Progress of web tools from Web 2.0 to 4.0 and their implementation into the educational process

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Abstract: *Web has become and endless and ubiquitous component in all educational systems from the moment when it changed the theory of learning and enabled its users to create everything, including educational materials available for everyone, all around the planet. From the Web 1.0 that made all information available to the Web 4.0 that make the networked intelligence of the future, where an individual is just a part of the global mind, the goals remain the same - deeper integration of ICT into the process of education.*

Keywords: *web, information society, education, ICT*

1. INTRODUCTION

1.1. Motivation

Several strategic legal documents have been passed in Republic of Serbia within the last several years that aim to implement the ICT into the process of education. All those documents clearly emphasize tools on the web and their potential uses within the teaching process. The documents that were concerned with the improvement of the use of information-communication technologies in education gave some more specific recommendations. To integrate web 2.0 technologies in implementation of teaching activities, since for every subject in primary and secondary education there are numerous web 2.0 applications readily available online [1].

Application of web tools in teaching, and the education in general can be regarded to be the present, and not the future. Every form of technology brings some pros and cons. Therefore, the central idea of this article is to give us a better view on the development of web tools and their characteristics. Our goal is to introduce both aspects of the application of web tools trough the periods of their development.

Since our country is still in the early stage of using the web tools in education the idea of this paper is to encourage teachers to adequately apply web tools for preparing their didactic material.

Using web tools solely for their own sake should not be the goal. Introducing new technologies is justified only when there is a clear reason for that and when the teacher is sure that applying such tools gives a positive learning outcome. As the web developed over

time, the number of tools that are available to the teachers increased. Nowadays there is a plethora of tools that are available, and the teacher can certainly find adequate tools that would improve the development process and the didactic materials, and, therefore, better motivate his students. Better motivation must result in better achievement, which is a goal of the teaching process. The winning combination is when innovative technology is successfully applied to the adequate teaching materials. The teacher must be a good designer of didactic material in order to be able to apply web tools adequately

2. THE INFLUENCE OF THE INTERNET TO EDUCATION

All actors in the educational systems know that the integration of ICT into every aspects of the education process i necessary to obtain more effective and efficient education [2]. Internet, combined with web tools that are free and available to anyone also has a positive impact on the education process. Currently, you could freely access various courses of mathematics, physics, biology etc. that have been created anywhere in the world, and you could use them in your classroom, discuss them in various forums on various topics. Teachers can use web tools to create educational content, track their progress, and test their pupils online. Pupils can use web tools to prepare for tests, to systematize what they have learned and to find new informations. The collaborative dimension of the internet and web-tools should also be considered and it can have positive results for many pupils.

Applying web-tools in education need not be beneficial. It is crucial to offer pupils well-prepared content and to guide the pupils trough the learning process (guided learning). Pupils must be educated about the potential dangers of using the internet.

3. HISTORY AND DEVELOPMENT OF WEB

3.1. Web 1.0, freely available information

Initial creation of web started in 1991. It was primarily based on publishing the content of traditional printed media that was digitized.Key technologies that made the web 1.0 are the HTTP protocol, markup languages HTML and XML, first web browsers, software platforms and development environments for web applications, programming languages such as Java and Java Script, the art of making web sites, commercialization of the web and the development of web business models. From the todays perspective, the possibilities that web 1.0 offered were quite limited. Only very skilled persons could create the web content, mainly because of the complexity of the technology that the user needed to know to be able to create publicly available content.

If these difficulties were overcome, technology still offered only limited possibilities. When considering web 1.0 from the educational perspective, the only thing that the teacher could offer was the static content that contained only text and images. Dynamics and interactivity was able to achieve only by using the programming language JavaScript, but the question remains how many teachers were interested to devote their time and learn programming and a new programming language, especially if their subject was not close to informatics and programming.

We can't say that web 1.0 did not have any advantages. On the contrary. The fact that the pupils could access the information created anywhere in the world and learn from such sources was a revolutionary discovery, unthinkable before web 1.0.

3.2. Web 2.0, everyone is part of a single network

Web 2.0 is a set of web technologies that have a social character. Namely, this step in the history of web enabled ordinary users to engage in creating web content that was ont possible before web 2.0. Before the content could be created only by skilled professionals who had a good knowledge about the web technology of that time. With web 2.0 the user is not just a passive user, but it can it can participate in the communication user – computer and user – user, over the web. With web 2.0, the user is in the center as the creator of the content. The main characteristics of this stage of web are openness, freedom and collective intelligence. Important characteristics of web 2.0 tools are that they need not be installed before they could be used.

Web 2.0 tools are a set of social programming tools that enable users to independently create content, share it to other users on the internet and to be engaged in collaborative creation of the new content on the web.Collaboration is one of the basic characteristics that became possible due to web 2.0 tools. The key advantage of these tools is that there are many publicly available, free tools that that the teacher can include for creating didactic content and enrich his teaching in a creative, interesting manner, very close to the kids. The only precondition for teachers to use those tools is that they are educated and prepared for their use. Since the tools are intended for mass use, it is not complicated to learn how to use them and a number of teachers learned how to use them by themselves and started using them in the classroom.

There is a number of tools that that users can use. Although they have identical or similar characteristics, we classified them based on how teachers can used them in education. The first group was named web 2.0 tools for content representation, the other was named web 2.0 tools for systematization and practice, and the third was named web 2.0 tools for interactive knowledge sharing. Note that these groups can overlap and some tools belong to several categories.

Table 1. *Classification of web 2.0 tools odela Veb-a 2.0 tools*

web 2.0 tools for content representation	*web 2.0 tools for systematization and practice*	*web 2.0 tools for interactive knowledge sharing*
• presentations (*Prezi*) • interactive online books (*FlipSnack*, *StoryBird*) • online games • creating movies and animations (*Animoto*) • creating interactive posters (*GlogsterEdu*) • generating words (*Wordle*, *Tagxedo*)	• cognitive maps (mind maps) (*Bubble*.us, *Mindomo*) • dynamic poster boards (*Lino it*) • quizies (*QuizeRevolution*, *Quizlet*, *Brane Games ProProfs*)	• Social networks (*Edmodo*, *Facebook*, *Twitter*, *Pinterest*...) • tools for avatar creation (subcategory – speaking avatars) (*Voki*)

Social networking is the most fundamental principle of web 2.0 philosophy. A great advantage of this philosophy is that the user centric perspective, since the user is the content creator. The user can create his forum, blog, web portal, web encyclopedia. Another advantage of this philosophy is that users can safely access information. Also, an advantage is that pupils can collaborate on different interactive content. Interactivity is a very important characteristics which helps pupils to learn.
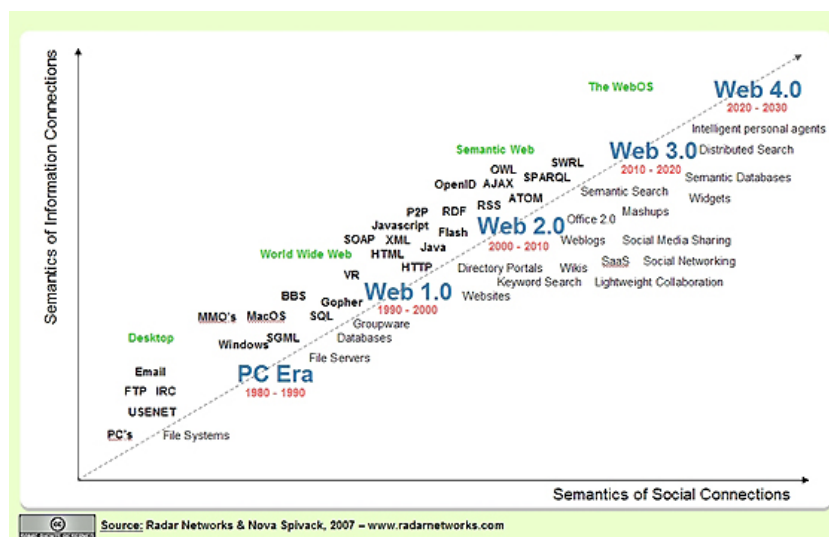
Slika 1: *Razvoj Veb-a[3]*

3.3. Web 3.0, networked knowledge

While the implementation of web 2.0 tools in educational systems is still in progress, it clear that the next step in web development is even higher integration of the content, great openness of the internet and work of intelligent systems that user will use without the need to understand how their work.The whole web should be completely transformed from a collection of separate applications into a unified framework. Several directions for such development can already be recognized.

Speed of connection

Accessing the internet over mobile devices has been expanding and all statistics show that a third of all online access is over smart phones, due to a great expansion of 4G network use.On the other hand a wide range network, fast internet access with prices affordable for all people (regardless of their income or location) is a so called digital inclusion, that is a necessary step in the development of the digital society. Therefore, networking and infrastructure will still be the primary condition for the web development. The future providers will probably be working on the regional and not only on the local level.

Still in the cloud

Great change in web 2.0 tools has been brought by the cloud computing, enabling users to access all the necessary data, applications and services trough the web browser without limitations imposed by the hardware and the software of their computers. Further development of this concept would include forming the whole "cloud fields" that carry global or regional systems, where software is developed as complex business packages for supplying for the complete needs of a user. The needs cannot be estimated since the structure of needed jobs and the necessary competences of individuals in the information society are changing almost on daily bases.

Free software

Using free software and the open technology movement is related to usage rights and that will probably be more regulated in the future. The need for knowledge sharing is

continuous and it is a common interest that the abuse is minimized, and the knowledge transfer is maximized. In the current state very respectful and relevant educational institutions use free software for education of their students and graduates. This trend is to further "legalize" the use of free software in all human activities, and it remains only to establish rules for its use.

Portable Identity (*OpenID*)

The need that all services and resources on the internet a user can access by a single user account yielded the concept of OpenIDidentity, where OpenIDis a provider that is a key figure in the communication between the services and the end users.It would be very beneficial if a user account could be transfered from a service to another service without a further authentification.

Intelligent Web

The semantic web will probably become the most challenging field in informatics in the years to come. The idea of the semantic web requires to tag every information that appears on the web and to connect connecting data from different categories only based on its description and meaning (semantics). The content that is only available, unless the user uses it in the right way, connecting the related content. Searching information by its format and its meaning becomes a fundamental goal and a present challenge. Databases that could support such selection of data will become the cornerstone of the semantic web technologies. By identifying the meaning of a term with its description given in a form of tags moves the focus from the linguistic to the information field, overcoming the liguistic barriers and unifying very different databases.

3.4. Web 4.0, a global mind

Web 4.0 is a term that is still "in the air" since no one can describe what would the next stage in the internet development bring, but there are some predictions that descrbe web 4.0 as a global operating system that offers complete business and economic models or platforms based on the latest digital technology. In every new revolution of the internet, the emphasis was on the accessibility and ease of use, but now we can say that "a cumulative aggregation of tools" brings control back to the system, and not to the user, that was brought by the web 2.0 tools. Personalization and giving a personal identity to so formed web services might be the field where web designers could go trough their creative revolution. We can say that the end user will slowly feel that everything is customized towards his personal tastes and needs. Is the user in such an atmosphere in a constant advantage is a question of the advance of technology and its influence on the development of the society, and that is a question that is considered by both sociologists and the IT experts.

4. CONCLUSION

The education, as all other activities, is impossible to consider without considering a current social context. The use of technology is a necessity in all areas of the moder society. The only question is to what extent and for what purpose. Respectful and relevant educational institutions adopt such trends in education and adapt the forms of teaching. The traditional forms of education are constantly enriched with the use of new web tools and the development of the online learning. This is the current reality, a process that has been started around twenty years ago and is still going on. The question that arises is whether the future development of the web will leave the user enough choices or will the global system

chose for him and trough its formed digital profile offer him what the system judges that is the most appropriate for him. Currently we can only have some vague ideas in which direction that development can proceed and we can only expect that the future work of experts on integrating the technology and education.

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