

IMPROVING THE INTEREST/SKILLS OF A FUTURE MATH TEACH: WHY AND HOW TO USE INTERNET TO LEARN AND TEACH

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Abstract. *This paper's goal is to analyze how education changed in the last years and how digital devices can make a change in the scholar. The present system was designed in 1800, during the Industrial Revolution. Reforming education isn't enough. The real task is to adaptation or transform the current model. Mankind needs a new education system that help children think differently on the 21st century. This is a bold objective that we must address.*

Keywords. *Mathematics, new education system, Khan Academy.*

1. INTRODUCTION

Since the end of the 20th century, the world economy has undergone tremendous changes that allowed multinational companies to operate simultaneously in several countries. The globalization of the latter half of the nineteenth century, was the process that allowed the ever closer integration of economies and societies of the world - in order to minimize costs - involving production, exchange of goods, information and thereby spreading the culture involved.

In this context, the future reserved for our world is integrally linked to the interaction of people from different cultures, relating to the distance of a click - due to the presence of modernity with their machines, everybody is very close - however, if we want future adults to be successful in this new reality, we must start now to open spaces within education so that people can learn to listen and interact with each other, thus learning to better relate. We need an education system that uses technology for knowledge and peace, and it is this order that this new system should bear for the education of this new citizen.

The world has been through constant changes in the last few centuries, but what about about education? For Khan,

Educational institutions and new models emerge at inflection points in History. Harvard and Yale were founded shortly after the colonization of North America. MIT, Stanford and the state university systems were products of the Industrial Revolution and the American territorial expansion. Currently, we are still in the early stages of a transformation that I believe is most important in history: the Information Revolution. (Khan 2013, 15)

In this context, it is expected that many activities will be rethought, as technological tools bring us closer, the knowledge cataloged in classes and the information content on the Internet.

I agree with D'Ambrosio (2012, p.1), when he states that, "The communication between generations and encounter groups with different cultures creates a dynamic cultural and cannot think of a static culture, frozen in time and space.". Besides that globalization approaches us under various looks / situations.

In this context, we can assume that future generations will organize the world and, therefore, we urge to find new ways of thinking about education in order to expand the creativity and development of new solutions to the problems that were created by Mankind until now.

The creation of new models is greatly important, because the analysis of the evaluations in various countries, including the Programme for International Student Assessment (PISA) - coordinated by INEP in Brazil, shows that some of our young people are not interested in learning.

Although young people are surrounded by information and make use of the internet as a tool to learn about the world around them, seeking to learn / know everything that interests them, they can not perform excellently in their own education.

Thus, remembering Mark Prensky (2001), who coined the terms in the past decade digital natives and digital immigrants, it can be related some guidelines for parents and teachers.

Fortunately, some teachers are digital immigrants who can not live without technology as a great ally in their search. But even so, as educators, we have a past that condemns us, or that haunts us, as we think some activities that do not make sense to younger, like going to the library looking for books or waiting someone return it. This is a very common habit among generations of the last century. If you remember these facts, surely you are a digital immigrant.

It is in this context that our intellectual baggage and technology allows us to access the facilities provided, and use, to promote quality education.

However, although well intentioned, some teachers still do not know what to do in the future that brings sci-fi technology to our everyday life. Some still insist on the same old system that they grew up, lost in a never ending discussion about when students should be allowed to use calculators in the classroom.

To change this scenery, we must understand the our own reality. The school model where we all graduated is the same for centuries, and it was even before our time. I agree with Motta (2013, 117) statement,

The transformations in the way of learning and teaching suffered significant interference such that everyone calls "Technological Era" and the Knowledge Society, in which the information arrives almost instantaneously, at the same moment that it happens.

Analyzing our practice under this light, we should find new ways to understand how the younger build their knowledge and how we can get closer to the reality experienced by digital natives, at the same time helping the younger to build a world with clean energy, sustainable, based on policies of peace and respect. What can we educators offer them

to build a future free of the evils of our present? The way the past generations have dealt with the future, anchored by the knowledge offered by Modernity, has resulted in our present. I agreed with D'Ambrosio's (2005, p.45):

that solutions to the ecological ethical and moral dilemmas existing nowadays leave the category of provisional determinations, becoming dynamic actions and in constantly evolving, it is necessary to think and implement any policy or action which review the direction of humanity with a whole.

In this pedagogical renewal, as Sir Ken Robinson (2004) said, education should be thought in a dynamic, innovative and creative way. In this sense, the way of teaching should value the knowledge, favoring the development of a plan of life, this is what can form new pedagogies.

According to Pierre Lévy (1998), the cognitive maps correspond to mental models and these are structural analogues of the world where the individual represents himself, although the mental image does not correspond to reality, one can combine the image's appeal some elements culture that pervades.

In this sense, the Internet offers freestyle research, keeping the information just a click away, regardless of socio-cultural barriers, and it brings people together through social networks and videochats available through some apps.

To Motta (2013, p.117) "it brings the need for reflection on a new act in this dynamic situation, whose teacher's knowledge matter and traditional teaching methods are put to the test"

It is in this sense that I believe that all the information and knowledge available in the social and research networks, in particular for young people, should be used in these projects and in the classroom so that the study process is something that motivates to learn about the world and its objects, turning the act of learning enjoyable and valued by young people.

2. SCHOOL TODAY: A BANKRUPT MODEL?

In summary, it is wise to say that to foster the search for solutions to problems that pervade the meeting between Mathematics Education and Educational Technology in a emancipatory perspective and therefore dialogical, it is a required action when it is intend to be school the social, technological and cultural interface to streamline the processes of teaching and learning during the life of the human being, considering that it is in this part of his life that he learns how to relate to the other and how to develop the mental structures he will use.

Therefore, the solidification of a research field for the construction of knowledge for improving the quality of mathematics teaching through critical reflection and technology becomes fundamental.

The process of globalization is changing some things around us, can be seen changes in politics, economy, culture, the history of humanity and thus also reflecting on education.

Today, the general consensus seems to be the need to teach mathematics in a context that is relevant to the student. It is in this context that the use of technological resources in teaching-learning process allows the interaction of all who are involved in it: school, family and society.

Even so, in the framework of mathematics teaching, there is still much debate about the use of technological tools - such as calculators, tablets, notebooks, software, online classes assisted by YouTube or on websites - that can serve to assist teachers and students in class.

It is important to remember that Illich was and still remains a questioner of the structures of society, openly criticizing and encouraging people to think about the education system and the degree of industrialization of the society, under penalty of human knowledge be limited to which the industrial society considers appropriate for the group in question.

Everywhere the hidden curriculum of schooling Initiates the citizen to the myth that bureaucracies guided by scientific knowledge are efficient and benevolent (Illich 1973, p. 74)

According to Illich (1975, p.9),

Everywhere, the student is led to believe that only an increase in production can lead to a better life. Thus settles the habit of consumption of goods and services, which denies individual expression that alienates, which leads to recognize the classes and hierarchies imposed by institutions

The author also contextualizes that school is a place of conflict and inequalities, where some will adapt better than others. He further explains that knowledge is presented to students so shallowly and rapidly, as Modernity want, and this will ultimately generate conformed teachers that are comfortable in this game and without time to deepen the knowledge or further knowledge to be taught, because the curriculum is closed.

In this context, we see that the school hides behind itself a bureaucratic and manipulative financial system founded by the industrial society.

The idea of school for all only begins to be diffused with the Industrial Revolution, because this elite needed skilled employees to operate and do not damage their machines for mass production.

Touraine (2004) contextualizes that our school system and also the labor market aims for the degree because, although considering that the school environment is bankrupt and universe youth is decontextualized, the school remains mandatory, with required knowledge to be taught according to political teaching projects that are decontextualized with social, economic and cultural life of these young people, thus it brings self-esteem issues to the not adapted students or problems of understanding in relation to knowledge presented, even the archaic form and uncompromising with reality which the young man falls.

To Sabba (2004, p.25), "the school may, in addition to the traditional triad: read, write and count, teach also see, to observe, to experiment, to report and represent - contemplating the draw - each element of nature and the world."

In this era of change, to learn in front of a computer screen is part of everyday life for all. Whether on a typical dish recipe typical of some culture or sophisticated mathematical calculation, the search for knowledge, fun, gatherings of friends - among other things - all caused changes in the act of knowing, being and thinking through the analysis of information of different medias. In this context, through many technological advances is impossible to think of educating without using information technologies and communication, but you cannot forget the cultural part of this training.

In a research commissioned by UNESCO, Jacques Delors (1998) reports that the main result of the Knowledge Society is the need for learning throughout life, founded on the four pillars of knowledge and continuing education: "Learning to know", "Learning to do", "Learning to be" and "Learning to live together."

According to Touraine, to learn to live together in peace is one of the great human achievement. We are increasingly connected to each other and to the world, and the internet brings us together and shows us an immense amount of data that must be processed so that this information is properly used for the construction of a better future.

Thus, the use of this knowledge is available to everyone in a unique way. While we all have access to it, this access is individualized, allowing each to analyze the information as many times find it necessary to learn it, and the best time to consider it all.

In the classroom, while teaching mathematics, one can see that there is still great fear of the educators to use any technology resource to introduce the concept of this discipline, and as it has very complex and abstract subjects, there is a greater difficulty in their understanding. In this context that the use of new teaching practices is present to introduce the student a clearer and concrete in some mathematical theory with practical application and makes significant discipline more accessible and better understood.

D'Ambrosio is right when he considers the number of students that are excluded from the math classes for not yet having developed mental structures that could be revealed by their teachers.

One of the concerns of a math teacher should be to show the naturalness of the mathematical exercise. In my generation when it came to mathematics, was a business for gods or geniuses. And with so many critical minds, many curiosities, how many inquirers, how much capacity abstractive we lost. (D'Ambrosio, 2005, p. 3).

Similarly, David Hilbert (1900) - who proposed the 23 issues that guided the mathematic of the 20th century, emphasized that a mathematical theory cannot be considered complete until it is possible to make it so clear that it could be explained to a random person in the street.

Thus, the technological resources that are being used by math teachers and students, may enable a better understanding of the contents required in teaching this discipline,

while allowing the student to be an active part in the process and not just a passive learner. This will also make it understand that learning is a continuous process in life.

3. THE BLACKBOARD TO THE WORLD: KHAN ACADEMY

The education system should adapt itself to the changes in society, but how to do that, when we see that in elementary and high schools some teaching practices do not stimulate to learn by building mathematical concepts through which make the students to be more active?

Teaching through the use of new technologies or virtual environments is just another way to bring the mathematics that exists in the world, in its objects and its relations packaged in a language more accessible for those who wish to learn.

The choice of language appropriate to broaden the understanding of mathematical content makes the students more interested in learning something that matches with their realities in which they operate. The use of art, symbols, diagrams, photographs and videos provides a different learning book and slate, and is getting closer to the younger.

Khan (2013) questions

How do people really learn? Does the classic model of the classroom - lectures in school, homework lonely night - still makes sense in a digital age?

Other areas, such as Neuroscience which is also dedicated to research for the improvement of these processes. One of the scientists who contributed a lot on this subject was the late neuroscientist Glenn Doman, known as the father of Early Learning, conducted extensive studies involving learning processes in infants and children with brain disabilities. His method of working was to encourage children before the usual period of having skills / learning how to read and perform math operations. Unfortunately in Brazil this concept is not known or widely used. However Doman continues to influence many generations in the US, Japan and other countries, and his research has won many followers all over the world.

Another researcher who is rethinking the ways of teaching and learning is Salman Khan, the first teacher and founder of the Khan Academy. He believes that "the way we teach and learn lives a pivotal moment that only happens every millennium" (2013p.9), thinking like Khan (2013) explains

The old model of classroom simply does not meet our changing needs. It is a form of learning essentially passive, while the world requires processing increasingly active.

It is in this sense that their classes are a hit on the internet. He was inspired by the educational technology developed in 1922 by Carleton W. Washburne - superintendent of schools in Winnetka. She rested on two key points. The first is that everyone could learn and second is that the structure of the model was based on understanding and

achieving goals, which ultimately dismantle the old models, based only on learning period.

Thus by solving exercises, students improve in different periods for the same level of knowledge, those who learn faster can do, or not, exercises for improvement. Who has more difficulty learning, is assisted by colleagues for individual tutoring or through exercises extras. Thus, workbooks for self-instruction were a hit at the time, but due to the high costs were left out.

Surveys were conducted to assess learning in these programs revealed, according to Khan (2013, p.46-47)

Students who are part of learning programs for the domain, at all levels, showed they had increased earnings in the results compared to those in traditional instruction programs. (...) Students retained for longer than had been taught in studies of both short and long term. Another study found that learning to the domain reduces the schooling gap between slower and faster without slowing down the fastest.

The studies also evaluated the satisfaction felt by teachers - who used the new techniques - front of the impact of the model and how students learned. Thus, "teachers who used learning for the domain (...) began to feel better about teaching and their professional role." (Khan 2013, 47).

4. FINAL THOUGHTS

As Sabba (2010), Khan (2013, p.48) agree that students should be responsible for their education, as well as their family.

Educating the younger generations is a challenge for parents, grandparents, uncles, teachers and educators around the world. What we thought was a national concern, extends worldwide. This fact leads us to inquire the educational model, which has been traditionally used in most Western countries.

It is important to note that being educated does not mean just learning scientific knowledge but use them in common situations. Khan shows that his teaching program is simple and easy to follow, in which even the graduates seek to learn about subjects they use in their daily lives. (Khan, 2013, p.173)

That is why it is said that Khan Academy is not only concerned with school education of human beings, but with the real dynamics of education to form people aware and thus build a true democratic and peaceful education!

As quoted in Sabba (2010) and Illich, the education does not require a formal school teachers in the manner that we were formed, we need the models to be rethought, because as seen in Khan, Americans are worried as they rank 23rd in the list of the best education in the world, while we Brazilians rank 85th.

Brazilians are really engaged in social media and cell phones use, but we insist on antiquated educational programs that do not value and do not allow the student to learn in his time. The act of going to school or university does not make learning easier.

When the student feels responsible for their learning and seeking knowledge, there are no obstacles that deviate from your goal.

It is precisely at this point that I consider that the new media facilitate access to this knowledge because they allow students to attend the same class as often as it deems necessary, return to the start when you want and at a time that suits him.

I believe this is a way to encourage the appropriation of the process of teaching and quality learning enabling continuous training of students anywhere, time or season of life without necessarily occur only in school. The technologies of information and communication, through assessments, can provide significant improvements in teaching to people everywhere.

REFERENCES

- ALMEIDA, M.E. **Education, projects, technology and knowledge**. Sao Paulo: Proem, 2011.
- BORBA, M. de C. and HAIRSTYLE, M. G. **Informatics and Mathematics Education**. 5th ed. Belo Horizonte: Authentic, 2012.
- BRAZIL. **Ministry of Education. National Curriculum: Mathematics**. Rio de Janeiro: DP & A, 2000.
- D'AMBROSIO, U. (2013). Available in <http://www.ufpa.br/ensinofts/etnomatematica.html> access in Mar 2013.
- D'AMBRÓSIO, U. **Education: from theory to practice**. Sao Paulo: Papyrus, 9th edition. Campinas. 2005.
- D'AMBRÓSIO, U. **Mathematics and Society - Distancing and approach**. Lecture, Group for Research and Study in Mathematics Education GPEEM - UNINOVE, April 19, 2012.
- DOMAN, G. **How to teach your baby math?** New York: Square one, 2005.
- FERREIRA, O. M. C. & SILVA JR, P. **Audio-visual resources for teaching**. Sao Paulo: EPU, 1995.
- GADOTTI, M. **Current Perspectives of Education**. Porto Alegre: Artmed, 2000.
- ILLICH, I. **Energy and equity**. Lisbon: SA da Costa, 1975.
- ILLICH, I. **Society without schools**. Petropolis: Voices, 1973.
- KHAN, S. **Um mundo uma escola**. Rio de Janeiro: Intrínseca. 2013
- MOTTA, S. **Educational technology in higher education: scenarios of distance education and evaluation institucional**. Porto Alegre: Penso. 2013.
- SABBA, C. G. **In search for education beyond school learning**. São Paulo: USP, 2010.
- VALENTE, J. A. **Analysis of different types of software used to Education**. J. A. Valente (Org), *The Computer in the knowledge society*. Campinas, SP: Graphic UNICAMP, 1999.