Under the Veil of Ignorance: Education through Technology

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Abstract

Although everyone agrees that integration of technology into education is necessary today, we are still unable to characterize the three components necessary for every quality system critiquing itself, heading in a particular direction:

1. A meaningful and convincing vision (or a philosophical, value-based foundation) which can be adopted – concerning the integration of technology into education.
2. Measurable behavioural tools used in the implementation of this vision.
3. Clear, concrete, applicable models implementing the vision through tools developed for this purpose.

In order to reopen the discussion, we use a reflection tool – "the veil of ignorance". Using this argument, it is possible to examine with unbiased eyes the issue which seems to have no truly satisfactory solution, thus gaining comprehension and reaching an optimal answer and clear insight.

Under the veil of ignorance, it was found that learning, as it is presented in different ways, even when it is updated and innovative, is nothing but an expression of basic pedagogical values known to society since the beginning of time, which have not been reached in a satisfying manner by any educational system. It is utopian learning, an ideal learning activity carried out by the curious, independent, obedient learner – who does not exist in reality, and who is constantly referred to, instead of the real learner. This is done through a variety of models and theories of utopian learning, which do not truly justify the use of technology.

During the past two decades and more, two opposing trends can be observed: a drastic decrease in the relevance of schools in the eyes of the learners and society in general, and an extremely fast increase in the use of an online environment for personal and social activity among youth – the NetGen (Net Generation), all over the world.

The vision suggested here is based on a concrete move in the direction of a renewed relevance of schools, by bringing the learners' natural environment – the online environment, to their learning in school. This will narrow the paradigmatic divide between the PreNet generation, leading the world as well as the educational system today, and the NetGen, leading its personal life completely online. Thus, learning and teaching will exist in the natural, familiar environment of the learners and of society in general.

At the same time, we suggest severing once and for all the aspiration for utopian learning from its connection with technology.

Keywords: Online Learning Environment, Integration of Technology into Education, School relevance.

Introduction

Every educational discussion in the world today includes use of terminology from the domain of online learning and innovativeness through one type of technology or another. Only lately we have witnessed the excitement of the UN General Secretary, holding in his hands a computer (OLPC, 2005), costing all of 100$ and requiring no external energy source, announcing the message of prosperity and success this will bring to third world youth.

No one will raise an eyebrow at hearing these pronouncements. There is general agreement that integration of technology into education is necessary, and all is in readiness for the declaration that following the industrial revolution, the scientific revolution and the information revolution, it is time for the educational technology revolution. This is the revolution whose results will be a decrease in social, economical, and cultural gaps all over the globe, and a sophisticated gadget useful for doing everything online with all human knowledge to date, with everyone wherever they are – geographically, mentally, and emotionally – making future generations more just, wiser and more talented than they have ever been. But for some reason, more than 20 years after the beginning of the use of the computer, the Internet, and now the different body-fitting gadgets, no one can wholeheartedly point at concrete evidence of the contribution of technology to teaching. There are still voices complaining that massive investments in education towards this goal[1] did not mature into positive results, and due to chronic shortages in government budgets must be stopped immediately.

We seem to be going round and round in a maze. All arguments, supported by the results of countless studies and theories, have already been quoted. A simple analysis shows, according to Stimson's[2] (1989) system of quality assessment, that even now, at least 20 years after the entrance of computers into classrooms, and at least five years of connecting the classroom to the Internet, we do not have:

1. A meaningful and convincing vision (or a philosophical, value-based foundation) which can be adopted – concerning the integration of technology into education.
2. Measurable behavioural tools.

3. Clear, concrete, applicable models implementing the vision through tools developed for this purpose.

With the lack of a meaningful concrete vision for the integration of technology into teaching and learning, it is impossible to characterize and build tools for its implementation, or characterize practical models for this purpose. We cannot, therefore, claim to be surprised that we are unable to point at any meaningful positive results.

The problem is, then, that clearly we cannot today speak about education without technology (McLoughlin, 2000), and the two must be integrated forthwith, but it is as yet unclear what the actual contribution of technology to the educational system and its products should be.

The Veil of Ignorance

In such a case, when processes are stuck with no end in sight, we need to re-examine the issue in a different manner. This might take the form of lateral thinking, according to DeBono (1967, 2005), whose main principle is the search for different, unusual, unconventional ways of thinking. We wish to add this recommendation to a powerful reflection tool – the veil of ignorance.

John Rawls, a contemporary American philosopher, chose an original way to confront a social challenge as old as humanity – "the theory of justice" (Rawls, 1971). He claimed that in order to reach maximal comprehension and optimal 'justice', we must go back to a condition of neutrality - Tabula Rasa, where we neutralize and forget everything we know, and examine the issue, despite our certainty that we are correct in our choice. Rawls calls this **'the veil of ignorance'**. This allows us to examine the issue with an unbiased look, having unveiled our ignorance, thus reaching comprehension, and following it the best possible solution.

We shall now examine the issue of integration of technology and education under the veil of ignorance: why it is essential, and why it has not yet succeeded. We shall neutralize our expectations, the frustration we feel at the status of the present educational system and its

achievements, including our dissatisfaction with the integration of technology into education, and go back to a primal situation in which we have a functioning educational system and an updated fascinating technology – through which it is possible to study in an online teaching and learning environment.

In order to do this we shall discuss four concepts, while going back to the basic condition of neutral and unbiased description as much as possible: the concept of learning and the concept of an online learning environment, where learning is a description of the action that is to take place in the learning environment. Based on this fresh comprehension, we shall discuss the two components necessary for the integration of technology into education, which are the vision-basic rationale, and the practical models implementing it.

The Concept of Learning behind the Veil of Ignorance

Placing the concept of learning behind the veil of ignorance immediately sheds mountains of terms, declarations, fashions and perceptions that have been changing at a fast rate during the last century. It seems we have forgotten that all these are the results of the last few generations, part of a young, modern paradigm, when a meaningful part of the younger generation has been experiencing it for no more that a few decades. Only a small minority had done so earlier.

At an early stage in the development of human society, it developed from learning in the simplest way possible, by passing information from father to son, to the much more complex means of teaching a narrow specialty in a needed skill - one which is not necessarily known by the parents or the close family. In this way a major part of learning was taken away from the familial-social circle close to the youngster, and passed on to experts whose responsibility it was to provide young people with knowledge and skills. A great leap forward in the concept of learning was achieved when writing became prevalent, and even more when print was invented, to the extent that knowledge was made available to the general public. In fact, the roots of modern learning are the acquisition of reading and writing, with no connection to the parents' education.

However, today we are deep in a paradigm of modern learning, which we perceive as obvious, full of theories and educational fashions. We do not pay attention to the fact that we cannot, in fact, differentiate between the comprehension data processing abilities of our forefather – a citizen in ancient society, and an honours student today. The same student who studies the known philosophies, methodologies and thinking strategies, analyzing them uses modern technological tools which did not previously exist.

Should some of us, members of the Internet, science, and hi-tech generation, with the average education common today (high school or BA degree), be miraculously sent to ancient Rome or Central Europe of the Middle Ages, what could we really teach society? What do we really understand so deeply that we can teach it in a practical, concrete manner? We have no real advantage over our forefathers as far as knowledge of social and behavioural theories, as well as (as much as we hate to admit it) technology. With all the updated knowledge of the 21st century in arithmetic (how many of us really understand mathematics?), the use of computerized tools, modern critical thinking, MTV and the Internet culture, use of collaboration on the net, and supposedly the "brave new world"[3] we are living in; with all these we have no meaningful advantage over our forefathers. Are we really going to impress anyone from that time with our stories of computers, cellular communication, television, GPS navigation, informed searches of the net, or even a device using electric energy, when we have no idea how these really work? Do any of us have any idea, like the literary hero we read about as children, who went back to King Arthur's court, how to predict an eclipse or make gun powder using basic chemistry, process different materials, or create electricity for a particular need?

What greatness, what enlightenment, what meaningful insights about ourselves, the world and the way it works, can we 'sell' to ancient civilization, to our forefathers, which they were not aware of? Practically speaking, we – the hi-tech, so called 'enlightened' people, have no meaningful advantage over our forefathers, or over what we call 'primitive' societies, who have not (yet) adopted the wonders of technology[4].

Let us not forget that a child from an ancient period, could he somehow appear in our times, would have quickly become integrated in society as a functioning citizen. We certainly would not have noticed anything different in his children hinting at their father's origin – a society that did not know plastics, electricity, the computer, or the existence of the Milky Way galaxy.

The difference between our 'primitive' forefathers and ourselves is, at most (Miller, 1984), the exposure to a multiplicity of points of view (as well as multiple perceptions of space, personality and society), as well as in the self-criticism of the mind, allowing us to examine different issues in other ways. We have achieved this through the writing system and expanded social contacts. But even the awareness of multiple world views, self-criticism, and the use of complex digital text – which we have had for the past few generations only, are at the social level. There is definitely no difference at the psychological level, certainly not at the neurological/biological one, in the brain structure and cognitive abilities of humans, with no regard to the period they live in, their origin or dwelling place.

All those who feel that in the near future technology will influence cognition – according to the term 'cognitive technology' (Gorayska et al, 1997; Dascal, 2006), and through it create a new and different man, or at least become one who becomes part of the smart mobs (Rheingold, 2002) (a crowd that has become wise due to use of technology), must 'cool off' behind the veil of ignorance, become updated, re-examine their personal paradigm, and lower their expectations.

The term 'learning' has not changed in a meaningful manner over the last generations, despite the construction of learners' behavioral theories, which is much more meaningful than in the past, as well as learners' activities from the physical-behavioural brain activity point of view (Sylwester, 2004). What has changed is the scope of the term 'education' and the attention society gives it, as well as its implementation among the younger generation. Any modern, updated description of personal and interpersonal skills, habits, behaviour and use of thinking and learning strategies mentioned in different contexts of 'learning', have been known in many ways, and accepted one by one by the greatest teachers of all times, such as Socrates and Pythagoras[5]. The essence of 'learning' has not changed, and anything written and defined today

as new, updated learning, is nothing but a footnote of things that were invented, carried out, written and even forgotten many generations ago. Everything said today regarding learning is only a subconscious imitation, sometimes only a shadow, of periodically rediscovered pedagogy, which was, is, and will be in our midst from the dawn of human civilization.

Built-in Educational Failure

The concept of learning discussed above moved between two foci: failing to achieve the educators' goals, and the birth of unplanned successes, despite the strict control devices society tries to impose through education. The tendency to present learning as innovative and updated is clear, since then, as now, human society has not managed to implement a **winning pedagogy**, in which the learner does not need a structured framework with clearly organized content, nor a teacher or pedagogical advisor for the purpose of independent study throughout his life.

It seems that there is built-in lack of success in the concept of education which is implemented through learning. No society has been able to cause a young person to study a meaningful amount of material by himself over time, based on the sheer wish to learn, and on a personal sense of responsibility regarding his actions, and the understanding that he must internalize data, personal and interpersonal values, and skills which will serve him as a mature citizen of society, beneficial for himself and his surroundings. No society has been able to do this, not because of lack of talent, laziness, hypocrisy, stupidity, or even evil (qualities ascribed to educators everywhere over time), but because pedagogy, then as now, confronts evasive human nature (a necessary evolution?) whose reasons for doing things are completely unclear to us.

A typical human learner is not obedient, and does not do everything he is told. Rather, he has a tendency for independence and the development of a private uniqueness. Rebelliousness against society's values and the present world order is part of his very nature, sometimes at a high personal price. Eventually, when he realizes it is impossible, the youth 'tows the line' and becomes an ordinary citizen. In almost every generation we see youth who add power-hunger and greed to the pseudo-ideological innocence of destroying the present, and end up kicking,

lowering, and completely annulling the present order of things. They invent, usually in the name of the oppressed masses, a new social order, much like the old one they had destroyed, and call it a revolution, progress, development, modernism etc. This unexplainable human nature of destroying the old exacts a heavy price from society – the destruction of cultures and societies through wars and revolutions. But new societies rise out of the ruins, characterized by renewal and updating, giving birth to amazing human creations, seeking and finding unchartered fields in society, the humanities and the sciences. Education is opposed to this process, as its aim is to preserve experience and qualitative, useful public memories, turning learning into a naturally conservative process, based on the past.

In the shadow of these great changes, education and learning are more led than leading, and their influence on the processes involved is minimal. They seem to be observing from the sidelines and reacting, never initiating or leading. The best evidence of this is the fact that in any revolution, even when it originates in the public attending educational institutions, the elite of education and academia is the first to be eliminated, verbally or physically, as its members are perceived as the most authentic representatives of the establishment.

This does not mean we should give up, the opposite is true. And it does not mean that education has failed and we must come up with alternative ideas and ideologies, as the present ones have proved to be wrong. Extensive work on educational theories, renewal and a deepening of the discussion, including the development of varied teaching and learning methods, is essential for education; serving, among other things, as a legitimate expression of the lack of satisfaction and lack of success of the present educational order. However, based on the above, this does not mean reinventing pedagogy, or expressing the same things through a different, supposedly more updated – modern or post-modern, terminology.

The pedagogical challenge is adaptation to educational challenges in modern society, where two opposing trends exist, both needing real answers: one trend is turning the world into a uniform global village, usually with a low common denominator, and the other trend is preserving cultural and value uniqueness with many varied faces, as part of a multi-cultural society.

Learning, as it is presented in different ways, even the modern, updated version, is only an expression of the same basic pedagogical values which society has known since the beginning of time, and which have not yet been satisfactorily achieved by an educational system anywhere. They are utopian learning (Rotem & Peled, 2006), an ideal learning activity, and an obedient learner, who does not exist in reality, and who is constantly referred to, instead of the existing learner.

Online Learning Environment

Following the re-examination of 'learning' as a concept, we shall discuss what an online learning environment really is, behind the veil of ignorance. Here we are actually discussing two aspects: the first – we are, indeed, relating to a learning environment[6] (Solomon, 1998), but more than anything else dependant on the existence of complex technological systems, beginning with end technology, used by the learner, a computerized gadget using complex communication to connect with local centers and distant servers. The second aspect is the fact that we are dealing with a learning environment in which a different organization of learning materials, learning sources, and ways of expression and realization of ideas takes place through digital text. This is a much richer and more varied media than written or oral text alone.
Using this environment demands concrete technical skills, but the NetGen children have these skills, and they should not be considered pedagogical values, as they are not.

Combining the online environment with the ancient pedagogy of the learning concept contains behavioural and organizational characteristics that can be attributed to this environment, but they are at the quickly acquired social level. They do not contain a meaningful change of the essence of learning or learners – an essence which was successfully realized in the academy run by Pythagoras and Socrates's dialogic learning, without any technology.

Any other word about learning in an online environment is superfluous, even if we hear continuous talk about an artificial union of utopian learning – the classical, ideal one, integrated with modern technology, as a magic means of creating social and pedagogical

miracles which were unsuccessful in the past and will continue to be so in the future. The veil of ignorance cools down these unrealistic wishes and expectations, but opens a fascinating new gate for the usage learners everywhere can make of this learning environment. This is done with a new vision and a practical model, different from the perception which has not, to date, provided us with the expected results, even partially.

The Vision of Searching for the Exceptional in Using Technology in Education

We have thus far shown that a system aware of its mission, working towards it in a qualitative manner, includes three basic ingredients that cannot be separated: vision, tools, and a practical model for implementing the vision (Stimson, 1989).

When we looked under the veil of ignorance, discovering what learning and an online learning environment are, we had not yet designed a real vision. We can use high register language (as many have, indeed, done over the last three decades, mostly integrating technology with unrealistic utopian learning), but we do not have an entirely convincing vision which we can implement through an online learning environment. We have not yet managed to convince ourselves of the importance of the use of an online environment in education.

Let us once more examine through neutral eyes the world of the NetGen children. This generation includes those born at the end of the 1970's and onwards, who were born into a computerized, online ('virtual') reality, and do not recognize any other. When we examine the global socio-economic pyramid, we can see an amazing phenomenon in the media, compared to any other recognized social process: a quickly growing section of the NetGen is rapidly growing towards distant, weak groups, in only a few years (OECD, 2006). Today, in almost every distant village in the third world, providing it has electricity, the younger generation is exposed to some kind of online system, through the Internet and cellular phones, unless it is prevented from doing so due to political or religious reasons.

A serious perceptual obstacle to the required change is the paradigmatic gap between old and new. The educational paradigm of the PreNet generation, which runs education and

governments today, is very different from the network paradigm of the NetGen. The latter does not need the establishment-run school in order to work with fascinating cooperation – thus bringing to life claims made by Marx and his peers, (give as much as you can, take as much as you need), which everyone thought had disappeared. The NetGen easily skips over the legal obstacles the huge content companies7 put up. It considers with a forgiving eye the concerns of the PreNet generation (parents and teachers) regarding the dangers of the net, and how they are blown out of proportion due to a lack of basic comprehension of the essence of the net. It finds itself sharing, cooperating, and communicating through different immediate means with a circle of friends, some of whom it had never met, regarding common areas of interest and materials which fascinate it. This generation does not need the organized establishment of the older one in order to satisfy its personal and inter-personal needs. It does so with no dependence on the educational system which is still entrenched in its PreNet paradigm, dealing with unrealistic theories and expectations. A system which terms innovative, and even revolutionary learning, commonplace activities such as the use of online discussions, searching for information for immediate personal use, using immediate messages through the net or cellular phones, and the sharing of digital materials.

It follows, then, that should we wish to activate the NetGen as part of learning, not through the use of activities used by Pythagoras or Socrates – as schools today still do, we must bring the learning activity to the learners' natural environment: the online one.

This, however, does not say anything about the necessity of the net to the learner's cognitive development, its added value regarding learning, or the learner's social-behavioural development. There is no meaning to the superfluous pedagogical intent the PreNet generation tries to attribute to the net, for better or worse.

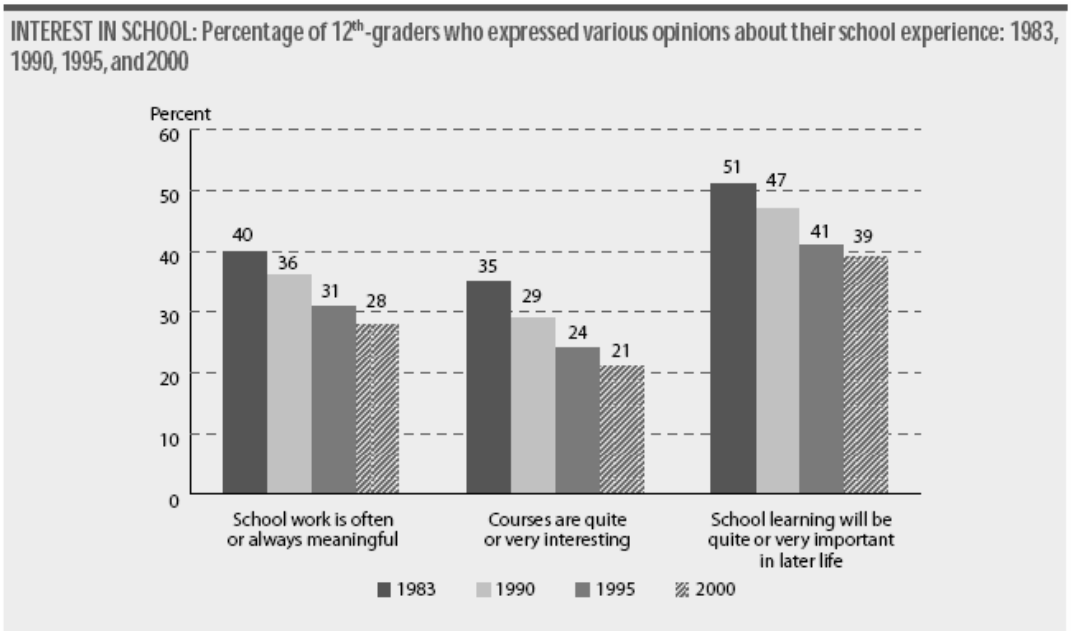
On the other hand, it means that we must bring the learner to his natural environment, which he uses 24 hours a day anyway, in order to ensure effective learning not only for the learner, but also for the educational system. This does not ensure success, but it does, at the very least, ensure the fulfilments of a necessary condition: return of learning and its outcomes to the pre-computer situation, in which established learning was more meaningful to the learner than it is

today. This is true even if we recognize that there is no direct causal relationship between the computer and the decline of the educational system's relevance.

A Quantitative Measure for Challenge Size

Quantitative studies of the National Center for Educational Statistics in the US carried out over two decades regarding the relevance and necessity of school for the learners specifically and for society in general, found that school is becoming less and less relevant (Condition of Education, 2002). It is no wonder, then, that alternatives to traditional schooling are coming up everywhere, to the chagrin of the educational system and against its strong, unobserved, opposition, and are taking a growing position as alternatives to the old-fashioned school which is becoming irrelevant to its own learners.

Figure 1. A Measurable Decline in School relevance to its 12th Grade Learners in the Years 1983-2000. (Condition of Education, 2002)



According to the data presented here (fig. 1), in the absence of additional quantitative research beyond the year 2000, we can estimate that within two decades, school's relevance to its learners had gone down by about **a third**.

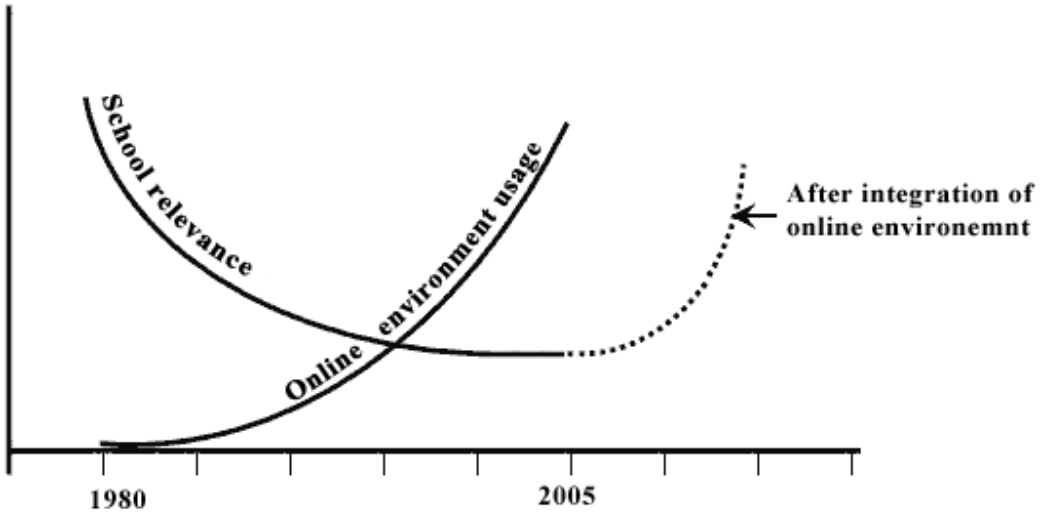
Parallel to this decrease we can see the growing use among NetGen teenagers of an online environment, rapidly growing and having to do with many aspects of their daily lives, while use of this environment in school is still minimal (OECD, 2006). Here, too, we have quantitative as well as qualitative data pointing at an increase of online environment usage through many parameters, such as: day to day use of the computer at home[8], extent of Internet usage[9], volume of email usage[10], network immediate messages usage, examining specific sites, usage of immediate message communication through cellular technology and other mobile devices, usage of broadband communication, and more.

Vision Principles of Integration of Technology into Education

Based on these data, and the analysis of the concepts 'learning' and 'learning environment', it is possible to offer guidelines for a vision of the integration of an online learning environment in education. The rationale is the accessibility of learning by the NetGen to their natural environment – the online one. We shall not, then, deal directly with the online environment, as this has already been dealt with in an unconvincing manner, as it was always brought together, as a necessary condition, with utopian learning and the ideal learner, who does not exist in reality. The vision will deal with the departure point in which the relevance of school to its graduates has declined by a third in two decades (fig. 1), while the usage of an online environment by these teenagers has been rapidly rising: from 0 in the early 80's to over 90% of OECD youth who spend most of their free time in front of the computer (OECD, 2006), while the rest of the world is following suit rapidly. Let us, then, define a question (Rotem & Peled, 2006), the answer to which will mark the implementation level of this vision: **How will the relevance and necessity of school change in the eyes of its learners from today onwards?** A drastic rise in school necessity (fig. 2) will provide a sufficient answer to the implementation

of the vision. A necessary condition for an incline in school relevance is the abovementioned idea – immediate integration, brooking no hesitance or compromise, of online environment among learners, as an additional learning tool. For this purpose we must, naturally, create measurable behavioural tools, as well as models of teaching and learning through an online environment. However, when there is intent and direction, the road towards them is more clearly paved than the present opaque situation, in which elements of utopian learning are unnecessarily mixed with technological characteristics.

Figure 2. Decline in School Relevance, Parallel to Unprecedented Incline of Online Environment Usage among Teenagers. (Rotem & Peled, 2006)



We cannot expect that massive, determined usage of online environment in schools, with no additional activities, will be the only cause of an incline in the relevance of the educational system to its learners. However, it is certainly a necessary and central element in the implementation of this vision.

A Practical Model of Integration of Technology into Education

With a holistic discussion of concrete, defined goals derived from a vision in which technology is an inseparable part of the learning and teaching environment, it is relatively easy to design a practical model of all the following components as one integrated whole:

- Ongoing use of an online learning environment in teaching and learning, as part of the daily routine of schools – no more special projects and unique initiatives supported on an individual basis.
- Use of network technology in all school subjects and content. No more special subjects for online learning.
- All students in the educational system, without exception, will use the online learning environment, side by side with the present, well-known ones.

Severing of the Dependency of Utopian Learning on Use of Technology

In light of all the above, we clearly need to sever the demand for good, utopian learning as a condition for use of technology for learning in schools. Good learning must take place in any manner of learning, including an online environment, but we must not tie use of an online environment together with unique pedagogical demands. The technical and behavioural aspects are not the pedagogical essence, and many of them are already internalized among the NetGen learner, without a real need for interference of the educational system with them, certainly not only with them, as a condition for good learning. Pedagogical aspects like understanding (Mohan & Lam, 2005), branched non-linear thinking (Eshet, 2005), research and questioning skills, as well as behavioural aspects of an independent, moral learner, are not unique for technology-supported learning, although in some contexts some of them may be enhanced by it. As important and right as they may be, they do not turn the learner into a person with unique personal qualities.

The use of an online environment in itself will **not** turn the student into a better learner in all situations and from all aspects, but may very well turn the educational system into a **more relevant** one for the learner. A professional, determined teacher, who is also a pedagogical

facilitator, may achieve satisfactory, qualitative results in an online environment as well. However, he should not, under any circumstances, expect the use of an online environment in itself to be a sufficient condition for the activation of better learning. This type of learning is meant to happen, based on the very nature of education, in any other context and environment, based on the professionalism and personal ability of the teacher-educator, and on the system's as well as society's support. The use of technology in education serves the learners in their natural environment, but the responsibility for the quality of education was and still is in the hands of the teaching staff and leaders of the system. This is what always was, what is, and what always will be. Education reflects society, never the other way around, and no technology or organizational revolution will change this.

Notes

1. In the mid 1990's President Clinton announced (Oppenheimer, 2003) an innovative five year educational plan costing 40-100 billion dollars: **"A bridge to the 21st century (…) in which computers will be as much a part of the classroom as the blackboard."**

2. A system analysis model by Stimson (1989), dealing with essential basic components of quality management systems.

3. A reference to the well known book "Brave New World" by Aldous Huxley (1998), written in 1931, describing a disuotopia as a result of enslavement to technology.

4. We have one major advantage over our forefathers which technology provides us with. We enjoy a higher quality of life for a larger section of the world's population. That is, if we do the impossible: agree what this quality is.

5. Socrates – 470-399 BC; Pythagoras from Samus – 569-475 (appr.) BC.

6. "A learning environment is a system made up of interconnected components, providing each other with meaning, aiming at learning." (Solomon, 1998)

7. Laws limiting the possibility of enjoying network materials without payment, such as DMCA – Digital Milleneum Copyright Act. The law was certified in the US in 1997. Since then, there have been many rulings against open sharing on the net, and many legal barriers have been put up, whose aim is to shut down sharing, which is strange to PreNet people, who have been raised on the pre-computerized paradigm of enlightened capitalism and neo-capitalism.

8. Research (OECD, 2006) carried out in all 36 OECD (an organization of countries ruling over the top nine tenth of world economy) countries points at a meaningful change of

organized usage of computers in the home between 2000 and 2003, where in the latter the use of online environment in the home in most OECD countries is over 90%.

9. Beginning with 1998, Internet usage is rising at the rate of 20% a year, and in the last few years has been equal to the phenomenon of adults cutting the net off. From 2000 to 2005 Internet use by teenagers in the US has gone up by 50%, and is today approximately 90% (according to the Pew Internet & American Life project).

10. From 1995 till 2005, the volume of electronic mail has increased 10 fold. Conservative estimates say that it will be 5 times as large by 2008.

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