

Research Proposal
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Scenarios of Digitalization of Education and their Application at TKK

1. Introduction

This is a research proposal for a Master's Thesis at the Computer Science Department of TKK. In this work e-learning is observed within a broad technological framework. In spite that the work belongs to the category of Computer Science, also Pedagogical and Organizational aspects will be taken as equal starting point of the research.

e-Learning happens always in some Pedagogical and Organizational context. Bypassing those contexts would lead to too narrow technological angle, because of which e-learning as research object would not be rightly understood.

The author has as a starting point the perception of ICT as leading change and development actor in education. The idea is to draft for e-learning at TKK a change and development path, which will be realized as a part of large series of changes in whole teaching organization and also in administration. On the other hand, as a consequence of the changes, it is possible to achieve the role of leading Technical University in Finland and a position among ten leading Technical Universities in Europe. These goals are set by our University Strategy. In the new strategy of TKK (TKK 2006), special focus has been put on digitalization. The strategy states:

It is TKK's goal to be on top of the World in utilizing digitalization in education and research in all technical branches represented in the University, as well as in administration and services in the Campus area.

This ambitious statement is the focus and driver of this study.

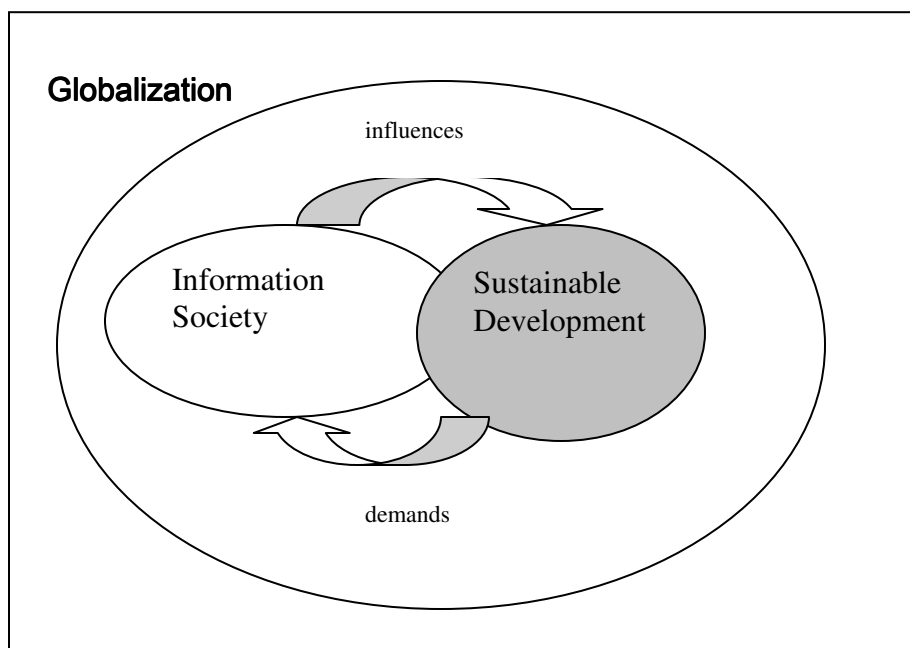
In (Abel 2007) the main idea is to look upon the application of IT in Higher Education units , how it is aligned with the mission statements of the said units. The aim of the study is to define a realizable path from today's situation to the ultimate goal of world leadership in applying digitalization. However the scope is in Education, not in all activities of the University.

2. The Big Picture

The industrialized societies of the world are bothered by three remarkable change processes in thinking and real life: Globalization, Information Society Development and Sustainable Development. These three change processes are in a strong mutual interaction relation. (Heinonen et al. 2002)

Information Society Development does not necessarily support Sustainable Development.

ICT's can and should be applied so that Information Society Development proceeds supporting Sustainable Development.



3.

3. University as an Institute of Information Society

- ICT considered as social communication system instead of technology
- focus on systemic level from individualistic teacher-learner centric approach
- ICT will be an essential part of new education system
- e in e-learning should be read "enhanced"
- Source: (Pulkkinen 2003)

3. Basic Concepts

In this study by scenario is meant future scenario, a constructed possible future, which is realized as a consequence of possible changes from present situation and realizes under certain environmental conditions. In Scenario work future possibilities are studied more than one. Future scenarios have their origin on futures research..

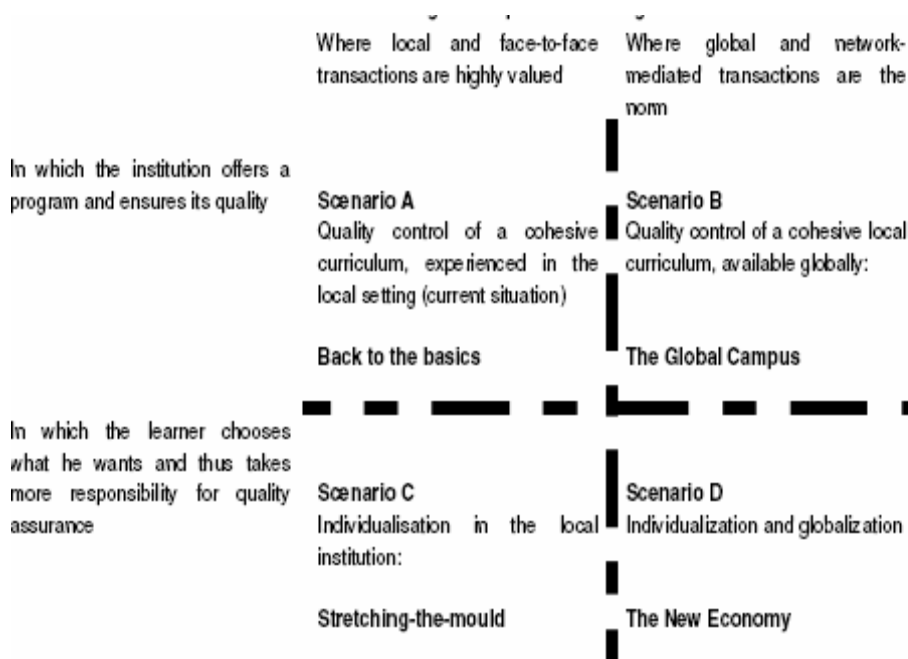
Digitalization

Digitalization in the context of this study is a process within which scattered incompatible data in the form of paper, tacit knowledge possessed by individuals or organizational units is digitized and integrated using Information Technology tools.

e-learning

e-learning is a generic concept, which in most cases means Internet and Mobile technologies applied to education. The applications vary a lot. A full-blown e-learning application could be an On-line, fully automatized course on the Internet.

4. Possible Scenarios of the Future



Below a description of these four scenarios for educational delivery is given,
directly taken from (Collis, Gommer 2001)

Scenario A: Back to Basics

In this scenario, higher education institutions focus on the traditional, campus based students, in which learning takes place through face-to-face contacts and through direct interaction with instructors. Virtual this and that are seen as just a hype; real learning takes place in a fine campus setting with its library, computer labs, instructors with office hours, and other students to interact with. The basic assumption is that experts in the institution are in a better position than the student to indicate what courses are useful and in which order they should be taken. Technology appears here in sensible ways; using word processors, email

and WWW browsers, getting course information via WWW environments.

WWW sites are also good for consultation of external course resources and to make communication easier. But the basics are still what matters: a well planned curriculum and regular face-to-face contacts.

Scenario B: The Global Campus

Students want to study in a well-planned program but they want to stay in their own locations and continue their own lives at the same time as they are studying.

They are able to participate on-line in the program of a university, even if they don't physically ever come to that institution (or only come once or a few times).

Technology here becomes very important. First of all, the student will need to use technology to find out about the programme of the university. Second, the student needs to use the technology to register for the programme. And third and foremost, the student will need technology for stable access to all the course materials, assignments, and for communication and interaction with fellow students and instructors.

Scenario C: Stretching-the-mould

The student has no particular interest in being involved in a program or course offered at a distance, but would appreciate more flexibility in his local study setting. He or she might like to substitute some courses from the home institution by courses from another (foreign) institution. This choice may be related to the fact that the alternative course takes another academic, pedagogical, cultural or linguistical approach, or to student's desire to interact with a wider (international) environment. The student may also think that the alternative course is more

efficient, relevant, or of higher quality. For all of these options technology is an important if not essential condition. The institution responds to the learner by increasing flexibility in a number of ways, not only relating to place and time, but also to content, assignments, prerequisites, resources, and other aspects of course participation. It may cooperate with foreign partner institutions in order to widen the choice for international on-line options within a common course management and credit transfer and recognition system.

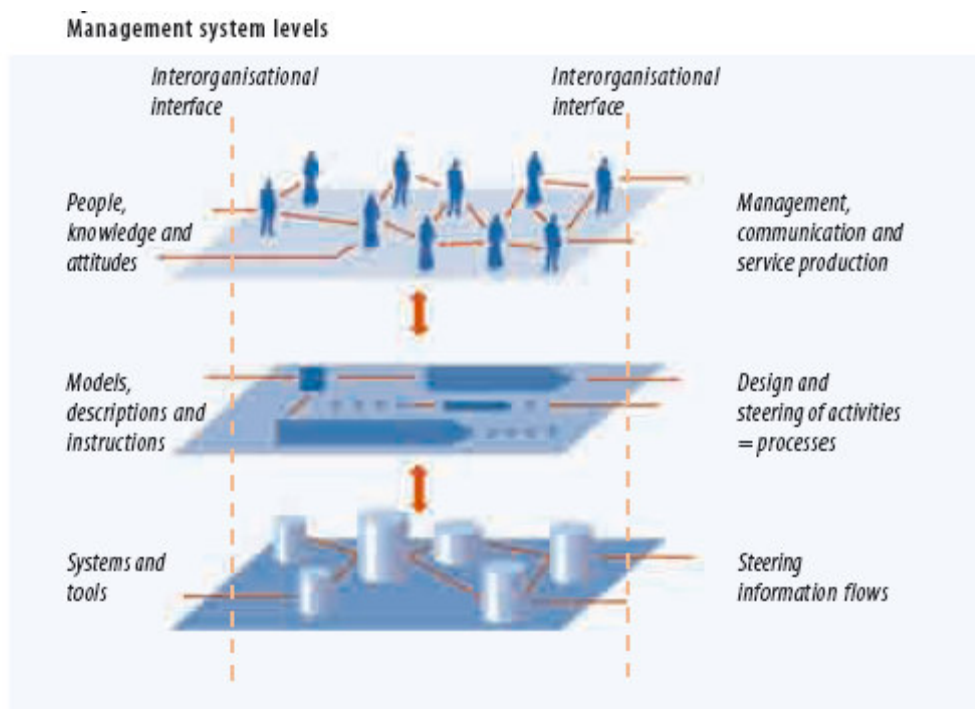
Scenario D: The New Economy

The student wishes to make his or her own decisions about what, when, how, where, and with whom he or she learns. The student will often be a working professional, and has a good idea of the types of courses or learning experiences that would be useful to his work setting. The employer is stimulating and supporting lifelong learning efforts. The student approaches an intermediary or advisory person (via the WWW), who provides assistance in defining level and learning needs. The student will search the WWW himself (or use a portal) to locate appropriate learning options. These may come from different institutions around the world, according to their particular profile and expertise. The student will choose on the basis of the relevance, quality, efficiency, and flexibility of the various options. The student can stay at home and continue professional and family responsibilities.

The scenarios and their impact will be compared. One scenario is chosen.

4. Management System Levels

The following picture describes the different levels of management systems as described in (The Information Society Council 2006)



Source: Markku Markkula, Lars Miiikki and Heikki Hallantie.

In the same report it is stated:

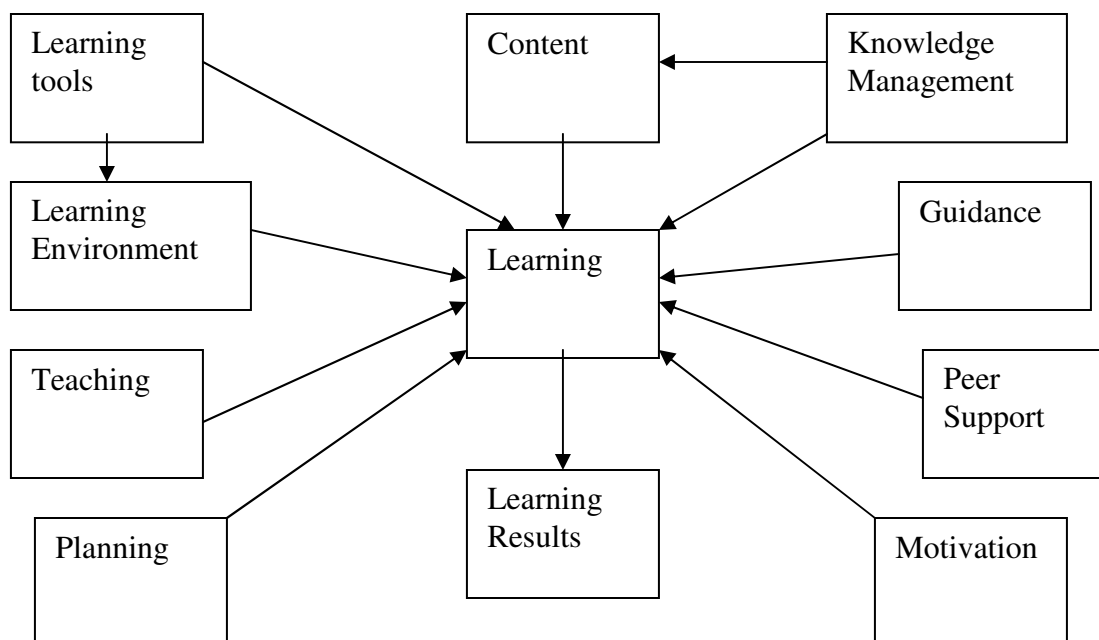
“In the development of activity, the relationships of dependence and impact between levels have not received the attention they deserve. The use of process descriptions can turn information systems and IT tools into a great source for increasing productivity. Often the impact of people’s own interests is forgotten. It is assumed that people can be forced into moulds and pigeonholes. If people’s needs are ignored, plans and projects will fail or their implementation will meet with considerable difficulties.”

Furhermore it should be understood that people on the top layer of the model have their own goals and preferences to fulfil in addition to the goals and preferences of the organization. This makes the picture additionally complicated..

This problematic is handled well in (Hämäläinen , Raimo P., Saarinen 2004).

4. Framework for e-learning

A new framework for e-learning called ICT-synchronized education is proposed:



The effects of different elements on learning results are studied within the chosen scenario.

5. Balanced Scorecard

Balanced Scorecard along the lines suggested by (Kaplan, Norton 1996) is applied to in the organization of TKK.

6. Research Methodology

The dilemma in this kind of research is the balance between Rigor and Relevance. Positivistic study methods are basically only applicable after the strategy and it's implementation are made. The Digitalization strategy and it's implementation is emerging during a working process with the people involved in developing and implementing it. As a research methodology suitable for this kind of work is chosen Canonical Action Research (CAR) as proposed by (Davison, Martinsons & Kock 2004). CAR aims to address organizational problems while at the same time contributing to scholarly knowledge.

CAR contains five principles

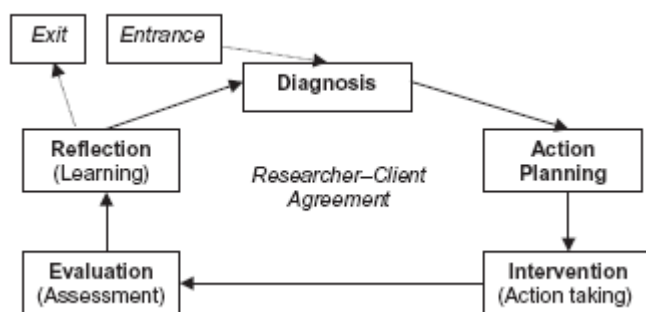
1. the Principle of Researcher-Client Agreement (RCA);
2. the Principle of the Cyclical Process Model (CPM);
3. the Principle of theory;
4. the Principle of Change through Action; and
5. the Principle of Learning through Reflection;

The Principle of the Researcher-Client Agreement (RCA)

The idea of RCA is mutual commitment of the client Organization and the Researcher to the work. The Organization gets the report, which supports its decision making process. As a parallel process the Researcher prepares a research document and the relevant Organization members commit to contribute the research. The Researcher has the role of improving the Organization, in addition of just studying it. An agreement between the Organization and the Researcher is preferable.

The Principle of the Cyclical Process Model (CPM)

The idea of RCA is to iterate a needed amount of times a cyclical development process, which consists of five stages: diagnosis, planning, intervention, evaluation and reflection. This illustrated by the following scheme:



In the Master's thesis the plan is to make one iteration only, because the amount of work

is too big for further cycles. It could well be a subject of a Doctoral Dissertation to conduct research over a second cycle using also positivistic methods in the evaluation stage. Now the evaluation will be qualitative only.

The Principle of Theory

The CAR- method assumes that there is theory creation , which is progressing in line with the research. The methodology does not need a ready theory to start with. The theory is emerging and tested in the process. The theory in this study is based on the authors input, organization member's contribution as well and literature survey.

The principle of Change through Action

The essence of CAR- process is to find concrete steps of change based on analysis of the organizational situation and theoretical reasoning of the researcher and representatives of the organization.

The Principle of Learning through Reflection

There is a difference of roles of the organization members and the researcher.

Organization members expect to have concrete results, while the researcher's academic task is discovery of new knowledge. The researcher should be successful in both these criteria. Two separate reports , one practical for the organization and one theoretical for the research community are needed. In this case they could be also chapters in the same report.

7. Realization plan of the study

The author presented main ideas of this study in a strategy seminar of TKK 19.4.2007 In the presence of rectorate, department directors and directors of separate research institutes of TKK.

Now, based on an assignment of the Rector of TKK, the author and the coach of the thesis Anna-Kaarina Kairamo are preparing a project plan, how the implementing the Strategy of the Digitalization of Education is carried out. The work should be accomplished by 31.12.2008. The work should be carried out in co-operation with other Working groups, which are established for the Strategy Implementation, especially with The Working group for creating Quality Assurance System for Education at TKK. Following the stages of CAR- framework, the contents of the stages could be:

1. Creating the Researcher- Client Agreement (RCA)

Preconditions:

- Existence and approval of the project plan (preparation in co-operation with organization stakeholders is progressing: dead-line end of August 2007)
- Approval of the Research Proposal: dead-line end of August 2007.
- Agreeing about roles of the researcher and organization stakeholders
- Agreeing scope of the research and practical development project.

2. Analysis of the situation at TKK in Digitalization

- Agreeing about general Digitalization Framework
 - Developing and agreeing quantitative indicators for Learning Outcomes
 - Developing and agreeing qualitative indicators for Learning Outcomes
 - Developing and agreeing economical indicators for Learning Outcomes
 - Conducting a literature survey on Digitalization of HE
 - Benchmarking survey of Digitalization in HE-units in Finland and abroad
 - Preparing various Digitalization Scenarios of Education at TKK

- Organizing a stakeholder workshop based on the above material
 - Publishing an analysis report based on the work mentioned above.
 - Dead-line : end of year 2007
3. Action planning based on the analysis report
- Preparing suggestions for actions taken by the organization
 - Work in close co-operation with the stakeholder representatives
 - Adjusting the theoretical framework of Digitalization
 - Publishing an action plan
 - Publishing findings in the form of academical report.
 - Deadline: April 2008
4. Organizational Intervention
- Work in co-operation with the stakeholders in order to start implementing the agreed actions.
 - Organizing supportive actions like training, lectures and distributing dissemination material
 - Writing an academical report on the findings at this phase.
 - Deadline: June 2008
5. Evaluation
- Evaluation, how well the actions seem to support to the organizational goals
 - Qualitative assessment supported by questionaries
 - Deadline: August 2008
6. Learning by Reflection

- Organizing a workshop concentrating on the learnings the organization has gone through during the study process
- Writing a practical summary on the learnings the organization has gone through.
- Writing a report on theoretical findings, which have academic value
- Writing a report on practical further suggestions
- Writing the final Academic Report with suggestions for further research.
- Deadline: End of year 2008.

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