

EDUCATION OF ENGINEERS-IT SPECIALISTS TOWARDS USE OF THE LATEST INFORMATION TECHNOLOGIES

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Abstract:

The author studies the up-to-date specifics of the Internet. He presents the most common mistakes made by Internet website builders. He views the reason for that in teaching methodology of to-be webmasters deriving from programmer teaching methodology directly. The author suggests changes in the methodology and adjustments to the Internet technologies specifics.

Key words:

engineers-IT specialists' teaching; webmasters' education; websites and Internet application creation; Internet technologies.

Introduction:

Modern computer science consists of a wide variety of separate domains. Some of them, e.g. computer networks, elaborated their own engineers teaching methodology. Others are still based on programmers' teaching methodology. The methodology seems not to be always adapted to the requirements of some IT-fields – fields that stood out recently in particular. One of such new domains is web application.

1. Paradigms of engineers-IT specialists' teaching

At the early stages of computer development IT specialist had to be acquainted with programming techniques and hardware construction as well. Assembler programming required in-depth knowledge on working and construction of processor, graphics and sound card, LPT and COM ports and many other computer sub-assemblies. One can compare it to industrial revolution period, when engineer - mechanic was able to design or repair all machines or vehicle types.

Information technology, like mechanics did previously, divided into a number of specializations. Each of them requires differentiated scope of knowledge, different abilities and, what is relevant, the other problem-solving attitude.

Computer science studies within programming represents the best systematized teaching methodology. A number of younger specializations are still being based on them. The methodology is the easiest one to be characterized through objectives, which are set to students, and tools, which students are to operate.

The objectives are:

- teaching algorithmic thinking,
- teaching data structure use,
- teaching problem-solving methods.

Programming language and development environment are the tools which programmers use. Student usually learn several programming languages. It can be assumed, that:

- algorithms are transferable between programming languages and development environments,
- different programming languages can be taught through examples of similar class,

- programming languages and development environments can be applied interchangeably.

Can we transfer these assumptions to teaching methodology of websites and Internet application creation? To judge this issue we should first answer the question: How today's Internet is viewed by an engineer? Which technologies should to-be webmaster know to create Internet service that would meet the contemporary user's demands?

2. How the Internet is viewed by an engineer

At the early stages the Internet consisted of a number of separate services which were based on a common technical infrastructure. World Wide Web (WWW) was just a one of the Internet services – its responsibility was to distribute hypertext data.

Today the most of Internet services was integrated through WWW system. Apart from showing data WWW websites have 2 new functions:

- they act as a distribution channel for services of different kind
- they act as a comfortable interface terminal for systems operating in remote control computers (Database Management System, expert system etc.).

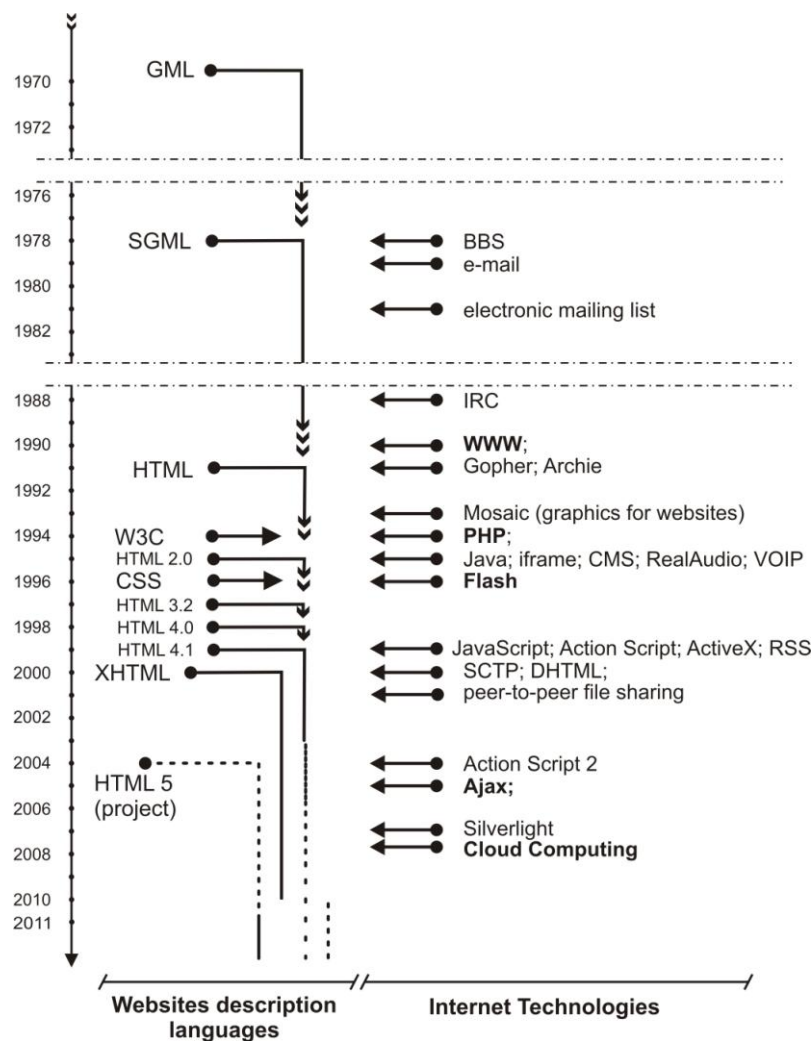


Fig.1. Contemporary Internet technologies
Source: [Bartoszewski, A., 2010, p. 333]

With reference to WWW websites description languages they are undergoing smooth evolution. Problems with standardization extort joining solutions specific for different languages. [Bartoszewski, A., 2009, p. 31]. W3C XHTML 1.0 Frameset standard permits use of iframe object coming from HTML 2.0 language in XHTML code.

Internet technologies (see fig. 1.), that give Internet websites possibilities comparable to stationary computers software are much more interesting, from our point of view. Two of them are forming a picture of contemporary Internet to a larger extent. These are Ajax and Cloud Computing [Bartoszewski, A., 2010, p. 334].

Ajax is an abbreviation of *Asynchronous JavaScript and XML*. This is a combination of a number of technologies.

The most relevant of them are as follows:

- XML – Extensible Markup Language,
- XHTML – Extensible HypertText Markup Language,
- CSS – Cascading Style Sheets,
- DOM – Document Object Model.

Ajax term does not define any specific technology. It is a paradigm to create internet applications, which facilitates dynamic interaction with a user, contrary to traditional approach to website creation, where every request for new data results in transmitting the whole website. Google Maps seems to be the most spectacular example of Ajax technology.

The second technology influencing the picture of contemporary Internet is Cloud Computing. It is an architecture of service, where calculations do not take place on the user's computer, but they are served by a number of servers. WWW website is just a user interface for programs operating on the remote server.

3. Conclusions for webmasters' education

The common feature to both of above mentioned technologies is a fact, that they combine a number of tools and programming languages. As opposed to traditional programming languages, which can be applied interchangeably, the tools complete and interweave each other.

Education of engineers, who will use them confidently, cannot proceed according to above mentioned training methodology for programmers. Habits embedded during the studies on the specialization are a reason for errors. The most common mistakes are:

- subordination of the whole project to the requirements of single technology (FLASH is the most common) [Nielsen, J., Loranger, H., 2007, p. 115],
- wrong (non-optimal) selection of technology to the particular tasks,
- creation of websites, which are then difficult to be rebuild and modified,
- creation of websites that are correct within the programming, but do not meet user's demands (absence of communication with a user) [Hoekman jr, R., 2010, p. 249],
- website layout does not match the content [Kiedrowicz, G., Bartoszewski, A., 2009, p. 349].

The other reasons are:

- inability to match technology to particular tasks in an optimal way,
- inability to use comprehensive approach to a project,
- lack of knowledge on users' requirements.

To avoid the mistakes, education of to-be engineers-IT specialists should focus on projects that integrate a multiplicity of components. One can point at existence of an object that would integrate the obtained abilities. Usability – the new branch of science dealing with interactive applications and devices ergonomics – is gaining in popularity and can play a role in the issue.

One should also postulate to:

- improve correlation between teaching contents and particular subjects,
- secure continuation of examples used on the particular subjects – joining technologies
- use of examples (cases) resembling real life situation (projects)

Summary

Contemporary Internet websites are conglomerates of technologies. Transfer of traditional programming teaching methodology to Internet service and application creation can bring about a lot of mistakes.

Engineers-webmasters education quality can be improved by:

- putting an emphasis on technology joining,
- putting an emphasis on team work (projects).

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