

ITU Kaleidoscope 2016
ICTs for a Sustainable World

Quality and Standardization in Technology-Enhanced Learning

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Outline

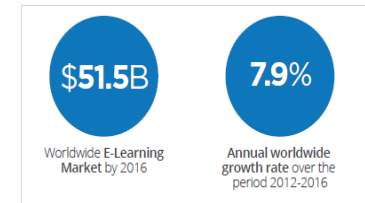
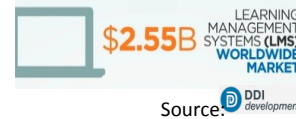
- Motivation
- Background
- Overview of Newton
 - ... some TEL methodologies
 - Adaptive Multimedia and Mulsemedia
- Standardization proposal
- Pilot Study
- Conclusion



Universidad del País Vasco
Euskal Herriko Unibertsitatea
The University of the Basque Country

Motivation

- E-Learning – fast growth in the last decade
 - Global E-Learning market
 - \$35.6 billion in 2011
 - \$51.1 billion in 2016
 - expected to reach \$7 billion in 2018
 - LMS market
 - \$2.55 billion in 2013
 - over \$7 billion in 2016
- Rapid advance of new multidimensional applications and services: TEL
- Increase learner experience, learning process and learning outcome
- A better access to education for people with disabilities
- Learner QoE as influenced by TEL – lack of standardized frameworks



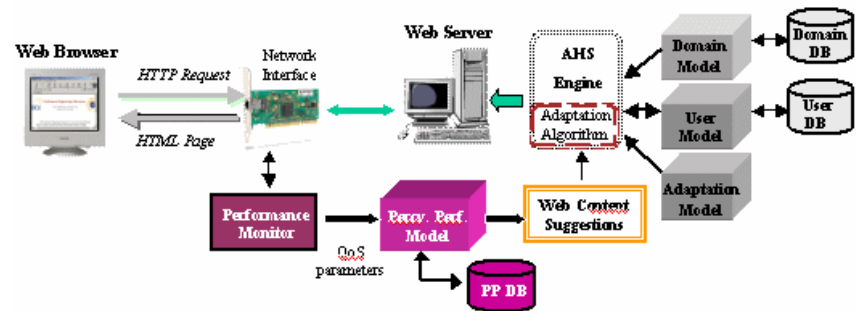
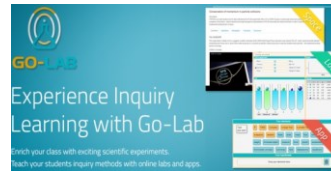
Source: E-Learning Market Trends & Forecast 2014 - 2016 Report (Docebo)



<https://elearningindustry.com>

Background

- A lot of studies and research have been conducted over the past few years focusing on the analysis and benefits of TEL.
- Some interesting initiatives in developing real functional platforms:
 - The Go-Lab portal
 - Phet
- Nevertheless...
 - No use of new TEL strategies: mulsemmedia, gamification, interactive augmented reality
 - Few initiatives on the analysis on the learner QoE

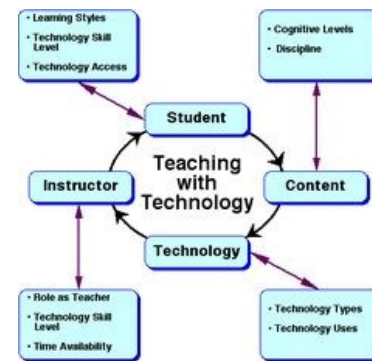
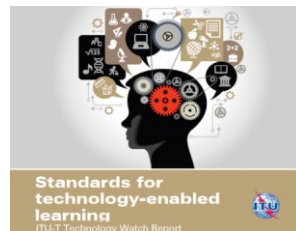


Source: <https://journals.tdl.org/jodi/index.php/jodi/article/view/179/159>

Background (II)

- Promising standardization initiatives related to TEL
 - ITU-T F.742: *"Service description and requirements for distance learning services"*
 - ISO/IEC JTC1 Subcommittee 36
 - MPEG-V (ISO/IEC 23005)
 - MPEG-7 (ISO/IEC 15938)
- Nevertheless, future work and novel proposals are needed to standardize a framework and procedures to better understand how new generation learners would react to such experiences.

User interfaces Assessment
 Accessibility Learner information
 Quality of service Runtime
 ePortfolios Application profiles Metadata
 Educational modeling languages
 Intellectual property and digital rights Platform and media
 Localization and internationalization
 Competency definitions Content aggregation
 Vocabularies Architectures and interfaces
 Digital repositories
 Collaboration



Overview of NEWTON

- Horizon 2020
- Academia and industry
- 7 different European countries
- 14 partners

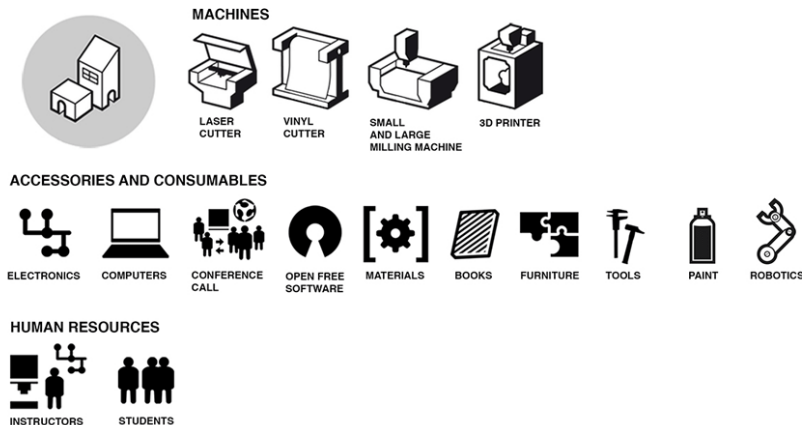


www.newtonproject.eu



Overview of NEWTON

- Aims to provide a pan-European learning platform
- Facilitates the delivery of STEM (Science, Technology, Engineering and Mathematics) subjects
- Addresses learners from a variety of backgrounds: secondary and vocational schools, third level education, people with disabilities
- Will integrate a set of distributed labs: existing state-of-the-art teaching labs (e.g. FabLabs) and newly created teaching labs



New TEL Methodologies

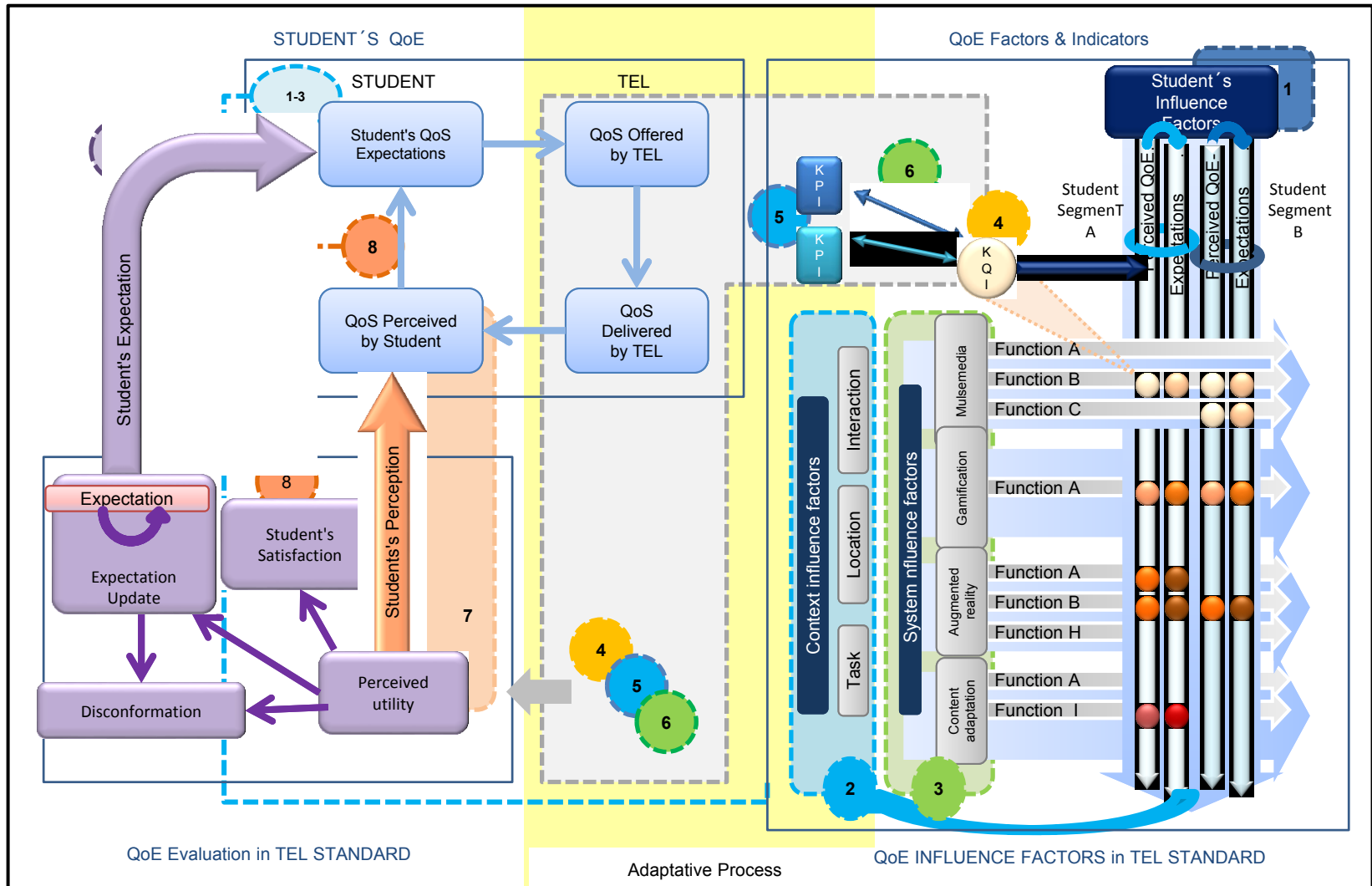
- **One of the main NEWTON goals:** develop innovative TEL methods that will be integrated in the platform
 - learner model-based personalisation
 - gamification
 - augmented reality
 - multimedia and multi-sensorial (mulsemedia) content delivery
 - adaptation of content delivery to learner operational environment: variation of network conditions, user device characteristics and user profile

Adaptive multimedia and mulsemedia

- Initial studies demonstrated that content adaptation can improve learning experience
- In NEWTON's case the adaptability has a three-fold purpose: to increase user/learner QoE, the learning experience and the learning outcome
- Researchers in neuroscience sustain as a best practice in learning the engagement of multiple senses – maximum possible
- Learning can be deeper, richer and more memorable experience and more effective
- People have a multisensory brain that has evolved to develop, learn and operate in multisensory environment
- A multisensory-based learning setting is natural for the human brain
- Important : the stimulation of compensatory senses (people with disabilities)

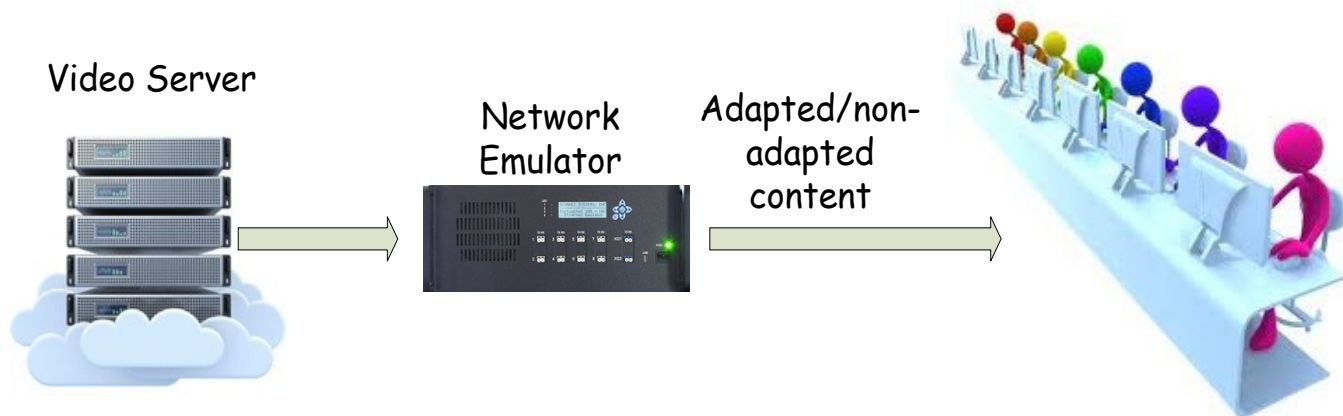


Standardization proposals for QoE evaluation in TEL



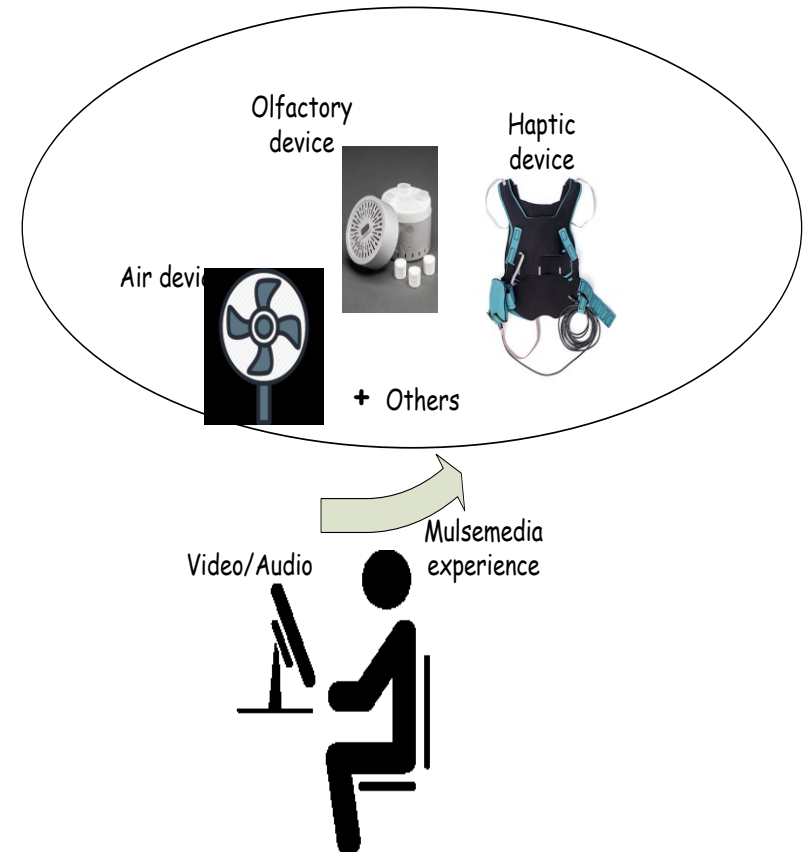
Pilot Study

- Adaptive multimedia and mulsemedia in learning
 - Students of the second year of the official Master in Telecommunication Engineering, attending the “Performance on Telecommunications Networks” course of the UPV/EHU
 - Same pilot is planned to be carried also in Dublin, Ireland in Dublin City University (DCU), at the master level as well.
 - Results obtained in both institutions, UPV/EHU and DCU, will be analyzed and compared.



Pilot Study (II)

- **Main goal:** to measure the influence of the employed innovative technologies on
 - increasing learner QoE
 - design and propose a corresponding framework
 - improving learning process
 - increasing learning outcome.



Conclusions

- Novel initiative to create a network of new and existing teaching labs in the aim to develop a pan-European learning platform.
- Attract students to STEM studies and to support the learning process of people with special needs through the enhancement of the student learning process by means of the analysis of the learner QoE.
- Use of new TEL tools and strategies (multimedia, gamification, augmented reality, etc.).
- Platform will be tested and validated in real life pilots across Europe.
- Based on the achieved results the definition of new standards to unify criteria on the QoE evaluation on TEL platforms for comparable results will be faced.

Questions



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