

Enriching the Distributed Education Experience in the Framework of Web 2.0 using Usability 2.0

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Abstract:

More and more voices have been raised in recent years for harnessing advanced Information Technologies (IT) in the service of learning processes of higher education in particular and the educational systems in general. The learning via such technologies occurs in different times, at different places, using varied media. The teachers, the learners and the study material do not have to be present at one place or at the same time in order for the learning to be carried out. Measuring the effectiveness of these technologies is nearly the single measure for evaluating the processes being used. However, learning is not only the outcomes resulting from it, but also a continuous process, that could be defined as a learning experience. Such a **Distributed Education (DE)** experience suffers from several known drawbacks; some resulting from the media in use, but some resulting from the unwise use of technology. **Human-Computer Interaction (HCI)** – that methodically deals with the ways to utilize these technologies and harness them for the users – can be of much help in better shaping these learning tools.

Web 2.0 is a buzzword nowadays with many Internet researchers. This term refers to a different type of thinking regarding the Internet that is supported by technological tools. Web 2.0 places much emphasis on the surfer as the producer of content and not only as the consumer of content. Another aspect, forming a basis for discussion of Web 2.0, is collaboration and social processes. A known learning theory, Constructivism (Reconstructed), shows that in the process of learning there are two major stages.

The first stage is the intrapersonal learning mode – the reconstruction of new knowledge inside the existing knowledge structures of the learner. The second stage is the interpersonal learning mode – the interaction between the learner and others (teacher, peers, and friends) that generates new

knowledge inside each learner itself and inside the overall group. It has been claimed that this method comes more into play in Web 2.0 since the two major principles that exist in Web 2.0 suit the basic methods of Constructivism. The principle of the surfer as the producer of content and not only as the consumer of content can be matched to the principle of personal learning, while the principle of crowd power and the sharing architecture can be matched to collaborative/peer/social learning (Idan, 2007).

The current research literature (Dede, 2005; Thompson, 2007; Downes, 2005) claims that the advance of technology has brought with it a new type of learner that is characterized by different attributes, and that the old learner is not similar to the new learner. Moreover, the experience of the new learner is inherently different from that of the old learner. Hence, the learner experience includes more than just the efficiency of carrying out the task and avoidance of mistakes, but also the furnishing of an experience that is fit for the new learner and the interactivity required in that domain – in our research – Distributed Education.

Goal

This research investigates how and in what manner HCI methods can be used in order to enrich the DE experience. The question this work tries to answer is – will the design of an e-learning environment in the framework of Web 2.0, via use of methodology and tools of Usability 2.0, enrich the DE experience itself. The hypothesis is that work in an interface constructed based on Usability 2.0 will bear fruit in two meanings. The first, and most important from the viewpoint of this research, is the enrichment of the educational experience, in the following parameters:

1. Increase of the internal motivation relative to the external motivation
2. Perceived feeling of control of the learning process
3. Creation of as many flow states as possible

The second meaning relates to the learning outcomes:

1. Improving the perception of self-assessment
2. Improving the perception of self-adaptation

Because of the capabilities and characteristics of the new learner there was increased questioning regarding what influence the interface designed using Usability 2.0 will have on the learning experience. In parallel, an investigation was carried out regarding the perceptions of the old learner.

Method

Research that measures the dimension of experience and the possibility if its enrichment, inherently exhibits objective hardships: How can we understand such a personal experience? How can we know what is the unique personal change that each participant in the experiment goes through? What tools can be used to measure if a change has taken place? In what direction has it taken place?

In responding to these problems we make use of measurement tools that collect the perceptions and feelings expressed by the participants themselves. For that purpose, closed questionnaires to measure the parameters of the experience were used. The students were instructed to mark (using a 5 Likert-scale) the level of their consent and the fit between their opinion and the statement.

To complete the understanding of the processes, quantitative methods were used: the participants were instructed to write down their personal comments regarding the process they are experiencing. In parallel, informal discussions were carried out between the researcher and the participants in order to absorb the aura of learning during the process, with oral quotations being recorded throughout the learning process. Moreover, several observations were taken on the learners' activities both within the learning systems and physically with the learners themselves, with personal impressions noted. At the end of the learning process several short interviews were conducted with the students.

The Research Population

The population to be investigated by the research is learners in a DE environment. To set the research sample a selection was made of sixty students in technological professions (computers domain) from different colleges in the northern region in Israel that were studying various courses in the 2008/9 academic year. The assumption basis was that this population is normative and represents a general learners' population, having no unique characteristics, since it is dispersed between several colleges, and is from different age ranges, settlement types, and nationalities. This population was assembled from separate learning groups but all these groups studied under the same instructor – the researcher of this work.

The Research Procedure

Because of the need to only investigate the influence that an interface designed with Usability 2.0 has on the learning experience, not to check the influence of Web 2.0 itself on the learners, two learning environments, built for Web 2.0, were chosen, but they differed in their interface design. That is, the two groups, control and experiment, were both Web 2.0, but each group had an interface on a different usability (1.0 and 2.0).

Use was made of Web 2.0 capabilities to empower the students by involving them in production of content, sharing their knowledge with others, and enabling peer learning (Boud et al., 2001) or collaborative learning for a specific task.

All the courses were carried out using the DE model of blended learning – e-learning mixed with frontal learning. As part of the class recitation, each learner experienced the two different facets of exercise submission (all exercises required a textual submission):

- 1. Own writing and publicizing of learning content** – individual writing of the solution to the exercise and its publicizing. A personal blog-like page was setup for each student that produced content and publicized to all other learners. This stage was used for intrapersonal reconstructed learning.
- 2. Shared generation of learning content via interaction between learners and teacher** – shared writing of the solution to the exercise by groups in the course and its publicizing.

Personal pages for shared work were opened, in a wiki-like environment. That was how the written page was shared between all learners and the teacher, leading to interaction that produced the final learning content. This stage was used for interpersonal reconstructed learning.

The research made use of two working e-learning environments that were based on Web 2.0 principles:

1. **Usability 1.0 Interface** – an interface in which shared learning was carried out in a classic Wiki, resembling a Web site, enabling weak interaction between the learners.
2. **Usability 2.0 Interface** – an interface in which the shared learning was carried out in a Web site, resembling a desktop application, enabling strong interaction between the learners and a richer user experience (Van Gorp, 2008; Melcher, 2007). The Hebrew version of Google Docs was chosen for this research. The Web 2.0 parameters that characterized this interface were:
 - a. **Continued saving** – use of AJAX technology to continually save the contents, with no loss, generating a feeling of flow during the work.
 - b. **Intuitive editing** – design of specific, simple to understand, editing options with support for both the keyboard and mouse.
 - c. **Compatibility with existing applications** – design of a consistent interface that is similar to desktop applications, while enabling easy transfer of content in common formats to the application and back.
 - d. **Presence and sharing** support for making each learner aware of all others also working on the document at the same time, and enabling concurrent shared writing.

Research Tools

As aforementioned, because of the complex nature of this research, quantitative research tools as well as qualitative ones were used. In the research, use was made of closed questionnaires (thinking style, new learner), semi-open questionnaires (self-adaption, self-assessment, internal motivation, perceived feeling of control, flow states), interviews and observations. These questionnaires were translated from their original language into Hebrew for this research.

Research Outcomes

1. Confirmation in a significant manner of the hypotheses that interface design using Usability 2.0 methods enriches the DE experience of all learners in the measures of many flow states and perception of better control.
2. Confirmation in a significant manner of the hypothesis that the new learner would be more influenced from a Usability 2.0 interface relating to the learning outcomes considering perception of self-adaptation.
3. Tendency to confirm the hypothesis that a Usability 2.0 interface enriches the learning experience in measure of change in internal motivation, and more so in the new learner group.
4. No confirmation of the hypothesis that a Usability 2.0 interface would cause a better self-assessment.

Conclusions

1. It is possible to enrich the DE learning experience via design of the interface.
2. An interface wrongly designed can cause a decline in the perception of self-adaptation.
3. Experiencing the Usability 2.0 interface enriches the DE learning experience, especially for the new learner.
4. Empowering the learner in Web 2.0 is beneficial for the new learner but causes hardship for the old learner.



5. The Usability 2.0 designed interface enables the new learner to experience an innovative flow experience.
6. It is better to use existing computerized tools designed with Usability 2.0 for use of the new learner.

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1178675