

USING INTERACTIVE TECHNOLOGIES FOR SOCIAL LEARNING

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ABSTRACT

Purpose: To propose a Web 2.0 approach to e-learning, taking advantage of interactive media and peer pressure to attract visitors' attention to issues they haven't considered previously and to push them into developing answers from their own experience.

Methodology: A stepwise approach is taken. State-of-the-art research from social psychology, contemporary media and e-learning is being projected onto a novel approach that takes advantage of a combination of established socio-psychological trends. As a proof of concept, a small educational platform is being developed. Finally currently gathered feedback and opportunities for further development are being considered.

Findings: Feedback indicates that the intended messages do reach the targeted audience.

Value: The paper provides indications that Web 2.0 techniques are enablers for both more efficient and effective education through awareness.

Keywords: social networking, game design, open source, garbage separation, web 2.0, e-learning, persuasive games, user-generated content

INTRODUCTION

With the turn of the millennium new unprecedented in scale changes emerge in social behavior. In the new information era the strict roles in mass media have disappeared. There aren't limitations on information sources anymore and people have become content providers. Young people choose not to have access to television, radio or newspapers, isolating themselves from socially important topics. Thus, new communication channels are needed to reach the evolving audiences. These new channels need to fit the new paradigm of consumers pulling the information they need, instead the classical paradigm of information agencies pushing information they collect. As part of this,

information media faces a new challenge – to advertise and promote its content, so people could choose it (Mackay & O'Sullivan, 1999). It also needs to be able to deliver over channels that are closest to information consumers, e.g. mobile devices or web browsers.

These evolutionary processes have started to attract educators' attention, raising the question of how new communication technologies can be used in scholarly and educational work (Ball, 2004), (Grosbeck, 2009). Although the nature of texts on interactive media and Web 2.0 is still rather open-ended, it shows an appreciation of the higher attractiveness of online media, compared to traditional approaches.

Naturally the technologies in use, adapt along with changes in society. These change in technology occurs notably online. Although it is difficult to define Web 2.0, the term could be considered as part of the overall evolution of Internet. Regardless if it is being defined as a state or period, it comprises many technologies and behaviors that have changed the way users interact online. In a rather informal selection this paper considers three general aspects as important factors:

- Users generate content and semantics
- Dynamic content, focused on user experience
- Open standards that allow connectivity and reusability

The targeted integration of these three in an educational environment allows for a productive process of transfer of knowledge. Each of the three factors is considered in a section below. After that a proof of concept game is being designed and feedback collected.

USER CONTRIBUTION AND NETWORKING

One of the processes that constitute change in contemporary society is the shift in participant roles, expressed in interactive media. Most notably, consumers start to get more involved and add value (Slot, 2007). The role of social networking and user-generated content serves to make an e-service more livable and attractive. In the case of games, both enable a constantly developing gameplay at a low production cost. Moreover they are a way for direct and indirect communication between users, a fact recognized even through its widespread use in traditional media (Jenkins, 2006).

A core features of the ongoing change is the socialization of the machine-aided experiences. With the advance of new media and Web 2.0, Internet is now being recognized as a social environment with particular e-learning value (Weller, 2007).

A way to allow users to communicate is to allow them to customize their character, assets, levels, giving them the freedom to express their personality. The content users develop implicitly contains their intention and serves as a valuable form of feedback and communication between peer users.

GAMES AS SOCIAL MEDIA

Learning and exercising through a recreational process is something that people have been doing traditionally since the dawn of civilization. In fact even animals learn through play (Crawford, 1984). These observations come to show that play is a much more intuitive form of learning about our surrounding than reading or tutoring. The main advantage of play is that learners have the freedom to experiment and convince themselves of the correctness of the lessons learned (Ruskov&Nikolov, 2007).

Exactly in this context, casual games are a perfect match. They are already a popular form of recreational activity, used by an audience, much wider than what are considered hardcore gamers (Boyes, 2008). Browser games, as a form of casual games, are one of the communication channels with greatest potential. Because of their specifics, browser games are accessible even to people that do not consider themselves advanced computer users. People do not have to care about hardware compatibility, software installation or performance issues. Users just need to click on a hyperlink and start playing and with it they unleash the exchange of information.

In cases of group pressure people tend to fall into conformance, easily accepting group tendencies (Millon et al, 2003). That's why in an educational game, adding a multiplayer element with opportunities to observe the behavior of successful players allows knowledge transfer with a lower degree of recipient defiance. Such a design allows for learning through reflective observation and active experimentation.

Player contribution is an important aspect of the gameplay and game content. Encouraging it allows further richness of the game world. One way to achieve this is through direct marketing to potentially valuable contributors.

OPEN STANDARDS

The explosion of content generation and rapidly evolving technologies have raised the treat to make a huge amount of content obsolete and thus inaccessible to the wide public. As a result, significant effort is being put to provide backwards compatibility in new systems, but nevertheless using older content often results in higher threshold to access data and broken functionalities. As some of most effort consuming examples can be considered mainstream video games, where hardware and system software are being fully replaced in a period of less than 5 years. As games are highly complicated multimedia products that cost millions to produce, this is a serious issue. Moreover recent massive multiplayer trends lead not only to financial investments by producers, but also to emotional commitment by players.

In this context it becomes apparent that backward compatibility and universality in general are needed. In order to counteract, efforts could be made in the direction of hiding away technical issues from users. Web 2.0 tendencies, such as thin client applications provide a huge step in this direction by hiding compatibility issues from users and requiring from them to access only widely available software such as average web browser with some free and widespread plug-ins. Traditionally user data from legacy information systems is a valuable asset that has higher cost to

access and integrate. A way to make these easier to access is to choose standards for structuring data, e.g. through the adoption of a widely used content management system as a de facto standard for user and game content management tool. This ensures both basic infrastructure and community help in various issues, such as low threshold for contribution and data migration.

CASE TOPIC: GARBAGE SEPARATION IN BULGARIA

In Bulgaria garbage separation is a relatively new idea to ordinary people. Only in 2004 green (glass), yellow (metal and plastics), and blue (paper) containers have been introduced (Melteva, 2008). The fact that local subcontractors sometimes choose to use combined yellow containers for paper, and metal/plastics causes further frustration. People are also unfamiliar with the steps towards recycling after the initial container separation. Many do not realize the fact that the separation process continues further to very narrow subcategories in dedicated separation facilities. Just then some of these subcategories are being recycled or stored, depending on the technology at hand and economic value of resources. Exactly for these reasons, it is important that a specific kind of literacy is developed in the Bulgarian society to improve separation efficiency. This setting appears to be perfect for a target of an experiment with casual games as a communication channel. An indirect approach is taken, with a non-challenging game that is rather a mechanical repetitive exercise, and does not introduce a steep learning process.

An important factor in information transfer is the social context of the recipient (Yakhlef, 2007). Thus it is important to make sure that the social context of knowledge provider and recipient are as close as possible in order to ensure that messages are received in the intended way. One way to ensure this is to aim the communication at a specific community in order to be able to deliver information narrowly targeted towards the intended audience. A possible approach towards this is to take advantage of linguistic segregation.

There is a difference between containers in different countries. Not only are the garbage containers different in number, but also there is different meaning to the German "Verpackung" (package) or "Gelbe Sack" (yellow sack) and the Bulgarian "пластмаса и метал" (plastics and metal). Good example is the bottle cap. While the German definition would leave many people wondering whether they have to manually separate the remaining cap ring from the bottle body, the Bulgarian clearly denotes that it is not intended for the glass container. With the current development the idea of context focusing is being exploited by intended use of Bulgarian language that would result in visitors that speak Bulgarian and because of the coupling of language and nationality are familiar with the Bulgarian socioeconomic context.

It has been identified that intended messages have higher chances of being considered if they are non-binding and artificial (cartoonish, humorous). This way it is less probable that users get in an affected state and thus get an unwanted bias.

The goal is a miniature virtual world, aimed at a targeted group of irregular gamers that consider themselves activists. The gameplay gets richer not through the continuous play, but through user-generated artifacts. In this type of virtual worlds, players can choose to be also authors and designers. In the current research this has been approached with trashy theme, which lower

expectations on potential own contribution.

EXAMPLE UNDER DEVELOPMENT: KO64ETO

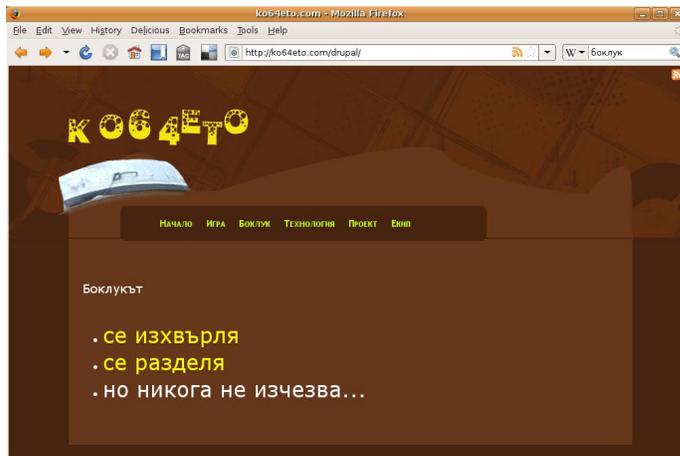


Figure 1: The initial page of the website intentionally focuses on the not so attractive problematic and not on the attractive media used

The platform under development is called Ko64eto - a chat jargon for the Bulgarian word “кошчето” pronounced “koshcheto” and meaning “the (garbage) can”. The game part is located at <http://razdeli.ko64eto.com>, which in Bulgarian reads "separate the garbage" a simplified simulation of the work at a separation facility. For pragmatic educational reasons in the currently existing level of the game the players separate the general container into the three colorful containers mentioned in the previous section. In the social part (<http://izhvarli.ko64eto.com>, "throw out the garbage") everyone could throw out a piece of garbage and

watch where others choose to separate it in the game for recycling.

Throwing out garbage is intended as both a form of challenge and expression for players. By giving them channeled opportunities to contribute to the gameplay development, users are given both easily accessible and artistically unlimited opportunity to generate content. They are given the options to describe their contributions visually, textually, semantically and even acoustically, in the initially planned version. In particular players can choose to provide the following data for their submissions:

- Image (picture, sketch, 3D model or any other non-textual description) – any form of visual representation of the intended content to be disposed.
- Contents – breakdown of the new contribution in terms of resources used. This is key to game mechanics, as it is the criteria for recyclability and thus the scoring of



Figure 2: The game is intentionally collaged, but also contains informative inline hints

the game.

- Description – textual description of the contribution. This could contain some jokingly message or a description in case the image does not show sufficient detail.
- Size – the diameter of the object, which is a simplified measure to compare how objects scale to each other. This is used both for amount of resources contained in the object, but also as a hint for the relative size of the object visualization.
- Contact e-mail – the contributor's e-mail address in case he/she is not registered and still wants to maintain contact with the site creators.

None of these fields is mandatory, allowing for submission of even only anonymous ideas. Furthermore although current regulatory framework in Bulgaria for recycling has been investigated, it has been decided that a simplified and non-binding resource taxonomy is adopted.

The game is being developed in Adobe Flex, allowing access by any Adobe Flash enabled browser. Drupal (Le et al, 2008) has been chosen as an open content management system, due to its relatively long development history and wide user base, resulting in several generations of implementation and a wide variety of modules. Finally to further involve the online community in the project, it has been released as open source on SourceForge, giving access to all its logic, designs, assets and formats. Thus the open source platform promotes modding.

Currently the project is still in development and only its proof-of-concept components have been released. This includes a one-level game and a content contribution module that is not fully automated.

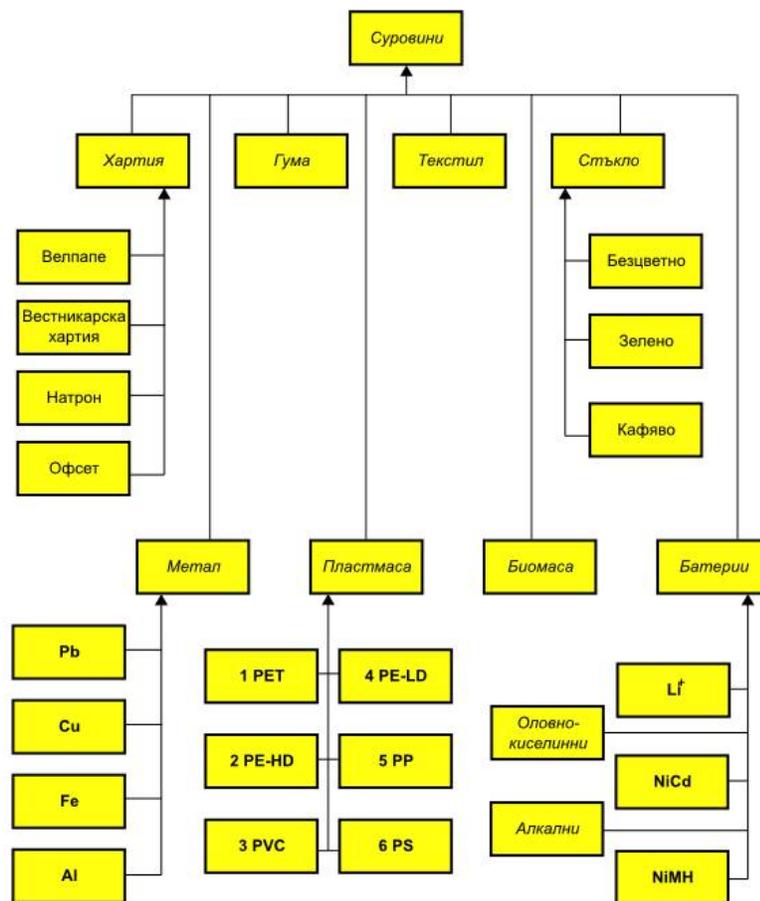


Figure 3: Within the project, an investigation has been conducted on the recycling regulatory frame, but for pragmatic reasons a simplified resource taxonomy has been adapted, focusing on the popular visual indications on products

FEEDBACK AND FURTHER WORK

The currently implemented features illustrate the idea, but no extensive user surveys have been conducted yet. However singular feedback has been collected. It indicates generally positive attitude among users. While mainly jokingly and humorously, users do bring up some of the implicit messages of the project, such as suggestions for adding further realism, making remarks on the trashy design and curiosity on separation issues they couldn't resolve. Also suggestions for improvements have been collected. The fact that users providing feedback bring up the topic of realism and deficiencies of the current design, reacting to the initial idea of cartoonishness and sloppyness, shows that they do make associations with real issues and possible solutions. Interesting discussions have been raised about the proper place of pieces of junk, such as fruits, tires and batteries. One limitation of the approach has been identified with this: people sometimes fail to come up with an idea where they should throw out an apple, ignoring the fact that in reality they will hardly think when they throw it in the general container with remaining waste. This container is included only implicitly in the gameplay as the place where unsorted pieces of junk go, but scored at the end of the level. The actual issue of rubber and toxic battery disposal has been identified and observed of being unsolved in Bulgaria.

Several directions for further development have already been identified and are being pursued. A basic requirement is to add garbage browsing. Another very important line of development is the opportunity to see game statistics that would allow site visitors to see where each particular piece of garbage tends to end up. This would allow users to both get to know game content and observe how others have handled particular pieces of garbage. It would also provide valuable feedback to contributors of garbage and would serve as an incentive for more user-generated content. An important continuation is to add further levels that allow the separation of each of the colorful containers into more precisely separated garbage types (e.g. colors of glass, types of plastics). Another further continuation of the gameplay could be done through the addition of an inter-player market for baled waste. Value of each bale would be calculated through a combination of the value of the recyclable material in it and the effort needed for its complete separation. Artificial market players will sell totally unsorted bales and will buy ones that are considered acceptable for direct recycling. Player registration (a prerequisite for the inclusion of a market) would also allow for a higher degree of authorship for contributors. Visitor surveys would provide important feedback for the playability of the game and for the efficiency of the intended player communication.

CONCLUSION

Changes in the way people live inevitably find reflection in technologies they use. In a race to catch up with these educators work towards conveying educational messages by adapting to people's lifestyle. Communication and media are radically changing, questioning existing definitions and defining new ones. New tools replace traditional ones and their sensible adoption is crucial for an effective and efficient transfer of knowledge.

The current paper proposes an approach that integrates three of the most essential aspects of Web 2.0: user-generated content and semantics, game-based user experience and adoption of open standards to allow connectivity and reusability. The theses, developed in the paper are put to an ongoing test via the development of a persuasive platform on garbage separation. The research is still open-ended, but there are already indications that messages are getting through to new groups of users and that players demonstrate interest to expand the educational value of the platform through an easy to use contribution process. In a summary, users are persuaded to get involved in the game in order to increase their awareness of the issues under consideration.

Although there are no undoubted proofs, this research shows that utilizing the tools provided by the ongoing information revolution provides, allows overcoming the perceived solitariness of e-learning, raising attractiveness and immersion and last, but not least make a step towards content coherency of e-learning.

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