Climate Dimensions in E-Learning[*]

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Abstract − In designing organization and environment, climate is a conventional conception. By an observation of Halpin, climate means the same for organizations as personality for individuals.

This paper introduces the concept of cyber climate and some climate dimensions in e-learning. We deal with some new cyber climate dimensions that should be observed during designing e-learning materials, and provides some other important climate dimensions that should be taken into account while designing digital learning environments.

Keywords: e-learning, cyber climate, climate dimensions, ergonomics, alternative accessibility, personalization, user interfaces

I. INTRODUCTION

When designing organizations or environments, the concept of climate should be kept in mind. School climate is a part of an organizational climate with special aspects, and has been a subject of interest for a long time. As noted by Arter, school climate instruments usually examine either the overall conditions at a school or the climate of a particular classroom, see, e.g., [1]. Efforts have been under way to clarify the specific connections between school climate and student achievement from pedagogical and psychological points of view, as well (see, e.g., [1], [2], [3], [4], [5], [6], [7]).

Alderman and Taylor [2] state that classroom climate is a perceived quality of the setting that emerges in a somewhat fluid state from the complex transaction of many immediate environmental factors (e.g., physical, material, organizational, operational, and social variables). By Homana *et al.*, a "sunny" school climate is positive and has high levels of trust, clear visibility of the direction taken, and possibility for steady progress; a "partly sunny" climate has patches of difficulty to be overcome, but generally a sunny outlook; in a "cold but clear" climate there may be agreement on what is needed but lack of trust and difficulty in moving ahead ([5]).

Halpin's considerable observation is that *climate* is the same for an organization as *personality* for an individual [4].

Nowadays e-learning gets a more and more important role in education. There are many people and organizations who design various types of e-learning coursewares in many fields of study.

Designers of e-learning courses lay stress on making coursewares compatible, embedding more and more functionalities into them, so developers have many concepts and tools on, e.g., how to organize a curriculum into small distinct parts or build correspondences of tiny learning objects into a system, and how to help learners in study or how to make evaluations. Researches in this field focus on the efficiency of *functions*, *interactions* and *organizations* of curricula (see [8], [9], [10]).

It means that an operational "individual" is built up and its "personality" is eliminated.

Initiatives can also be found in this field, but these concentrate on disabled people (see Section II.B).

FIGURE 1: Outdoor classroom at Atkinson Elementary PTA

The aim of this paper is to examine other possibilities and needs which are essential in creating an agreeable climate for e-learners during their study. After a brief review on climate researches some new climate dimensions are introduced.

II. CLASSROOM CLIMATE OR CYBER CLIMATE

Climate is an influence formed from many parts, an environmental factor that has an effect on individuals living in the organization, but it is true the other way round, i.e., that individuals form and change the climate, too [11].

Mentioning school climate in relation to on-line systems is unusual. However, e-learning environments (i.e., frames and curricula) produce a special micro-climate – can be called *cyber climate* – around the learners during study that can help or impede learners in the process of their study. Producing an agreeable climate and environment is a legitimate requirement concerning e-learning courses.

A. Climate in some investigations

In the centre of researches on classroom climate there are various considerations, and the climate dimensions determined by them are wide-ranging. Here, we mention those researches on climate dimensions that may have an important role during developing e-learning materials and are needed to develop cognitive ways of learning.

a) Focus on learners

The primary aim is to put forth the personality of students. For example, De Charms centres on the autonomic personality, among the climate dimensions he applied [12] the following climate dimensions are useful from our point of view:
- leading learners to determine their own goals
- acting based on own decisions

b) Focus on objectives

There are surveys that focus on the objectives of study. For example, according to Steele, House and Kerrins [13] a good climate makes it easier to reach the objectives of learning. The evolution of the following qualities is required in a good climate:
- efficiency of memory
- interpretation
- analysis and synthesis
- estimation
- transfer
- application
- verification

c) Focus on teachers

These surveys esteem teachers as operatives. In our case, it makes sense concerning the additional help for students in on-line systems, checking the answers for exercises and helping students by the teachers. From our special point of view, the following climate dimensions are important:
- support [14]
- acceptance of conceptions of the learners [15]

d) Complex methods

There are studies which regard various considerations. These surveys consider substantial, for example, organizational mechanisms, as well as relationships of students inside and outside school. Some of these models deal with climate dimensions which are important for us.

For example, in Moos's model [16], there are some characteristics beside the student's and teacher's features that can be adapted to on-line systems, such as:

- the architectonical features of the school building
- physical environment

The latter climate dimension appears, e.g., in a research by Alderman and Taylor ([2]), too.

B. Accessibility as a climate dimension

Accessibility is a well-known concept in web design: it is an important characteristic of technology that enables people with different kinds of disabilities such as visual, hearing, motor, or cognitive impairment to use the technology, for example, e-learning coursewares. It helps people in case they have old or slow hardware and software.

Accessibility initiatives can be found in [17], [18], or at [19] well-usable principles and advice are written, e.g., in [20] or [21].

Initiatives of accessibility focus on people with permanent impairment: the design principles are for helping disabled people (such as [17] or [22]), for general visual design (e.g., [23]), and for usability (e.g., [24]).

Accessibility can also be seen as an important climate dimension with several climate components, because it is a necessary condition of an agreeable environment.

E-learning systems should apply the techniques to make the systems usable and convenient.

There are several techniques that help disabled people in using softwares, here we mention some of them.

a) Visual impairments

People with poor vision must have possibility – among others – to enlarge letters. Pictures, icons and all of the colours on a page should be fitted to the needs of people with colour blindness. Pages should be made readable by a special screen reading softwares for blind people.

b) Hearing disabilities

Systems should not imply that the user hears the auditory notices. Sound information should be associated with written information. Frequency of sounds is to be set by the user.

c) Motor impairments

For those people who cannot use mouse, joystick, or head tracking system, keyboard access should be provided to all features of the program. Predefined hotkeys and other key combinations should be simple. Linked icons and texts should be selected easily.

III. ADAPTATION OF CLIMATE DIMENSIONS TO E-LEARNING MATERIALS

As the *classroom climate* is seen as a major factor in classroom behaviour and learning ([2]), the *cyber climate* formed by an e-learning system can be seen as a major factor which determines the approach to self-study. Understanding how to establish and maintain a positive cyber climate is considered as the basic part of improving efficiency of learning, we can show significant relationships between cyber climate and matter such us learning methods, self-efficacy, time saving, convenience, etc.

This section provides an overview of our interpretation of climate dimensions in on-line learning environments, including the key characteristics. We focus on those aspects of cyber climate that can have beneficial effect on the efficiency of study and decrease the barriers of learning.

We suggest the following climate dimensions that should be taken into account when designing e-learning systems. They help to form an attractive and convenient physical environment, hence an agreeable cyber climate for students during study [25].

A. Aesthetic surroundings

An important condition for efficient learning is an agreeable and personalized surrounding APAS where the learner feels good. Essential is the appearance of the room (see Fig. 2 and 3), the book or the web page that he or she reads. Designs of e-learning systems must be acclimatized to the growing awareness of

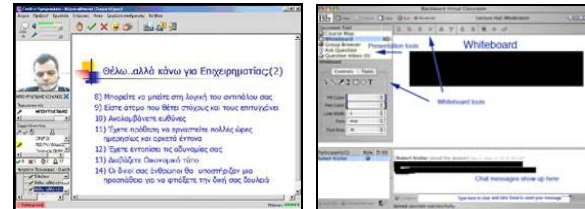Figure 2. The building is given, but we have many possibilities for decorating it

Figure 3. Typical appearances of virtual classrooms. Do we have any possibilities for decorating them?

aesthetics in every day life, from products to personal appearances, to the tastes and changes of mood of learners. For example, people who are of a feminine or masculine type decorate their houses in different styles, they prefer different environment styles when they are learning. In addition, tastes of people with feminine as well as masculine character, differ, their flats are decorated in styles from, e.g., a pink "Barbie" through a sunny yellow Mediterranean to an elegant art deco; the owners of these flats do not necessarily prefer similar styles in screen layout.

The consequence of these facts is that almost everyone prefers different layout styles for digital documents. Beyond that, people's mood and taste change from time to time, so other colours, forms and arrangements are required for the surrounding objects. (Enough to think of how many times people repaint, redecorate and rearrange their houses or web pages.)

These notions tell the e-learning system designers that the number of layouts to be designed is infinite, which, of course, cannot be managed, therefore other ways should be used for fitting layouts to the learner's tastes, helping them create an APAS with an agreeable cyber climate necessary for effective study.

A possible way to solve this problem is to give a possibility to learners to match layouts to their own actual needs in an easy way, without any knowledge about or skill in style sheet programming. We suggest the following techniques for consideration:

1) Colours should be chosen from a free colour palette, because available skins are not quite acceptable for many people. A preview can help the users choose the appropriate colour combinations.
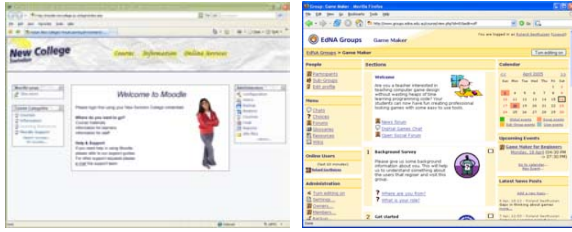
FIGURE 4. Different colors, different feelings. LCMS's have some built-in skins

2) Forms of the designs should be more variable, people must have a possibility to choose or create various layouts fitting their own tastes:

   a. Various designs from cold, clear and rectangular to warm, smooth and roundish – as basic frames – should be offered.
   b. People need a possibility to apply or cancel decorations according to their preferences (e.g. pictures of a motorcycle or a bouquet of lily) onto the main or subwindows. Giving this possibility to learners is in accord with the opinion of Tognazzini (see [20]): "Adults, too, feel most comfortable in an environment that is neither confining nor infinite, an environment explorable, but not hazardous."

The settings of colours and forms should be combined in and saved from a WYSIWYG editor.

B. Alternative accessibility

As we mentioned above, accessibility helps disabled people to use e-systems.

An *alternative accessibility* could help people with temporary limitations, because people with temporary limitations need different supports from those with permanent impairments.

The concept of *alternative accessibility* helps everyone who has no visual limitation, may use eye-glasses or lens but left them at home; who has no mobility impairment in general but broke his shoulder or feel dizzy; who has no hearing limitation but one day he or she feels sick with a headache. There is no doubt about that everybody knows well at least one of the types of problems mentioned above.

When such a problem occurs people with temporary limitations need partially similar but not exactly the same supports as disabled people.

For example, if somebody has forgotten his eye-glasses at home and wants to use the well-known websites but cannot identify the tiny icons, buttons or menu items.

The situations are similar when people have temporary motor limitations because of a broken or arthritic finger, wrist, elbow, shoulder.

Voices can make life more difficult when one cannot stand loud voices. Think of the case when somebody is listening to a music on a computer in a low pitch module and suddenly an error or warning message panel comes up (often sound like that can be configured only by the system administrator of the computer).

In these cases people do not want to use the web pages made for disabled people because these pages have completely different structures and hard to find the functions they are looking for.

On Fig. 5 the home pages of a Hungarian town (Pilisvörösvár) can be seen. On the left-hand side, the main page of the town can be seen, on the other web page the same functions and menus can be found, which are made for people with visual impairments. The difference between the appearances of the two versions for the same home page is significant. Fig. 6 shows a very similar situation by presenting the web pages of a Hungarian digital library. Someone who knows and often uses the standard version of the home page cannot use in an easy way those the web pages which are made for people with visual impairments.

The supplementary assistance of alternative accessibility could help them.

For example, the following techniques could be used:

▪ There should be possibilities for icon, button and menu item zooming.
▪ A sound on/off button with a scope just for the program in question is needed.
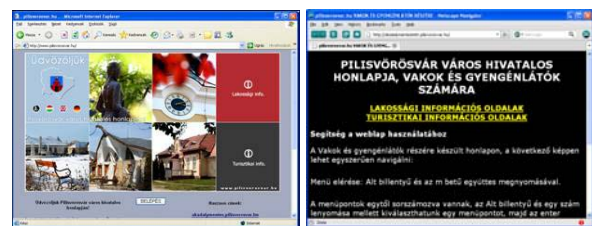

FIGURE 5. Home pages of a town (www.pilisvorosvar.hu)

FIGURE 6. Home pages of the Hungarian electronic library for OSZK (http://mek.oszk.hu)

IV. CONCLUSIONS

E-learning systems play a more and more important role in our daily life, hence these systems must be fitted to people's life, their needs and tastes. After reviewing the most relevant methods of the concept of classroom climate and highlighting those climate dimensions which are important from an e-learning designer's point of view, some new climate dimensions are introduced.

These climate dimensions help the designer develop e-learning systems that are able to effectuate an agreeable cyber climate around learners, so they must be kept in mind while designing human-centered learning systems and might be adapted to other computer programs.

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