

Changes in education and labour and their influence on society: 2020 perspective

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Abstract: In the coming decade mobile technologies [9] and social software [12] will transform the future of learning and labour. Some important technological trends are observed on the market. The power of processors, capacities of memories and batteries are increasing while their sizes are decreasing. On the other hand costs of majority core elements is decreasing. There is a trend to standardize file formats as well as operating systems. Moreover all mobile devices communicate better with each other. mLearning is fully anywhere, anytime and always. It produces best results as a part of blended learning used not only for teaching but also for creating, communicating and collaborating. On the other hand mobile technologies used to communicate help to change radically working practices. The current generation of young people could reinvent the workplace and even society they live in during the coming decade. The only thing we can do is to get used to it [8].

1. Trends in hardware changes

In the coming decade some well documented actual trends will be continued [3]:

- Increase in the power of the processor, memory and battery and decrease of the physical size.
- Decrease of the costs of many core ingredients (screens, batteries, memory).
- Standardisation of operating systems, as well as file formats and the media we use for transferring them.
- Better communication of mobile devices with one another in several different ways.

There are several aspects of better communication of mobile devices [3]:

- Wireless networks provide fast data access wherever we are. The standards are evolving, and speeds are increasing for both short- and long-distance connections (WiMAX, Wi-Fi, UWB – UltraWide Band).
- Internet usage is not restricted only to desktop computers – it is nowadays a living web of information available to any device connected to it (phones, PDA's, navigation systems...).
- The format of the information in the Internet is suitable for majority of devices ranging from mobile phone to personal computer.
- Global Positioning System (GPS) is no longer the domain of special equipment. Mobile phone with this feature opens possibilities for new contextualised and personalised services.
- On the other hand Bluetooth is connecting all sorts of different devices to one another what enables us to create our own personalised device.

- Different identification protocols are helping various devices to recognise each other and moreover connectors are getting more standardised.

There is still an open question – will all devices converge to single one or should we use different ones [4], [5]. Perhaps both solutions will exist on the market. Handheld devices [9] like PDA have power and features of laptops which are as powerful as desktop devices. There is only slight problem with communication tools like monitor, keyboard and mouse for such ‘handtop’ computers. Monitor can be simply replaced by a handheld projector, paper-like display, glass-mounted display or even virtual reality helmet. Keyboard can be replaced by microphone and voice recognition, virtual reality glove, touch screen or projection keyboards. Finally mouse is partly replaced by touchpad and could be further replaced by a touch pen with digitizing tablet, touch screen or eye trackers.

2. Software changes – Web 2.0 and social software

In 2001 the burst of the dot-com bubble created a turning point for the web [13]. As it is believed the concept of the term Web 2.0 was started by a conference brainstorming between O’Reilly and MediaLive International, but the seeds of what is now generally accepted as the read/write or shared content nature of Web 2.0 appeared in 1980 in Tim Berners-Lee’s prototype web software [6]. Idea of sharing concepts was started by Ward Cunningham who wrote the first wiki in 1994-5 and first weblogs were created in 1997. Change from Web 1.0 to 2.0 can be summarised by a simple statement: in first version few content authors provided content for a wide audience of relatively passive readers while in second version users of the web use the web as a platform to generate, re-purpose, and consume shared content so web also becomes a platform for so called social software that enables groups of users to socialise, collaborate, and work with each other. Summarising one can say that concept of Web 2.0 does not have a strict boundary but rather a gravitation core.

The term social software was for the first time used six years ago and is attributed to Clay Shirky. He defined social software as “software that supports group interaction” [16]. There are some key attributes of social software related to education [1], [2], [12], [14]:

- Delivers communication between groups
- Enables communication between many people
- Provides gathering and sharing resources
- Delivers collaborative collecting and indexing of information
- Allows syndication and assists personalisation of priorities
- Has new tools for knowledge aggregation and creation of new knowledge
- Delivers to many platforms as is appropriate to the creator, recipient and context

2.1 Wikis

Wiki software [12] allows people to easily upload to the internet content that it is then editable by other readers. One of the most well-known examples is Wikipedia, an online encyclopaedia. The principle of it is that the knowledge of the group is greater than that of an individual. Moreover the group who use it are also the group who create it. Individuals within the group decide when new entries should be created. Further through collaborative editing of entries an article that satisfies the needs of the group is created.

2.2 Blogs

Weblogs [12] are easily updatable personal websites. They are often used as personal journals. The social aspect of weblogs lies in the ability for readers to comment on postings,

to post links to other blogs and, through using trackback functions, to keep track of other blogs referencing their posts.

2.3 Social bookmarking, tagging and folksonomy

Social bookmarking and tagging [12] are relatively recent additions to the variety of available social software. Social bookmarking is a web-based application that allows users to store and share bookmarked web links in a format accessible by the internet for everybody. This idea was started in 2003 by the launch of one of the early social bookmarking sites, del.icio.us. Bookmarking activity becomes social when tagging is added to the functionality. Tagging simply means adding a keyword (tag) to a link. Internet users can search bookmarks through tags (keywords). This process of organising information through user-generated tags has become known as 'folksonomy'.

2.4 Media sharing services

These services store user-contributed media, and allow users to search for and display content [6]. Besides being a showcase for creative person, these services can form valuable educational resources. The best examples of such services are YouTube (movies), iTunes (podcasts and vidcasts), Flickr (photos), Slideshare (presentations), DeviantArt (art work) and Scribd (documents). Podcasting is a way in which a listener may conveniently keep up-to-date with recent audio or video content.

2.5 Social networking and presence systems

Such systems allow people to network together for various purposes [6]. Examples include Facebook and MySpace (for social networking / socialising), LinkedIn (for professional networking), Second Life (virtual world) and Elgg (for knowledge accretion and learning).

2.6 Syndication and notification technologies

In a world of newly added and updated shared content, it is necessary to to easily keep up to date with new and changed content, especially when somebody is interested in multiple sources of information on multiple web sites. A feed reader sometimes called an aggregator is used to centralise all the recent changes in the sources of interest. Then user can easily use the reader/aggregator to view recent additions and changes.

3. Labour 2020

The traditional structure of manufacturing industries is constructed upon land, labour and capital (manufuture). The challenge is to move towards a new structure founded on knowledge and capital [10]. Changes will occur in six main areas:

- From resource-based to knowledge-based manufacturing
- From linearity to complexity.
- From individual to system competition
- From mono-disciplinary to trans-disciplinary.
- From macro- to micro- to nano-scale
- From top-down to bottom-up production.

On the other hand in the next decade the service sector in the CE countries will be the main driver of economic growth [15], [7].

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