

2020 Visions | Wim Veen's Projection

Learning landscapes have always been determined by a combination of economic factors, technology, and societal factors. Let's take a short look into the ongoing developments in these three areas to get a picture of how the learning landscape might look like in 2020.

Economy

Schools as they still exist nowadays have been configured for an industrial economy where mass education was required for blue collar workers. The organizational structures of industries were based on hierarchy, mass production, standardization, planning, and control. The same structures have been replicated for governmental, health, and education systems. These structures have proved to be very adequate and effective as long as the socio-economic structures were mainly industry oriented. However, technology has come to be a major change factor and the traditional national industrial economies have been transformed into global knowledge-intensive structures. Entire economic sectors, such as banking and insurance, and process industry have changed tremendously compared to thirty years ago. But education has succeeded in resisting these changes, 'chalk and talk' lectures, whole classroom teaching, standardized curricula and examinations, and age-based groups still being the mainstream organizational structures. As a consequence, education systems are lagging behind the economic changes that have occurred in West European economies over the last thirty years. In fact, West European countries experience an institutional crisis that demands rigorous policies for restructuring sectors such as education. Should it not be education, which has to shape the students to join the workforce?

Society

In addition to these economic changes, another change factor has emerged. It is a human factor that formerly was considered as a raw material. It is a generation of students that has been born with a PC mouse in their hands and a computer screen as a window to the world. I have called this generation Homo Zappiens. This generation has grown up with technology and learns through computer screens, icons, sound, games, exploration, and questioning; its members also show non-linear learning behaviour. Traditional books, lectures, and text-based e-learning do not suit Homo Zappiens, who wants to be in control of its own learning process using tools that support its information processing skills. Young learners of today have grown up with electronic devices (computers, game consoles, ipods, cell phones, and TV remote controls) by which they have learned to keep in control of information flows and how to deal with information overload.

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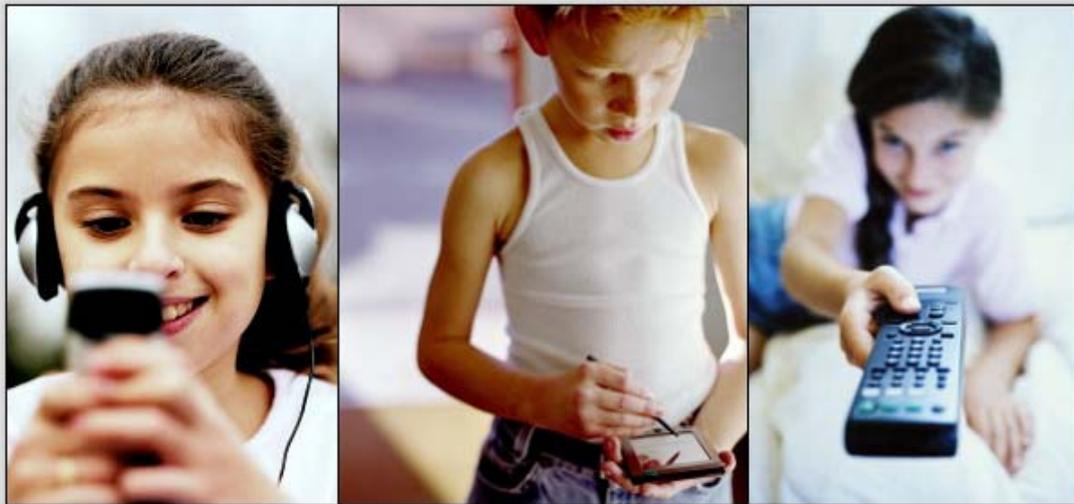


Figure 1: *Homo Zappiens born since the end of the eighties, developing crucial learning skills for a creative and chaotic society*

They have also learned how to navigate efficiently and effectively through information, how to communicate, and how to build effectively on a network of peers. Experiencing these digital information flows, kids develop an exploratory learning approach trying to give meaning to the information provided. In particular, games seem to stimulate this exploratory approach as kids often start gaming without knowing the ultimate goal of a game. Instead, they define their own goals, finding out the available tools and defining the appropriate strategy to achieve their goals. Through this exploratory approach, kids develop a number of meta-cognitive learning skills directly related to learning. This is a way of learning using electronic tools and systems. In short, Homo Zappiens is digital, schools are analogue.

<i>Homo Zappiens</i>	<i>Former Generations</i>
⌘ twitch speed	⌘ conventional speed
⌘ multi tasking	⌘ mono tasking
⌘ non-linear approaches	⌘ linear approaches
⌘ processing discontinued information	⌘ processing single information flows
⌘ iconic skills	⌘ reading skills
⌘ connected	⌘ stand alone
⌘ collaborative	⌘ competitive
⌘ active	⌘ passive
⌘ learning by playing	⌘ separating learning and playing
⌘ instant payoff	⌘ patience
⌘ fantasy	⌘ reality
⌘ technology as friend	⌘ technology as foe

Figure 2: *Characteristics of Homo Zappiens and former generations (based on Marc Prensky)*

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By 2020 Homo Zappiens will be founding families, and the early birds among them will be looking for education that suits their kids. Homo Zappiens will look for schools where their children can exploit the digital skills that they will have developed before going to school, taking an active and explorative attitude to learning instead of being passive and docile consumers of content. These parents will be seeking schools where their kids can meet peers with whom they can explore, experiment, and produce new knowledge, and have fun: places where you can collaborate on themes of your interest beyond the traditional subject matters, and where you build your individual portfolio instead of the standard examination. Parents will be looking for schools where the three major underpinning principles will be self direction, challenge, and immersion. These are the very same principles used in the video games they played when they were young.

I conclude from above that the education systems will experience increasing pressure for change, on the one hand from the labour market and on the other from the consumer market. Industries will progressively demand more flexible, highly educated employees for knowledge intensive companies. Parents will no longer accept 'one size fits all' schools and will demand more flexible learning institutions where their children can develop as human beings and creative thinkers., where the children can excel and deepen their talents, and where non-relevant courses are not mandatory to get a valued degree.

Technology

Technology is the third major change force that coincides with the above-mentioned change factors. Research on IT and ICT uses in the corporate sector has shown that the growth of technology follows a natural S-shaped curve consisting of distinct stages from scratch to maturity (Nolan, 2000; Rogers, 2003). Figure 3 illustrates three eras, which Nolan has described as the S-shaped organizational learning curves, in which three dominant designs of IT have been and are being assimilated into organizations. The Data Processing (DP) Era dated from 1960 to 1980; the microcomputer (Micro) Era dated from 1980 to 1995; and the Network Era, which began around 1995, is expected to continue until 2010.

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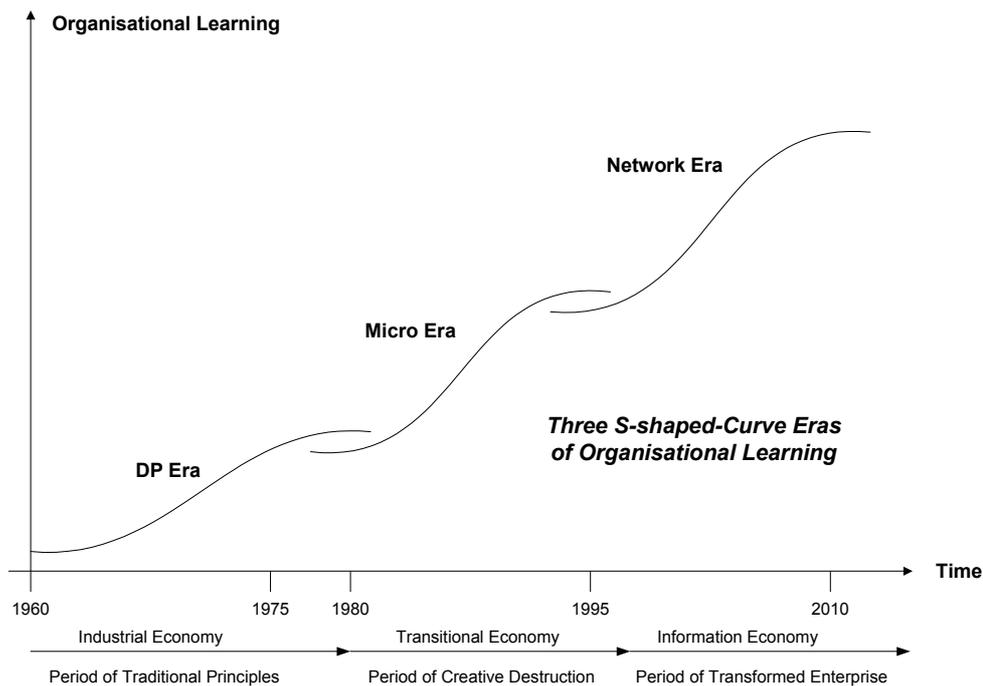


Figure 3: Three eras of Organizational Learning according to Richard L. Nolan

The successive S-curves overlap during a period of 'technological discontinuity'. During this period, further growth of the mature old technology directly conflicts with the vigorous growth of the emerging new technology. The technological discontinuities indicate that new technologies are brought into the organization. Once the new technology is accepted, new jobs occur and the organization demands new ways of advice, of work, and of support, meaning a lot of vacancies.

If we take Nolan's stages theory and his three eras of organizational learning, and we transpose these theories onto the educational sector, we may perceive similar eras. Where the micro era can be compared to computer based training, the network era can be compared to online learning. If we take learning-on-demand into account, a third S-shaped curve can be indicated. And if we consider social and economical trends, such as lifelong learning, digitization of libraries, virtual universities, flexible and ubiquitous technologies, these may give us a fourth S-shaped curve, which we will call the learning mall (see figure 4).

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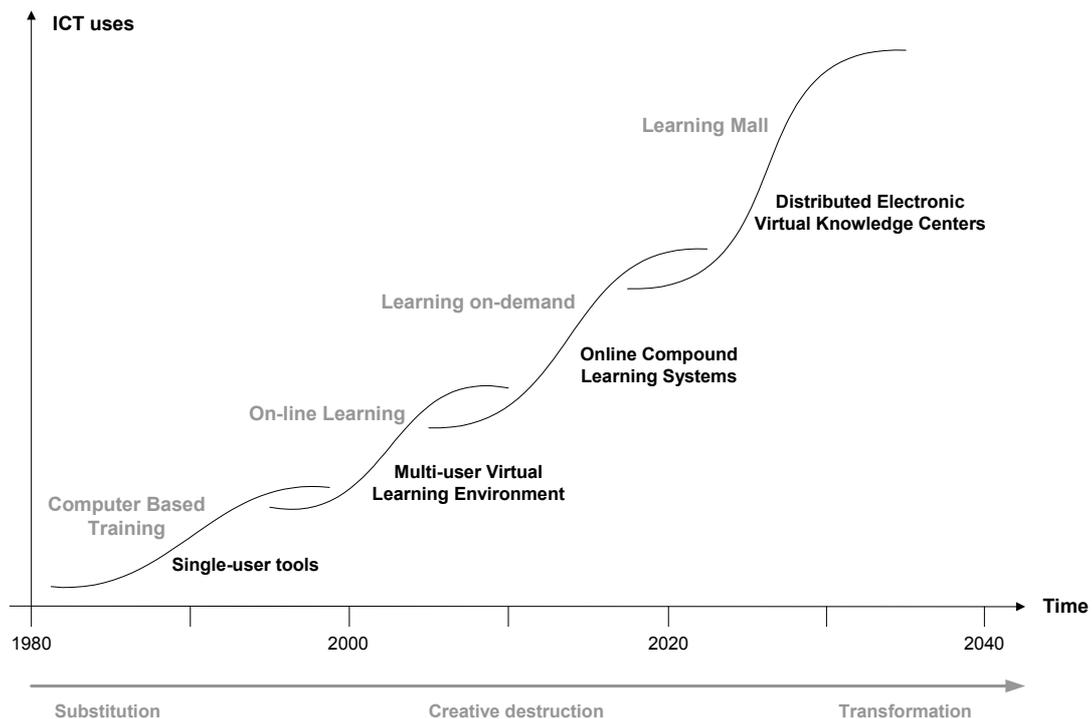


Figure 4: *Successive Stages of Educational Technologies and Practices by Piet van der Zanden and Wim Veen, 2004*

The time axis represents the period from 1980 to 2040; moving from the first widely used computer applications in education to the complete implementation of a learning mall of the future where any desired or required learning object can be obtained online. The time axis also represents the learning material, which is constantly fragmented in a creative destructive way and gradually transformed into complete independent online learning material.

Computer-based training represents a period of single-user tools in which the computer made its entrance in education and was brought into use for mathematics, computer-aided design, simulation programs, infinite calculation methods, writing, and presentation skills.

Online learning represents multi-user tools, such as communication tools, the World Wide Web (WWW), streaming video and a virtual learning environment for online courses. Lecture notes were digitized and put online, as were video snaps together with references to publications that could be reached via hyperlinks. Underlying tools for two-way communication are used to support this time- and place-independent way of learning.

Learning on demand represents the next generation web-based virtual learning environment where learning material, which is broken up into specified learning objects, is initially distributed online for regular educational tracks. The underlying systems will be compound systems with merged technologies and features gathered from several compound learning systems.

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The learning mall represents distributed electronic virtual knowledge centres equipped with personalized-learning delivery robots. Student, undergraduates, graduates, post-graduates and other experts will have access to these future distributed online libraries where 'just in time', 'just enough' and 'just for you' learning objects can be retrieved.

Four Changes

Many school managers and school boards do currently recognize the need for fundamental changes in schools and education systems at large. Some of them have already started revolutionary experimental schools. First results from these schools show that students love the new approaches that have been adopted and that learning results are satisfying. In the Netherlands, about six schools have started recently to work along entirely new lines. The inspectorate adheres to these experiments and seeks to get evidence of successes and failures. In addition, parents who no longer accept traditional schools have started schools that are based on the ideas and ideals of the Sudbury Valley School in the USA and the Summerhill School in the UK. Again, in the Netherlands twenty schools have been created this way and another forty schools are under construction. When comparing these educational experiments, it is interesting to see that all of them have adopted four major organizational, pedagogical and curricular changes (see figure 5).

<i>Traditional Schools</i>	<i>Future Schools</i>
<ul style="list-style-type: none"> ⌘ 50 minutes lectures ⌘ Subject matters ⌘ Classrooms for 30 students ⌘ Age-based groups on a yearly basis 	<ul style="list-style-type: none"> ⌘ 4 hours periods ⌘ Interdisciplinary themes ⌘ Areas for 90 to 120 students ⌘ Continuing individual learning paths

Figure 5: Major characteristics of traditional and future schools

From figure 5 we can see that the underpinning principles for new ways of learning appear to be self-direction, challenge, and immersion. Students are supposed to work independently and collaboratively, using technology extensively. They are challenged to solve complex problems that are relevant to them and authentic, and to come up with creative solutions. Students are immersed in learning situations and learning a foreign language is concentrated in activities with durations of one to three months.

Concluding, I think that by 2020 pressure on our education system will have grown substantially. Schools will have to cope with these pressures by making choices in teaching and learning practices that meet the needs of a flexible group of learners. The educational market will probably consist of schools and institutions that will provide education in a variety of teaching and learning modes from which parents can choose. It is beyond doubt that technology will play a major role in this future educational scene. And what about an additional learning theory based on ever-connected individuals?