprise the actual experience. This culture has already emerged and was constructed by the Network society.

Network society is a new social structure of the Information Age. The material basis of Network society lies in the fact that people's livelihood is in the space of flows and in timeless time. The first one means, that the dominant values are organized in the society simultaneously without contiguity, which is the flow of information independently of locale. And the timeless time means that the dominant values do not refer to any time in the past or future, all experiences in the landscape of computer networks are mixed in hypertext and are rearranging all the time, depending on the interests and moods of the senders and receivers (Castells, 1998).

The Network society in the way Castells describes it and Florida's Creative Class have very much in common. Both rely on weak ties, use human networks and have a deep need to share and exchange the information with the highest speed. We should focus on this kind of society and find out ways how to facilitate its development and efficiency in work.

2.3.3. The vision of Oasis' development

Creative Class now does not recognize itself as a class. To be effective it needs to invent new forms of collective actions (Florida, 2004, p. 317) and to do so Creative Class has three issues to address:

"(1) Investing in creativity to ensure long-run economic growth," (Florida, 2004, p. 318) – at this point we need to remember that creativity cannot appear from nowhere, it should be cultivated to rise. It means that we should invest into creative capital (Florida, 2004, p. 320). And it is not only Research & Development sectors or educational system, but also multidimensional and varied forms of creativity as well as related infrastructure and communities – art, music, culture, design, etc.

In Oasis context it means that interior and instruments should support not only technologically innovative abilities, but other ways of self-expression from traditional to new once as well.

"(2) Overcoming the class divides that weaken our social fabric and threaten economic well-being" (Florida, 2004, p. 318) – in this respect we can say that low-end jobs usually don't imply creativity, thus we should make as few this kind of jobs as it is possible. This will leave no choice for people and redirect them toward more creative jobs.

To apply this vision to Oasis we can propose that it should be a place where everyone may avoid low-end job and be more creative in what one's doing. This point probably concerns more technical and instrumental part of Oasis. It should be done so that most of routine job is done automatically – e.g. scanning the slides can be a routine for a photographer or typing – for a writer. It takes time and forces, but doesn't give anything new to the creator except the desire to avoid this process.

"(3) Building new forms of social cohesion in a world defined by increasing diversity and beset by growing fragmentation" (Florida, 2004, p. 318, 324). In the fast-developing world of new relations we still need to have strong communities, even if they are temporal, while also accommodate the mobility and change. The basics of these communities are low entry barriers to effective participation, diverse, desirable, authentic and cohesive place and the idea that people of all types and backgrounds can live and work together (Florida, 2004, p. 324 – 325). Oasis should meet these requirements as well – like 'plug-and-play' community, open and easy to reach.

2.3.4. How creative communities can be built?

Florida proposes that for building a Creative Community we need *people climate* much more than business climate (2004, p. 283). That means supporting creativity and building a community suitable for creative people, not only for high-tech companies. To bring people and economic activity to the cities, according to Florida, several forces are needed (2004, p. 285 – 291).

1. Crime should go down and cities become safer. At the same time cities become cleaner.
2. Cities become the prime location for creative lifestyle.
3. Cities are benefiting from powerful demographic shifts. There are two ways how demographical situation influences cities – more people are staying single longer and immigration surge.
4. Cities have reemerged as centers of creativity and incubators of innovation. In general the tendency for appearing high-tech jobs in the cities can be seen.
5. The serious tension rises between established neighborhood residents and newer, more affluent people moving in.
6. Both renewed cities and traditional suburbs are seeking to emulate the elements of urban life.

Beside these factors the presence of a major research university is a great advantage in the creative economy. To be an effective contributor to the economy, University must play three roles, which are the 3T's of creative economy (Florida, 2004, p. 292): *Technology* – universities are important sources of new technology and spin-off companies according to Florida. On one of the Oasis members' meeting Ilkka Kakko proposed that not Technology, but Science is even more important. I agree that Universities are first of all the suppliers of scientific knowledge and technology is a result of further collaboration with commercial companies thus cannot be seen as a basis for success, but as a goal and result of such collaboration.

The next 'T' is *Talent* – Universities attract talented people, create new spin-off companies and provide other companies with new knowledge workers. *Tolerance* – Universities help to create an open and progressive climate that helps to attract new members of creative class. But University cannot survive without proper

surroundings. University can attract talent, but to retain it we should have both the economic infrastructure and the quality of place.

Effective *People climate* (Florida, 2004, p. 293 – 297) is one where anybody can find a place to exist – from young, just graduated, or families with children up to seniors. It also supports diversity in culture, ethnic, etc. Creative communities appear not as a result of conscious planning but as organic product of converging strategies.

According to Florida and Tinagli's (2004) research "Europe in the Creative Age" Finland has very good chances to become the leader in attracting and retaining creative class. Florida shows that places, which combine three T's of Talent, Technology and Tolerance, are the most probable economy thriving locations. Today the number of workers in the creative sector of economy in Europe and USA is between 25 and 30 percents, in Finland it is one of the highest – 28,6%, after Belgium and Netherlands. In Talent Index – a combination of Human Capital, Scientific Talent and Creative Class – Finland scores the first in Europe and second after the United States according to Florida's statistics. In Euro-Technology Index, which is based on R&D, Innovation and High-Tech Innovation, Finland is ranked second in Europe after Sweden and third, if included the USA. Finland has the highest ranks in R&D and High-Tech Innovation sectors, which is a big benefit in competition for knowledge-oriented professionals attraction. And the last constituent is Tolerance, meaning openness to new people and ideas, sets Finland on the fourth place with high attitudes, but average values (meaning to what degree country reflects traditional or modern, secular values) and Self-Expression factors.

2.4. A piece of critics

I'd like to start this part with discussion of Florida's ideas. His theory already started to influence American cities development. But let's first take a look on unclear sides of this theory.

He has made a good research on correlative dependencies of a number of variables. But the assumption was that all of them influence one characteristic – the number of creative people in a particular city. I strongly believe that these interdependencies are much more complicated. It might be so that not only high level of amenities attracts creative people, but creative people themselves make this level of amenities high enough. "Coolness" cannot exist without people who make it happen. Even if we build new night clubs and open stylish cafes it would not guarantee that

people will come there and, definitely, won't mean that creative people start to move from other cities. Only the existence of a layer of people, who already need this factor, make the correlation between the number of creative people and this particular factor high.

Thus his correlation analysis seems to be one way only:

Number of Creative People *("Coolness", Climate, Amenities, diversity, Market factors, etc.),*

but the interdependencies are more complicated and require deeper analysis from sociological, psychological, philosophical and some other positions.

The next issue not to agree easily is the assumption that companies are really ready to attract new people. First of all, it's a problem of most people been conservative. Even if many of organizational leaders understand the good points of new approaches in business, but it is difficult to break old rules.

To my mind, attracting new people and creating diversity, independence and individuality facilitation should start from organizational level. If in the region there are no companies that utilize in their work these principles, then the number of creative people will never grow. Thus, what is needed, is not only building new amenities and bicycle-roads, but starting to change people's mind so that everyone would understand the benefits of working in a new way.

If we come back to the correlation analysis, then I'd like to admit, that Negroponte's idea of building Creative Culture is more logical:

Creative Culture *(Diversity, Serendipity),*

Serendipity *(Openness, Idea Sharing).*

Of course, Diversity and Serendipity are also results of some other factors, like trust between people, historical factors, etc. But at least not a direct result of Creative Culture as in case of number of creative people and level of amenities.

Castells' ideas of new real virtuality and ways how people will work in the future also require some comments. First of all, I can't fully agree that real world will immerse in virtual world. Face-to-face contacts and tacit knowledge exchange play one of the most important roles in human lives (see Chapter 3). Thus although virtual environments provide high-speed communication, they will never substitute the real ones.

I would suggest that when thinking of new working environment we would take into consideration these new trends. Castells' Network Society and Florida's

Creative Class – both are formed by the people, who greet weak-ties, like to work in diverse communities, wish to remain individuals and feel free to work wherever they will. This makes these two types of societies similar. But I'd propose that we won't equal them. Creative Class may include as well artists and other people, whose professions are not so closely connected with virtual networks. At the same time, Network Society might be wider then Creative Class. The correlation between these two groups requires time and deeper analysis as well.

At this point I would like to turn to the point of leadership in organizations and the way it could be changed.

2.5. Creating "Flow" in Oasis Way of Working

In this section we shall take a look on the Csikszentmihalyi's idea of "Flow". What is it, how is it important in work and how it can be achieved? The analogy with Oasis Way of Working will be drawn.

2.5.1. What is "Flow" and Oasis Way of Working?

"Flow", according to Csikszentmihalyi, is an experience of feeling the deep enjoyment, which comes from doing some activity and feeling deeply involved in it (2003, p. 39). Csikszentmihalyi describes Flow in terms of eight conditions, the meanings of which might vary in different situation, but still they are the most important components of what it feels like to be in flow. We'll just briefly look through them.

1. *Goals are Clear*. True enjoyment comes not from global goals, like winning the game or earning money, but from the each step, each moment on the way to this goal. For a deeper involvement in any activity it is essential to know what tasks one must do each moment (Csikszentmihalyi, 2003, p. 42).

For Oasis way of working there are two ways of defining goal. The goal of visit is known beforehand, thus we don't need to think much about this situation. For example, if someone comes to make new contacts with needed person, we could just help this creating Oasis calendar with planned meetings and possibility to invite partners or announce somebody's visit. Or the goal is not known before coming to Oasis and is to be found there. In this case we need to have tools that help to find the goal or several objectives for future development and realization. Tandem and Group

work should be utilized in this process with a help of educational technology methods such as problem-based learning where the first step is defining the goals.

2. *Feedback is Immediate.* It is important to give necessary information on time to stay absorbed in an activity. One needs to know that what he does matters. Feedback may come from various sources, but preferably that it comes from the activity itself; it means the high trust to internal standards and lead to satisfaction and enjoyment of doing the activity (Csikszentmihalyi, 2003, p. 43).

In Oasis way of working the main feedback comes from other people – they support ideas if any good one appears. During the Oasis creation process the feedback could be got from discussion flows. In many cases this is a good tool for immediate feedback, but we propose that some more tools could be developed for the feedback control. For example, anyone could vote anonymously for the interesting idea or the rating of best ideas could be built from the popularity of them in discussions. As dissemination of what one has done is an important step in knowledge creation process then we should offer several tools for this step – such as tools for publishing and notifications for others to give a fast access to new knowledge.

3. *A Balance Between Opportunity and Capacity*. Flow occurs when challenges and skills are high and equal to each other. If skills improve, one must increase the challenges otherwise the task will become boring. But with too high challenges and low skills one might feel depressive as gap between the opportunities and capacities is too huge. Thus one needs to decrease goals and improve skills. Challenges higher then skills lead to desire for learning (Csikszentmihalyi, 2003, p. 44).

Facilitation of learning is an essential part of Oasis way of doing things. e-Learning environment that is built into the working processes is a good tool to start with. Another aspect of such environment is encouragement of curiosity via learning games for individuals and groups. Tools for simulation of processes and visualizations of future artifacts should be included in learning environment as well. The development of advanced e-Learning tool is a challenging task itself and should take into consideration a lot of aspects of human cognition, psychological needs, ease of use and great opportunities for collaboration.

Next five conditions deal with deeper psychological transformations of the individual during the Flow than the previous three. That is why it is more challenging to find means to facilitate them on the way to achieve Flow. First, we name these conditions, and then add some ideas of how they can be achieved in Oasis.

4. *Concentration deepens.* When involvement into activity passes some threshold of intensity, one suddenly feels being deep in the work, interaction or any other activity. In such moments the distinction between self and activity disappears, the concentration is so high that one feels like in different reality, the ties with everyday routine life vanish (Csikszentmihalyi, 2003, p. 46).

5. *The Present Is What Matters.* In flow the world narrows to the limited space of the present moment task, all the other everyday problems have no chance to register in mind. This is the way in which flow allows to escape from reality, like the art and science do (Csikszentmihalyi, 2003, p. 49).

6. *Control Is No Problem.* One feels a strong sense of being in control in flow. It means that one has the ability to control each small step of his performance, even in smallest and the most insignificant details (Csikszentmihalyi, 2003, p. 50).

7. *The Sense Of Time Is Altered.* The time pass differs in flow from the normal, it can be much faster (like what seems to be some minutes is in reality several hours), or slower (the control of each minute and even second) or it can even stand. In the sense of time adopts itself according to the action (Csikszentmihalyi, 2003, p. 52).

8. *The Loss Of Ego.* When in flow one forgets not only the reality problems but also even one's very self. This is a result of deep concentration on the task and after the flow experience self-esteem of a person appears in a stronger form (Csikszentmihalyi, 2003, p. 55).

To take one's mind away from reality in Oasis we may use Wow-factor to impress the person and revolutionize the everyday view of life. Wow-factor is a degree to which the first impression of something makes a person say "Wow!", a surprise, originality, coolness factor.

Then we might offer a gripping environment as a mixture of real and virtual worlds where one can feel the union of two realities. Places for concentrated work should be created in Oasis environment and so-called soft-factors taken into consideration accurately. In the modern over-stressed life the Interior's goal is to support not only aesthetic and functional needs of human being but psychological also. The design of "outer" space affects deeply our "inner" space of self-confidence, creativity and intellectual abilities (Lipczinski, 2004). Lipczinski and Boerner proposed that the main elements of western depth psychology and key factors of eastern Feng Shui should be included in the research on soft-factors. The psychic

processes such as feeling well and at ease enhance creativity and thus in the future planning of Oasis spaces should be taken into account.

Finally, we would like to stress that flow can occur not only in creative work. Any kind of activity, sport, reading, any hobby or even tasks, which seem to be routine to somebody, make feeling of flow for others. The interesting point is that flow is a natural part of our mind – the deep concentration and full control comes from our human's disability to cope many stimuli simultaneously, we just need to intensify it.

2.5.2. Is it good to be in "Flow"?

If we consider flow from a business point of view – is it good when worker experience flow while working?

We can say that people tend to like when they feel happy, doesn't matter – in everyday life, family, job, hobby or whatever. People pay for goods or services as they think it will make them happier independently of what kind of goods – food, clothes, cars, computers, traveling, medical services, etc. The desire to be happier is essential to people.

What about the job? Humans' nervous system and bodies are just built for working, but at the same time works are not always built for people (Csikszentmihalyi, 2003, p. 85). As job is the most important part of social life for most adults, then it is necessary to give an opportunity to get enjoyment from what one does almost every day. Especially it may concern knowledge workers – who are searching for jobs that will deeply expand their capabilities. The challenging job within the person's capabilities, including increasing capabilities to grow and learn will be the most probable place where flow can occur.

At the same time everything can be enjoyable if the elements of flow are present. Thus if a work can produce flow it would be more enjoyable. Within this framework, even a boring routing job can be a source of fulfillment if it includes flow.

So, the answer to the question "is it good to be in Flow?" is "yes", the better we do our job, the better we feel. The more concentrated on task we are, the deeper we can understand it. In flow we are the most interested in activity and the most productive within it.

To stimulate the interest in the particular job we can do three things, according to Csikszentmihalyi (2003, Ch. 5):

1. to make the objective conditions of the workplace as attractive as it is possible;
2. to find ways to saturate the job with meaning and value;
3. to choose and reward individuals who find satisfaction in their work.

There are several reasons why we cannot reach often flow at job or cannot do it at all. First of all it happens when the goals are not clear or the goals of organization and a worker are not the same (Csikszentmihalyi, 2003, p. 92). How can we avoid this problem in Oasis?

The *lack of feedback* is another big problem – one cannot be deeply involved in his job, if he does not feel the meaning of his job (Csikszentmihalyi, 2003, p. 92). This is mostly the problem of communication. The feedback is important as it gives one a possibility to see how other people esteem his work and how meaningful is what he does. Feedback deepens relations between people and makes the whole work more organic. Oasis should be such a place where everyone can share his ideas with others freely and get answers to his questions and appraisal of his job. Here we may consider feedback from other people in Oasis, co-workers and friends out of Oasis or even virtual acquaintances. We need to make these communications as easy and available as possible.

The skills of the worker are not matched with the opportunities for action (Csikszentmihalyi, 2003, p. 93). Normally a problem is that workers do the same job every day or a job that requires only a fraction of their skills. This kind of job very quickly becomes boring, as it doesn't challenge a human being for future development. First we need to remember that we need to avoid this in Oasis providing an atmosphere that requires deep involvement in the creative process and doesn't leave any chance to become bored. Interactions with different people can cover this problem partly but also Interior and Instruments must be shocking enough to facilitate curiosity, Tools and Methods should be very effective in building new knowledge and Services high to avoid concentration on unnecessary troubles.

The second case when the job (or any activity) does not match with possibilities of a person is when skills are not enough vs. challenges. In this case a person either begins to improve her skills and to learn – it is the Arousal state according to Csikszentmihalyi, which is characterized by focused and alert condition. Or one fells into Anxiety, gets stressed, where the normal reaction is only to decrease the challenges.

Using new technology in Oasis we should remember, that it should be challenging enough for visitors to become first wondered, then thinking and after that leading them to the creative state flow. But at the same time never forget that too complicated environment can push away some individuals with lower skills.

As we don't know who will come to Oasis we need to take into consideration different opportunities implemented in Interior and Instruments that suit for people with different levels of skills. We cannot give a real guide to each visitor who will explain how everything works, thus we should create the environment in a way when it is challenging in its opportunities but available in its comprehension.

The next problem of many companies is *lack of control* – not only over the goals but also over the each step of the performance (Csikszentmihalyi, 2003, p. 94). Almost all human groups need some kind of hierarchy; someone should have more power and responsibilities, others less. But at the same time control from above should be balanced with autonomy of each person. The sense of personal control over the situation and opportunity to choose how to work further will essentially increase the involvement into the process.

The Oasis way of working gives a good chance to avoid this problem also. As we do not have any strict organizational structure for visitors and only self-organized groups exist in Oasis then the whole control over the situation is a care of individuals. At the same time groups can set up limits for themselves according to their possibilities to work on the projects and thus providing a good self-control tool for team-working. The practice proved that the best teamwork could be reached in the self-organized groups where the balance of different kinds of persons is achieved in natural way. Roles that people choose to play in one or another team depend on other individuals in the group. And what is more important is that in self-organized teams these roles reflect individual's ability to organically integrate one's talents and skills with the requirements for the task.

Another set of constraints is created by *the use of time* in organization (Csikszentmihalyi, 2003, p. 95). The usual nine-to-five schedule creates inflexible working day, which lacks the personal control of time and doesn't give any opportunity to avoid stress of not-been-on-time. Even modern communication technologies made a chance to be freer only for some small part of working people. In Oasis we can easily give visitors a flexible way of working, people can plan and

control their day by themselves. This is the idea of 24 hours open and available environment.

2.6. Conclusion

In this chapter, we considered two topics – attracting Creative Class and building environment to support Flow. According to the first topic we need to stress, that not only market factors attract creative people, but also cultural and recreational amenities are important. The diversity of people with different background and the need to support openness for everybody are crucial in this process. Environment that facilitates networking and weak ties and at the same time supports strong ties as well will win the war for creative class.

Three 'Ts' are the basis for attracting creative class – Talent, Technology and Tolerance. High quality of amenities in the surrounding area, diversity of people, services and activities and open-minded culture of the community will facilitate the income of creative people. Building plug-and-play environment where everybody is welcome is a difficult cultural problem that is a great challenge to solve.

The second topic – creating Flow in work – deals more with inside the community relations and has a purpose to make people happier when working. To facilitate Flow in the working process we need to set up clear goals and make immediate feedback easily available. The environment and atmosphere, where people work, should be challenging enough to make people alarmed and facilitate learning, but not too complicated to produce stress and fear of moving further. Some deep psychological moments are also important to support – such as deep concentration and the loss of time passing.

Oasis way of working is a solution for these challenges – an open-minded atmosphere of various experts communicating randomly in the inspiring environment is a goal. Supporting Services would offer a diversity of amenities, individual control over environment would facilitate Flow and a combination of real and virtual way of working would produce serendipity.

3. Knowledge Creation in Oasis

This chapter is dedicated to the Oasis knowledge creation processes. It is based on the Nonaka's theory of organizational knowledge creation. First we shall briefly get acquainted with Nonaka's theory and its main points. Then discuss the need for proper software to support group creativity. After that we shall turn to the deeper analysis of knowledge conversions in Oasis and "Ba" concept in relation to the Oasis project. Introducing Oasis flexible pairs and Glow experience we add new ideas for the improvement of Nonaka's theory in Oasis context. At the end of this chapter the idea of Mega-tribe will be given and importance of ubiquitous use of peer-to-peer philosophy will be stressed.

3.1. Discovering Ideas in Oasis

Nonaka and Takeuchi developed a theory on organizational knowledge creation (1995, p. 56-94). They claim that the basis for human knowledge is tacit knowledge of individuals, but the organizational knowledge is created through a process of interaction between tacit and explicit knowledge. This knowledge transformation cannot be confined within an individual, as it is a social process.

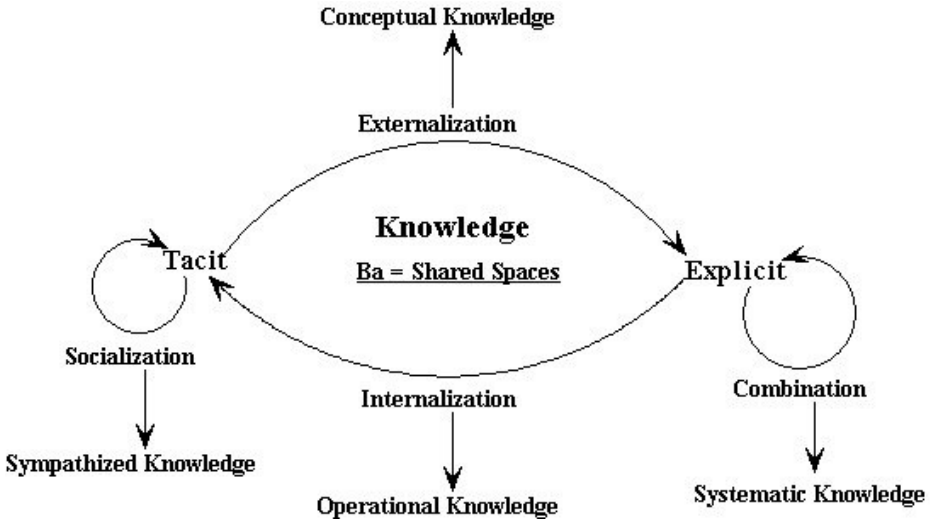

Figure 1. Knowledge conversions between tacit and explicit knowledge in organization.

"Ba" is a Japanese concept, which can be translated into English as word "place" and it can be seen as a shared space for emerging relationships (Nonaka,

1998). It is a space for individual and/or collective knowledge creation; it is a place, where trust and caring facilitate sharing of ideas. “Ba” can be a combination of some spaces like physical, virtual, organizational and ideational for human interactions. Knowledge is spread in “Ba” and can be discovered in a particular context through experience or reflection of others’ experiences. Without being put into the context, it is just information, not knowledge. In contrast with knowledge, which is intangible and exists in “Ba”, information is tangible and resides in media and networks.

Figure 1 shows the transformation of knowledge from Shared spaces “Ba” to different kinds of knowledge. Tacit and Explicit knowledge also transform inside each other and from one of them to another creating new kinds of knowledge.

Nonaka and Takeuchi explain four different types of knowledge conversion: tacit to tacit (socialization), tacit to explicit (externalization), explicit to explicit (combination), and explicit to tacit (internalization). Each of these transformations influences the type of knowledge to be created. The product of socialization is sympathized knowledge; conceptual knowledge is a product of externalization; operational knowledge – product of internalization, and systemic knowledge is a combination product.

According to them knowledge is created in spiral manner, so that four kinds of knowledge interact with each other and influence each other. By "mobilizing" tacit knowledge of individuals it is expanded in the organization and crystallized at group, organization, and inter-organization levels (Nonaka, 1995, p.72).

Piet Kommers writes about the need for proper software to catch the concepts of individuals and structure them. More and more various software appears for learning and as Kommers writes there is a growing need to offer a software that helps to perform tasks, cover communication aspects and reflection tools. Development of distant communication tools, simulation programs and cognitive mapping tools is followed by arrival of Cognitive Design software. It should allow not only collecting material from human designers but also consider enormous design assets created all over the world with background ideas plus less successful solutions to compare with (Kommers).

Concepts here are more transitions than constants. Good concept design tools should help the designer to give up non-productive ideas and generate more heterogeneity in new ideas. The problem here is that we need to understand how new ideas can be born in our mind? Kommers says that only few theories deal with the

process of creative design and in the field of creativity there are no adequate mental models at all. What is Creating new ideas? Henri Bergson writes that this is mostly intuitive process rather than connected with instincts or intellect. Kant and Spinoza considered intuition as superior to systematic knowledge. The basic idea is that concepts are ideas outside ourselves according to Platonic view. The more recent connotation of 'concept' is 'a new view on an already existing idea'. It means that concepts are more not the results of ideation, but the process of transforming from one idea to another (Kommers). Concepts are not passive elements in our mind; they change constantly and influence our mind, thoughts and other concepts.

3.2. Knowledge conversions

Now we turn to the deeper analysis of the theory of organizational knowledge creation by Nonaka, Toyama and Konno to better understand what are its processes and stages. In the classical Western understanding, the organization has been seen as a machine that takes information from the environment, processes it and applies to solve the particular problem and adapts to the environment solving the problem. This view is static and passive and doesn't consider the dynamics of knowledge creation. The authors claim that organization is not just a processing machine, but it's an entity that creates knowledge through action and interaction and it can even reshape the environment and itself (Nonaka, 2000).

In this context we should understand "knowledge" as dynamic and context-specific. It is created in social interaction between individuals and organizations and it depends on a particular moment and place. And knowledge is always related to humans, as it exists only in relation with human actions. We should say that information could become knowledge only after humans' interpretation in a given context and fixing it in the beliefs and commitments of individuals (Nonaka, 2000).

There are two types of knowledge: *explicit* and *tacit*. Explicit knowledge is one that can be expressed in formal and systematic language of data, scientific formulae, manuals, specifications, etc. Tacit knowledge is opposite to explicit – it is hard to formulate. Tacit knowledge is very individual and includes insights, intuition and hunches; its roots are in action, procedures, commitments, ideals, values and emotions. Traditionally in Western culture only explicit knowledge has been viewed as a food for new knowledge creation, but in reality both types play a significant role in this process, complement each other and through their interaction new knowledge

is born (Nonaka, 2000). Now we'll take a closer look on the processes of interactions between the two types of knowledge.

There are four kinds of knowledge conversions (Nonaka, 2000): Socialization, Externalization, Combination and Internalization.

Socialization is the process of converting new tacit knowledge through shared experiences. This means that it occurs in environments where people spend time together in informal way and learn through hands-on experiences, rather then from written materials. Socialization occurs beyond organizational boundaries and through this process worldviews, mental models and mutual trust are created and shared.

Externalization is the process of transforming tacit knowledge into explicit through its crystallization and further possibility to spread around. Thus the knowledge becomes the basis of new knowledge, if proper sequence of metaphor, analogy and model had been used.

Combination is the process of systemizing, combining and editing explicit knowledge, which could be collected from inside and outside organization, to more complex and structured explicit knowledge. To facilitate this process creative use of computerized communication networks is needed.

Internalization is the process of embodying explicit knowledge, shared throughout organizations, into tacit knowledge of individuals. Internalization process is closely connected with 'learning by doing', action and practice, experiments and simulation.

After internalization a new spiral of knowledge creation starts by sharing new tacit knowledge of individuals through socialization. This spiral permeates through both intra- and inter-organizational levels. There are different ways to facilitate each of these conversions that should be mentioned here to use both in Oasis creation and future functioning as inter-organizational working environment.

Tacit knowledge accumulation, intra-firm social information collection and transfer of tacit knowledge, according to Nonaka (2000), can stimulate socialization. In Oasis we shall take into consideration Negroponte's idea of openness to increase serendipity, thus offering and facilitating not intra- but inter-organizational social interactions.

Facilitating creative dialogue and "abductive thinking" stimulates the externalization process and concept creation. "Abduction" essentially involves reasoning by analogy; it is based on looking for similarities between object and

phenomena. Abductive or metaphorical thinking leads to increasing creativity and discovering deeper truth about reality, and even more – according to Bateson, it is a key feature of Learning II that is learning to learn (Dilts, 2000).

The methods used to assist combination are acquisition and integration, synthesis, processing and dissemination. The main purpose of these processes is to plan strategies and operations, create manuals and documents and sketch implementations. To encourage these processes, tools for simulation and forecasting are needed.

The last step before the new spiral – internalization can be achieved by personal experiences and experimentation with acquired knowledge, thus requiring facilitation of prototyping and challenging spirit to explore the findings of previous steps.

3.3. Oasis' Ba

Now we shall discuss the "Ba" concept and different kinds of "Ba". The ideas concerning *Oasis Ba* will be suggested and their difference from Nonaka's "Ba" will be shown in some additional concretizing features.

A context for knowledge construction is "Ba" – a place, where knowledge is shared, created and utilized. Contrary to Cartesian view of knowledge, Nonaka, Toyama and Konno (1998) propose that knowledge is specific to time, place and people, who participate in its creation. For individuals historical, social and cultural context are significant in the process of information interpreting. Thus "Ba", as a specific time and place not necessarily physical, provides the energy to interpret information and create knowledge. The key point in understanding "Ba" is 'interaction', meaning interactions between individuals or individuals and environment that is not stable but changes all the time together with participants, who are not fixed members of "Ba" but come and go. This is true for Oasis, as it exists now: the concept of Oasis is continuously created throughout interactions between members and ever-changing environment. As it will be open for visitors as developers, who can come and go, it is true that human part of *Oasis Ba* is also constantly unstable.

As was discussed above, four processes exist in creating new knowledge. These four conversions require a proper context to be done – four kinds of "Ba" – originating, dialoguing, systemizing and exercising correspondingly. There are two

types of interactions used in “Ba” – individual and collective, and two kinds of media used – face-to-face and virtual. One more type of interactions will be proposed later for Oasis way of working – flexible pairs; and a border between face-to-face and virtual kinds of media is anticipated to be almost destroyed. Let’s first briefly stop on already known types of “Ba”.

Originating “Ba” is defined by individual and face-to-face interaction. It is a place where socialization happens, as it the only way to share feelings, emotions and mental models, and capture the whole range of physical senses and psycho-emotional reactions. In this “Ba” emotions, like trust, care, love and commitment emerge and form the basis for knowledge conversions among individuals. The assets for this “Ba” are, for example, know-how and skills of individuals, physical knowledge as facial expressions, energetic as senses, enthusiasm and tension, and rhythmic knowledge such as improvisation and entrainment. Experiences are the only way to build these knowledge assets.

Dialoguing “Ba” is defined by collective and face-to-face interactions. This is a place to share individuals’ mental models and skills that could be converted into common terms and concepts providing externalization process. Dialoging “Ba” is more conscious in that sense that people who participate in the externalization process should have predefined specific skills and characteristics to succeed. Thus the right choice of team is significant in dialoguing “Ba”.

Systemizing “Ba” is defined by collective and virtual interactions. It offers a context for transforming and spreading explicit knowledge, which can be effectively done in written form via online networks, documentation, databases and offering a virtual collaborative environment to systemize the knowledge. The knowledge assets of this “Ba” are the most visible in a form of manuals, patents, etc.

Exercising “Ba” is defined by individual and virtual interactions. This “Ba” offers a context to internalization when an individual reflects explicit knowledge written in manuals and documents through action, comparing and justifying this knowledge with the reality. A main characteristic of knowledge assets gotten in this “Ba” is that they are practical. To help to form these assets in Oasis know-how, Oasis culture and ‘stories’ can help.

Oasis’ *flexible pairs* appear on the border between individual and collective interactions. It was proposed by Oasis developers’ team that “1 + 1 = 3 or 4”, meaning that two individuals working voluntarily together may achieve the same results as a

group of three or even four people. Tandem work proved its effectiveness in language learning already in 1960's and now its application in working practice can be found. Good examples of tandem work could be found in Nokia experiments. This level of flexible pairs adds efficiency to knowledge creation process and makes an easier and faster switch from originating to dialoguing "Ba" and from systemizing to exercising.

Diminishing the gap between face-to-face and virtual world we speed up the process of transforming dialoguing "Ba" into systemizing, and exercising into originating for the new spiral to start. Taking virtual space into account is discussed widely but hardly anywhere realized in this way. Making a border between two realities indistinct and flexible, we form a supportive virtual community for the actual one.

The virtual community can expose to new ideas and information – many questions can be answered, if only hastily, just by asking (Jellinghaus, 1995). Virtual Oasis is represented by Oasis Garden – a place in the Internet, where information about Oasis, its proceedings and results of work can be found; facilities for different kinds of communication are provided; and information about visitors and members is stored. Informal chatting and other volunteer based communications contain a lot of useful business world's information (Hakanen, 2004), thus we need to offer tools for this kind of interaction, facilitate them with good usability and support the ideas elicitation from discussion flows.

Oasis Glow project appeared on the wave of combining real and virtual Oasis and has a purpose to bring virtuality to reality in an essential way. Briefly speaking, Glow is a kind of experience that is not available anywhere else but in special places of real Oasis, where avatars – a virtual representatives of persons – can be felt as real individuals through human's senses like vision, hearing or sense of smell, for example.

"Ba" exists in many ontological levels and when these "Bas" are connected so that they might form a greater "Ba". Individuals working together form the "Ba" of teams, teams working in one company – "Ba" of organizations. In Oasis individuals from different organizations will form the "Ba" of inter-organizational level – *Oasis Ba* (Nonaka, 2000).

In the Oasis Garden discussions the importance of organic appearance of whole Oasis was mentioned (Hakanen, 2004). As we think of every Oasis' cell individually, in the same way different "Bas" exist – as autonomous, self-sufficient

units that could be connected with other “Bas”. However, relationships amongst “Bas” are not known a *priori*, they are not predetermined and clear, it is significant to support the interactive organic coherence of various “Bas” and individuals by trustful sharing of knowledge and continuous exchanges (Nonaka, 2000). A special role of virtual space, as the most flexible area that joins individuals by their own will, was mentioned in the Garden (Hakanen, 2004). As only communications with emotions and personal contacts make the space real, it again emphasizes the idea of creating such a real-virtual environment that the border between them is as invisible as possible.

3.4. Building Ba

“Ba” can be built in two ways – spontaneously, but it changes or disappears very quickly, thus needed to be found and utilized. Or built by providing physical, virtual and mental spaces for interactions. Both ways should be taken into consideration for effective work. Next step is to ‘energize’ “Ba” to give energy and quality to knowledge conversion processes. Further we’ll take a look at necessary conditions for energizing “Bas” and possibility of their use in Oasis.

The first important condition is *autonomy,* which motivates members to create new knowledge and increases chances to find valuable information. We may consider autonomy as a combination of Oasis’ values of Diversity and Trust and Respect, which actually means the value of individuality – everyone is respected and accepted as one is and given a possibility to show one's worth. In the innovative process as researchers found (Nonaka, 2000) the use of cross-functional teams with involvement of broad variety of specialists is very effective. These teams if self-organized provide a powerful tool for creating autonomy. And this is exactly the way in which Oasis teams are and will be created.

The second condition is *creative chaos*. It stimulates interactions proposing challenging goals and sense of crisis in teams. Creative chaos is a provocative way to stress the settled habits, boundaries of thinking and cognitive frameworks.

The next one is *redundancy* – the intentional overlapping of the information. Redundancy speeds up the process of knowledge creating in two ways. First, it produces sharing of tacit knowledge through sharing of redundant information. And second, it helps members to understand their role in the knowledge creation process and thus providing self-control to the groups.

Requisite variety helps a knowledge-creating organization to maintain the balance between order and chaos, as creation lies at the edge between them. Requisite variety can be achieved by providing equal and fast access to the information for all members of organization, so that the knowledge can be accessed at the highest speed. Oasis Garden's Information area will play this role as a tool for fast access to all knowledge bases in Oasis, Ideas monitoring, supporting system of e-Libraries and more.

The last important condition of successful "Ba" creation and energizing are *love, care, trust and commitment.* As information and knowledge creates power, it could be so that members will try to hide it even from their colleagues working in one organization if not feel safety. If we talk about Oasis, then it is even more crucial to create an atmosphere where knowledge can be shared safely between its members. Good security system is needed in this respect. Talking about Virtual Oasis we could propose to create at least three levels of access to the Information area – for Oasis members, the deepest level; for Oasis visitors – those who wish to be involved more in Oasis way of working, "hanging-around" visitors with access to the results and main steps in proceedings and possibility to comment and send new ideas, for example; and Common area for all the rest of the world.

Finalizing this part I would say that in Oasis creation process in general we follow these steps of knowledge creation process. Through tacit knowledge of individuals new concepts are born and are crystallizing now to more systematic knowledge. In the testing period, which has already started in the developer's team, everyone accepts or rejects some ideas and the new spiral of Oasis knowledge creation process starts.

3.5. Mega-Tribe

Let's consider previous models in Oasis project. We can say that knowledge is located in some shared space Ba, where people coming to Oasis get their tacit knowledge. Probably some visitors can get similar ideas (before coming to Oasis or in Oasis) and it forms their Self-knowledge. The process of catching new ideas here is more discovery than learning, as normally we suppose learning as a conscious process and discovering of tacit knowledge is unconscious process – it appears through different kinds of experiences (Oasis experiences!) or reflection of experiences of other visitors or just people passing by. When several persons from this knowledge

creating community get similar ideas and exchange them, then through process of socialization and externalization new knowledge is created. New tacit and explicit knowledge is shared between the members of the Oasis community and after their coming back to their own organizations it can be transmitted to systematic and operational knowledge. And then the cycle repeats again.

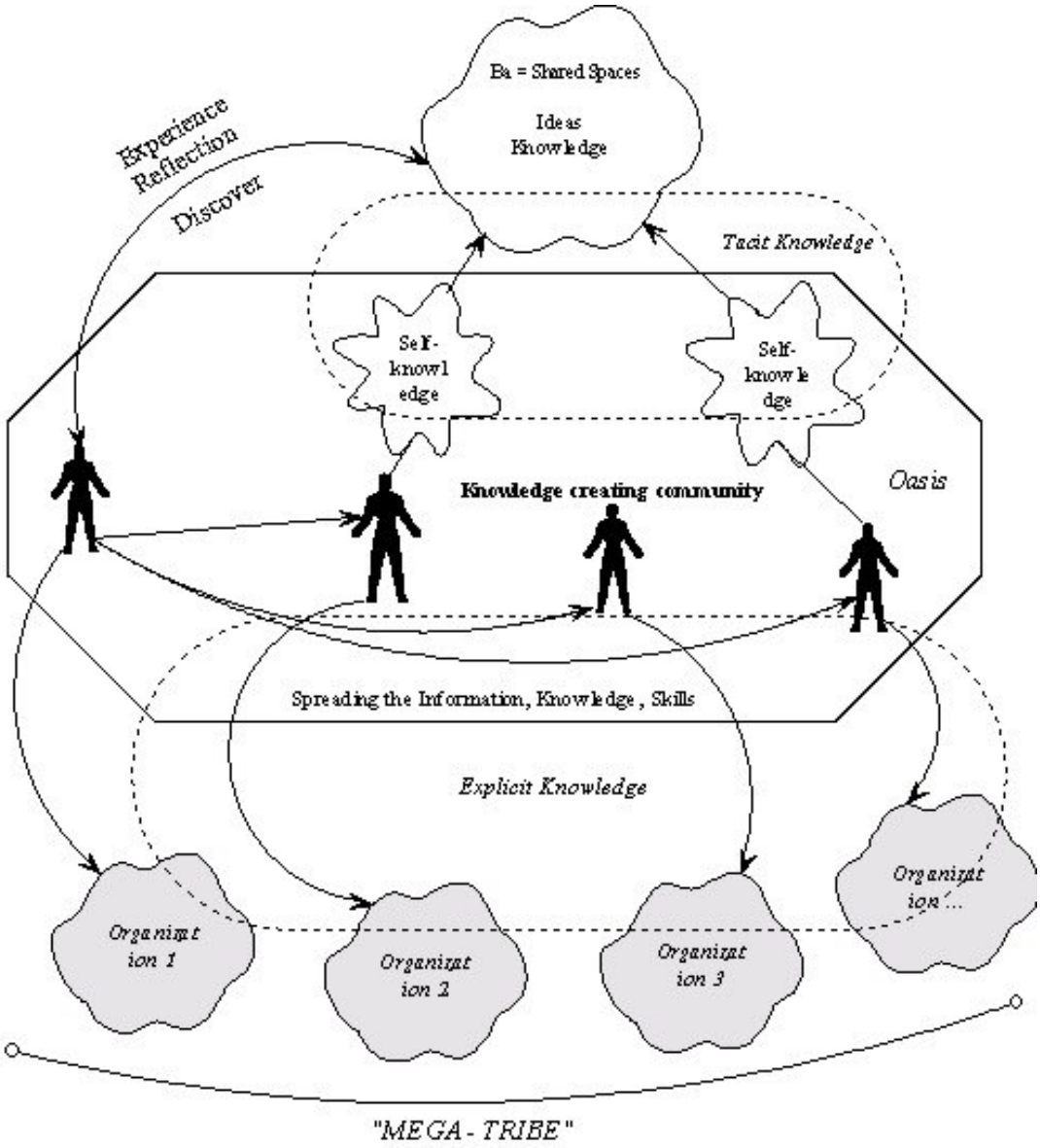

Figure 2. Oasis "Mega-tribe" model.

Figure 2 shows the concept of Oasis' "Mega-tribe" and the process of new knowledge creation in Oasis and spreading it to the whole Mega-tribe.

Through the process of knowledge exchange, sharing and creation, through the interactions with many different people and further development of acquired ideas new Mega-tribe of knowledge creators is born. Actually the concept of "Mega-tribe" is an example of the processes of socialization and externalization in Oasis-creators' community, and it already exists in life and develops further – as partnership network for example. "Mega-tribe" is a result of global spreading the information and it will arise from the Oasis creators and visitors to their companies, partners of their companies, partners' partners, etc.

What we should do now for Oasis – is to find ways how to facilitate the process of discovering new ideas and exchange similar ideas between people. Partly this is a question of education technology; partly it is connected with psychology and cognitive science, partly with computer science and human-computer interactions via new technologies.

3.6. Peer-to-Peer Philosophy

Nicholas Negroponte in his interview to BusinessWeek Online (2004) magazine stressed that utilization of peer-to-peer philosophy in future services and communications is a key. Here we'll discuss a brief history of peer-to-peer technology, its possibilities of use in communication and utilization of the idea in Oasis.

Originally a peer-to-peer (or P2P) term comes from computer network and refers to any network that instead of fixed servers and clients has a number of peer nodes that function as both clients and servers to the other nodes on the network (Wikipedia, 2004).

If we take a look on the history of P2P development then we can see that the first steps were done about twenty years ago – in the beginning of 1980s. The term P2P is a new invention, but basic P2P technology has existed at least as long as USENET (1979) and FidoNet (1984) – two very successful and completely decentralized networks of peers (Sundsted, 2001). The history shows even more - the original Internet was fundamentally designed as a peer-to-peer system. As the Internet has grown it has become more asymmetric with client/server architecture, with millions of consumer clients communicating with a relatively privileged set of servers (Oram, 2001), the peer-to-peer networking became difficult because of many restrictions. Now the current situation is changing in a new turn to P2P applications as

a medium for communication for machines that share resources with each other as equals. Further we'll check out two most useful for communication application of P2P technology – Instant Messengers and Shared Folders.

3.6.1. Instant Messengers (IM)

Regardless of not considering Instant Messengers as a part of communication tools of the enterprises, it is estimated that IMs are used in 85% of all companies worldwide. Most of public IM services offer insecure connection and their use increased by five times during the last two years. All this is a direct result of the strong perceived benefits on the part of IM users. The IM's success is supported by a number of convenient features it offers – finding the status of a co-worker or friend via Internet or intranet connection, sending a short text message in real time to anyone 'alive' on the Net and some other features that vary from one IM to another (Perey, 2004a). The ease of use is also one of the decisive characteristics of IM.

On the other hand we have a problem of unmanaged use of IM that according to Radicati study (2004) threats to company's security and forces nearly 20% of all IT managers to block the possibility to use public IM services. But preventing IM usage will increase the phone calls time, cut off highly productive employees who rely on their buddy lists from their contacts in mission-critical processes and will put IM users into psychologically uncomfortable return to old communications and messaging technologies, such as telephone, fax and e-mail. IM could replace Phone calls, especially it would be important for multi-continental and distant work. It is much easier to organize an IM conference than phone conference and obviously much cheaper. At the same time the use of IM results in reducing e-mails' flow, saves time of waiting for an answer and space on e-mail servers. Matt Cain in the report titled "Justifying instant messaging investments" writes about eight points that should be taken as the benefits of IM and purposes to invest in IM development (Perey, 2004b). We will shortly describe them.

1. Phone displacement – IM could be used for geographically dispersed environments as a substitute for phone-calls.
2. Back channel – IM could be used to augment other communication channels, such as phone calls or distant meetings, by support of other organization's internal or external IM users.

3. Immediacy – IM could be a key in time-sensitive projects, or in customer service where immediate answer is required.
4. Emergencies – IM is an effective tool for rapid dissemination of critical information to all users, groups or individuals. It is even more important that in some critical cases IM remain up, when other means of communication like phone lines and e-mail systems get down.
5. Bonding – IM can connect different workgroups, especially it is useful because of the ability to quickly add new team members to the buddy list.
6. Find-me service – IM-to-SMS (Short Messaging Service) gateway service can be used to route messages from computer-based IM system to the cell phones net.
7. Experts on demand – IM could help users get a fast access to other experts and their knowledge base or even communicating with several experts at once.
8. Self-service – IM could also benefit from the access to data and information folders.

It is difficult to overestimate the benefits from having immediate answers to questions, access to experts and closer and more collaborative relationship with partners. New workflows supported by IM could reduce the need of administrative support, improve connection with remote teams and speed up the work processes.

It might be difficult to defend rigorous ROI calculations for IM investments, in part because the communications needs of employees vary so widely. Employees with external communications responsibilities will need greater support in using public IM services, while employees who communicate primarily with other employees might benefit more from an internally deployed and managed enterprise IM platform.

Though IMs are still seen as uninvited guests, they continue to introduce themselves deeper into organizational communications. Thus we should take into consideration benefits of IM and take it positively in the future development of communication tools for intra- or inter-organizational levels.

3.6.2. Shared Folders

Another application of peer-to-peer technology is File sharing. Social networks have three goals to focus on in this aspect: share your files in your network, discover files of other members and protect the information and network itself from

outside attackers. Thus a well-defined social model should be the basis to achieve these goals (Kaye, 2004).

We shall take a look toward human evolution to find proper social models for next generation networks. According to Jared Diamond (1999), humans first formed hunter-gatherer tribes in order to share burden of food. After tribes grew in size enough they organized chiefdoms and then states like those in which we live now. Something similar is happening in network creation. A tribe of trusted people starts with creating a friend net, but sharing files inside of a small tribe is not enough as it can be interesting for a limited period of time with limited amount of files to share. Further tribes connect to other similar tribes to form a kind of chiefdom. Finally, chiefdoms connect to each other and form an open file-trading system.

In this 'tribal' culture the role of tribal elders should be mentioned as well. Elders, most probably selected by the tribe members, are responsible for defining the set of policies or rules that are effective for the group. Elders also take care of the danger from outside attackers understanding these risks and educating their tribe to act accordingly.

Social policies regulate who can be invited to the network and how to verify the information of a potential member, what other tribes can exchange information with this tribe? What structure is suitable for the tribe, and what kind of hierarchy or loose collaboration will be used? All these questions will influence the social policies and the network, thus it is crucial to find a right balance between needed security and the utility of the network at the very beginning.

In the social networks search horizons are limited by the tribe community and 'friendly tribes' in comparison to some popular networks formed by P2P applications and used mostly to download music and movie files. But at the same time social networks give an opportunity to consider quality of content above the quantity. While random P2P connections form random ties, file sharing in social networks enables users to explore their strong and weak ties giving access to more relevant information than a random tie. People sharing some common bonds tend to associate and it results in creating stronger community of friends with common tastes (Kaye, 2004).

We need to mention some basic requirements for social networks applications. First of all they need to include a proper level of authentication and authorization, reliable message routing and delivery, content and resource management, distributed queries and naming (Sundsted, 2001). The central server that would lie at the heart of

social network could implement some of these features via web services (Kaye, 2004). The whole phenomenon of P2P communications is a challenge to both – network designers and application authors who should work in tandem. Applications must be robust to function in the complex Internet environment, and network support new P2P applications. Luckily we can find a lot of answers to these questions in the early Internet and forward them to the future's systems (Oram, 2001).

3.6.3. Utilization in Oasis

The idea of "peer-to-peer" philosophy by Nicholas Negroponte seems great to utilize in the Oasis way of working. First, using Shared Folders we could build a strong community, or Tribe, of trusted friends. Then expand this network society to other similar online societies of interests. This is an idea of creating Mega-Tribe from a bit different, more technical, point of view. Then, using Instant Messenger for Oasis we could catch two goals – utilize popular technology in a secure for Oasis Way of Working manner, and facilitate strong and weak ties between members and visitors.

In knowledge creation processes both these tools will play important role – tools to distribute information, exchange knowledge and opinions, create new tacit and explicit knowledge and support community of practice.

3.7. Conclusion

In this chapter we described the idea of creating knowledge inside the community. We supposed that knowledge is concentrated in "Ba" – special places, where individuals and groups can acquire it. The way that knowledge is built in the community is a rather complicated approach though conceptualizing individual knowledge and practicing the knowledge of organization. Knowledge is built in spiral manner through socializing tacit knowledge of individuals, externalizing it and building concepts, combination and systematization of explicit knowledge contained in concepts and internalization by individuals through the practice.

First two operations with tacit knowledge are done usually in real face-to-face communications and the latter two with explicit – in virtual form through the dissemination of materials and manuals. We added to this knowledge creation concept two intermediate steps – flexible pairs between socialization and externalization processes and real virtuality as a deep mixture of two worlds to facilitate the transformation from tacit knowledge to explicit and vice-versa.

Oasis Ba is a harmonic combination of four “Bas” that support each kind of knowledge conversions. Each element in these processes should be seen as autonomous substation and a combination of them creates Oasis Mega-tribe, where knowledge sharing and dissemination are crucial moments. For these purposes peer-to-peer communications were suggested. They would facilitate communications among experts and ideas exchange. This is the most critical moment especially in conceptualizing tacit knowledge, which is naturally done in real communications, but virtual world provides much wider possibilities to reach the others’ ideas. Thus Instant Messengers and Shared Folders are proposed as peer-to-peer technologies’ applications to support knowledge conversions and building Oasis Mega-Tribe.

4. Principles

In this chapter I would like to discuss some educational points of Oasis Way of Working. How we can combine working, learning and playing processes in one environment? And what are the supporting places and tools for them? We'll take a look at already existing solutions and suggest some future visions. The basic principles for building Oasis will be discussed from the Interior and Instruments point of view and some new tools will be considered.

4.1. Education and Culture in Oasis. Problems.

One of the main problems that Pasi Eronen (in process) mentioned in his Master Thesis is the leakage of brain from North Karelian region. It is happening despite of plenty of natural and recreational amenities in the region. The way to stop it is in creating new stimulating and interesting places – for work and leisure activities. The meaning of culture is of great importance as well – tolerance and diversity should be encouraged. Inspiring and varied environment and different people reflect in the ability to produce new ideas, knowledge and networks.

On the other hand one of the main problems is educational. In modern working places the facilitation of ubiquitous learning is significant. The word 'ubiquitous' comes from the Latin language and it means "existing everywhere at the same time" (Fujitsu, 2004). It means that educational content should be available at any time and anywhere. There are six main characteristics of ubiquitous learning described in (Chen, 2002; Curtis, 2002).

Permanency. Learning processes are recorded continuously, so learners never loose their work unless it is purposefully deleted.

Accessibility. Learners have access to their materials from anywhere using requests. Therefore, the learning involved is self-directed.

Immediacy. Learners can get access to the information immediately from any place, or if it's impossible they can record the questions to look for the answer later.

Interactivity. Synchronous or asynchronous communication can be used to interact with experts and peers, thus allowing easy access to the human knowledge base.

Situating of instructional activities. We need to embed learning in our daily life as all the problems and knowledge required are present in the nature and authentic

forms. It helps learners to notice the features of problem situations that make particular actions relevant.

Adaptability. Learners can get the right information at the right place with the right way.

Ubiquitous learning also can be Computer Supported Collaborative Learning (CSCL) environment, the focus of which is on the socio-cognitive process of social knowledge building and sharing. Ubiquitous learning as a concept may be seen as a next-generation e-Learning rather then as a supplementary form of e-Learning (Lindquist, 2001).

If we go further then we'll see the strong ties between new knowledge creation and cultural diversity – in generating new ideas the variety of participants and their knowledge and skills are critical.

Creativity is a broad social process and it requires teamwork, human exchange and networks. There are different ways to increase creative thinking in a group of people. Some of them recently became very popular and proved their effectiveness. Educational Technology proposed problem-based learning, which was engineered at McMaster University in the late 1960's and at Case-Western Reserve University in the early 1950's (Lee, 1997) as a teaching method for medical students. The idea of use the problem solving approach in creating new knowledge can be used in Oasis.

In problem solving approach there exist several steps. Different researches have different number and names of the steps, but the idea is the same. First, we need to get a total picture of the problem, define the questions why it occurred, what are the reasons to solve it and what kind of other problems there are (Mumford, 1998). The second step is to choose the strategy to be used to solve the problem. The right choice is critical for this approach, the strategy should meet three requirements: correspond to known facts, be coherent and fit with accepted knowledge and be pragmatic, which means that the solution could give the practical results. The last steps are applying the strategy and analyzing feedback. At any of these steps human interactions are important part. But what is even more important – the diversity of these interactions. People with different cultural, professional, educational and personal background could give wider view on a problem at each step.

The next issue is how to get different people together and make them work collaboratively. The ideation sessions could help in this respect. First, all, even "wild" ideas are welcome. The goal is to gather as much ideas as possible, only the quantity

is important. Then, ideas can be improved and combined, thus the quantity transits to quality. The main character of these sessions is that participants should think positively, not criticize at the first steps and feel free to let others know their ideas. Self-expression is essential part of this process and the feeling of psychological comfort and technical support.

To be able to use these techniques in practice we need to invent the software and hardware to support people in these processes and help to do it easier and faster. But at the same time we probably will need guides for organizing such sessions or invent special rules, which with a help of technology will work in the same manner as real guide. For real sessions in groups a real guide would be more convenient. But also we could offer a virtual kind of sessions where a virtual guide helps visitors to collect ideas, share them and proceed with them further.

During the Oasis Members' seminars we had the following structure of combining ideas proposed and organized by Torfinn Slåen. First the main elements of previous meetings were discovered to remind old members and get a short introduction to the new ones. Then we needed to proceed three steps.

1. Define what tasks, topics, questions to be solved could belong to the project. At this step we produced individually or in small groups everything that could belong there. Next phase is a work in pairs to rank the best ideas. After that, the topics with highest rank were proposed as main ones and all the others were organized in columns according to main tasks. The last phase in this step is "ColumnWise" – to put similar main topics together or close to each other, especially if they have overlapping.
2. Objectives for the task groups. At this step working in groups we need to make proposals for each project first. Usually one group takes one project and works on it to the end. The second phase is to make SMART-check, meaning Specific, Measurable, Achievable at 50%, Relevant and Timetabled. After creating several proposals for each project, rewriting of previously proposed ideas should be done so that they clarify the steps to the certain goal.
3. Rewriting tasks + Adding outcomes. At this step we take a time line and put each task of each project to the schedule. Define what are the proceedings need to be done to reach the objectives of each project.

The last step here is finding the Resources – human, material, funding, etc. This way of working showed itself as a very effective method of gathering ideas and

creating tasks that lead to the final goal. To my mind the important thing here is a need of facilitation and a common goal for all participants. What is also interesting – one psychological notion – even if we worked whole day, but the way how everything was organized is so inspiring that practically everyone involved in the process got a feeling of Flow described by Csikszentmihalyi. A good combination of work, that includes brainstorming, individual thinking and augmented proposals, with a game-kind and almost random interactions and possibility to learn all the time from others' participants' expertise worked successfully.

Now we shall consider the 'tandems' of these three processes in more details and figure out the main problems to be solved from the Oasis point of view.

4.2. Working-learning process

First we'll take a look at the most significant part of modern way of working – ubiquitous learning during the working process. We can divide the work of a person into three significant parts according to the types of interactions with other persons: *Random meetings – Brainstorming – Private work.*

Random meetings are the first what people try when they come into Oasis. Meetings could be arranged in "Open areas", where people randomly meet each other, discuss their ideas, problems, possible solutions, etc. Most probably, during these meeting no ready solution would be found. At this step the most important thing is to get acquainted with other people and make new contacts. For example, areas for rest, such as sauna, gym, theatre, library, bars, or even "Japanese gardens" are the best places to meet people. The importance of high quality of services as well as interior and support of soft-factors in the environment should be stressed here. The atmosphere of openness to new people, knowledge and ideas should be supported to force people to communicate freely. Learning at this step comes mostly from other peoples' expertise area and their tacit knowledge.

When some similar points are found the process of idea development starts. On this stage we need to discover the problem that is to be solved and ideas concerning it. Groups of interested people meet to discuss their opinions about possible solutions, get new ideas how to do it. Special places are required to form an atmosphere of trust between members. This kind of work might be done in not big rooms for collective work. Here we may use some special technologies to draw mind-maps, both software and hardware – e.g. sensitive screens, which send pictures to the

computer, cameras to fix the process, projectors, etc. On this stage weak and even random ties created on the previous step are changing to stronger relationships. One specific kind of group work is Tandem work in flexible pairs that allows the most effective use of human resources.

Private work is the last part of the problem solving before a new iteration through all types of interactions, where a person can realize everything what s/he got during the two previous steps. The use of various databases, electronic libraries and other sources of information could be crucial at this step. Oasis services and informational system should provide required facilities on demand. This step requires quiet place to work, maybe after some relaxation in special 'thinking' rooms. This kind of working place should include all the best new technologies and opportunities. Maybe here should be used special sounds, music, light, and smells with individual control; view to outside or closed rooms without windows. We need to offer different kinds of facilities for various kinds of persons with different and even specific psychological needs. At this point the flexibility of places is very important.

As was already mentioned the process doesn't stop at this point, the new iteration in communications starts again from the random or group work level.

4.3. Learning-playing process

Learning-playing process forces the way people get their new knowledge. It is not a traditional academic way of learning, but should be done as a laboratory for testing new things. During the discussion of these processes two types of supporting environment to test new ideas were clarified – real "FlexLab" and virtual "Playground". But our world cannot be divided into two parallel worlds, thus the idea of introducing virtual reality into physical emerged – a Glow project with its Alternative Reality that is a unique mixture of virtual and real.

Quite new trends in Educational Technology propose Problem-based learning as a tool to encourage curiosity and creativeness in learning process. Elements of game brought from impressive and inspiring pieces of art creation, relax in nature and Oasis surrounding experiences will influence the learning process of individuals.

The process of forming a solution from a single idea is rather long: Idea – Problem – Reason – Information – Solution. But on this way relaxation moments and a switch from one kinds of methods and environments to another will help to increase the interest and get boredom, which may occur, away. If we would take only one step

of the chain of human interactions – brainstorming – than we could offer several tools to organize it in a different manner. For example, 3D virtual conferences could be one tool to support distant communication instead of teleconferencing. Shared virtual white-boards could be improved by adding a real sensor screen. Collaboration could be done while playing or resting, and of course using new technologies, like Voice-controlled systems; Special furniture that allows to relax and easily communicate with each other.

Any problem has its reason and thus after modeling the problem we'll need to find out the reasons and decide what kind of information is needed. The information can be found using the virtual libraries, or exchanging the knowledge with other people in Oasis in open areas, for example. After utilizing the information in a proper manner and building the solution the next step of testing the solution is required before applying it to real life. For the testing period tools for visualization and simulation will be needed and a special playground that provides tools and methods that are not available in the real world.

People learn from each other, the Web, literature and knowledge distributed in human networks, using technologies that should be done "invisible" and easy to use, making the whole process of learning more fun and relaxed.

4.4. Working-playing process

The essential part of Oasis way of working is combining working and playing processes. We should remember that it might be difficult to make seriously working people playing the games, but at the same time creative class people like various kinds of activities that make life more joyful. At this respect we need to say that making a tribe culture is a good point to start with. Defining rules, methods and traditions of work can be a task of the self-developing tribe of trusted friends. New creative ways of working will influence the tribe culture as well.

Oasis should be open 24 hours a day, as it gives everybody a chance to choose his or her best time to work and relax. Furthermore, people are becoming more mobile, what means that they don't need a normal office with a table and a chair to work; they can work whenever they want and feel comfortable. Creating random weak ties with various people also influences the culture of Oasis tribe.

Visitors can communicate with each other inside the Oasis even if they are in different parts of it, or they can close all the connections with others for some time. It

is important to make connections to the outside world also, using all multimedia opportunities, 3D models of participants for virtual conferences with colleagues, private connections with families to support strong ties, and random ties with the rest of the world.

4.5. Oasis as permanent experimental laboratory for innovations

One of the basic principles of Oasis should be that it would be a permanent experimental laboratory for innovations. This is the main purpose of Oasis – to invent and test new tools, technologies and methods in a quite small real community and a larger virtual society. There are two projects that should exist when speaking about laboratory. The first one includes real tools for real people to test new ways of working, inspirational materials and other means for creative collaboration. This project's purpose is to create a FlexLab that supports face-to-face communication between Oasis members.

The second project deals with a virtual world and forms a Playground to test virtually new methods of work, ideas, concepts and solutions. This Environment provides a broader range of opinions on any topic, though still needs to be facilitated.

The culture of testing laboratory comes from universities and Oasis could offer University of Joensuu facilities to test certain tools and methods. I will list the most important topics that need to be tested in Oasis even before it will start to work.

- ✓ Virtual reality combined with physical. The most important idea here is that this virtual reality focuses on the physical as the only one existing and adds additional characteristics to it. Virtuality should be naturally built in reality and present as if it were there on a molecular level.
- ✓ Ergonomics and technology. There is a big challenge in creating ergonomic environment that includes technological achievements and soft-factors that influence psychological well being of the visitor. The flexibility of the environment is another important point to mention here that also should be developed and tested.
- ✓ Office of the future – next generation's scenarios and stories. The vision of future office environment changes all the time thus new visions should be permanently developed into concepts and tested at least in the FlexLab facilities.
- ✓ All devices should be able to work independently from each other, but easily wireless connected if needed. This is one of the basic principles to support mobility and flexibility.

- ✓ Developing future projects. This means providing opportunity to test the future Now and to offer companies ideas to implement. Thus we could benefit from the Wow-experience given by the future, and support North Karelian economy by trading ideas.
- ✓ Technology supports people. Technology should be easy enough to use, reliable and support individual control.
- ✓ Virtual communication should be available anywhere. Whether this communication would be provided by a number of 'get-into-another-reality stations or by offering each visitor a specific device that describes his/her location in Oasis, searches for other visitors and connects with outer world, the easy availability of this service would be a good point to start.
- ✓ Culture. The main idea is to create Oasis culture as a unique and impressive tool to inspire visitors. Another purpose is to make a feeling of open-minded atmosphere, where everyone could feel himself comfortable, ready to share ideas with other community members as with members of one family, where trust and respect for each person, diversity of opinions are the main values. Love for Potential and Passion for results should be a driving force in this culture, as it is stated in the Oasis Concept paper (Slåen, 2004).
- ✓ LEGO performances. The impression produced by huge moving robotics is gained to change the usual way of looking at things. The highest goal is to open the minds for innovative environment.
- ✓ Interactive art everywhere, permanently changes. The idea of artistic environment is not new and was also considered to be utilized in Oasis. But the main goal here is to achieve a dynamic and interactive art. Visitors could not only enjoy the pieces of arts already created by somebody else, but make their own.
- ✓ Paperless office. Even though people feel better when they read printed material, there are a lot of garbage papers in today's usual office. The goal is to diminish the paper flow in the working process.
- ✓ High security level. This will make Oasis zone very open inside and protected from outside attackers. Both real and virtual, or Internet, should be considered, but also the value of private work should be not forgotten and if needed private materials should also be protected from everybody except the owner.
- ✓ 24h7d reachable. This topic deals with high security level as well. Its purpose is to make Oasis available any time. This is important point because of

human nature – different people work most effectively at different times and we cannot do anything with that only to offer the possibility to work at particularly that time. We also need to remember, that because of multiculturalism of the project and possibility to come to Oasis from any time zone of the Earth and work distantly with any as well, the benefits of creating 24h7d reachable environment are obvious.

- ✓ Mixture of work and leisure. The modern world is a huge stress for everybody, and the normal work with its deadlines and schedules adds more stress. Thus the idea is to feel when working in Oasis as like on vacation. This is a challenging task for the Interior project group and for the Service support system. We need to develop the ways how work could be organized out of physical Oasis in Joensuu and Karelian region at least. Various special events, short-term trips with possibility to organize a seminar somewhere in the natural environment or distant work in cottages would be a good opportunity and very specific, not widely available anywhere else.
- ✓ Cybernetic/techno-physical environment. This idea is worth thinking about the ways how it could be realized – the whole environment should be changeable according to continuous feedback collected from the visitors. It could be seen in a large scale to be able to change some global characteristics of Oasis and this should be tested as soon as possible. Or in small scale and it could mean for example individual control of some parts of Oasis environment by the visitors. Accordingly it means different kinds of feedback and response of the environment on them.

After defining the topics that should be tested beforehand in Oasis, I would like to mention the questions that require the answer, which could be found by the Oasis community in a group work. Some solutions are already found, but there is still much to be defined and constructed. How to support creativity with technology? How to make everything working all the time? What are the possibilities of devices vs. people's knowledge and skills? How to divide or mix the zones? How to make interior effective in increasing communications? How technology can help in creating new human networks? How to provide security in Oasis: access to Oasis, security of information inside, etc? How to make Oasis alive in the Internet? What kind of furniture should be – transformable, for relaxation/concentration? What kind of art-gallery should be? What kind of instruments for Input/Output we will use? What kinds of communication we need?

4.6. The necessary parts of Oasis working environment

Pasi Eronen (in process) in his Master Thesis mentioned three layers of publicity in Oasis: some places are available for everyone, like restaurant, pub, library or meeting rooms. Some are half-public places that include gym, sauna, silence rooms and shared working places. And the rest are private areas, where one can work alone. Here we will analyze these zones from the communicational point of view and the way how Oasis knowledge could be built with a help of them.

4.6.1. Zones in the netWork Oasis

We should take into consideration the environment of the Oasis itself, the outdoor environment in the closest neighborhoods and the environment of Karelian region in general. Oasis should naturally blend with its surroundings and it should offer a place for effective and comfortable work and a place for relaxation.

We can divide Oasis into several zones for different types of work.

- ✓ Private – For personal work
- ✓ Group – For teamwork, brain-storming
- ✓ Public – For random meetings

At the same time we cannot say that these kinds of work cannot be mixed. At one place, like café, public meeting may occur and private work, for example, using laptop might happen. Thus we should consider these zones mostly not as physical reality, but as places for mental sharing of the working processes.

One more addition to the types of zones is a Tandem work zone, where people could work in pairs. This zone is between private and group work. The relations in tandem work are naturally closer than in group-work, both participant have to be active, while in group-work some people might stay in shadow of others. This point comes also from psychological researches on the roles that people play in community – one might be very active and deal as a head of a group, while another person needs to be heard.

We can suggest different kinds of physical zones, which support various activities. At the same time we should not forget that these zones should be flexible in respect that different kinds of work can be done there simultaneously.

From another point of view we need to take into consideration Virtual Oasis, where the same kinds of public activities could be taken and thus require support – random meetings, group, tandem and private work.

Now we need to make a place where real and virtual Oasis are overlapped in all public meanings as well - a place where 'Glow' will occur. The need to make achievable virtual-world contacts in real world and vice-versa is a new step in developing online communities as well as real ones. We will consider physical zones of Oasis environment first, then virtual, and after that we'll define possibilities to combine them in one place.

Physical Oasis could contain such zones as rooms for private work, silence rooms, video conferencing halls, communication rooms, virtual connections rooms, meeting points, speech hall, library, sauna, gym, indoor garden, restaurant, coffee-tables and so on.

Some of them can be utilized for random meetings. These kinds of zones are very important as a repository of tacit knowledge of individuals, where they could exchange ideas and share skills. Some technical facilities should be offered here as well to produce these random contacts – when people need to use same tools they will definitely need to make contact, especially if tools would be interesting and difficult enough.

Zones for group and tandem works enable sharing tacit and explicit knowledge of individuals and stimulate the process of conceptualization, thus making individuals' and groups' tacit knowledge transforming into explicit.

Private work zones facilitate further personal systematization of explicit knowledge. Personal experiences are the most significant way of receiving feedback from the practical application of acquired knowledge and skills.

Virtual Oasis should offer public zones like communication areas – discussions, informational area, shared calendar, Oasis monitor of ideas, chat, virtual whiteboard and so on. Group working zones could include shared folders, virtual meeting places and playground. Zones for Tandem work are Instant Messengers and other peer-to-peer communication facilities. And Private zone is a user's personal computer.

Oasis 'alternative reality' – the Glow zone should be constructed in a way that it brings the all-over-the-world virtual Oasis with all its knowledge base, experts' skills and benefits of diversity and serendipity to the real physical place.

Now the question is which of this zones should be separated and which combined? Probably we don't need a strong separation between zones; people work together in the mixed environment better as they have a choice what to do in each particular moment and where.

4.6.2. Rules for Oasis' zones

First of all we need to define what kinds of communications we will use. Then we can model proper zones for each type of communicational processes and find possible intersections in these zones.

From communicational point of view we defined four zones – private, tandem, group and public. Let's take a closer look at each of them.

Private working zone should increase individual creativity and concentration on the process. At the same time it can provide the place for personal virtual communications with partners, co-workers out of Oasis, family and friends. It should give a person a high level of feeling secure about the topic he or she works at. Or it gives relaxation in a quiet place.

Probably when a person comes to Oasis for the first time, this private zone should be the last one he or she will visit. The first place to visit will be some common area. It can be a place just near the entrance, or restaurant, coffee tables, garden or hall for speeches and discussions. People can meet here face-to-face or it might be a place for distant virtual communications – (video/voice)-chat boards for example. These are the places where people can get together 24 hours a day and talk freely on any subject. These are the areas for informal learning and working, places where one can come voluntary and catch new idea from anybody and develop it further. These places can produce serendipity; no one knows what can be found here. The environment gives a lot of space to fill with sounds or music, arts, pictures, sculptures, scents and so on. It is also possible that the visitors themselves can create them. Oasis just needs to support their good ideas.

These kind of random meetings normally lead to more closed discussions in a group of 2-5 people. They might need special places to talk, draw schemas, mind maps, and hold brainstorming or videoconferences. In some cases they might need to be done in privacy, thus require high level of security service. In other cases it could be open group discussions, which can be done anywhere in the public place. The first requires special rooms with good sound isolation, for the latter Oasis could offer

transformable furniture depending on the number of participants in the meeting. In the most of group discussion whiteboards are needed to put ideas in written form or draw them. Here we could offer some innovative technology – touch screens that store all the drawn information in digital form. Let's call them "expression walls".

Oasis is a chance to live in participative art – you could not only see the pictures on the walls, but also draw your own or write on the walls when the inspiration visits you. These expression walls can be used everywhere – as contemporary art galleries; as a substitute for the whiteboards on the meetings; as a working sheet for designers, artists, poets, etc.

Actually now we can talk about the Oasis way of working. People work in Oasis, they work out of Oasis and they make real and virtual connections between each other. One of the most important features of Oasis way of working is a possibility to test the idea and get immediate feedback from other Oasis members.

4.7. What kinds of technologies/instruments already exist?

There were several meetings of the Instrument group of Oasis project where we discussed technologies and instruments to be used in Oasis. First we divided all instruments into three parts – hardware, interactive instruments and imported by visitors.

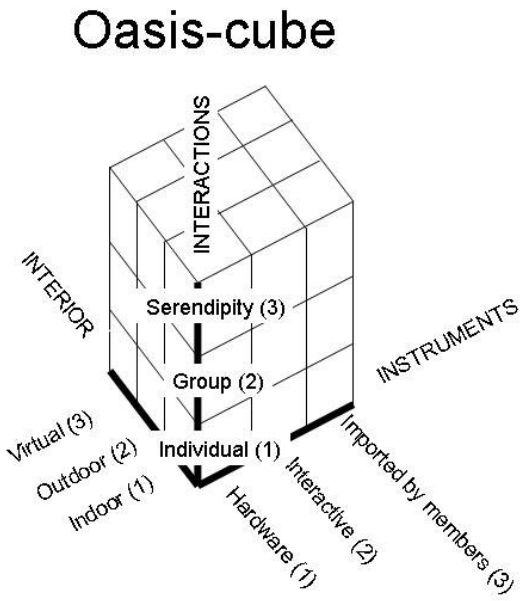

Figure 3. Oasis Cube

Then three-dimensional model was constructed. We categorized instruments by Oasis-cube (picture 3) made by Urpo Lehikoinen and modified by whole group. In this cube the first dimension is Interactions, second Instruments and third Interior. Interactions were divided into personal, group and serendipity (unknown). Interior was presented by Indoor, Outdoor and Virtual.

The map "Types of Interactions" (Appendix 1) shows what kind of interactions can be held inside and outside of Oasis. We cannot do anything with Outdoor instruments, thus we'll leave this part for now. But other two parts are of great importance to develop in Oasis. Table of Instruments (Appendix 2) shows the results of the work on these elements of Oasis Cube. We took 16 out of 18 rest elements and wrote down all possible and impossible tools that could be used to support them. After that we divided them into two groups according to the interior scale – Indoor and Virtual – and put them in the table as if they are available already, need some changes or not available yet and need to be developed.

4.8. Several ideas of new possible technologies to be used in Oasis.

Several new ideas for Oasis instruments are described here, such as Screen ceiling, Expression walls, 3D Videoconference, Robotics as service workers.

4.8.1. Screen ceiling

The sky has always attracted people's attention. Stars with moon at night or deep blue after the rainy days, or clouds that make you think creatively to recognize the objects they form, in Karelia you can see even *aurora borealis* that are very impressive, they give a feeling of being a part of something infinite and eternal. It could be nice not to miss all the inspiring opportunities the nature gives us. But even if the weather is bad, Oasis can give a chance to enjoy the sky via transparent ceiling that turns into the huge screen for demonstrations.

4.8.2. Expression wall

The idea of Expression walls came actually from the idea of art gallery. Permanent art exhibitions cannot attract attention all the time, thus we need to change more or less regularly the pieces of art and their location on the walls. Then the idea of digital art gallery appeared – pictures could be demonstrated for a quite short period of time and at any position on the wall. And finally we've got an idea of

expression walls – where not only pictures could be shown, but also anybody could draw and write anything desired. It could be realized as touch screens or projector screens with special software that allows putting multiple tasks on the same screen/wall. Several persons can work simultaneously just limiting their area by marking it with special pen. The menu can be reached be pressing a button on the pen for example. It can allow saving information from the particular restricted area or the whole screen to the computer via wireless connection, or to the flash or any other kind of memory that can be accessed with internal devices in the wall (memory-card readers/writers, thus the wall could work and store information independently from computers). Also opportunity to print what is drawn is important.

4.8.3. 3D Videoconference

Besides the usual video conferences with camera and microphone new technology could offer 3D conferences, where each participant is represented as a 3D being looking like real one or like anybody else depending on self-expression of a person. The problem here is that it will take a lot of resources – financial and scientific. But the idea can be well used especially in case when users need to share and show some features of 3D objects.

4.8.4. Robotics as cleaning-washing staff

Robots can be programmed so that they would do all the cleaning work – like vacuum cleaners, washers, etc. Based on peer-to-peer technology they could exchange information between them and find work for themselves according to different parameters and messages. They could be programmed so that when needed they could even find a place to recharge their batteries, so no human control would be needed for them to work.

4.9. Conclusion

In this chapter we considered the main principles of Oasis way of working. Educational Technology proposed Problem based learning and Problem Solving approach in working, where a number of various experts work for one solution. The diversity of opinions is crucial in this process. Facilitation of ubiquitous learning is also important, thus we need to offer an environment that supports a combination of

working-learning processes, as well as doing by playing and testing. Playground to test tools, methods and ideas for working and learning is a solution for this problem.

Playground is a powerful tool to 'try on' future visions now and some of these visions were proposed as the most critical to be tested first. First we need to mention that Oasis way of working is a deep combination of real and virtual worlds; it is reachable 24h7d and is secure to use. On the other hand we should test the ideas for Interior – flexible, transformable, ergonomic and cybernetic. The idea of future office should include the artistic environment with impressive interactive pieces of arts, like moving sculptures and expression walls. Culture of communications and work should be also created through the group collaborations with help of Oasis Mega-Tribe community and tested in Oasis.

In this chapter four levels of public activities where proposed – random, group, tandem and private. From another perspective we considered three levels of communications – face-to-face, virtual and alternative as a mixture of real and virtual. In Oasis way of working we need to combine all levels in a very natural way.

Three levels of communications are supported by real physical Oasis, virtual Oasis Garden and Glow project, which goal is to bring virtuality to reality. Four levels of public activities are supported by Interior in the real Oasis and Oasis Garden structure in its virtual presence. At the end I'd like to say that building Oasis we should remember to create connections between all these levels, Instruments are the tools for this.

5. Supporting tools, e-Learning

This chapter is devoted mostly to Virtual Oasis and digital, multimedia and other virtual tools that could support its development. First, we shall discuss the basic requirements for creativity support tools from the software users' point of view. Then I'll define what is e-Working, e-Learning and e-Office and the use of multimedia in e-doing something. The last part describes online communities and Virtual Oasis in this respect.

5.1. Basic requirements for Creativity support tools

Ben Shneiderman (2002) writes about a growing need in software tools that support creativity. Some supporting tools already exist, but defining a clearer set of requirements for them could help software designers to make more rapid progress in such tools. First Shneiderman identifies the users of creativity support software. They are usually innovative scientists, artists, doctors, lawyers, musicians, teachers and other knowledge workers. Normally these people use one or another kind of supportive tools in their work, so the actual goal of designing these tools is to make more people more creative more often. Shneiderman proposed the following user activities that need support: Collect, Relate, Create and Donate. Let's briefly look at each of them.

'Collect' means to learn from previous works that are stored in the Web, libraries and other sources. These resources might be useful at any step as well. 'Relate' means consultations with peers, tutors and experts on different steps. Csikszentmihalyi also stresses the benefits of these consultations and emotional support as he emphasizes the social nature of creativity. 'Create' is to explore and compose possible solutions, as well as evaluate them. And 'Donate' is the last but not the least important step in the spiral of knowledge creation – to disseminate results through the libraries, the Web and other sources of knowledge.

After defining the main activities of the users Shneiderman proposes eight tasks that need to be covered with novel software. First two are dealing with collecting the information – Searching and browsing the sources and Visualizing data and processes. The next one is closely connected with 'Relate' activity – Consulting with peers and mentors. Following four tasks are about Creating – Thinking by free associations, Exploring solutions, Composing artifacts and performances step-by-step

and Reviewing and replaying session histories. The last task is Disseminating results to gain recognition and contribute to the searchable resources.

All these tasks can be realized in many different ways or even some more tasks and subtasks could be added. But the main challenge for the users and designers is to make smooth integration between new creativity supporting tools and existing software such as word and graphic processors, email, databases or other office tools and Web browsers.

5.2. What is e-Learning, e-Business, e-Office?

When we talk about e-Offices, e-Business, e-Learning, we usually think about modern way of doing everyday job at our offices using various electronic equipment. First we'll take a closer look on each of these activities and define what can be seen as "e-" doing something.

5.2.1. e-Learning

In general *e-Learning* is any kind of education delivered via the Internet, network, or standalone computer. e-Learning means the use of electronic applications and processes, different kinds of electronic informational sources like audio/video tapes, CD/DVD-ROMs, satellite TV, etc. It includes several types of transferring the knowledge and skills; the most common are Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. Usually when we talk about e-Learning, we mean *Distance Learning* – learning where the instructor and the students are in physically separate locations, but we will not limit e-Learning by only this (LearnFrame). Now if we look more precisely at different kinds of electronic education then we could divide it into several sub-groups.

From time perspective e-Learning might be asynchronous or synchronous. *Asynchronous Learning* – any learning event where interaction is delayed over time. This kind of learning allows flexible schedule for the participants, and does not have any limits in geographical location of them. Could be in the form of a correspondence course or e-Learning. Interactions in this respect can be done using various technologies like threaded discussion. On the opposite side *Synchronous Learning* is any learning event where interaction happens simultaneously in real-time. It requires attendance of a class from learners, where it can be done in real traditional classrooms, or with a help of technology distantly (eLearners.com).

From the instructional point of view the learning process can be either *Instructor-led Training (ILT) or Computer Based Training (CBT).* The first one is led by an instructor and usually is held in a physical location or delivered via a network. In most cases it implies the professional or organizational level and means synchronous learning. The latter one – CBT – means that a computer program provides motivation and feedback in place on a live instructor. It can be delivered not only via network, but also distributed through CD/DVD-ROMs and the Internet. This kind of education is more expensive in its development as it requires teams of people and instructional designers.

In case of professional learning we should talk about such kind of e-Learning as *Web Based Training (WBT).* This is a training delivered over a network and can be ILT or CBT.

The terms *Online Learning* and *Online Training* correspond the processes held in the Internet as opposite to a local or wide area network.

Historically first appeared *Correspondence Courses* - courses completed from a distance using written correspondence for interaction and to submit assignments. Then with the development of technology and Internet Distributed Learning became more popular. *Distributed Learning* is a kind of distance learning that makes use of information technology. It includes both Distance Education and Distance Training (eLearners.com).

New technology concerns of course not only educational sector in high education or professional level, but business itself as well. Thus after defining the e-Learning terms we can take a look at e-Business.

5.2.2. e-Business

There is plenty information about e-Business in the Internet and software that supports its existence. First, lets define what it is.

e-Business is commerce conducted in cyberspace, where the real-life business processes are executed with a support of network and Internet technologies (POSC Glossary). e-Business includes not only buying selling but also servicing and collaborating with business partners (Student Aid Front 2 Back Dictionaty, 2004).

Primarily e-Business is carried out electronically over the various networks and typically uses Web technology to streamline business processes. This way of doing business increases productivity and efficiency. It gives ease communication

with partners, vendors and customers, connect users to back-end applications and databases and transact commerce in a secure manner (OPF Glossary, 2003).

5.2.3. e-Office

e-Office – we mean by this term a combination of real office and e-business opportunities. "e-" ways of working and learning became already an essential part of most businesses and higher education and they will develop further not only in technical, but also in the creative aspect. This is a new way of working that should be taken into consideration in Oasis project as well.

5.3. The use of Multimedia

Hubert Tardieu and Valerie Gyselinck in their research showed the importance of one psychological concept, which has to be considered when thinking about constraints in the use of multimedia systems (as integration of different types of information: verbal, pictorial, sound – or at least one of them) – working memory of humans' brain. The fact is that it has limited capacity, which should be taken into consideration when presenting multimedia information for learning or working (Herre van Oostendorp, 2003, p.3-22). Working memory plays a crucial role not only in cognition of multimedia information, but in various domains of higher-level cognition as well: comprehending a text, solving a problem, and reasoning, for example. They propose that a user may well be able to cope with different types of information operating with different types of memory, while the big enough amount of the one kind of information may cause difficulties in memorizing and processing it. The study reported there emphasizes the importance of flexibility of multimedia systems according to the user's working memory capacity and the usage of various kind of information in a way that encourages their integration.

In case of facilitation of communication we can think about the usage of Web technology. The Web has great potential for sharing knowledge, storing, exchanging information and fostering collaboration within the organization (or any community like Oasis, e.g.) and in inter-organizational, global sense. As in many organizations experts work mostly alone, they need to meet colleagues for discussions and knowledge exchange. In knowledge work the existence of distributed real-time collaboration is crucial, and Web technology can provide all necessary support for synchronous as well as asynchronous collaboration using text, audio and video (Herre

van Oostendorp, 2003, p. 97-126). But we should mention also that face-to-face meetings are very important for facilitating learning and competence development, like brainstorming, for example. The research "WWW as social infrastructure" (Herre van Oostendorp, 2003, p. 97-126) also showed that participants of any virtual working environment are in favor of knowing each other before virtual meetings.

5.4. Online Community

The term "online community" has become very popular recently. First we'll define what it is, what are its basic characteristics and principles of effective work.

5.4.1. Characteristics of online community

According to Lazar and Preece (Herre van Oostendorp, 2003, p. 127-151) there is a set of characteristics of an online community:

- *A shared purpose*, that makes sense to all members of the community;
- *People*, who interact within the community and take different roles;
- *Policies*, that guide interactions with language and protocols;
- *Folklore and rituals*, those make a history of the community and create social norms for it.

There are two main factors that make online community thriving: *usability* and *sociability*. Usability is concerned with interface: it should be consistent, controllable and predictable. These make the interface easy and satisfying in use. From the usability point of view we can say that the following elements of Collaborative Virtual Environment are necessary for distributed work (Herre van Oostendorp, 2003, p. 97-126):

- Good communication facilities – speech interface, video;
- Support for sharing the material – documents, files, etc.;
- Support for parallel activities – writing, drawing, following the presentations, etc.

The second – sociability – concentrates on processes and styles of communications that support social interactions. Sociability cannot be predicted by the community developers, but can be influenced through the responsible moderation, stable leadership and appropriate level of registration (Herre van Oostendorp, 2003, p. 127-151).

Usability and sociability are closely connected in the online community. Success of the community depends on both factors well-designed software and carefully developed social policies. Let's take a closer look to the "sociability" factor concentrating more on its virtual representation, but remembering the real aspect, too.

5.4.2. Sociability factor

First of all, defining the community's purpose is important so that people who'd like to join know what to expect. This part concerns both Virtual and Real community. In context of Virtual Oasis we should remember that its web representation (like Web-page) should be in harmony with its main purpose and the community name.

Lazar and Preece state three most important issues in online communities existence: Registration, Trust and Security, and Governance. In registration question it is necessary to link the access possibilities with the purpose of community. To encourage people of diverse cultures, races, and genders to join the community probably different versions of interface may be needed, e.g. in several languages. Trust and security is about how personal information of members will be used, if the members know that their privacy is protected, they communicate freely. Governance deals with the ways community is organized – by members or by owners; what are the regulations for level of free speech; how is "netiquette" defined in the community; how deep moderators or mediators influence the interactions in the community (Herre van Oostendorp, 2003, p. 127-151).

There are usually several important roles in Virtual community functioning. *Community Founders* are the first people in respect to whom the community is to be born. *Community Leaders* are those who offer a welcome to newcomers, advice to those who ask, and wisdom based on past experiences, they play an active role in community's life. *Moderators* are needed to control the fulfillment of social norms by community members and organizing the proper way of topics in the discussions. *Community Members* are all the others who participate actively or not actively in community life. The one sub-group in Members group is a group of *Lurkers*, who just follow the discussions, but do not actively participate. Lurkers shouldn't be considered as passive negative elements, as they in most cases are simply interested in the topic but with the lack of experience just try to learn for themselves. The last role is more specific for commercial online communities – *Business Managers*. Any of

these groups of members can see the success of the community from different points of view, but anyway governance and participation policies should encourage the community growth, not encourage people to leave.

There is one more important question about the online community functioning. The first one concerns the reason for people to communicate, and the second one – the right level of registration to join. If we would speak about physical environment then it is likely that people will form a kind of community if they have similar interests in some sphere. In online communities the processes are almost the same – people will interact online regardless if they have permanent or periodic face-to-face contacts or they don't, but they will interact if they have some shared goals or interests. The clear state of purpose of the community could help here in finding common interests for members.

5.5. Virtual Oasis

Portal – "a grand and imposing entrance" (often extended metaphorically) (WordNet, 2004).

Usually Portal is used as a marketing term to describe a Website that is or is intended to be the first place people see when using the Web. Typically a Portal site has a list of sub-sites, a search engine, news, weather, etc. A Portal site may also offer free e-mail and other service to entice people to use that site as their main point of entry on the Internet (Alphabetic Dictionary of Internet Terms, 2001).

Portal is also an integrated and personalized web-based interface to information, applications and collaborative services. In most cases access to portals is limited to company's needs (an intra-company portal) or company and certain qualified contractors, customers and other parties within the extended enterprise (an inter-company portal) (Zeus Glossary, 2004).

Virtual Oasis is a kind of a portal that is recently used for collaborative virtual work of the team-members participating in Oasis project. And what is even more important is that Oasis will have its own portal for all its visitors and invited guests. This means the possibility to share knowledge and skills, to get access to the information, have e-mails, forums, chats and other ways of communication with Oasis-members and co-workers from visitor's own company.

Virtual Oasis has at least two purposes, first, it offers information for people, who never were in Oasis – what is it, where is it and how does it work, this is mostly

commercial part of virtual Oasis. And second, it gives people who are in Oasis new way of meeting different people from all over the world – at any time and from any place. It could be used as for public conversations with anyone who wants to join Oasis community or to know better what is Oasis and who are the "Oasis" people; as well as for private chat rooms with former Oasis visitors, who would like to refresh the feeling of being there; and for discussions inside Oasis but when you don't exactly know whom you are talking with. It can be organized as a screen in some hall with main communication room or/and portative devices for private or thematic rooms.

5.5.1. Registration

In this part we'll consider more technical side of registration – what kind of information will be needed to join the community. There are several kinds of registration. It could be free entrance for everybody, but in this case it is difficult to control it and provide the proper level of security. Another kind – subscribing via e-mail e.g., it could be easy for visitors who just need to know what is going on in the community. And the most advanced – providing some personal information about names, addresses, age, interests, etc for community members (Herre van Oostendorp, 2003, p. 127-151).

In Virtual Oasis it could be possible to create at least two types of registration – for visitors and for members – and give the proper rights for both groups. For example, visitors could read the common information about Oasis, some parts of general discussions or see the list of discussed topics, while registered members could, participate in these discussions, create new topics, order more information about Oasis and reserve time to come to the Real one.

5.5.2. What is the place of Oasis in global network of e-life?

Virtual Oasis is represented by Oasis Garden. A brief story of its development is that first it was created as a collaborative e-working environment for Oasis developers' team. The most actively used facility of this environment was discussion area. Different materials and results of the meetings, group and individual work were also uploaded there. Now Oasis broadened its connections and more and more members arrive to Oasis Garden. One of the important features of e-environment now is to provide effective search possibilities of both – materials, what already works, and people, what is more difficult due to the lack of information about participants.

In the near further of Oasis Garden's development new areas will occur – Oasis Visitors' Garden and Public area. Public or Common area should be available for everyone from the Internet and offer some basic information about real and virtual Oasis, like news, Oasis happenings and calendar of general Oasis events.

Oasis Visitors' Garden is for people from all over the world who are interested in Oasis way of working, were invited by Oasis members and registered online. They will have access to the results and main steps in the ideas' development, some communication facilities and information about the people who are already members or other visitors. If they would got really interested in Oasis way of working, after some steps and time they could become members of Oasis Garden as well as members of real Oasis.

Oasis members' area is the deepest one and offers all the possibilities of virtual Oasis – Oasis calendar with opportunity to invite somebody to real Oasis or see who is there and when, a variety of communication facilities, shared folders, service support, playground area, Oasis monitor of ideas and testing area, access to materials produced by Oasis members and virtual libraries.

The structure of Oasis Garden is described in Appendix 3 "Oasis Garden Structure. Mind Map" and Appendix 4 "The Structure of Oasis Garden".

5.6. Conclusion

In this chapter, we considered virtual tools for e-Learning and collaborative distant work. E-Learning appeared in universities for distant education and then e-working methods were developed. There are four steps in knowledge creation process that should be supported by e-working tools: collect, relate, create and donate. Each of these steps should be supported by Oasis Garden.

First of all we defined the main parts of e-work that should be taken into consideration: a shared purpose, people, policies, folklore and rituals. In order to work, people need to have good communication facilities, support for sharing the materials and support for parallel activities.

Oasis Garden structure was developed in the way to support these activities. Oasis Information area enables sharing the material, Communication area provides facilities for interactions and parallel activities would be supported by peer-to-peer communications, shared virtual whiteboards and Playground.

We considered Oasis Garden structure from the membership's point of view – whether a person is a member of Oasis community, a visitor invited by a member or just external person who does not belong to the community but is interested in the Oasis way of working.

I would say that Oasis Garden structure developed recently corresponds to the requirements of good e-Working environment.

6. Glow

This chapter concerns the most recent subproject in netWork Oasis called Glow. This subproject is about blending virtual and real in a unique mixture. The purpose is to bring virtual community to the real to support the latter one. The answers to the questions *who needs Glow, why* and *how to be in Glow* are given in this chapter.

This chapter appeared as a result of a close collaboration with Glow team: Mika Ilari Koskinen (project manager), Matti Tedre, Evgenia Chernenko, Markku Kiiski and Anssi Gröhn.

6.1. What is Glow?

Glow is a blend of a virtual and real worlds. Virtuality gives wide possibilities for communication, knowledge storage and exchange. Reality brings face-to-face meetings, tacit knowledge exchange and facilitation of community feeling. The proposal for Glow is that it should have not only advantages of virtual and real, but also a Mindset – mental aspect. Glow is Oasis community hybrid space, where we stay in reality instead of diving into virtuality.

The next issue is that we focus on user's mindset, not only on usual physical ergonomics. Facilitation of mind-work is the main goal. Glow, as a tool, will use many technological innovations, but the central idea is that the equipment is just the equipment and its purpose is to assist the substance of knowledge-work.

What is better: working for results or working for the process? What Glow shall support is getting fulfillment from what one's doing and achieving. It offers a blend of work, learn and play, encouraging participation, interaction and knowledge exchange. There are quite many theories on how to use virtual in real, but not many examples how they are implemented. We shall try some of these theories in practice.

Scharmer's theory about Presencing is very close to Oasis way of working and very useful to be mentioned here to be used in Glow development. Presencing comes from the U-curve, where the top level is Open Mind, the middle – Open Heart, and the deepest – Open Will. First, a person pays attention to the problem with Open Mind, and then goes deeper into it with Open Heart. After that, lets the problem go and with Open Will presences solution from the future. Letting come, enacting and embedding are the final steps to the result.

Facilitation of going deeper to Open Will in Scharmer's U-curve is one of the goals of Glow. But this is also a big challenge.

6.2. Glow Design

To start Glowing each member of Oasis needs to have Static profile and Online profile (Chernenko et al., 2004). ***Static profile*** includes some personal information about the user such as Name, Address, Contact information, Phone number, Date of Birth, etc. This information is hidden from other users and is used only by Oasis owners to send a bill or contact a person in special cases, etc.

Online profile consists of some *part of Static profile*, e.g. User Name, and two other parts – Adjustable and Dynamic profile, which we'll discuss in details.

Adjustable profile is a part of Online profile that changes at most once in user's unique log-in session. These are more or less stable features in user's profile such as Current Location, Day Quote, Picture and User Skills. The last feature is very interesting as it can greatly help other users in searching expertise and answers for their questions. Each Skill includes Skill's name, user's knowledge about this skill and his/her will to deal with it – interest.

Dynamic profile is another part of Online profile. Dynamic profile is that one, which changes quite often – at least several times a day. It includes such features as Online/Offline status, will to Interact, Teamwork and Availability. It can be changed automatically according to the user's location in physical Oasis – Availability is small if user is in private room and high vice-versa, etc. Or user can change his status manually. For automatic set of status we'll need a location tracking system that can be designed in different ways – cells, gates, matrix, censors, etc. And different tools – RFID (Radio frequency identification), Bluetooth, etc.

The idea to represent Availability status of a user with colors appeared during one of the discussions on implementation. We suppose Red color as most private zone, where user doesn't wish anybody to disturb him. Yellow is for semi-privacy mode, Green for free-time, like cafeteria zone. Light blue for having fun and leisure time. Deep blue is for Oasis working mode in groups. Violet and purple for Flow state with high concentration on the task that is closer to privacy as well.

Each user in Oasis is supposed to have some kind of identification key – RFID chip, for example. Or it could be voice and speaker recognition system, fingerprint or

whatever. After user identified himself in Oasis and have set his Online profile, s/he is ready to Glow.

All users are represented in Glow in different ways according to the device that is used. It could be video on the screens, sound on audio devices like radio or "voice shower", or text on mobile tools such as mobile or smart phone. Supporting different devices we provide possibility for ubiquitous working and learning in Oasis.

6.3. Why to Glow?

We need to remember that all these avatars are only tools. But Glow success depends on the quality of communications and effective information exchange!

To answer the question *why to Glow* we should first answer *what are the Avatars*? Originally term "Avatar" comes from the Sanskrit for the incarnation of Godhead. Avatar was the name of the temporary body that God uses when visiting Earth. Recently term "Avatar" is widely used as a name for graphical representation of virtual community's participant. If we won't limit only by current interpretation of "Avatar", but also take the original one into consideration, then we'll get a new meaning. Avatar is sudden accidental help coming from other Oasis people.

Now it's easy to answer the question why to Glow? Oasis community through Glow is a 24/7 working team. As a network of experts it provides one-click-away answer to a great number of various questions. Glow gives a feeling of belonging to the community through virtual images in real place and real peoples' Avatars in virtual environment. If you are looking for experts for your project, just click the button "Who is in Oasis working mode" and give the system a task to search for experts on the topic you are interested in. Qualified information services based on your profile and interests will be offered via Glow as well.

And the last but not the least is that Glow provides serendipity – you never can predict whom you'll meet there!

6.4. How to Glow?

Glow team developed different kinds of interfaces. We kept in mind the necessity of using multimedia to influence as much human senses as possible. We suggest screens with graphical representation of Avatars and text for messages, "voice showers" as sound devices, and text for text-based portable tools. Screens in this respect could be small or big screens on the walls inside and outside of physical

Oasis. Or we might mean by a screen a user's personal computer or laptop screen as well.

The classification of all hardware tools can be done according to two characteristics – possibility of input or/and output and the requirement for identification. I've put the tools and their functions to the tables accordingly "With Identification" and "Without Identification".

All these tools are physically connected to Oasis – they are located in its physical facilities or nearby in Joensuu area. But there is one more tool that was not mentions here – program interface for distant Glow.

The basic instrument for Glow is a web-based interface that has almost the same picture as big screen in physical Oasis. A person after logging in could see all on-line Avatars, check users' online profiles, send messages, change his own online profile, skills, location, status, etc. For pilot version of Glow we developed virtual Glow environment using Flash and HTML. Further technical characteristics will be given in IT-project.

Without Identification

Only Output	Output and Input
Small screen - everyone can see all Oasis community online - could be used in public places – from restaurant in Science Park to the Airport **Voice shower** - everyone can hear voices from discussion / sounds of Avatars **Big Screen** - Inside Oasis - All Oasis community visible, works like a mirror - users' and Oasis services messages/information	**Small screen** - anybody can send a message or a question to Oasis community - could be used inside Oasis for anonymous public questions

With Identification

Only Output	Output and Input
Small screen - Automatic log in - Personalized information, messages, etc. - View profile **Voice shower** **-** Personalized information, e.g. "you've got a new message"	**Small screen** - Automatic log in - Send public/private message - View/Change profile - Search for expertise **Big screen** - Mirror-like (Avatars on the screen are on the same positions that people in physical Oasis) - Send message/ View profile, etc. **Control touchpad** - Control over big screen: - Find user, expertise, pair, etc. - Send public message, invitation, etc.

The next step for developing distant Glow would be tools supported by mobile devices – mobile phones, PDAs, smart-phones, and so on. Most probable these would be text-based environments or if possible, supporting simple graphics. In the future, with the spread of new technologies, such as 3G and 4G communication systems for example, mobile devices and software tools for them will become more important. This should be taken into consideration by the Glow team.

6.5. Conclusion

In this chapter a new subproject – Glow – of netWork Oasis was discussed. It is recently developing subproject with a purpose to create a new kind of combination of virtual and real. Glow is a unique mixture of two realities, a combination of equipment, databases and a variety of tools, and human knowledge, information flows and interactions. We need to remember that Glow success is in quality and substance of communications and transferred information. I'd like to mention here some challenges that Glow-team observes now.

How to keep community active, online and present? In many virtual communities this is a destroying factor. Motivation to participate is critical.

How to make easy control over own Avatar and how to facilitate people to take care over their Avatars? How to make Avatar-based profiles easily understandable?

What are the new rules and new Culture for this real-virtual community? Any specific policies, responsibilities?

We have a lot of questions concerning trust in Oasis: Security vs. Usability, Openness vs. Privacy, Confidentiality vs. Accessibility, etc.

There are many other challenges, but the last that I'd like to mention is about feedback. How to collect it? Nobody likes to fill huge forms, but if we propose users as developers and co-creators, then we need a good feedback from them.

7. Summary

It is a big challenge to make tools that support creativity, as creativity has been always considered as a human intrinsic privilege. Considering tools that could support and attract creative people we shall answer first the sub-questions that were proposed in the beginning of this research.

ii. *How creative people could be attracted and what is the most effective way of working creatively?*

Creative Class is attracted by a variety of factors combined in one place. First of all, it is diversity of people working there and tolerance to new comers. Then, high quality of amenities and technological support attract creative people. And the last but not the least is talent, meaning other talented people, universities, cultural amenities and events.

The most effective work happens in the Flow. It can occur in any kind of work, even non-creative, but to achieve this condition the rules are the same for everybody. Clear goals and immediate feedback, a good balance between person's skills and challenges, support for deep concentration are the basis for effective work. Creative people can feel Flow more often then others but even though they need to be facilitated to feel so.

iii. *How knowledge is built in the community?*

Knowledge building is never-ending process going on in a spiral manner. It starts with socialization of tacit knowledge of individuals, transforms through externalization to explicit knowledge in concepts, combines with other concepts to systematic knowledge and in the end of one spiral it becomes operational knowledge of individuals through internalization process.

The idea of this concept is that knowledge is shared in Ba-places. Individuals and groups can acquire knowledge from Ba in different manners according to the type of knowledge conversion. To energize Ba and facilitate knowledge conversions different tools should be used accordingly. In Oasis way of working we broaden the tools by adding to the face-to-face and virtual meeting a mixture of real and digital worlds in the Glow project. And putting one layer between private and group work – tandem collaboration, facilitating thus the process of transformation from one type of knowledge to another.

iv. *What are the principles of building the mental structure of Oasis spaces and activities?*

In the Oasis way of working we consider three layers of activities – working, learning and playing. The idea is to create such environment that would facilitate ubiquitous learning during the work, and working and learning while playing. The roots of this approach come from problem based learning theory in educational technology and are developed further to be utilized in Oasis.

Another principle that should be mentioned here is that Oasis should offer three levels of communication – random, group and private. Oasis' physical zones should contain possibilities to support each of these communication types. Then we should create such working environment that it would support learning by doing principle, we could provide Playground and FlexLab to test new ideas, methods and tools before they would occur in real life.

Next principle is that Oasis should bring virtual world to the real through communication facilities, special places and Glow that will happen there.

If we consider physical Oasis then the newest opportunities of ergonomics and flexibility should be taken into consideration in the Oasis Interior. A high security level should be supported by both physical and real Oasis. The idea of interactive digital art and other tools to facilitate curiosity and imagination is also worth mentioning here.

v. *What are the possibilities to support creativity with modern technologies like e-working tools?*

There are not many tools for e-learning that support creativity and it is a challenge to develop and create such tools. First of all we defined user's activities that should be supported – collect, relate, create and donate. The first one – collect – requires the informational base where knowledge could be obtained – libraries, material folders, good possibilities to search. Next one – relate – should be supported by the communication tools to make an easy and fast access to the required experts. Instant messengers, chats, discussions, virtual conferences could help in this activity. 'Create' is mostly the individual, tandem or group work, thus it does not require a huge amount of external collaboration facilities, but it needs a variety of possibilities to work in groups – shared folders, shared whiteboards, e-Meetings, simultaneous text/graphics editors and so on. And the last one – donate – is a good chance to

demonstrate one's knowledge and skills, obtain recognition and share new information.

Oasis Garden structure was developed in a way that it could support all these activities. Further more, we need to remember the importance of high security level in Oasis Garden and possibility to have at least three groups of users – members of Oasis Garden with access to whole information and communication facilities; visitors, who could register online or be invited by a member and have access to some results and proceedings of Oasis' members' work. The last group includes all the other people from all over the world, who could find the information about Oasis on the Internet and, if wishing to become a visitor, to register as well.

i. The main question is *how information and communication technology could help in facilitating creativity?*

After answering all the sub-questions we need to say that a role of ICT in facilitating creativity is becoming higher and higher. Tools for e-learning, e-working, distant collaboration and virtual meetings will obviously give a positive impact on the creative work. This is especially important in Oasis, as we shall have a multicultural and diverse community, where people if not in Oasis physically will most probably wish to be there virtually. Thus we need to provide tools for making weak ties of creative people from all over the world and support old strong ties with family, friends and colleagues.

Another technological application to the modern creative environment is interactive digital art, moving Robotics sculptures, flexible furniture and individual control over the environment conditions. FlexLab and Playground are the two worlds' technologies to test and invent new ideas into real life.

In Oasis we propose Glow as one of the main communication facilitator and information exchange tool – a blend of real and virtual.

In the future I would like to concentrate more on e-Learning tools, e-Working environments supporting creativity and tools supporting ubiquitous learning. There is a lot to be done in the context of cognitive and human interactions' psychology. Oasis Playground and FlexLab are good tools to test new theories, but they are neither well defined, nor well structured yet.

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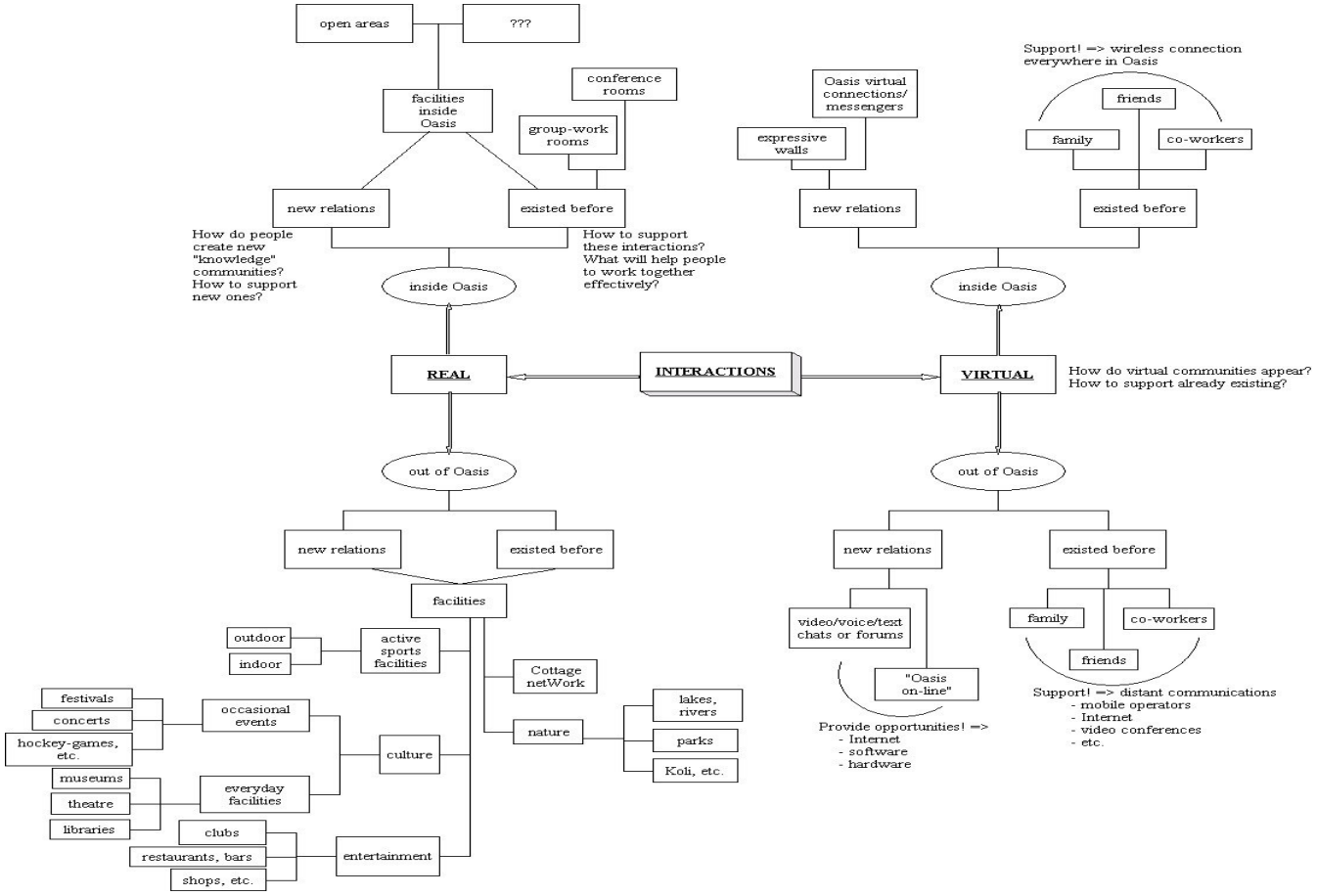
Appendices

Appendix 1. Types of Interactions



Appendix 2. Table of Instruments

Indoor instruments

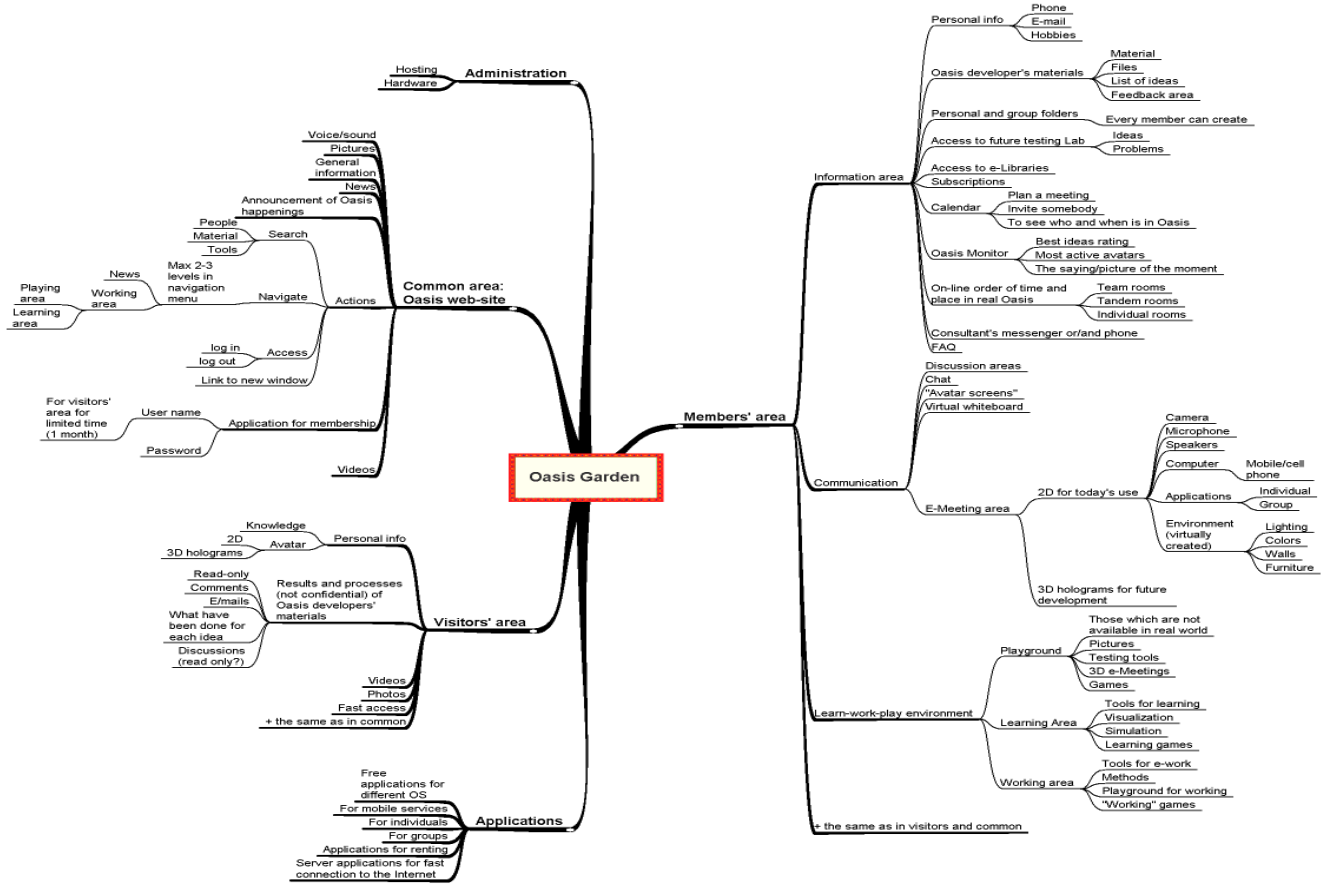
Available	Available with modification	Need to be developed
Laptop	Chair	Portable intelligence suitcase
Cell phone	Table	Remote control for Oasis
Office trollie	Lighting	Working methods
Minibar	Refreshment-kit	Imported software and hardware user interface
External screen	Chat	From speech to selective text secretary
External keyboard	NetMeeting	"Dating s/w" for cell phone
Office tools	Software/computer recognition	
Printer	Group furniture	
Sound system	PowerPoint + Super screen	
Performer tools	Identification	
Voice recognition		
PDA		
Personal equipment		
Flap		
Smartboard		
Flatscreen		
XBOX		
Whiteboard		
Projector		
Web-cam		
Microphone		
Loudspeakers		
Announcement board		
"Spot me"		
"Dating software"		

Active board		
Deprivation tank		
Wireless LAN		
LAN		

Virtual instruments

Available	Available with modification	Need to be developed
Laptop	Identification	Environment for personal information and performances
Camera	Oasis Garden	Oasis Garden for Visitors (to Invite to membership)
Server	VR-WOW	Oasis game
Oasis Web-pages	Refreshment -kit	Working methods
	Chat	Equipment for group information and performances
	Forum	

Appendix 3. Oasis Garden Structure. Mind Map



Appendix 4. The Structure of Oasis Garden

Oasis Garden structure is divided into three main parts according to the access rights – *Members*, who have full access to all kinds of materials, *Visitors* with restricted rights, who are interested in Oasis way of working and after some time may become Members. And *Common* area accessible for everyone from the Internet.

Two supportive components of Oasis Garden are *Applications* and *Administration*.

Members' area

Information area

Personal info

- ✓ Phone
- ✓ E-mail
- ✓ Hobbies

Oasis developer's materials

- ✓ Material
- ✓ Files
- ✓ List of ideas
- ✓ Feedback area

Personal and group folders

- ✓ Every member can create folders

Access to future testing Lab

- ✓ Ideas
- ✓ Problems

Digital resources

- ✓ Access to e-Libraries
- ✓ Subscriptions

Oasis Monitor

- ✓ Best ideas rating
- ✓ Most active avatars
- ✓ The saying/picture of the moment

Calendar

- ✓ Plan a meeting
- ✓ Invite somebody
- ✓ To see who and when is in Oasis

Oasis online services

- ✓ On-line order of time and place in real Oasis
  - Team rooms
  - Tandem rooms
  - Individual rooms
- ✓ Consultant's messenger or/and phone
- ✓ FAQ

Communication

Discussion areas

Chat

"Avatar screens"

Virtual whiteboard

E-Meeting area

- ✓ 2D for today's use
- ✓ Hardware
  - Camera
  - Microphone
  - Speakers
  - Projector
  - Computer
  - Mobile/cell phone
  - PDA
- ✓ Applications
  - Individual
  - Group
- ✓ Environment (virtually created)
  - Lighting
  - Colors
  - Walls
  - Furniture
- ✓ 3D holograms for future development

Learn-work-play environment

Playground

- ✓ Those which are not available in real world

- ✓ Pictures
- ✓ Testing tools
- ✓ 3D e-Meetings
- ✓ Games

Learning Area

- ✓ Tools for learning
- ✓ Visualization
- ✓ Simulation
- ✓ Learning games

Working area

- ✓ Tools for e-work
- ✓ Methods
- ✓ Playground for working
- ✓ "Working" games

+ the same as in visitors and common

Visitors' area

Personal info

- ✓ Knowledge
- ✓ Avatar
  - 2D
  - 3D holograms

Results and processes (not confidential) of Oasis developers' materials

- ✓ Read-only
- ✓ Comments
- ✓ E/mails
- ✓ What have been done for each idea
- ✓ Discussions (read only?)

Videos

Photos

Fast access

+ the same as in common

Common area: Oasis web-site

General information

News

Announcement of Oasis happenings

Actions

- ✓ Search
  - People
  - Material
  - Tools
- ✓ Navigate
  - Max 2-3 levels in navigation menu
  - News
  - Working area
    - Playing area
    - Learning area
- ✓ Access
  - log in
  - log out
- ✓ Link to new window

Application for membership

- ✓ User name
  - For visitors' area for limited time (1 month)
- ✓ Password

Multimedia materials

- ✓ Videos
- ✓ Voice/sound
- ✓ Pictures

Applications

Free applications for different OS

For mobile services

For individuals

For groups

Applications for renting

Server applications for fast connection to the Internet

Administration

Hosting

Hardware