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# Web 3.0 and its Reflections on the Future of E-Learning

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**Abstract:** *There is a large number of diversity in Web 3.0 technologies accessible for incorporation in the educational environment, but recognize how to use these and can be fascinating to the instructor. Web 3.0 is also known as technologically advanced medium which enables the user to Read/Write/Execute and also enables the machines to carry out some of the thinking so that it can be accessible for the human beings. The acceptance of Web 3.0 technologies is quite easy and it contains more than the Internet and basic word processing techniques.*

*An analysis on Web 3.0 applications, which are easy to use, reasonable, and require minimum technology skills. Web 3.0 items that can be easily executed by learners or by the instructors include podcasting, weblogs, etc. Web 3.0, always uses the Internet as its transfer technique which can be an effective method of making a dynamic learning and teaching experience.*

**Keywords:** *Web 3.0 technologies, Semantic Web, e-Learning, educational environment.*

## I. INTRODUCTION

Web 3.0 and its effects on online-learning are still growing with a vision of "E-Learning 3.0" is still in the future. Instructors have opportunity to influence the developing Web 3.0 technologies with helping to define that vision. While using many of these latest technologies in the classroom may seem foreign to expert teachers, the youth arriving in universities today are familiar to creating, learning and communicating using technology. It is not just the younger generation who has accepted using these type of technologies on everyday basis. According to a survey, the average game player is 39 years old and 30% of the Americans over 60 play online games. According to Facebook's press, people spend over 700 billion minutes on Facebook in a month.

Web 3.0 technologies are the beginning of the Internet will be changed how we get and share information. There are different types of web, According the Wikipedia: "Web 1.0 is Read Only, static data with simple mark-up for reading. Web 2.0 is Read/Write dynamic data Via web service modify websites and manage items. Web 3.0 is mainly Read, Write or Execute."

In Web 2.0, user can not only read information from the Internet, but also offers data through internet to share with other users over internet. Now, there are many popular Web 2.0 communicating applications like Blog Podcast, Mashup, Tag, Wiki, P2P, etc. Opinions of different innovators on the development of Web 3.0 vary significantly. Most of the consider that evolving technologies such as Semantic Web will convert the way of the Web is utilized, and lead to new possibilities in AI based applications. Other thinkers propose that increase in Internet connection speeds, modular web applications, or advances in computer graphics will play the main role in the development of the new version of WWW.

## II. DEFINITION OF WEB 3.0

The phrase 'Web 3.0' was proposed by John Markoff and was first used in a blog post by Jeffrey Zeldman entitled "Critical of Web 2.0 and allied technologies such as Ajax" in early 2006. Different approaches to the future Web are supported by major IT specialists and scholars. Experts are unanimous in their predictions for how Web 3.0 will develop. The thoughts of pioneers in the field in this regard are discussed below. Tim Berners-Lee developed the phrase "Semantic Web" and pushes the idea of turning the Internet into a massive database. Tim Berner Lee had this to say about Web 3.0:

"A lot of people want to know what Web 3.0 is. I believe that with an overlay of scalable vector graphics atop Web 2.0 - everything rippling and folding and seeming misty - with access to a semantic Web interconnected across a large territory of data, you'll have access to an enormous data resource."

As mentioned below, founder of Netflix, Reed Hastings says that:

"Web 1.0 was dial-up, with an average bandwidth of 50K; Web 2.0 is an average of 1Mb; and Web 3.0 will be 10Mb of bandwidth all the time, which would be the complete video Web, and it will feel like Web 3.0."

The new era of tools and approaches for developing programs, data, content, and web applications, according to Yahoo founder Jerry Yang, will blur the lines between professional, semi-professional, and consumer. Yang stated at the TechNet Summit in November 2006:

"Web 2.0 has been thoroughly documented and discussed. The Internet's power has reached a tipping point, with features that can be implemented at the network level. Not only in hardware like gaming consoles and mobile devices, but also in software layer, we've seen richer gadgets and ways of engaging with the network during the last four years. To write a program, you don't need to become a computer scientist. Web 2.0 is a terrific example of this, and Web 3.0 would be a great expansion of it, a truly shared media... The line between professional, semi-professional, and consumer will become increasingly blurred, resulting in a network effect of business and applications. Finally, consider what Eric Schmidt, Google's CEO, said: "Web3.0 is a collection of interconnected applications." Artificial intelligence, which can intellectually learn and interpret semantics, is the basic software technology of Web3.0. As a result of the use of Web3.0 technologies, the Internet can become more customized, accurate, and intelligent."

It is one of the major IT industry expert's views on Web 3.0. Following that, we'll go through some of the characteristics of Web 3.0.

### III. CONCEPT OF WEB 3.0

The term 'Web 3.0' was early introduced by John Markoff of the New York Times in 2006 and first appeared significantly in early 2006 in an article in early 2006 in an article "Critical of Web 2.0 are related technologies such as Ajax" written by Jeffery Zeldman. Many IT experts and researchers follow different approaches to the future of Web. There is full agreement among the specialists about how Web 3.0 will grow. Web 3.0 and the Semantic Web as "the advancement in Web emanation. It's about having data, documents on the Web so that machines can execute, transform, accumulate, and even process on the data in suitable ways". Semantic is defined as "meaning"; the Semantic Web allows computers to recognize the significance of information as opposed to simply displaying information. A common example which help Semantic Web novice fully understand the capabilities of the Semantic Web is an evaluation between a today's Search engine and semantic search engine.

Today's search engines can be unsatisfying to users. Users hit keywords to search and then it should evaluate typically significant results and determine which results are appropriate.

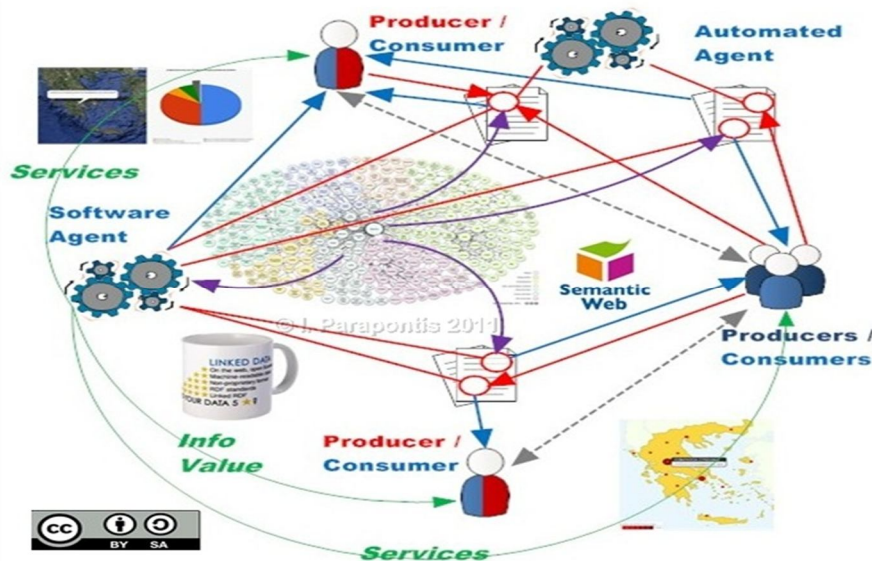


Figure 1 Concept of Web 3.0

### IV. CAPABILITIES OF WEB 3.0 TECHNOLOGIES

The web has evolved from the early days of the ENQUIRE project to the alteration of Web 3.0. Generally speaking, where the Web 1.0 joins real people to the WWW, the Web 2.0 joins real people who use the www, the Web 3.0 will join the virtual delegates of the real people who use the www. So, it is assumed that Web 1.0 is about giving information, Web 2.0 is about burden of information and the Web 3.0 is about control of information. As declared above, Web 1.0 is commonly referred to as the "read-only Web" creating content accessible online for showing.



Programmer of the web usually code what they want others to show and then upload it on the server. The user can visit on websites and can communicate to the programmer or publisher if contact information is given. There is no direct link or communication between the programmer and user. Like static websites and webpages created in HTML.

The term Web 2.0 is generally associated with the O'Reilly Media 2.0 conference, but was essentially used for the first time in initial of 1999. As disparate to the Web 1.0 which is known as the static web, Web 2.0 is referred as the dynamic web. The users can read, write and collaborate to a certain level. The latest technologies used on client end or server end in Web 2.0 are XML (Extensible mark-up language), Ajax (Asynchronous JavaScript), Adobe Flash, PHP, Python, etc. The technologies associated to the Web 3.0 though still in the beginning stage, are growing very rapidly. The Web 2.0 has given an improvement to the data being created by social network and there will be a need to empower the utilization of these data. An amazing value by the Forrester Research given that 97% of the users not ever look away from the top three search results when they are searching on the internet. The main function of the Web 3.0 technologies which discriminate it from its previous generation, Web 2.0 are given as follows:

- 1) *Semantic Web*: The term semantic web denotes to the Web3.0 vision of Web linked data allowing people to produce data and build terminologies. Simply put, semantic web is about explaining things in the form which is accepted by computers.
- 2) *Openness and Interoperability*: This refers to directly in relations to data formats, application programming interfaces, , protocol and compatibility between devices and platforms and global repository of data: This is the process of data which are accessed by different program across the whole web.
- 3) *3D Virtualization*: Comprehensive use of 3D modelling and 3D spaces by means of service such as another life and modified avatars linked to your devices. Distributed and Cloud Computing: The distribution of computing as a service rather a product.

Web 3.0 is also mentioned as the Semantic Web of Data, there will be enormous database created, so the necessity of the time is management of 'Big Data' and 'Linked data'. The Web 3.0 would make use of technologies such as SPARQL (Query Language for RDF), OWL (Ontology Web Language), RDF (Resource Description Framework) and SKOS (Simple Knowledge Organization System) these would help structured data such that programs like web spiders and web-crawlers can search, discover, collect and analyse data from the web.

## V. CHARACTERSTICS OF WEB 3.0

### A. Virtualization

Web 3.0 would be a web with higher speed of internet bandwidths and High end 3D Graphics, which can be used for virtualisation. The fashion for future web mentions to the creation of virtual 3D environments. An example of the most popular 3-D web application of Web 3.0 is another Life.

### B. Interoperability

In the perspective of Web 3.0, the term Interoperability, collaboration and reusability are basically interrelated. Interoperability involves use again, which is again a form of collaboration. Web 3.0 would provide a communicative medium for data and information transmission. When a user or a software program produces information on the Web and this information is used by another user, then the formation of new form of information or data takes place. Web 3.0 applications will be easy to modify & they can individually work on different kinds of devices. An application based on Web 3.0 will be capable to run on different types of Systems, Hand-held devices, Microwave devices, TVs, Mobiles, Automobiles and so on. Pervasive Web is the term used to explain this phenomenon where web is operable to a wide range of electronic devices.

### C. Intelligence

Professionals consider that one of the most promising features of Web 3.0 will be web with intelligence, that is an intelligent web. Applications would work perceptively with the usage of Human-Computer collaboration intelligence. Different Artificial Intelligence based tools and techniques like neural networks, rough sets, fuzzy sets, machine learning and so on will be integrated with the applications to work perceptively.

That is, an application based on Web 3.0 can mainly do intelligent analysis, and then optimum output will be possible, even without much interference of the user. Documents in other languages can be intelligently converted into any languages in Web 3.0 era. Web 3.0 should allow us to work through native language. Thus, users can use their native language for communication with the others over the world.

#### D. Personalization

Another specification of Web 3.0 era is Personalisation. Personal or individual preferences will be measured during different activities like search, data processing, creation of personalized portal on the web. Semantic Web will be the core technology for Personalisation in Web 3.0.

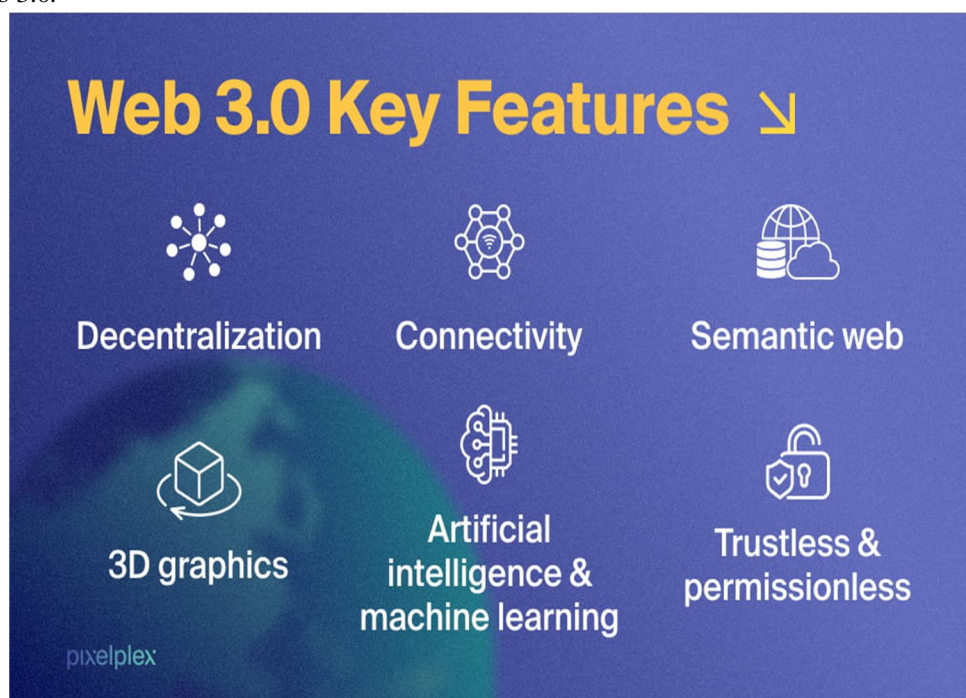


Figure 2 Key Feature of Web 3.0

## VI. TOOLS AND SERVICES OF WEB 3.0 FOR EDUCATION & RESEARCH

The learning in Web 2.0 emphasizes the active involvement of internet users and collaboration with different social communities, with the help of social network tools or social software like social networking, social book marking, wiki and Blog. The tools & services of Web 3.0 technologies will foster a more open method to learning. Web 3.0 has been suggested as a possible future web consisting of the combination of efficient graphics (Scalable Vector Graphics or SVG) and Semantic data Graphics. There have been considerations around 3-D internet environments and immersive 3-D social networking systems this will involve the best use of virtual worlds and gaming environments and merge them with the Web.

We are in the initial stage of an advanced revolution in information management and sharing that will make more and more data available to any combination of human and computer processing, permitting new means of cooperation between and across disciplines.

Web 3.0 proposed many tools and services for many different kind of web applications on Internet, as shown in figure below.

#### A. Learning with 3D Virtual worlds & Avatars

A 3D virtual world is a combination of 3D augmented reality, gaming technology, simulated environment powered with Internet technology where users interact through portable avatars. Users create avatars on the Web and allow them to reside in the virtual worlds. The foundation of new era of E-learning can be seen in virtual worlds as they allow learners to do role-play, 3D modelling, creativity, simulations and their active participations. Recently several web based virtual worlds, such as IMVU, Active Worlds, and Red Light Centre, have increased interest for the students as well as the teachers for education & learning across the worldwide. Instructors may conduct classes in a variety of different settings within a 3D virtual world where they can communicate in real like in a class. Instructors & learners may cooperatively conduct sessions from geographically dispersed locations in a shared virtual 3D space. They can give access to Instructors & learners in presentations, seminars, digital exhibitions, conducting meetings where learners can visit and communicate like the same way we do in our real life. 3D virtual worlds available today and in coming future it will be very useful across a diverse range of disciplines including medicine, business, science, communication, education, media, art, architecture and design, law, computer science, language learning, history and geography to mention but a few.

### B. Intelligent Search Engines

In the past few years, learning procedures have advanced by using the technological development of the web. The expansion of the web has allowed the introduction of new educational processes, which are more resilient for accessing the resources for learning. These days Internet has become the utmost valuable and powerful source of information. In order to effectively deal with the enormous amount of information on the web, advanced web search engines have been established for retrieving significant and relevant information for its users.

When you use a now a days Web search engine, the engine is not capable to actually recognize your search. It searches for Web pages that contain the keywords found in your search terms. The search engine can't tell if the Web page is essentially relevant for your search. It can only search that keyword which appears on the Web page. A Web 3.0 era of Agents based-search engine could search not only the keywords in your search, but also understand the perspective of your request. It will give appropriate results and give suggestions for other content related to your viewed items.

Experts states that Web 3.0 will deliver users with better-off and more appropriate experiences. Experts also says that with use of Web 3.0 services, every user will have a unique internet profile based on that user's browsing history. With the help of this profile Web 3.0 will modify the browsing experience to each user. If two different users are searching on the internet with the same keywords to the same service, they will receive different results determined by their individual profiles. Students will also get advantage from knowledge structure powered by the Semantic Web.

A Semantic Web Agent based search engine will return a multimedia results rather than just a list of search queries. An expert agent can return books, relevant blogs, local lectures, and television programs related to the topic of the user. Ontologies will link the user's need and characteristics so that personalized agents can search for learning material based on the user's need.

Users can apply the same kind of search opportunities with other media objects such as image, audio, and video. Some examples of these kind of technology can be found on software like Ojos Riya photo sharing tool that allows to automatically tag images using face recognition, or Like.com which allow the users to search for products based on the similar images.

### C. Online 3-D Virtual Labs / Educational labs / Simulations or 3D Web

3D GUI (Graphical User Interface) will work like a powerful platform for the users to contribute and perform collaborative activities, sharing results and exchanging media information with the other user in a very natural way. Some examples of 3-D Virtual Labs/Educational Labs/Simulations or 3D Web based applications that will shape future education are as follows:

- 1) *To Explore Places those are not Reachable:* Visiting a variety of locations in virtual worlds will benefit tourists in a variety of ways. Ancient sites that students can digitally visit for a period of time. For example, to take a look at ancient places like Paris or Rome, Red fort, Students can interact with teachers, other students and can have their mentor as guide through the web 3.0. Likewise, they can view the different monuments or visit an Egyptian village in the same way. There is a lots of possibility where we can explain the students and give them a safe and economic way of experiencing such things.
- 2) *To Promote Student Collaboration:* Students can virtually join together and communicate in a diversified and attractive manner. They can collaborate and work on joint projects. Students and educators can have discussions, talk, connect, and chat about common projects. They can even use and work in multiple 3D worlds at the same time.
- 3) *To Promote Assessment Through Project Based Learning:* Students, for example, can conduct research and design a (virtual) village in, say, the Roman Empire. Furthermore, a large group of students from all over the world could create this environment while taking a distance learning course. This allows them to collaborate on a project while also experiencing new ways of learning from a distance.
- 4) *To Develop Scenarios and Simulations:* With high-resolution graphics and sophisticated 3D web applications, students can create simulation-based environments or labs for studying or conducting experiments. These labs are called "dry labs". These web-based labs are very useful for online students. Experiments can be performed in an immersive virtual science laboratory. Students can then go offline to a real science lab to perform real-world experiments and see how they work after the simulation. We were able to conduct advanced scientific experiments and provide specialized technical training in ways that were not possible at universities and schools. Consider splitting atoms, performing surgery, piloting a plane, or exploring hostile environments.



Figure 3 Tools & Services of Web3.0

## VII. CONCLUSION

Web 3.0 is more than just a collection of new and useful technologies and services. Web 3.0 technology delivers a wide range of services to create a real online learning environment. In essence, Web 3.0 services will have a positive impact on teaching and learning. This research paper argues that, like its predecessors, Web 3.0 technologies, once settled and well developed, will continue to transform the discipline of eLearning. However, it does not seem necessary to appeal to a new learning theory because the theory of association theory is sufficient. However, with the introduction of any technology and adoption, Web 3.0 reflections about the future of ELearning will come with a lot of technology, social, legal and moral challenges. Web 3.0 technology provides advantages from search engines based on smart agents, virtual environments such as avatar and semantic digital library.

On the other hand, there is a great potential for semantic bands to have an impact on learning processes. Daly stats, "Organizations and students might benefit from using half-year perspectives in their studies as well as direct reflections". The intelligent agent cannot execute their duties if information on the Web has semantic meaning. Humanity enthusiasm to mark knowledge and security apprehensions about access to information as blockades to Web 3.0 will need to be addressed.

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