A METHODOLOGY FOR THE DESIGN OF LEARNING ENVIRONMENTS.

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ABSTRACT
This article presents and discusses some theoretical starting points and design considerations for addressing emotional and aesthetic aspects of virtual learning environments (VLEs) for support of ubiquitous teaching, studying and learning. In this article, we note that a VLE should be viewed upon as an interactive and sensations arousing instrument, a tool or mediator for communication and regulation of psycho-social processes and presence in terms of social distance. As a symbolic artifact to be assessed and perceived from the viewpoint of aesthetics. The most important emotionality aspects of a VLE could be pointed out to be a tool allows virtual presence and simultaneously allowing possibilities to regulate the social and psychological distance to others.

This work focuses on emotionality, particularly from the viewpoint of avatar based VLE collaborative solutions, graphical representations and participants of social simulations, which are used, as shared virtual spaces and mental tools: tools for thinking and mental problem solving. In addition, this work considers emotional mediation through the use of such communication technologies. With the provision of a basis for the ability to empathise, entering into another person's role, emotional reciprocity and as an essential factor for generating a shared and trusting or secure enough mutual emotional state for successful and motivating problem solving and innovation development. Emotional, study-related situations are also discussed from the perspective of one's cognitive and emotional load as well as via situational anxiety and situational pleasure.

Keywords: Emotional, Experiential, Virtual Learning Environments, Ubiquitous, Mobile And Network Based Learning.

1.   INTRODUCTION
In the broadest sense, we can step into "virtual worlds" with different media, with the help of television, cinema or books. Even if such media stimulate only a few senses – the key point is the *imagination*, which fills in the gaps and for different amounts the emotional – sensatorial aspects it affords together with the aesthetic dimensions of such environments (cp. Peltoniemi & Tammi 1999). The way in which the development of computer technology has contributed to this changed reality offers great potential in terms of the development of dynamic aesthetic and real looking and *interactive* solutions. Novel technologies such as computer based virtual learning environments (VLEs) (see e.g. Lanier & Biocca 1992) and other network-based mobile tools (Gredler 2004; Lehtonen 2005; Page Lehtonen & Thorsteinsson [to appear]) have become very popular tools and environments in *educational research and development* or *design based research* (Orrill, Hannafin, & Glazer 2004) (Lehtonen, Thorsteinsson, Page, & Ruokamo, in press; McLellan 2004; Steuer 1992). Nevertheless, from the present research perspective it must be noted that emotional and aesthetic aspects are equally significant as the more commonly researched cognitive and rational aspects of such environments. In its entirety, the VLE becomes a interactive and sensatorial arousing place where people can sense presence, situational pleasure and experience things *embodied* with all their senses. We argue that research has been until presently somehow lacking for especially the embodied emotional and aesthetic dimensions of the development as well as the research of human emotional activity in those environments (see also Laurel 1992; Lehtonen, Hyvönen & Ruokamo 2005; Vuorela & Nummenmaa 2004). The emotional and the aesthetic factors might be seen to be key factors in creating such environments where the both the embodiment of emotionality and imagination takes the role and immerses us into virtual presence and engaging our activities there. It is therefore asserted that as well as the cognitive and rational aspects e.g. knowledge creation are important to study and take into a account in these environments at least as important aspects to take into a account are the emotional and aesthetic aspects (Lehtonen, Hyvönen & Ruokamo 2005). This work considers such emotional and aesthetic considerations that need to be provided for in VLEs and mobile network based learning environments.

It is essential to examine *emotionality* and *emotion media*tion related to interactive and socially formed VLEs and mobile network based learning environments and considers that phenomena also as attributes vis-à-vis the processes it consists - the teaching, studying and learning processes. An attribute, in this context, is a property of

an object, situation (e.g. communication situation), or a feature of the immediate environment, that indicates how that object situation or feature may/can be interfaced or in case of mobile network collaboration *interacted with* (McLellan 2004; Gibson 1966; 1979). In other words, for example in technology mediated communication seen from the viewpoint of emotions as attributes show what is possible or potential to do, or to achieve in certain situation. We acknowledge that such attributes can and should be made noticeable (dominant) through e.g. proper technologies to mediate emotionality in a suitable ways dependent on the situation to achieve fully benefits a human being's potentiality as a committed, self-directed creative and productive member of a group.

It can be seen that taking into an account the human emotion and emotional activity in *teaching, studying and learning* (Illeris 2003; Uljens 1997) a theoretical level structure based on multiple levels of emotionality observation (Table 1.) is needed. The emotions and emotionality is seen here on the five levels of observation evident in Table 1. The aesthetic dimensions are seen to provide highly emotional relations with the environment in dynamic user process in the levels of 2 in direct interaction with it and in the level 3 in dyadic or social interaction with others represented by the environmental characters (avatars) and situations.

Table 1. Five levels of the emotional activity observation (based on Lehtonen, Hyvönen & Ruokamo 2005):

1	The level of subject's (subconscious) internal underlying emotional (neural) mechanisms (studied by psychology, neuropsychology / cognition science) in relation to technological and social environment.
2	The level of subjects' emotional aspects of behaviour as a subject in interaction with the technology, emotion expression and emotion experience (feeling)
3	The dyadic/social level of shared or mixed technology mediated emotionality as a subject and as a member of groups, (emotionality and network group dynamics in social interaction between teachers, students and learners as subjects') in joint attentions. The dyadic means that in the social situations in typical form are actually in each separate small communication situations actually in a way two people meeting at the time but in rapidly changing social situations, which are in relation to the others.
4	The emotionality in cultural level, especially cultural ways of emotion expression and emotion experience (feeling). The way how certain group, organization or country has its own communication culture.
5	The emotionality in inter- or transcultural level in global-level social interaction between teachers, students and learners with different cultural backgrounds.

This article presents some theoretical starting points for the consideration of emotionality and aesthetic aspects for the VLEs and mobile network based learning environments. In other words how some of those most critical emotional and aesthetic aspect could be taken into an account.

2. EMOTIONS, SOCIAL AND AESTHETIC ISSUES AS A SOURCE OF EXPERIENCE

We define emotions in this article to be consciously or subconsciously generated processes with negative or positive tones that help estimate the significance of artifacts, situations and actions and their value for one's self (cf. information theory of emotions, (Siegel 1999; Simonov 1981; S. S. Tomkins 1962, 1963, 1991, 1992). According to this contemporary neuropsychological-based view, emotions are based on activities throughout the entire brain and different bodily systems (e.g. hormonal, motor and sensory ones) (Siegel 1999). It may be claimed that emotional processes and emotionality serve to provide overall direction and impetus for such relations with environments and human activities that appear rational or which are said to be rational. Learning and studying in and via online networks VLEs and mobile network based learning environments are no exceptions to this. (Brod 2000; Damasio 2001/1994; Siegel 1999). To quote Damasio (2000/1999b, 257-258), the concept of consciousness may even be totally reversed, *consciousness is a strongly emotional experience*, *a feeling of what is happening [and where]*. Emotions are experienced as episodes and mental states of various types, such as mood, happiness, sadness, hate or anxiety and it should be noted that all those affect decisions and activities we make. In addition to that a large number of emotional processes *are barely conscious or subconscious* (Damasio 2000/1999a; Oatley & Jenkins 1996; Siegel 1999). Emotions can therefore be considered as processes, with identifiable stages: first events are evaluated for their relevance to what is important to us, then follows an evaluation of the context – what can be done about the event (Oatley & Jenkins 1996). Furthermore, emotions may be considered as mental stages of readiness for action, setting priorities and prompting plans.

However, emotional and aesthetic aspects could be more seriously taken into an account and provided for in the development of such VLEs and mobile network based learning environments. Emotional and aesthetic factors have too often been paid little attention or overlooked by researchers which study learning especially in VLEs and mobile network based learning environments. The aesthetic dimensions of VLE applications should be understood or to be felt in *dynamic interaction process* rather than more or less passive perception process (cp. McLellan 2004; Gibson 1966; 1979). The aesthetic environment may be seen to *afford* positive emotions toward

the activity in *dynamic interaction* situation. Emotions and the tendency to assess experiences on the basis of how pleasurable or disagreeable they are, are not only background factors for the inclination to study and motivation but they also directly bear on how one studies, what one studies, whether one learns anything and whether what one learns is remembered (Lehtonen, Hyvönen & Ruokamo 2005; Damasio 2000/1999a, 2000/1999b; Siegel 1999; Simonov 1981). The body, the brain, the intellect and emotions are inseparable parts of us. The physiological-psychological-environmental activities labelled as the mind are 2000/1999a, 2000/1999b; Dennett 1996; Lehtonen, Hyvönen & Ruokamo 2005). From that viewpoint, emotionality and the dynamic interaction process require aesthetics as a key aspect also in all network-based environments (NBE), like VLEs and mobile network based learning environments. Furthermore, in taking into a account the emotional aspects in designing those as well as having a strong impact on the ways one teaches, the willingness he or she studies and learns, and on the issue whether one remembers what was studied or taught and supposedly learned.

The aesthetics, defined in this time how we *emotionally react* and *feel* our presence and interaction with our technology mediated social and technological surroundings. It may be seen to be very important attribute of emotionality. Albeit briefly referred to the significance of aesthetics may be said is from the emotional viewpoint how pleasurable or disagreeable we experience the environment. It is then not only one background factor for inclination to study and motivation but through the emotional influence it also directly bear on how we study, what we study, and do we learn anything and whether what we are capable to recall and later use from the areas we have been studying (Damasio 2000/1999a, 2000/1999b; Siegel, 1999; Simonov 1981; Lehtonen, Hyvönen, & Ruokamo 2005). We argue also that the aesthetic dimensions are very culture dependent and also the individual variation may be argued is quite significant. From that viewpoint the aesthetic dimension should always be paid a lot of consideration. In addition to presented above the aesthetic dimension may not be seen or treated as just visual art of just visual design issue, instead of it should be treated or studied from the viewpoint: what kind of *interaction* and *emotional* factors it *affords* while been actively used, not been only as passively assessed object. We point out that those points are too often paid little attention in research and design-based research of educational solutions.

2.1. Social level emotional activity
According to our research e.g. the *emotional mediation* between the participants in different forms and means provides very interesting phenomena in the consideration of the benefits and the disadvantages of technology-mediated communications. In addition, there lie the possibility that it allows one to regulate the social and psychological distance but still maintain certain amount of presence in the virtually represented ways. If the modulation does not happen well enough or almost at all the distance easily remains too long and the collaboration may be seen to suffer from it. The social interaction, *network group dynamics* (cp. e.g. Aulls 2004; Hargreaves 2000; Peltoniemi & Tammi 1999) and the *manifestations and the mediated interpretations of embodiment* must be paid attention to when planning the implementation of VLEs and mobile network based learning environments (Brave & Nass 2002). The current interactive facilities evident in most networked situations - predominantly text-based, are also, in addition those are slow, very demanding from the point of view of promoting interaction especially from the emotion-mediation viewpoint. Technologies used and teaching, learning and studying influence what emotions are evoked and mediated by studying and what students' experience. From that viewpoint, the different communication and embodiment representation or simulated embodiments like avatars; multimedia communications (voice, video) and especially avatar representation may be giving the sense of emotional presence but same time of letting people regulate the social and psychological distance and level and ways of interaction (Peltoniemi 2004). Furthermore, this mediates the real or simulated acts of embodiment, the bodily representations and attention from one to another that the shared feelings may carry the desired activity.

Online learning and studying, on the other hand, provides the possibility of protection afforded by technological conveyance, an option to withhold one's true feelings whilst being represented as an avatar as a participant. Especially the written communications despite of its limitations offer also many benefits in such contexts. They allow time regulation, time shifts, accuracy of messages and possibility to return to the message as well as the freedoms in answering, more anonymity (less emotion mediation) and possibilities to easy regulation of psychosocial distance. It is not surprising people seem to like written communications as e-mail, SMS, net chat, television chats indicate. This experiential emotional protection may also provide a way of handling difficult concepts for discussion or the consideration of subjects which would be otherwise, for example through face-to-face interaction might be very difficult. Afforded protection may also make collaboration on the level of feelings in some situations easier in a group and lead to extended openness which might be rarely encountered in personal interaction.

However, in other forms of collaboration, such emotion mediation problems make collaboration difficult and the lack of cues or attributes for expected or typical behavioural reaction in certain situations in meaningful ways makes the collaboration difficult ant emotionally very consuming. In such cases there needs to be a possibility for regulating the emotional mediation. This can be done, for example by selecting the expected or typical behavioural gestures of communication to be used from set of alternatives (e.g. chat, voice over IP, video, avatar with lip and face sync etc.). This can be seen to be important provision from the social level as well as cultural and inter and transcultural level and viewpoint (Figure 1.). Moreover, individual users may differ in these issues and more so between cultures in the ways and willingness to express and mediate emotional states sometimes differs very much and the systems should offer enough ways to mediate the emotional needs or the collaborators.

These mediated emotions serve to create a shared emotional state and "carry" as well as encourage the other participants to continue the collaboration and simulate the states of mind of others. In order to generate socio-mental connections, people often profit from a human mode of action called embodiment where the bodily expressions, particularly facial expressions and gaze play a significant role (Bowers, Bauer, & Heilman 1993; Erickson & Schulkin 2003). In a dialogue, one not only interacts with information but also on the individual level of emotions and cognition as a member of a group in some level of psychosocial distance. The connections are strongly both emotional and cognitive (Brave & Nass, 2002; Chayko 2002; Damasio 2000/1999a, 2001/1994; Lehtonen, Karppinen, Matikainen, Säkkinen, & Ruokamo 2005; Siegel 1999) and emotion mediation should be always being taken into account also in different mediated communication situations. Also the environment and aesthetics issues influence, we define the aesthetics to be in strongly connection with emotions. Aesthetic solutions have among their users a connection to positive emotionality to the pleasure.

3. EMOTIONALITY, INTERACTIVITINESS AND AESTHETICS

VLEs and mobile network based education based on virtual realities or simulations utilizes different and, in most cases, novel technologies and applications. It is based on the technological infrastructure, which we will study through an extensive use of modern interactive and *mediating* media like desktop virtual reality (VR), simulations and multimedia communication applications. But the technology is not the most important factor in that process. The most critical issue is to take into an account the users, *the human nature of using those technologie*s.

VLEs, mobile network based environments and collaborative simulations (Gredler 2004) may be seen as essentially shared virtual spaces. Providing mental and in group settings through visualization and communication tools, tools for thinking and mental problem-solving for presenting and sharing ideas and thoughts on symbolic level to others and a tool for communication, distributed knowledge and shared expertise in group setting. Those tools engage us just for especially two reasons. The way of using those media is *interactive in its nature* and the *emotional aspects* are well present in interaction with those tools. We may say the VLEs and mobile network based environments *afford* us more *emotionality* than many other ways of forms of computer-based environments. Those tools may be said to be *experiential*, which usually pertains to *experience* or *personal observation*, instead of obtained from reasoning. Those tools may be said in other words to afford us interactive and sensationally arousing experiential teaching, studying and learning. In this sense, experiential always refers to a personal and *emotionally coloured reality* as seen by individuals. By emotional we mean as stated mental activity comparable with perception, thinking, language and learning, which also produce feelings. On the social group level (see Table 1.) s*hared emotional states* as bring the participants together and motivate them in the ideation process. Such opportunities for using a VLE as tool for symbolic manipulation of problem-solving activities and as a tool for even cross-cultural communication has established a new and open way for ideation using VLE and mobile network-based solutions. Furthermore, the aesthetic factors should always taken into a account - and also from the multi- and cross-cultural viewpoints.

Emotions are also essential also from other perspective. For example, Prensky (2001) states that the present generation of students – the games generation of children – are quite different from older generations, they do not want to stay in a passive role with different media. They want active participation and emotionality, to manipulate presented objects and expect a degree of emotional and interactivity as opposed to merely passively watching and listening. It can be proposed that the traditional way of thinking and learning has been shifted from deploying established media such as literature and print - to a considerably more interactive media such as virtual realities and interactive digital video and audio. McLuhan (1997) once predicted that the information environment, in this case the virtual reality or simulation based environment, and the related effects engendered *by the computer are as inaccessible to literate vision as the world is to the blind*. The present generations of students do in fact also learn to use the different forms of digital media "as a second language". In addition, the emotionality in different forms belongs very much into that context. In the next section we observe more closely also two emotion related concepts: the *situational anxiety* and *mental load*, which do have quite strong influence

on the study processes and learning and the background variables, which may increase or decrease the presented phenomenon.

4.   WHAT ARE SITUATIONAL ANXIETY/PLEASURE AND MENTAL LOAD?

Situational anxiety is an emotional response to a situation that is perceived as too rapidly changing, difficult and its characteristic features. Anxiety may be seen also in relation to fear or anger; those may be seen in a way compelling feelings (Huttunen 1997; Nathanson 1992; Thompson & Madigan 2005; Tomkins 1962, 1963, 1991, 1992). In strongest forms situational anxiety is sometimes replaced by situational fear or anger and disgust leading too often to avoidance toward the whole activity or situation (Huttunen 1997; Thompson & Madigan 2005).

A concept developed by us, *situational pleasure*, in contrast, may be understood to be the opposite, an emotional response to a situation that is experienced as easy or pleasant (cf. flow Csikszentmihalyi 1992). Mental load as a concept has been derived from Sweller's theoretic model of *cognitive load* (Chandler & Sweller 1991; Sweller & Chandler 1994) by supplementing it with *emotional load*. Mental load implies an *excessive burden in relation to a learner's emotional and cognitive resources* that is caused by the structures and activities of study-related equipment and materials and social interaction forms, which diminishes learning capacity. A part of this load is due to learning of the issue being processed and a part to concurrent effects of negative emotions. (see e.g. Thompson & Madigan 2005)

4.1 Situational anxiety and situational pleasure

By *situational anxiety* we mean that the strong feelings of fear and helplessness or anger and experiencing a situation as threatening inhibit learning. On the other hand, the situation itself may be remembered well but what one attempted to study during it is often forgotten or actively avoided. Indications of this have been found within neuropsychology, in particular. (Booth-Butterfield 1988; Cahill et al 2001; Damasio 2001/1994; Virsu & Haapasalo 2001; Siegel 1999). *Situational pleasure*, i.e., positive emotional substance that is evoked in a situation of learning or other activity, has an effect of supporting, even enhancing, remembering, cognitive functions and learning. (Damasio 2000/1999b; Virsu & Haapasalo 2001; Siegel 1999). This is utilised in different areas, for example, in the entertainment industry where the activity itself is entertaining. The pleasure provided by the senses and embodiment in active processes like studying via VLEs and mobile network based interactive and sensationally arousing environments, which is an important element in the contexts of learning.

The fact how easily situations are felt to be a burden or a pleasure is also influenced by the student's earlier experiences and attitudes. The significance of situational anxiety, fear and anger is revealed in its extreme form when a person faces a threatening situation and concentrates on repulsing danger or escaping to safety. Fear and anger may be seen to represent active ways of regulation of the situation. Another outcome may be passivity. Such situations are often accompanied by neurological and hormonal responses, for example, perspiring hands and stuck thoughts. (Adolphs et al. 2005; Cahill et al 2001; Siegel 1999). Under these conditions one is strongly controlled by emotional assessment and relatively rigid action patterns instead of flexible creativity and conscious problem solving (Brod 2000; Siegel 1999).

It has frequently been observed that the reactions caused by emotional assessment and excessive situational anxiety have effects that inhibit studying, learning and remembering, as well as being linked to study avoidance behaviour (Farnill 2001; Griffin 2000; Siegel 1999). Situational anxiety disrupts studying, especially when one studies something for the first time, and may lead to study avoidance behaviour (Oatley & Jenkins 1996), for example, dropping an online course. In later stages of studying, however, challenges or situational anxiety arising from a learning topic or problem may also have positive effects.

4.2 Mental load

Mental load has a crucial effect on alertness and selective attention. For example, an excessive load, poor and insecure social structure and poor group processes, deficient materials, equipment or navigational structure or incompetent use of hypermedia may, along with the load caused by subject matter, lead to rapid exhaustion and scattering of selective attention, which is important for studying, towards multiple targets. That kind of problems has also reported in some VLE and mobile network environment systems research (see e.g. McLellan 2004). Moreover, also excessively low demands of the subject matter may reduce alertness and diminish motivation (Virsu, 1991 1995).

Inadequate course structures and network orientation, study counseling and ambiguously compiled and expressed information about study content and goals can e.g. cause excessive load and apathy, even though such information is intended to help perceiving cognitive structures. One a crucial factor for mental load is the course

structure and time management (Tella et al. 2004). It appears e.g. quite often that students maintaining the pace on a course designed with a fixed schedule may entail problems. This causes anxiety to both the student and the group.

4.3. Some factors affecting situational anxiety and mental load

By the feeling of security we imply that a student can rely on the both social structures as well as on technology on individual level and on the level of social instruction and tutoring. Despite it, the research has given evidence that the social factors are much more important in network based activities than the technological ones. The technical things despite it do still have a strong influence - and, it is obvious that the chain is always as strong as its weakest link. Technologies such as VLEs and mobile network environments, scheduling, and especially interaction and peer groups are all important, but the social factors seem be the most important ones (Hastings & Sturt 2004; Vuorela & Nummenmaa, 2004). A secure, especially socially secure enough environment encourages unconventional thinking, creative practices and creative attempts of trial and error (Himanen 2004; Hyvönen & Juujärvi 2004; Siegel 1999).

An online student must achieve a harmony with his internal qualifications and difficulties and the emotions that they give rise to. Internal qualifications include goals, interest, motivation and will. Inner difficulties, in turn, are related to beliefs about ability, attitudes and various fears. Examples of external difficulties include the so-called accessibility factors or gaps, which occur, for example, when a student does not have use of a computer, necessary software or sufficient support, such as a support person. A significant external difficulty may also be considered to be vague expectations of cognitive activity or online orientation: because of defective instructions or tutoring the student is unable to perceive the entirety of action or content, its subgoals and subactivities. In addition, the terminology used may cause perceptual gaps. "Getting lost" or feeling the activity too complex or time consuming because of faulty orientation or improper VLEs or mobile network based learning environments by the improperly functioning systems is unpleasant and often leads to intense situational anxiety and mental load with numerous consequences. Those planning for and offering study units can address external difficulties and qualifications. In an optimal situation, difficulties are removed and qualifications reinforced so that teaching and studying can have potential to result in learning. (Hyvönen 2002). In the following chapters we highlight some additional factors that may be said to be quite lot related emotionality aspects: 1. *pedagogical models and guidance*, 2. *reliability of technological solutions*, 3. *reliability of equipment*. According to our experiments (e.g. Lehtonen, Hyvönen & Ruokamo 2005) and experience, these are the most central sources of situational anxiety and factors that affect mental loading.

4.3.1 Pedagogical models and guidance

The socio-pedagogical structure or model, the structure, goals and methods of a study unit as well as the socio-structural models are usually described and introduced by using various online materials and tools. The purpose of online instructions is to enable quick grasp of the structure of studying so that a student can subsequently assess his own needs, goals and time management. If the tools, pedagogical models (Lehtonen, Thorsteinsson, Page & Ruokamo 2005; Page, Lehtonen, & Thorsteinsson [to appear]) and instructions are not clear enough (improper orientations, Lehtonen, Thorsteinsson, Page & Ruokamo 2005; Page, Lehtonen, & Thorsteinsson [to appear], the student may try to find the fault in himself which may be said to be emotionally very harmful.

The significance of the general orientation period lies in the creation of a common ground (grounding process) (c.p. Galperin 1989). This is the time when rules, roles, shared goals, meanings, operational principles and fundamental knowledge that are required of everybody will be created and clarified and the necessary tools provided (Mercer 2000/2003). A well enough presented shared basis of online orientation functions also as a cognitive and mental framework between people and technologically-based equipment. The creation of a shared basis particularly decreases mental load, situational anxiety and contributes to the necessary feeling of security. Furthermore, modelling can be utilised to clarify a student's position so that selective attention and study processes will proceed optimally. Such models provide the student with a script and a pattern of thought about what, how and when he should act (Lehtonen, Hyvönen, & Ruokamo 2005).

4.3.2 Technological solutions - adaptability, suitability and usability

Situational anxiety and mental load can also be caused by the technological solutions for activity and interaction. Related factors are students' ability and inability to use information and communication technology and, for example, difficulties in using VLEs or mobile network based applications or for example moving inside the VLE or handling the simulation contents. The technology must be suitable and usable for a pedagogical context (Mattus 2004; Tella et al. 2004). Especially the *intuitive usability*, how intuitively the user may guess and find the way to act in certain situations as well as learnability, how easy it is to learn the system functionalities are very important viewpoints to consider. In some cases the user may adapt the system to suit properly for certain

usage situations. Furthermore, automatic adaptation may help users when implemented in ways, which do not confuse or surprise the users too much and when the active adaptation functionalities takes place. Consequently, the key issue is the ability to tolerate mental loading – how far will a student be able to progress in a cognitively and emotionally taxing environment and to what extent does the actual studying of the content suffer from such an environment? An environment or a tool should not be a hindrance but rather an instrument for thinking and problem solving (Fjortoft & Sageie 2000).

4.3.3 Reliability of equipment

Unreliability of the equipment in technological teaching, studying and learning environments, i.e., computers, networks, operating systems and software, e.g. VLE or mobile network software, causes fear of failure and anxiety. Technological problems can be overcome by improving the intuitive usability and especially reliability of equipment under different conditions of use, providing clear support systems for solving experienced problems and improving the usability of diverse equipment and their suitability for teaching and studying practice. In addition, despite of the fact,, that online communication solutions of such as internet protocol (IP) multimedia communications, are valuable options because of their features that convey emotional factors more comprehensibly (Lehtonen, Hyvönen, & Ruokamo 2005). But unfortunately on the same time the multimedia communications are still quite susceptible to different problems.

5. CONCLUSION

In network-based teaching and studying there is slow tendency to shift to contemplate situations connected to technology mediated networked interaction and the current conceptions of the tools used therein, to more ecological views taking into a account the emotional and social and even cultural views of group dynamics and technology usage. This is understandable, as the technological and cognitive points of departure emphasised in the early experimentations with network-based teaching and learning are proving from the perspective of high-quality, functioning network-based teaching research, design and implementation to be an inadequate point of departure.

We may see for example emotionality to be very important to take into account from this more ecological or holistic perspective. That is particularly important because just emotions represent us an individual-level system that provides us valuable information about the state of our own bodies and the relationship of our bodies and ourselves with ongoing activity, such as studying inside VLEs or with different types of mobile network based learning environments. We always assess, in all activity, our knowledge, training and all our acts also emotionally, even though we do not always notice it.

We have raised in this paper some important starting points for the discussion to take emotional aspect in consideration in research and in design based research of the area. We have also presented some of the emotional concepts like situational anxiety and pleasure and mental load for the design and assessment of VLE and mobile network based education, which at least should be taken into an account when developing, and researching network based education. Through the careful considerations of emotional aspect we may argue also that the VLE and mobile nwtwork based environments may benefit us in many ways from the study related emotional viewpoints and also that we need to take into a account also the emotional aspects of teaching, studying and learning to get the add-value we are expecting from those solutions.

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