THE EVOLUTION OF EDUCATION 1.0 TO EDUCATION 4.0: IS IT AN EVOLUTION OR A REVOLUTION?

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Abstract. The education systems implemented in most countries today are characterised by the elements of Education 2.0, while very few countries are pushing for reforms defined by Education 3.0. The features of the development stages of Education from Education 1.0 to Education 4.0 are more or less clear. But talking about Education 4.0 with today’s technologies may not be so accurate. We do not know what will be the technologies in 15-20 years and how these will affect the learning processes. However, we do know that today’s technologies are not fully utilized in the current learning processes in school education systems. The objective of this contribution is to try to answer the question: is this an evolution or a revolution? Some related EU funded projects, like L-Cloud: Development of tomorrow’s Cloud Education Leaders and new digital-based student competitions will be discussed.

Key Words: Education, Evolution, Technology, Digital Learning.

From Education 1.0 to Education 3.0

In table 1.1 we present a comparison of some of the characteristics that highlight the evolution from Education 1.0 to Education 3.0. In some countries, one can see the Education 3.0 characteristics developing but still this usually depends on local authorities or private schools, which are usually more flexible in bringing change.

Table 1. From Education 1.0 to Education 3.0

Education	**1.0**	**2.0**	**3.0**
STAGE	Authority & Input-Centric	Output & Testing Centric	Learner & Student Centric
STUDENT	Passive recipient	Memorising input	Exploring new questions
TEACHER	Authoritarian	Expert	Facilitator
RELATION	Informative (Teacher Centric)	Knowledge through Testing (input-output)	Knowledge and Experience through Dialog and cooperation
PERSONAL TECHNOLOGY	Confiscated at classroom entrance	Acceptance and use with caution and no coordination	Everywhere , low cost but not free
TECHNOLOGY IN SCHOOL	Purchased with high cost and neglected	Open source and available on average cost	Low cost and are used with a plan
SCHOOLS ARE LOCATED IN..	In buildings	In buildings and on web	Everywhere/any place
THE PARENTS SEE THE SCHOOL AS…	Day care	Day care	A place where they can also learn

From Education 3.0 to Education 4.0

In Table 2 we present a comparison of some of the characteristics that highlight the evolution from Education 3.0 to Education 4.0.

Table 2. From Education 3.0 to Education 4.0

Education	**3.0**	**4.0**
STAGE	Learner & Student Centric	Co-Creation & Innovation Centric
STUDENT	Exploring new questions	Co-sensing & Shaping the Future
TEACHER	Facilitator	Coach
RELATION	Knowledge and Experience through Dialog and cooperation	Co-Creative, co-player

PERSONAL TECHNOLOGY	Everywhere , low cost but not free	Easily accessible, free and expected
TECHNOLOGY IN SCHOOL	Low cost and are used with a plan	Free and accessible by all and everywhere
SCHOOLS ARE LOCATED IN…	Everywhere Coffee shops, restaurant, work areas	On the Cloud or some technology, we still do not know.
THE PARENTS SEE THE SCHOOL AS…	A place where they can also learn	A place where you can develop skills and creativity for innovation.

Discussion and Conclusions

The next question is how we prepare our school leaders for this evolution so future school students and teachers can have the tools, competences and skills to adapt to the changes.

The Cloud Computing industry is experiencing exponential growth and is the foundation for ubiquitous digital administrative and operational systems, including education. Supporting products, such as mobile device applications are multiplying, including email, information storage, file sharing, collaborative tools, digital communication and other services.

School learner expectations are changing. They require ready access to collaboration tools and content. As a result, educational institutions must show significant leadership to embrace such challenges and provide greater inter-operability between the organisation and student platforms, as well as 24/7 access to secure, reliable networks and the ability to create, deliver, and share content across the institution on any number of devices.

The European Commission acknowledges that Europe must become much more ‘Cloud active’ to stay competitive in the global economy. It has tackled major barriers surrounding legal issues, data security and copyright. Computer systems provide a quick, reliable, 24/7 service, which requires a different service model.

Cloud Computing adoption in education remains fragmented because, while Cloud Technologies offer many advantages, decision makers are largely unaware of the potential benefits for learning, teaching, administration and management. Therefore, training and support systems are needed to help them keep up to date with the rapidly changing Cloud Computing environment.

As a result of an EU funded Network project during 2013-2016 named ’School in the Cloud’ [1], it was demonstrated that leadership for change is

needed. The main issue today is no longer access to technology, but the capability to establish meaningful leadership for Cloud-based learning, teaching and administration.

Having all of the above in mind a set of stakeholders from several countries in Europe have managed to develop projects and receive EU-funding that contribute to the necessary tools and resources. Some of the projects are listed here below.

2019 - 2021 projects:

1. STEAME: *Guidelines for Developing and Implementing STEAME Schools*

www.steame.eu ;

2. INNOMATH: *Innovative enriching education processes for Mathematically Gifted Students in Europe*

www.innomath.eu ;

3. E-I-STEAM:*Educational Info-graphics for STEAM*

https://steam-edu.eu/#competitions ;

4. LEARN+: *Building Communities of teachers producers to implement*

t personalised learning of mathematics supported by machine learning and block chain to assess competences;

https://learnmore.milage.io/#competitions ;

5. C-DAOEF: *Development of Computerised adaptive applications for the dynamic assessment and enhancement of executive functions in students with neurodevelopmental and learning disorders*

http://adaptivelearning-project.eu/#competitions .

Progress information for the five projects above can be read through www.cms.org.cy.

The above will be difficult to apply without having a path for developing future Adaptive Cloud Education leaders, as the speed of technological change will be so fast in the future that teachers and citizens will not be able to be trained all the time as, by the time of training completion, the application of tools may easily become obsolete.

Therefore, since 2018 the EU-funded project L-Cloud: Developing Tomorrow's Cloud Education Leaders (October 2018 – 31 October 2020) [2], is finalized with the following three outputs, published on www.L-Cloud.eu:

1. Guidelines for Skills and Competences for Adaptive Education Cloud Leaders;

2. Qualification Framework for Education Cloud Leaders based on Skills and Competence with an International Professional Certification Programme;
3. A MOOC and Webinar for developing adaptive education cloud leaders.

Considering all of the above and through the experiences and reflections between more than 50 partner organisations from almost all European Countries, the answer to the questions 'is it an evolution or a revolution' is currently the following. The conclusion is that it is a revolution for teacher's competences and may be for school infrastructure and an evolution for student learning as a necessary subsequence of technology development and because they like it.

References

[1] Project "School on the Cloud": https://www.schoolonthecloud.net/;

[2] Project "L-Cloud: Developing Tomorrow's Cloud Education Leaders": www.L-Cloud.eu.