Enhancing Technology in Teaching & Learning
(Course ID: 471707)
Learning & Teaching PhD Programme
An-Najah National University
Palestine

July 7 – 9, 2020

eLearning reference model for a non virtual or distance university

Francisco José García-Peñalvo
Computer Science Department
Research Institute for Educational Sciences
GRIAL Research Group
University of Salamanca, Salamanca, Spain
fgarcia@usal.es

CAMPUS DE EXCELENCIA INTERNACIONAL

Course data

Course	**Course title: Enhancing Technology in Teaching & Learning** Course ID: 471707
Description	This course addresses the strategies of employing technology in teaching and learning, focusing on a number of related notions such as open learning, e-learning, blended learning, and electronic course design. It also addresses the notion of open electronic sources, how to produce and publish them, and how to access and make use of the published resources through databases and free open online sources. It also addresses electronic publishing and its ethics and licensing
Academic year	2019-2020
Duration	8 weeks
Workload	3 academic credits
Number of lessons	14, 2 lessons a week (1 hour, each); 7 lecture-weeks + 1 assessment
Start	June, the 9th, 2020
End	July, the 28th, 2020
Competences	• Effective use of technology as a complement to improve learners' habits, competences and performance • Effective use of technology as a key tool to facilitate learning processes • Effective use of technology as a key tool to design, use, re-use, implement, asses, manage and perform excellent online courses and teaching methodologies

Course data

An-Najah. PhD Programmes in Learning & Teaching. Summer Course on TEL, 2020

Schedule of live lectures and weekly topics

Nr	Date	Forename of lecturer	Surname of lecturer	Title of lecture
1	June, 9	Daniel	Burgos	Technology-enhanced learning as a key milestone in education
2	June, 11	Daniel	Burgos	Effective tools for teaching online
3	June, 16	Saida	Affouneh	Online support for online learner and teachers
4	June, 18	Saida	Affouneh	Online support for online learner and teachers
5	June, 23	Khalid	Berrada	Open Educational Resources and Open Science
6	June, 25	Khalid	Berrada	Designing LMS platforms to disseminate OER at the university
7	June, 30	Alberto	Corbi	State-of-the-art methods and tools for assignment completion in online STEM education
8	July, 2	Alberto	Corbi	State-of-the-art methods and tools for assignment completion in online STEM education
9	July, 7	Francisco José	García-Peñalvo	eLearning reference model for a non virtual or distance university
10	July, 9	Francisco José	García-Peñalvo	eLearning reference model for a non virtual or distance university
11	July, 14	Ahmed	Tlili	Application of games and gamification in the learning process
12	July, 16	Ahmed	Tlili	Application of Smart educational games to enhance learning outcomes
13	July 21	Katherine	Wimpenny	Collaborative Online International Learning (COIL)
14	July, 23	Katherine	Wimpenny	Collaborative Online International Learning (COIL)
15	July, 28	Saida, Daniel	Burgos, Affouneh	Presentation of final project

Contents

1. Institutional context

University of Salamanca

- Oldest university in Spain (since 1218, more than 800 years of history)
- Medium-size university (around 30,000 students)
- Traditional, face-to-face university
- https://www.usal.es/

VNiVERSiDAD D SALAMANCA
CAMPUS OF INTERNATIONAL EXCELLENCE

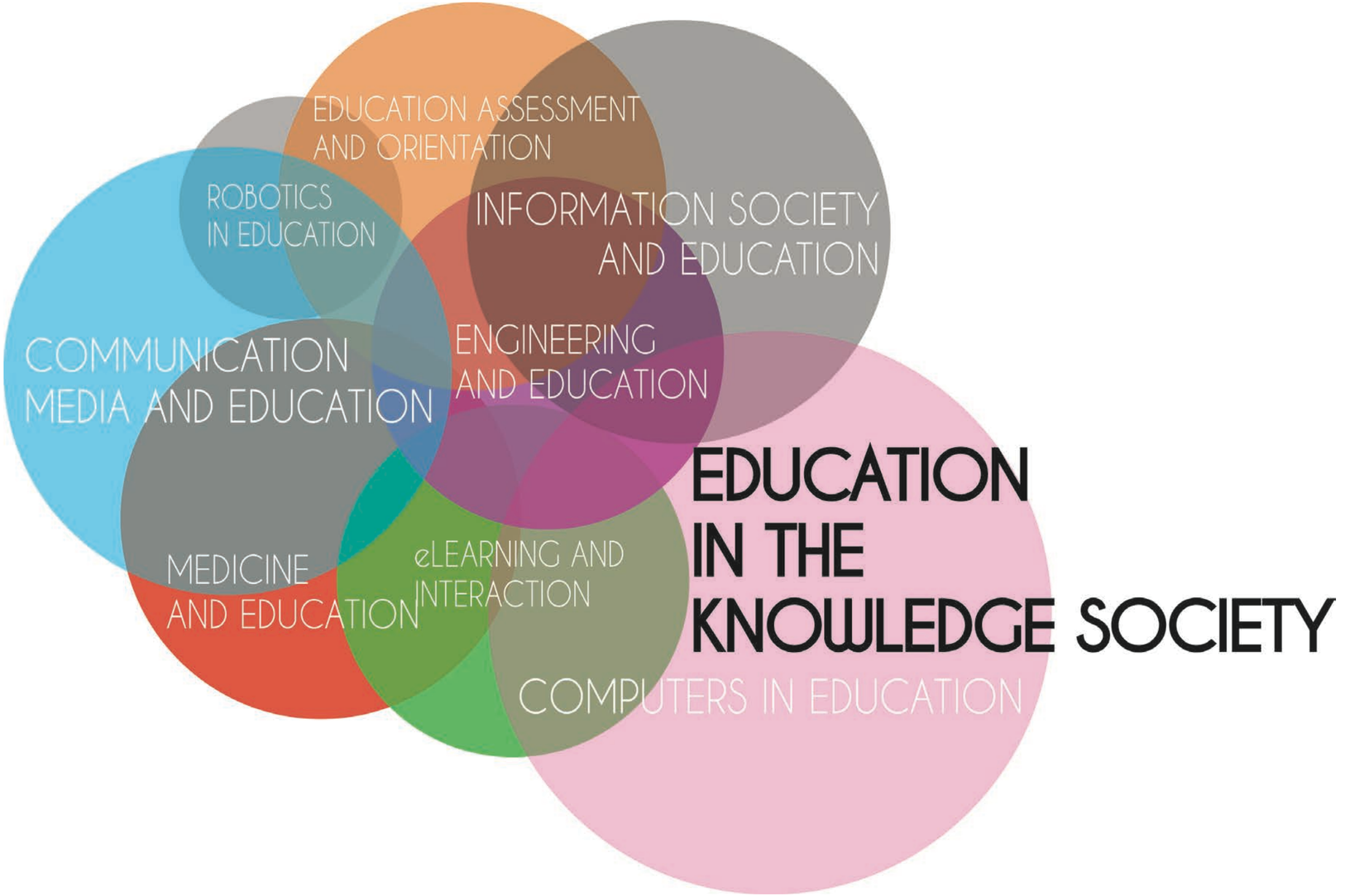
University of Salamanca

https://youtu.be/jPpF0HYs6cg

Research Institute for Educational Sciences

- IUCE - https://iuce.usal.es/
- The IUCE is characterized by its interdisciplinary nature in both research-innovation activities and training of university teachers

Education in the Knowledge Society PhD Programme [1-5]



Education in the Knowledge Society PhD Programme

- Official degree of the University of Salamanca
- Linked to and supported by the research groups of the Research Institute for Educational Sciences
- The teaching&learning processes and technological advances are taken as the driving force behind the advancement of the Knowledge Society
- Interdisciplinary approach
- More information at
  http://www.usal.es/webusal/node/30026
  http://knowledgesociety.usal.es

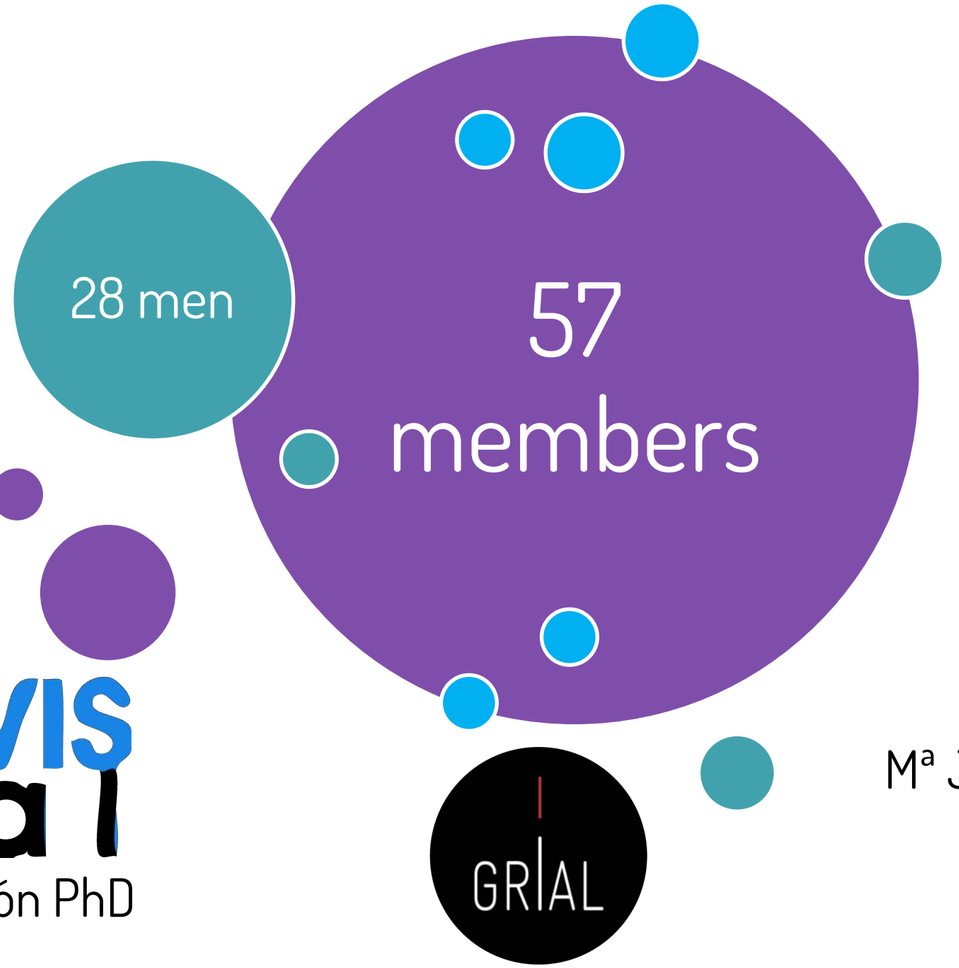
GRIAL Research Group [6-7]

- Recognized group inside the University of Salamanca (since 2006)
- Excellence research group (since 2007)
- https://grial.usal.es

Who we are

GRIAL is a multidisciplinary research group, fundamentally a mixture of Informatics and Education, but including researchers from other disciplinary fields (Philosophy, Philology, Humanities, etc.)

Who we are



Roberto Therón PhD

Mª José Rodríguez Conde PhD

Francisco J. García Peñalvo PhD

Research lines

- Digital humanities
- eLearning methodologies
- ICT and educational innovation
- Information science
- Interactive learning systems
- Learning Technologies
- Quality and assessment in education
- Social responsibility and inclusion
- Strategic management of knowledge and technology
- Technological ecosystems
- Visual analytics
- Web engineering and software architecture

Photo by Ivy Son from Pexels

Selected projects

Building the future of Latin America: engaging women into STEM
https://wstemproject.eu/ [8-10]

Promoting Open Education through Gamification
https://opengame-project.eu/ [11]

Integrating STEAM and computational thinking development by using robotics and physical devices
http://robosteamproject.eu/ [12-13]

2. Presenting the issue

Transformation and new actors [14-17]

- The digital transformation in higher education is unstoppable
- The most advanced universities have not considered online training as a second-class product and have created well-defined strategies
- There are companies that are entering the higher education sector with online products

Welcome to reality by Georgin-chan
http://www.deviantart.com/

Growth of the eLearning sector [18]

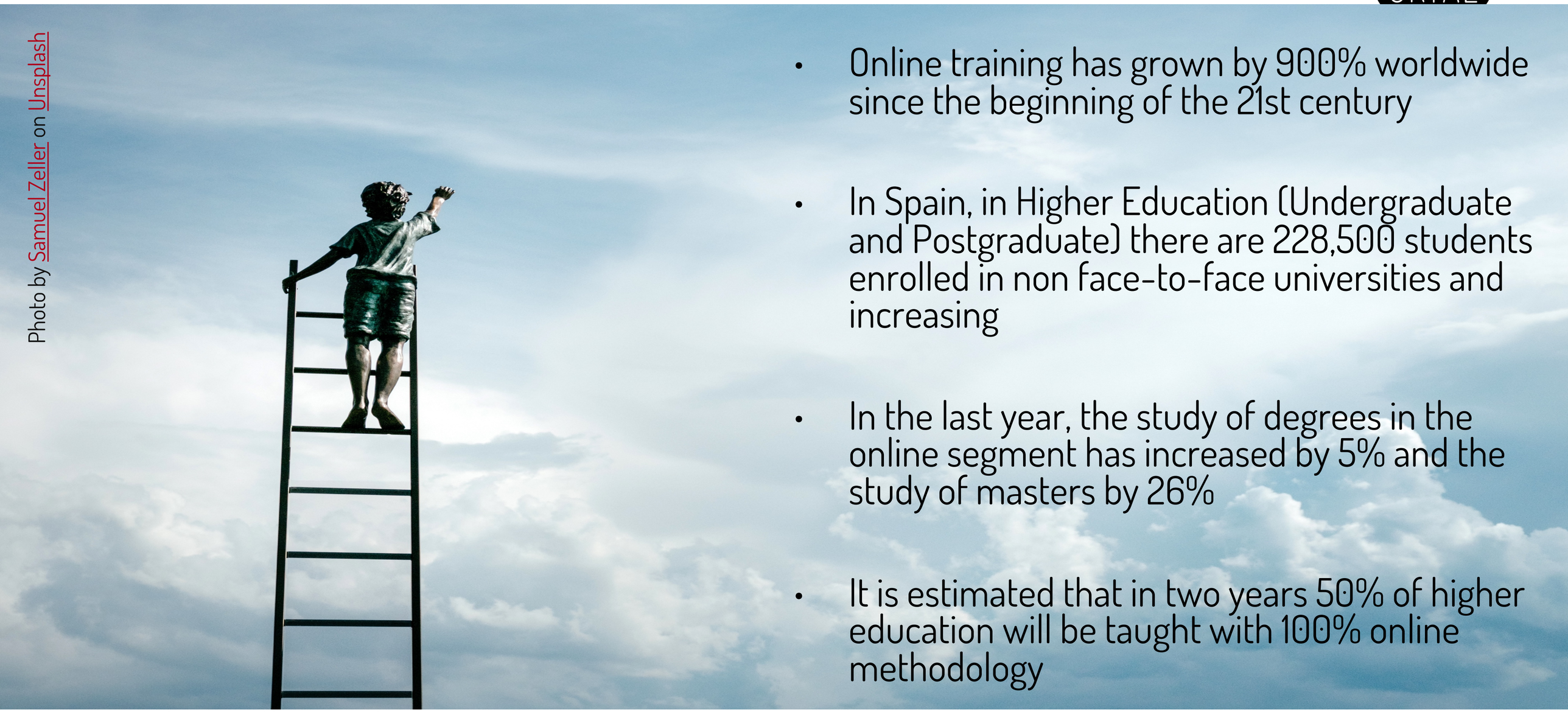


Photo by Samuel Zeller on Unsplash

- Online training has grown by 900% worldwide since the beginning of the 21st century
- In Spain, in Higher Education (Undergraduate and Postgraduate) there are 228,500 students enrolled in non face-to-face universities and increasing
- In the last year, the study of degrees in the online segment has increased by 5% and the study of masters by 26%
- It is estimated that in two years 50% of higher education will be taught with 100% online methodology

The objective of a face-to-face university should not be to become an online university, therefore, it should differentiate itself in offer, quality and innovation

There are different perspectives on what eLearning is

The objective is to present the different approaches to the concept of online education


https://unsplash.com/photos/Zdf3zn5XXtU

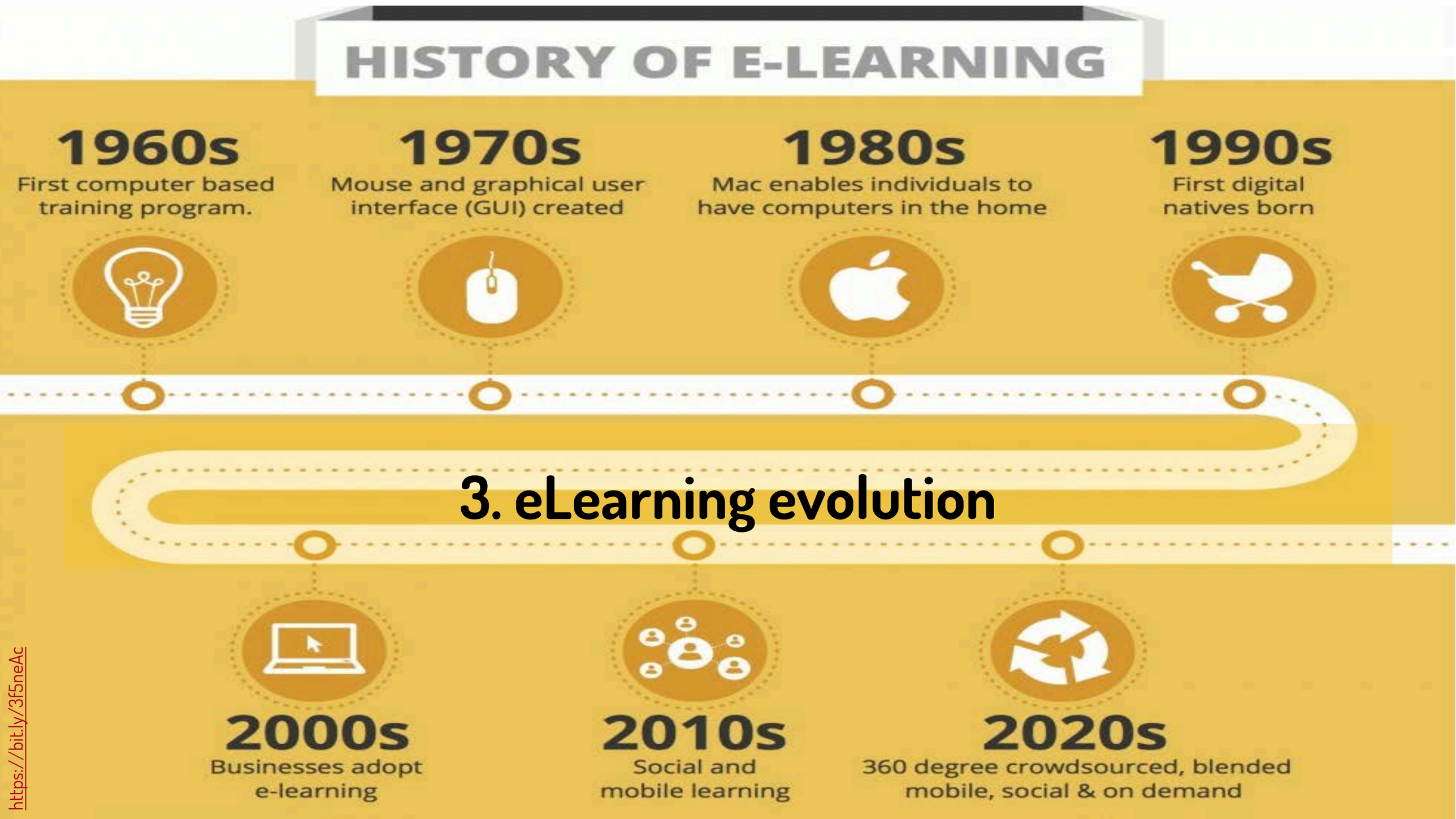
Digital divide [19]

- Access Gap
- Usage gap
- Skills gap

Gap in the educational methodologies [20]

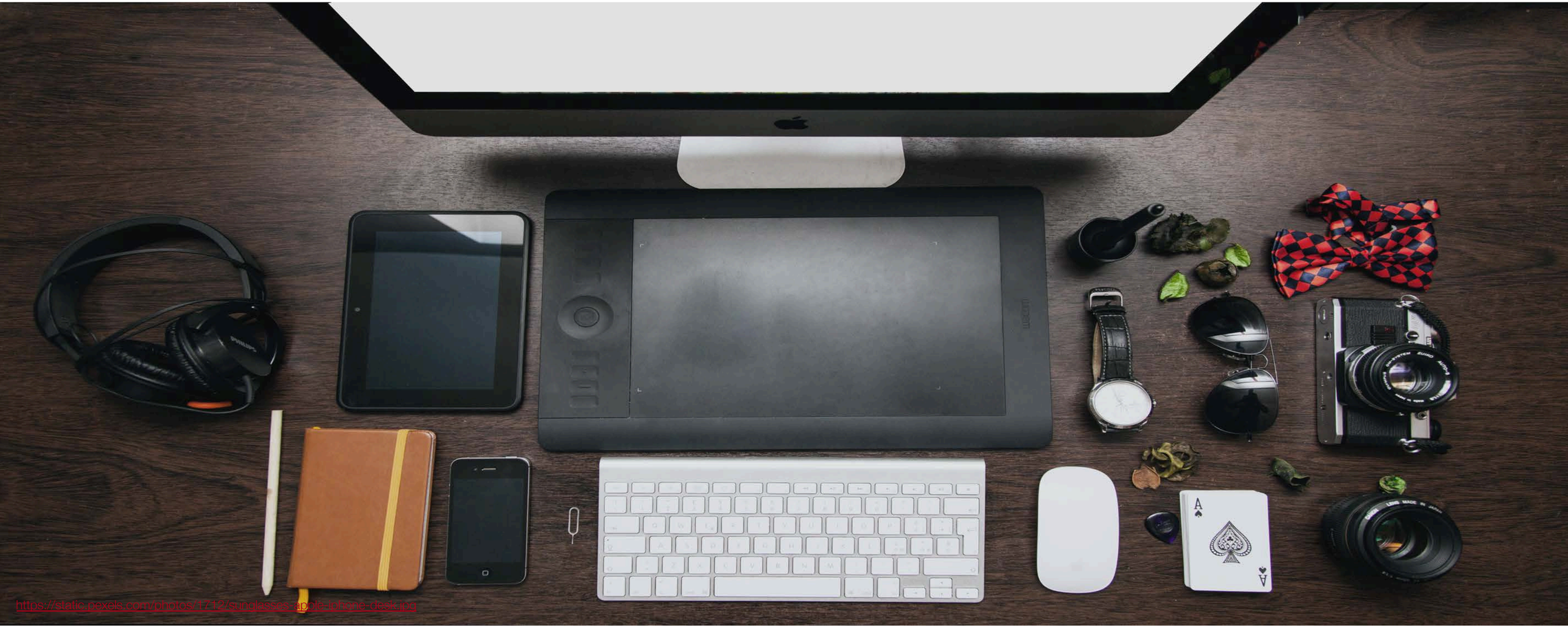
https://unsplash.com/photos/NYKAZIzW0Nw

3. eLearning evolution



https://bit.ly/3f5neAc

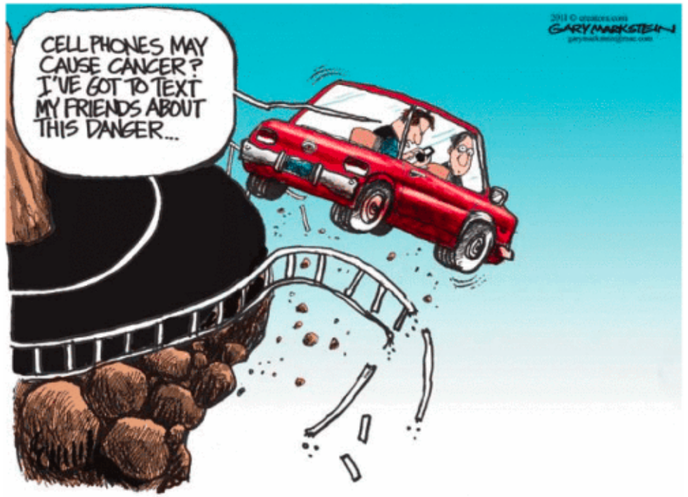
Technology is part of our daily lives...

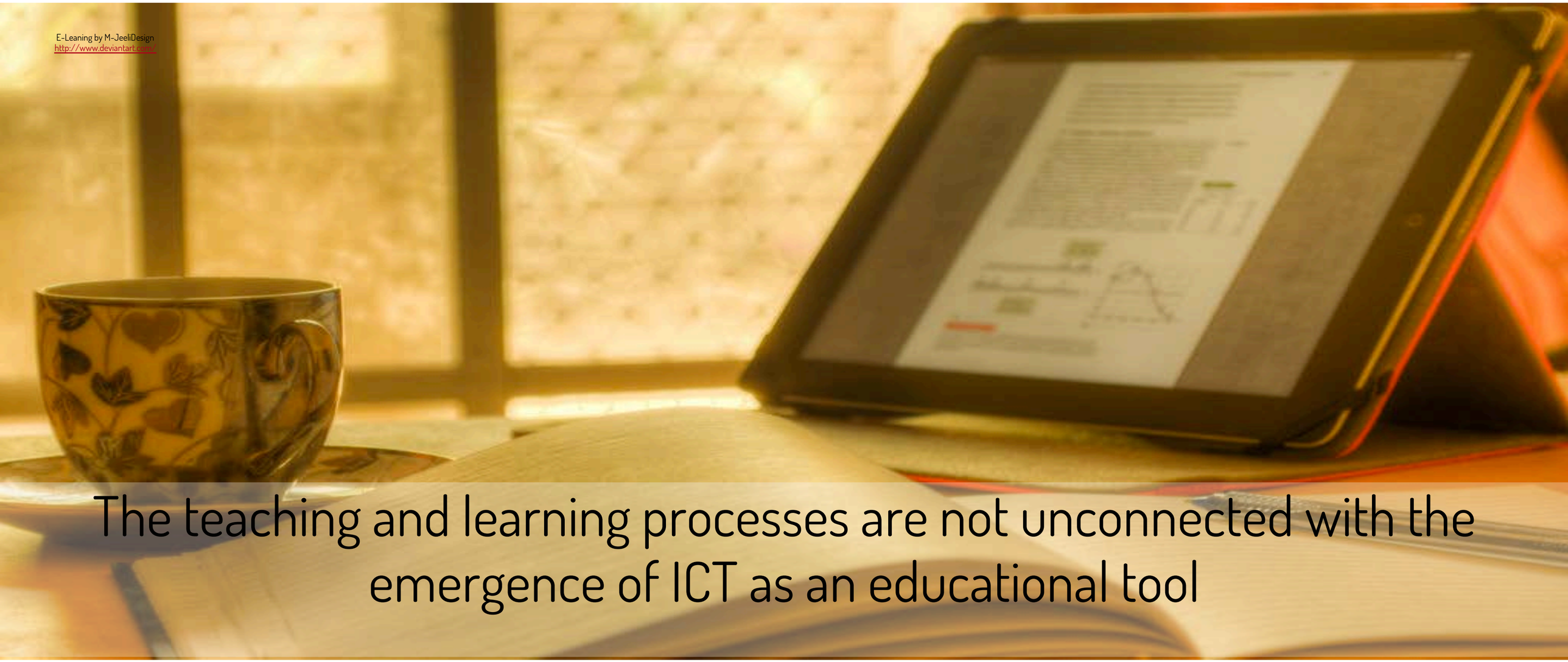


https://static.pexels.com/photos/1712/sunglasses-apple-iphone-desk.jpg

… and it changes our habits

"I'm trying to be more active. Which one burns more calories, Twittering, Blogging or Googling?"



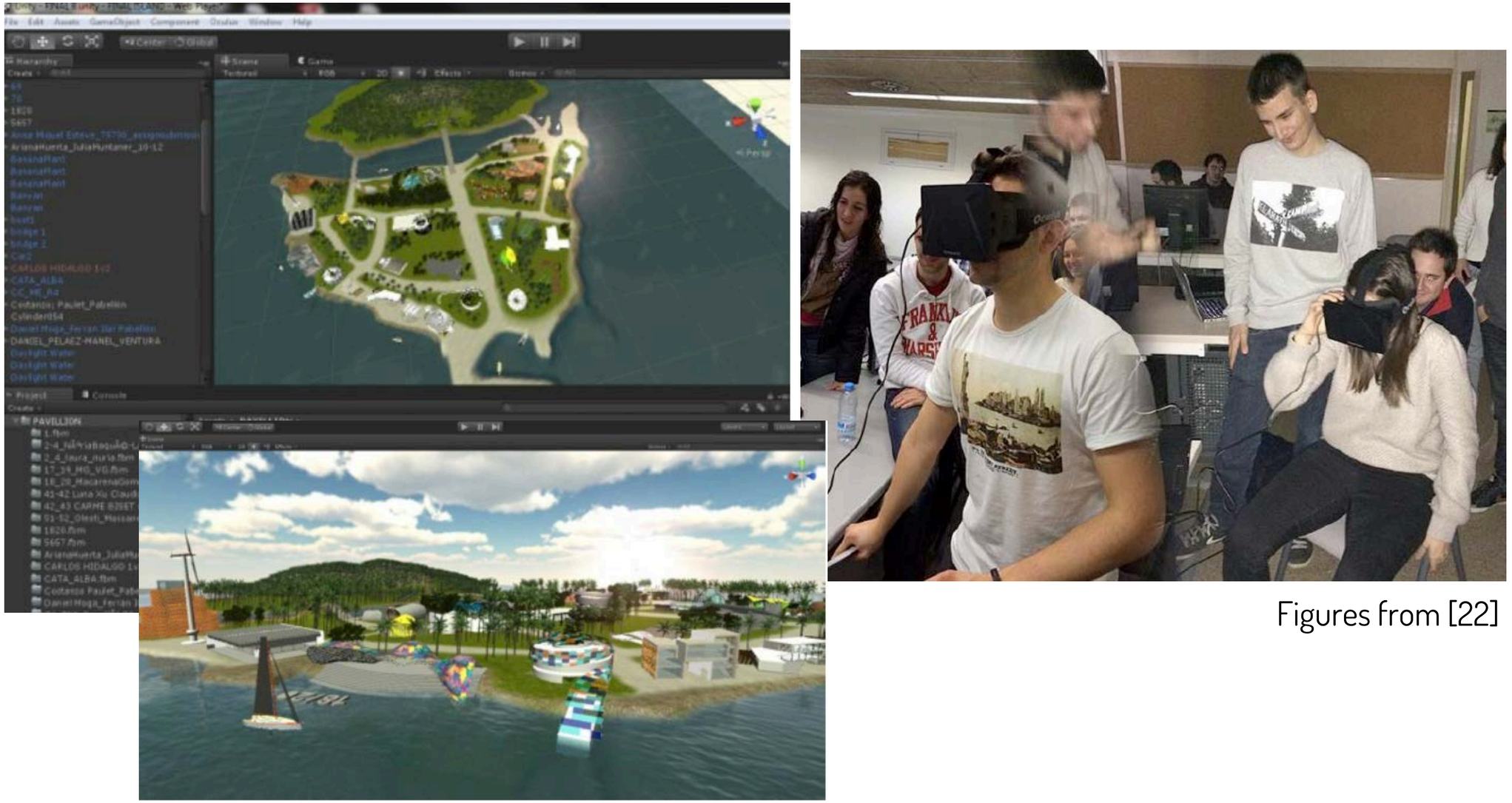


The teaching and learning processes are not unconnected with the emergence of ICT as an educational tool

Figure from [21]

Producing advances and innovations at an exponential rate, much faster than their adoption capacity

Producing advances and innovations at an exponential rate, much faster than their adoption capacity



Figures from [22]

Phases in the life cycle of a technology

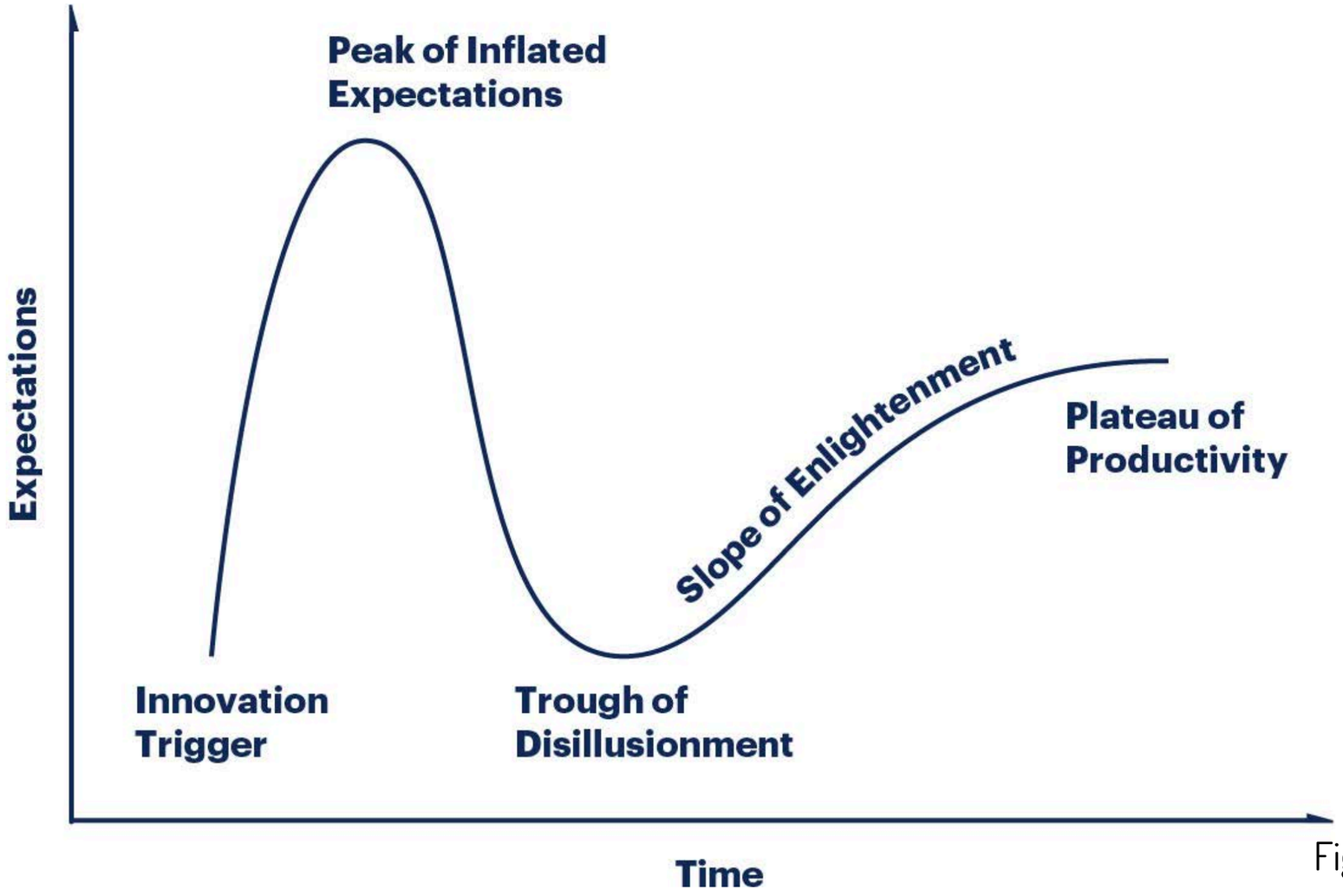
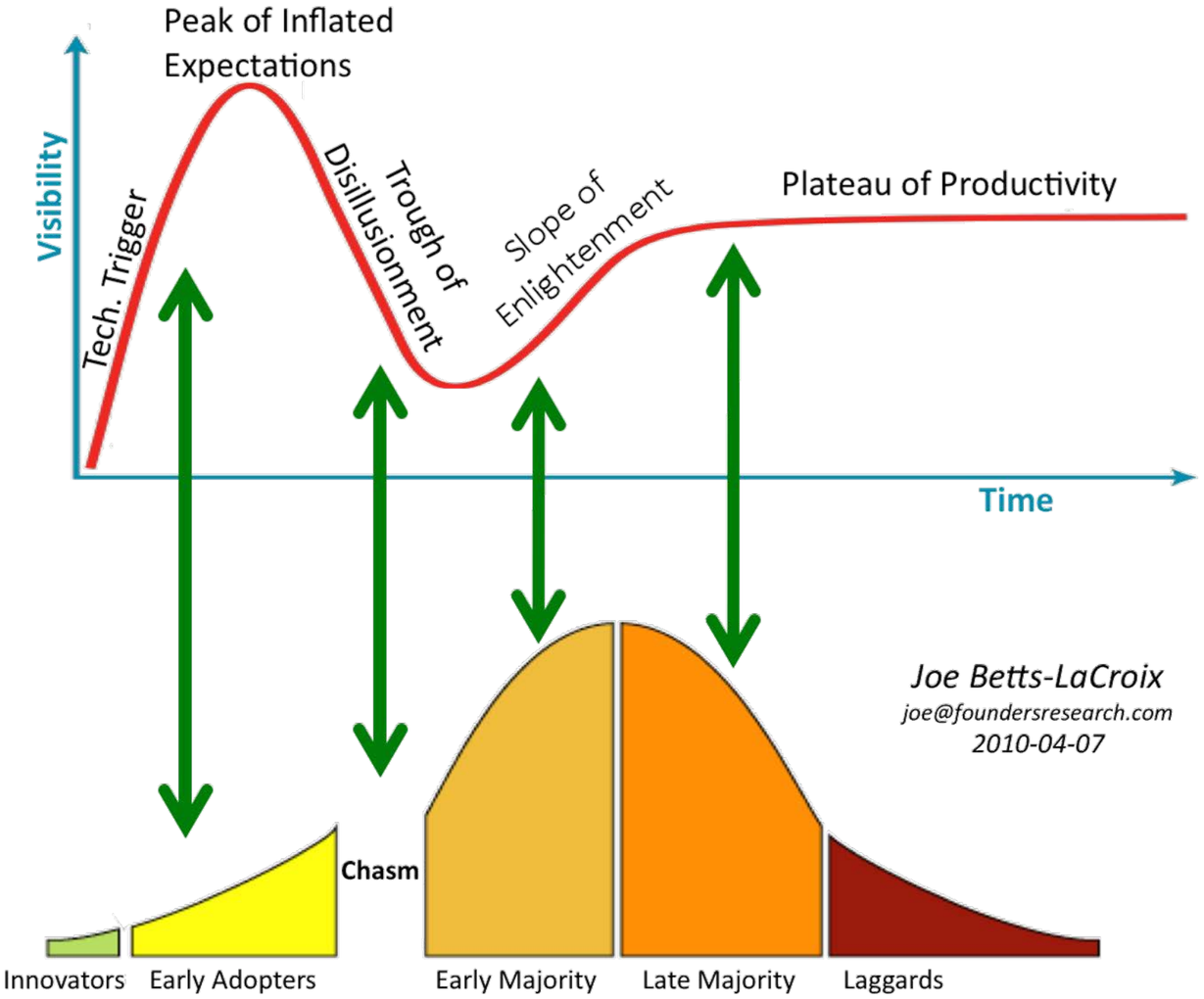


Figure from [23]

Hype Cycle for Education

Dissemination and adoption of technology



Evolution of the eLearning concept

Timeline metaphor [24, 25]

Generation metaphor [26, 30]

Three generations of eLearning [30-31]

- The different generations do not replace each other, but live together [29]
- The maturity of the former brings with it the evolution of the latter and the appearance of new ones

First generation

- Emergence of the concept of the eLearning platform or LMS (Learning Management System) as an evolution of Virtual Learning Environments [32]
- LMS were more focused on digital content than on interaction
- There was a concern for technological rather than pedagogical aspects
- There was an influence of the educational multimedia, educational software, intelligent tutors [33] and adaptive hypermedia [34-36]

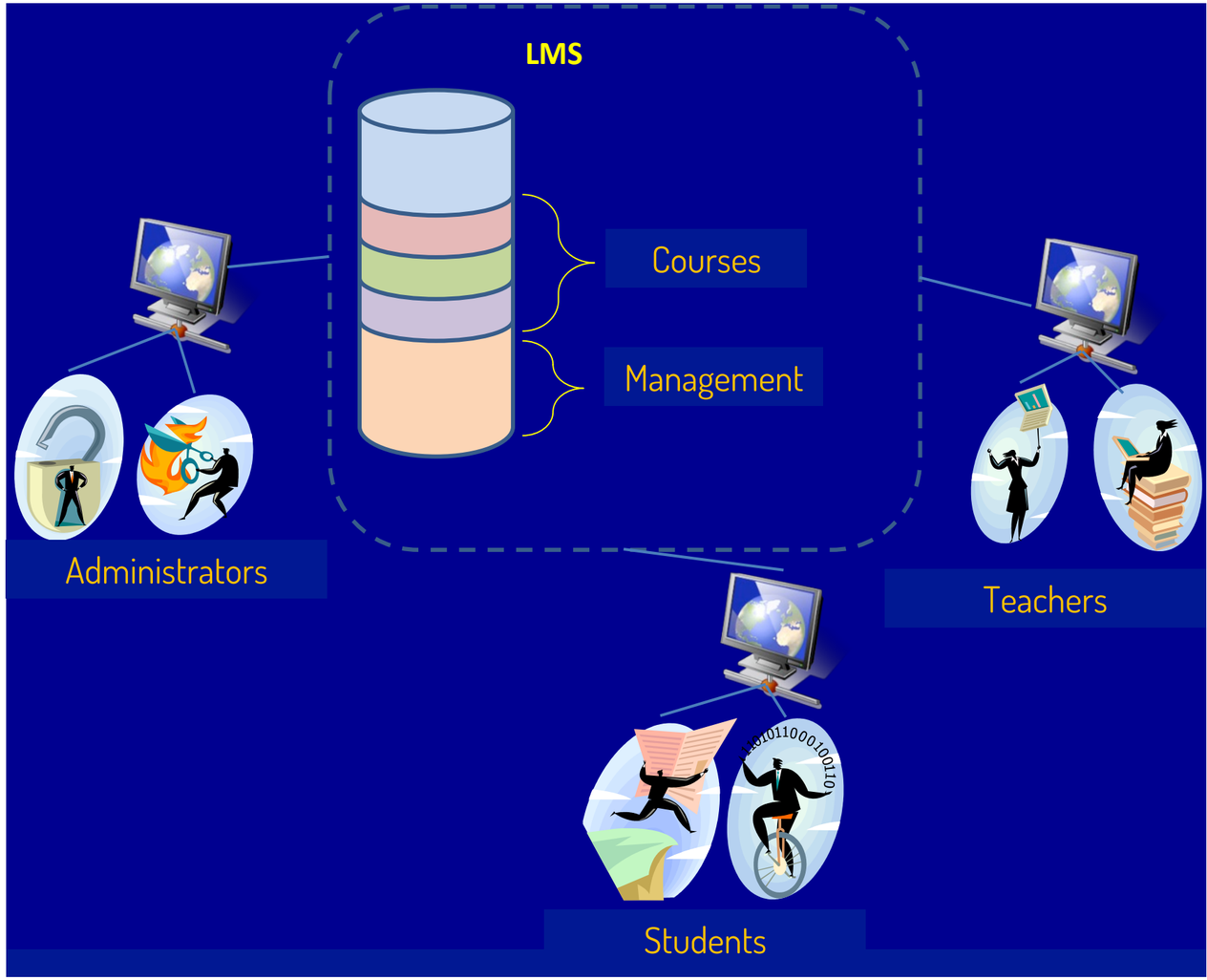


Figure adapted from [37]

eLearning definition (1st generation)

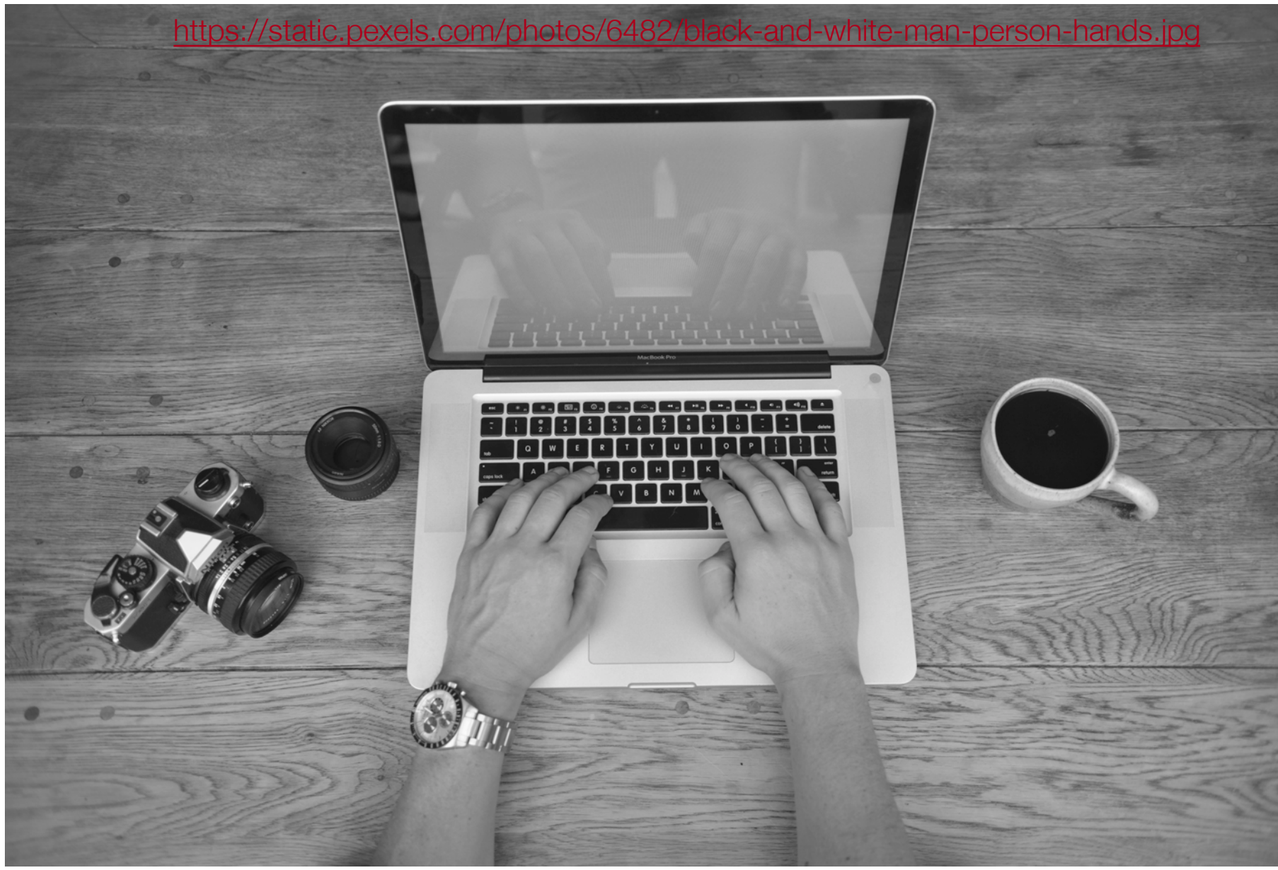
Tele-learning is the connection between people and resources through communication technologies with a learning purpose [38]

eLearning is the delivery of content through any electronic medium, including the Internet, intranets, extranets, satellite communication, video and audio tapes, interactive television and CD-ROMs. eLearning is defined more narrowly than distance education, which would also include text-based learning and correspondence courses [39]

eLearning is the non-attendance education that, through technological platforms, enables and makes more flexible the access and time in the teaching-learning process, adapting them to the skills, needs and availability of each student, as well as guaranteeing collaborative learning environments through the use of synchronous and asynchronous communication tools, in short, enhancing the competence-based management process [40]

Second generation

- Greater emphasis on the human factor
- Interaction as the differentiation from the mere publication of content
- Development of Web 2.0 [41] to define an eLearning 2.0 [42]
- The foundation for Learning Analytics is established [43]
- The beginning of mLearning [44] and virtual worlds [45]
- Evolution of LMS to support mobility, socialization and interoperability [46-47]
- Open knowledge movement [48]



Social networks

- Social networks have an important social acceptance
- Social networks have a high potential in their application to education
- Community of Practice Concept [49]

https://unsplash.com/photos/5KKglNI852A

Learning analytics types

TYPE OF ANALYTICS	LEVEL OR OBJECT OF ANALYSIS	WHO BENEFITS?
Learning Analytics	**Course-level:** social networks, conceptual development, discourse analysis, "intelligent curriculum"	Learners, faculty
	Departmental: predictive modeling, patterns of success/ failure	Learners, faculty
Academic Analytics	**Institutional:** learner profiles, performance of academics, knowledge flow	Administrators, funders, marketing
	Regional (state/provincial): comparisons between systems	Funders, administrators
	National and International	National governments, education authorities

Table from [50]

Learning analytics reference model

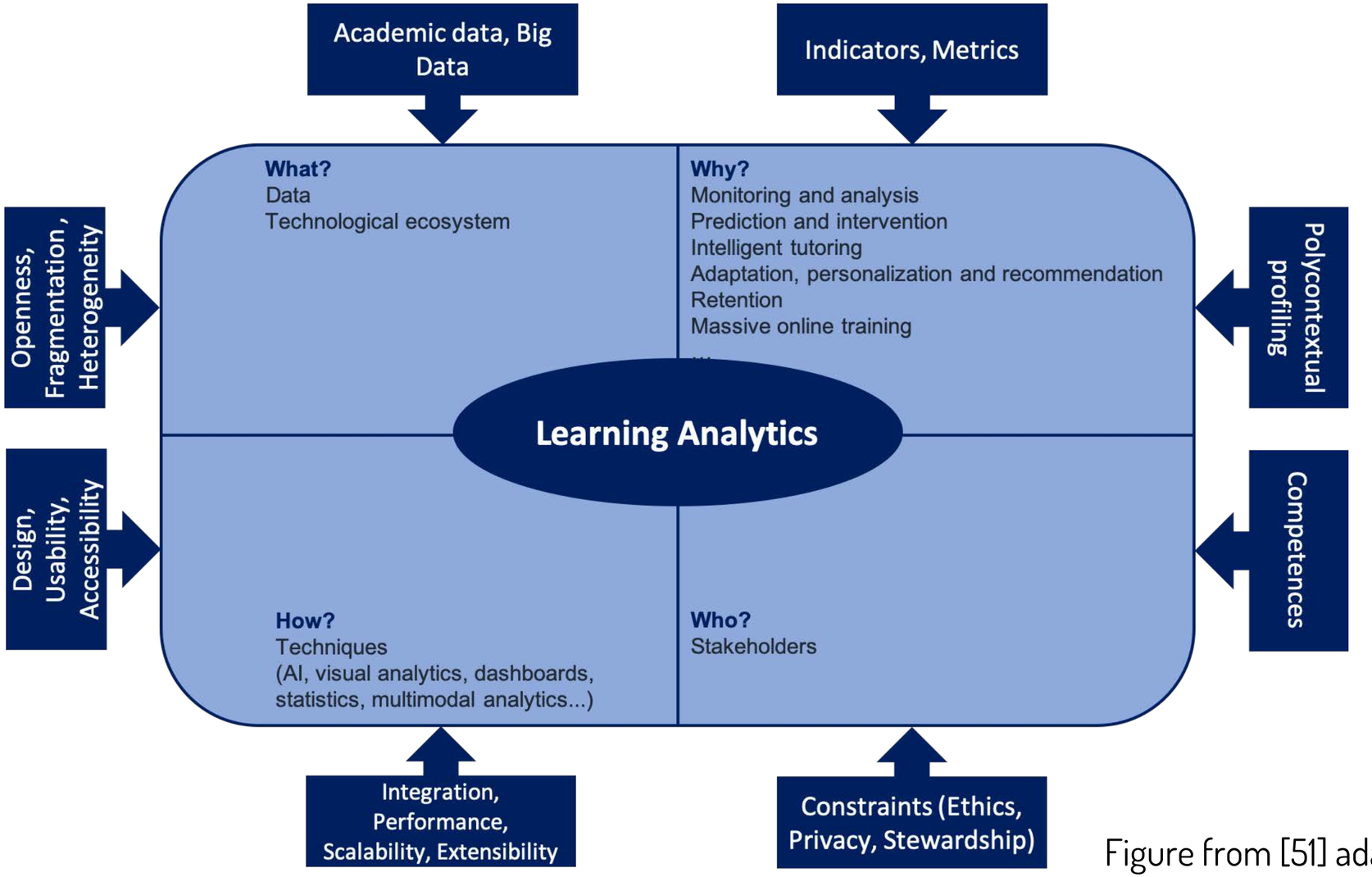


Figure from [51] adapted from [52]

eLearning definition (2nd generation)

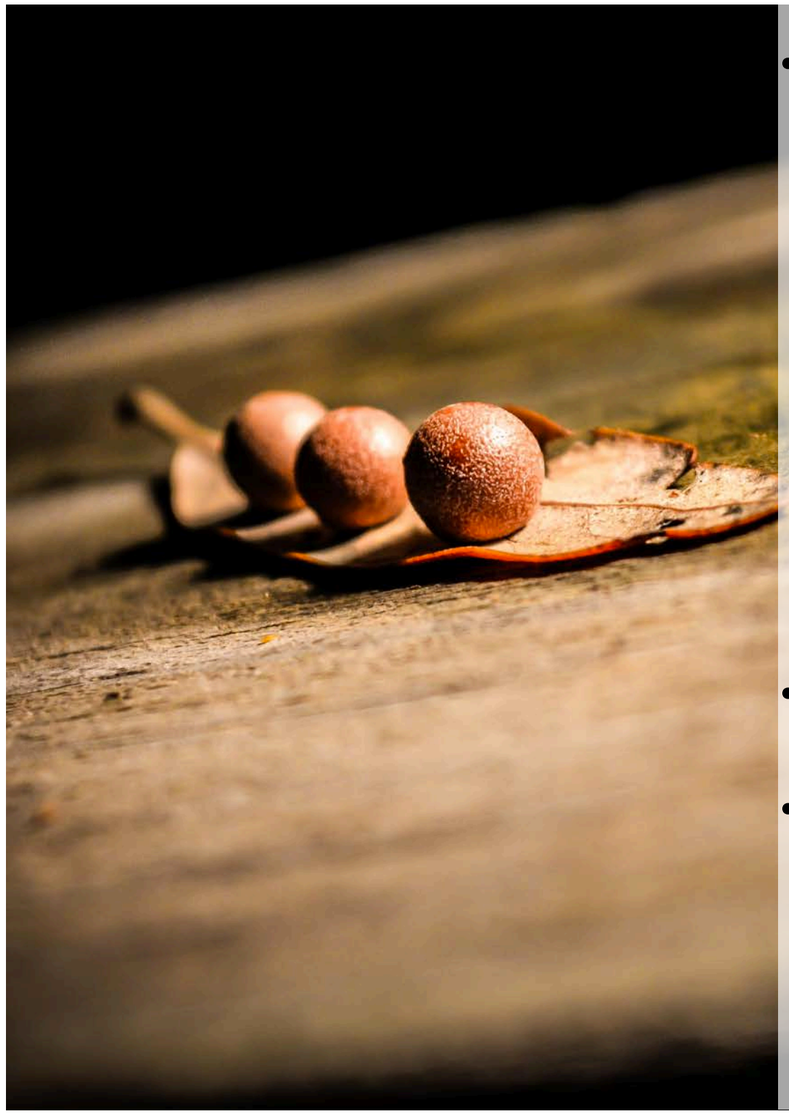
eLearning is training that deploys a digital device such as a computer or mobile device to support learning [53]

eLearning is a teaching-to-learning process aimed to obtain a set of skills and competences from students, trying to ensure the highest quality to the whole process, thanks to: the mainly use of web-based technologies; a set of sequenced and structured contents based upon pre-defined but flexible strategies; the interaction with the group of students and tutors; the appropriate evaluation procedures, both of learning results and the whole learning process; a collaborative working environment with space-and-time deferred presence; and finally a sum of value added technological services in order to achieve maximum interaction [54]

Third generation

- It breaks with the concept of LMS as a monolithic element and solely responsible for the functionality for online training
- Loss of verticality of the eLearning concept to become a more transversal and universal element at the service of training in its broadest sense

Technological ecosystem



- A technological ecosystem is proposed where a community, with educational methods, policies, regulations, applications and work teams can coexist in such a way that their processes are interrelated and their application is based on the physical factors of the technological environment [55]
- To provide institutional support [56-58]
- To provide personal support through Personal Learning Environments (PLE) [59]

Components of a learning ecology

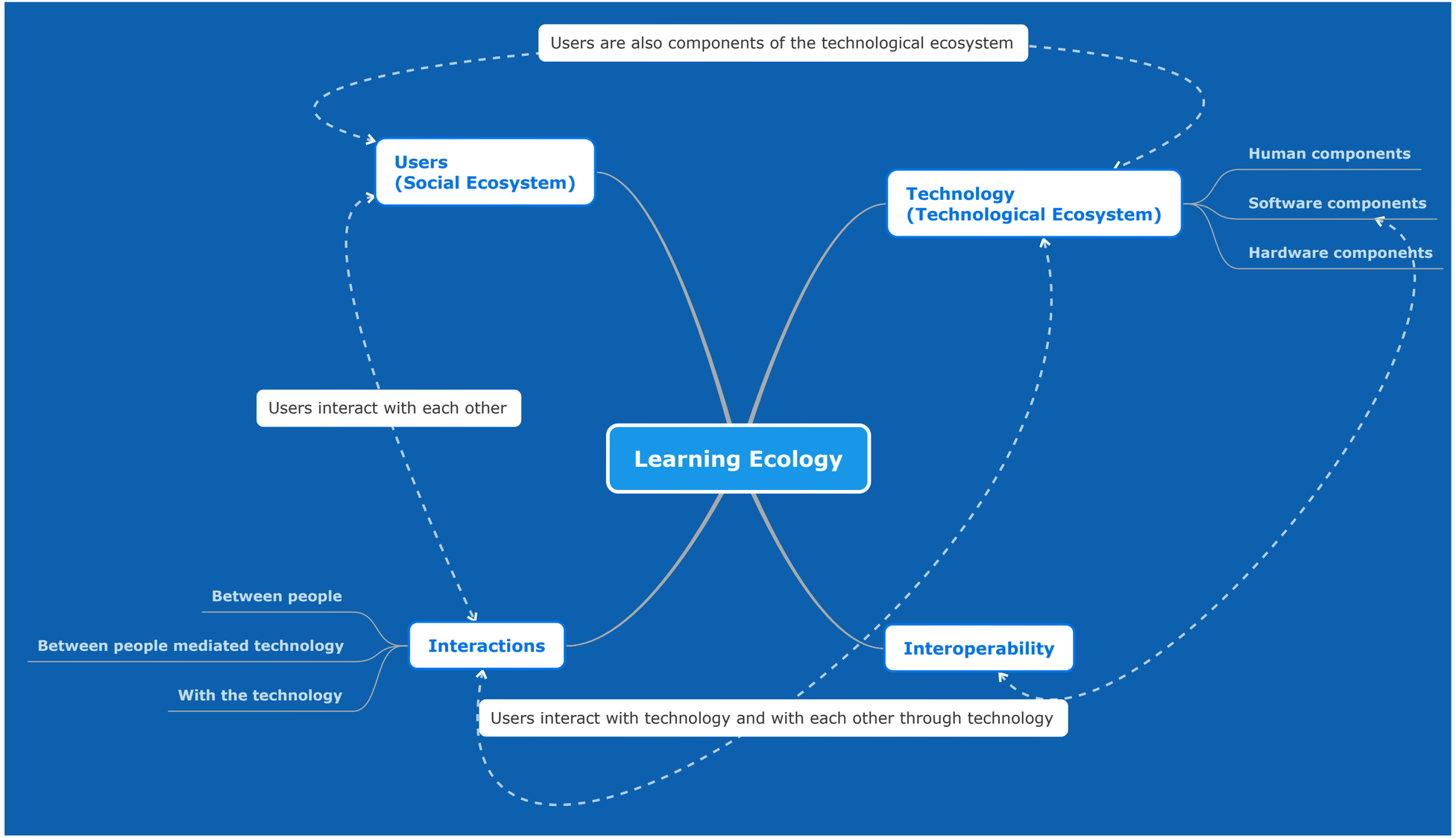


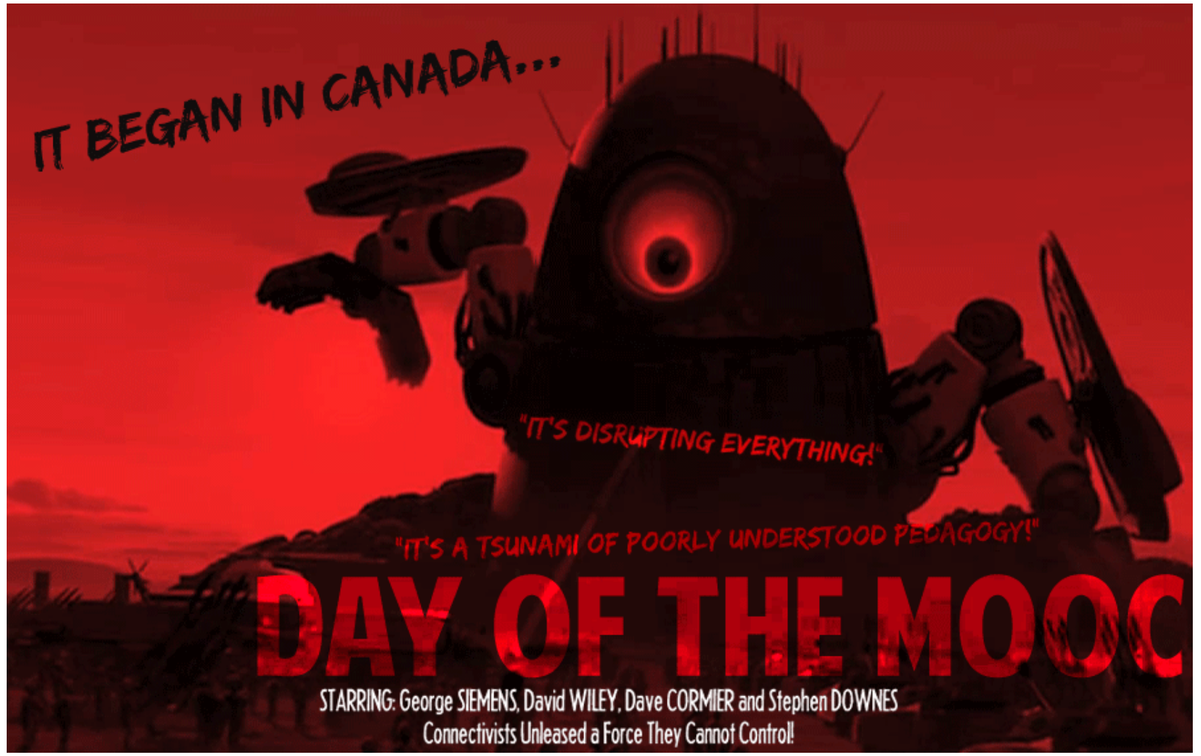
Figure adapted from [60]

eLearning definition (3rd generation)

eLearning is the educational process, of intentional or unintentional nature, oriented to the acquisition of a series of competences and skills in a social context, which takes place in a technological ecosystem in which different user profiles interact, sharing contents, activities and experiences and which, in formal learning situations, must be tutored by teaching actors whose activity contributes to guarantee the quality of all the factors involved [30]

MOOC

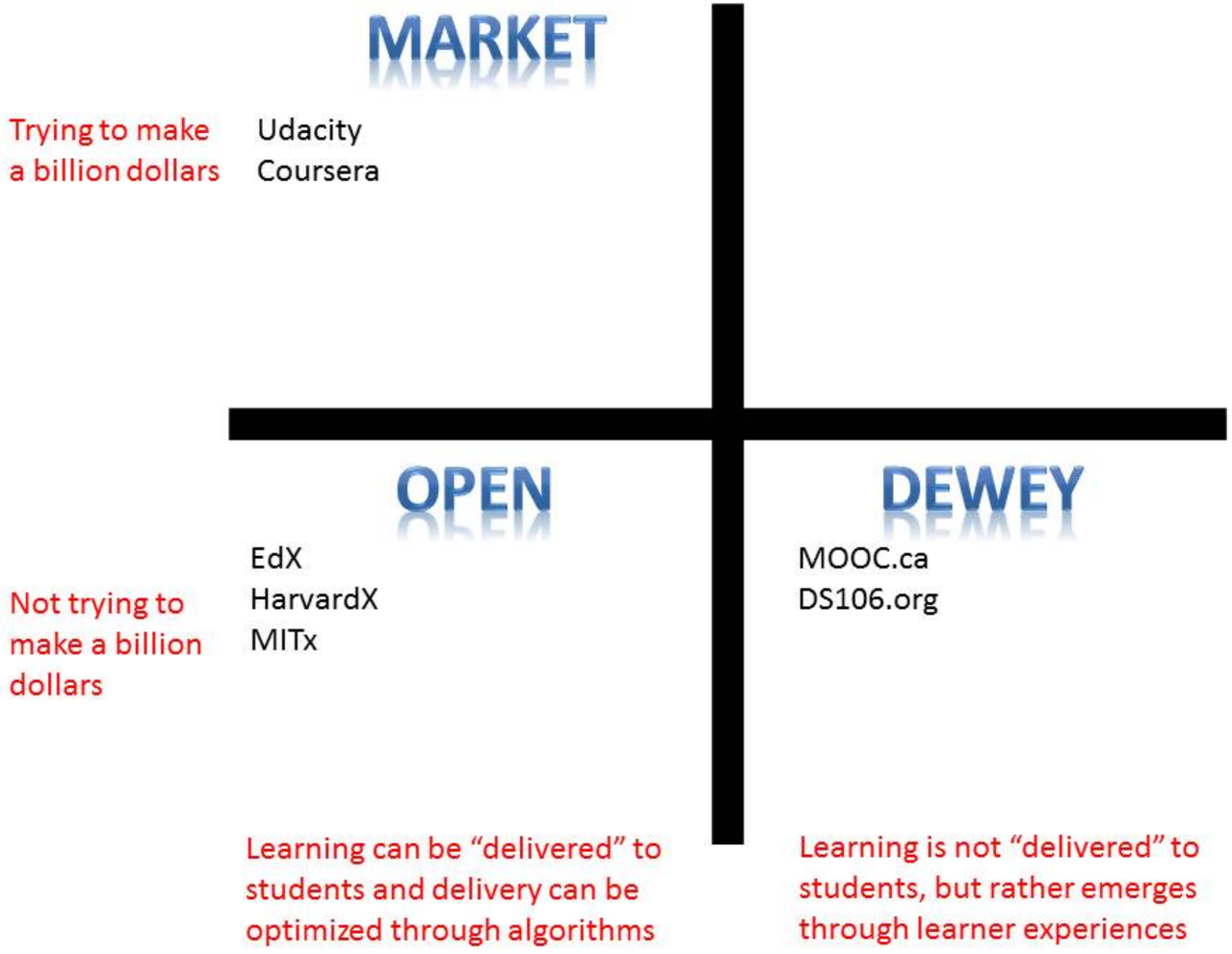
MOOCs are bringing about changes in higher education and lifelong learning models, as well as in the way universities understand online training [61-62]



Are MOOCs a disruptive innovation? [63-66]

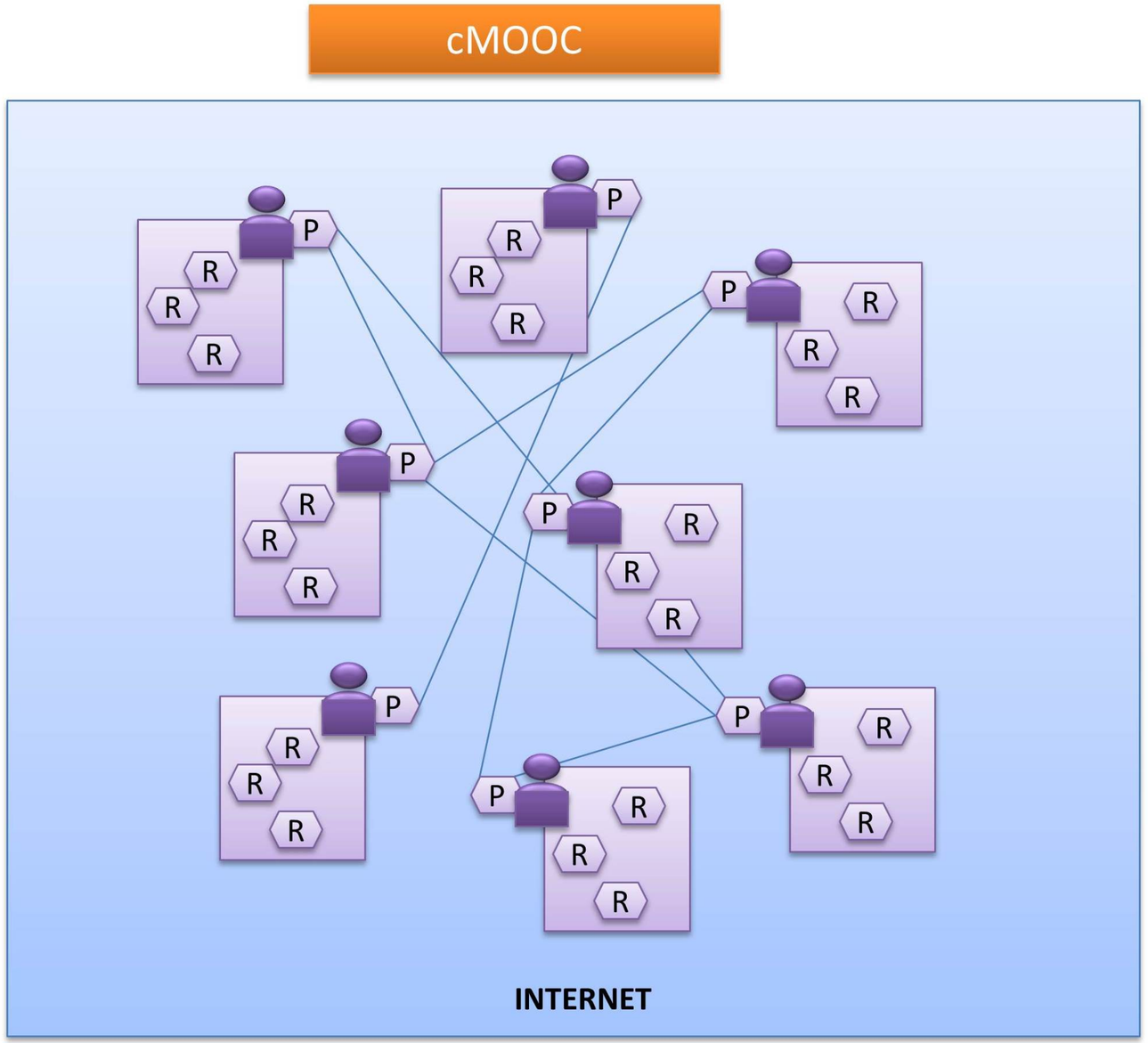
https://static.pexels.com/photos/1990/man-person-people-emotions.jpg

MOOCs' Approaches to Open Education [67]

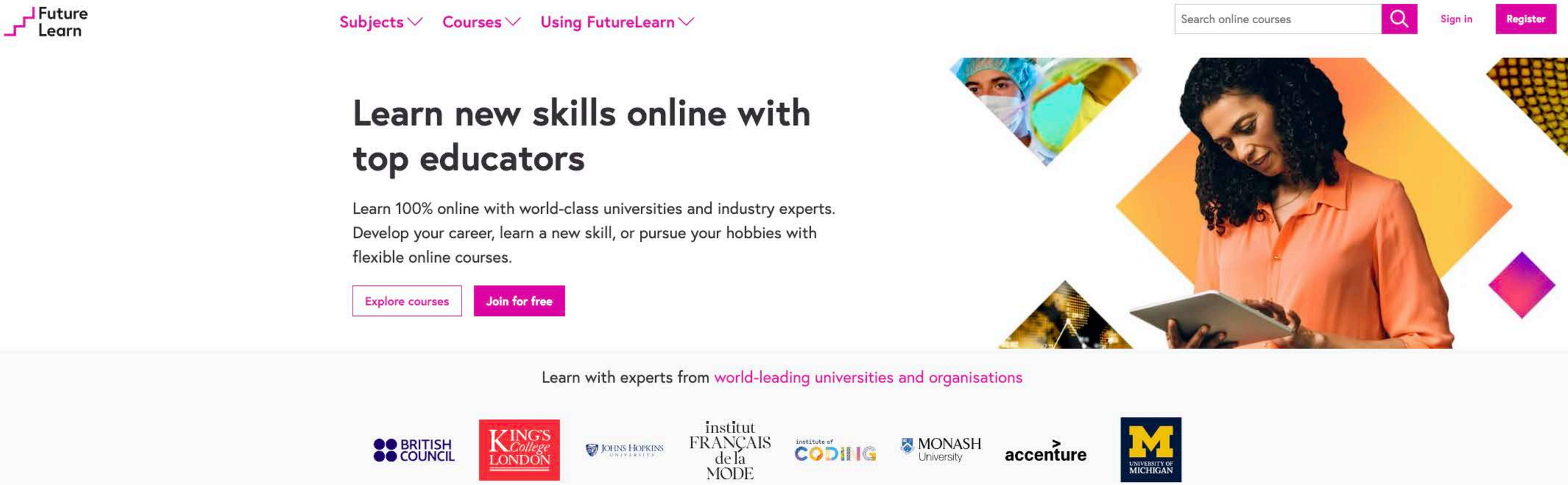


https://unsplash.com/photos/Tw5N6HdxsMo

MOOC models: cMOOC [68]

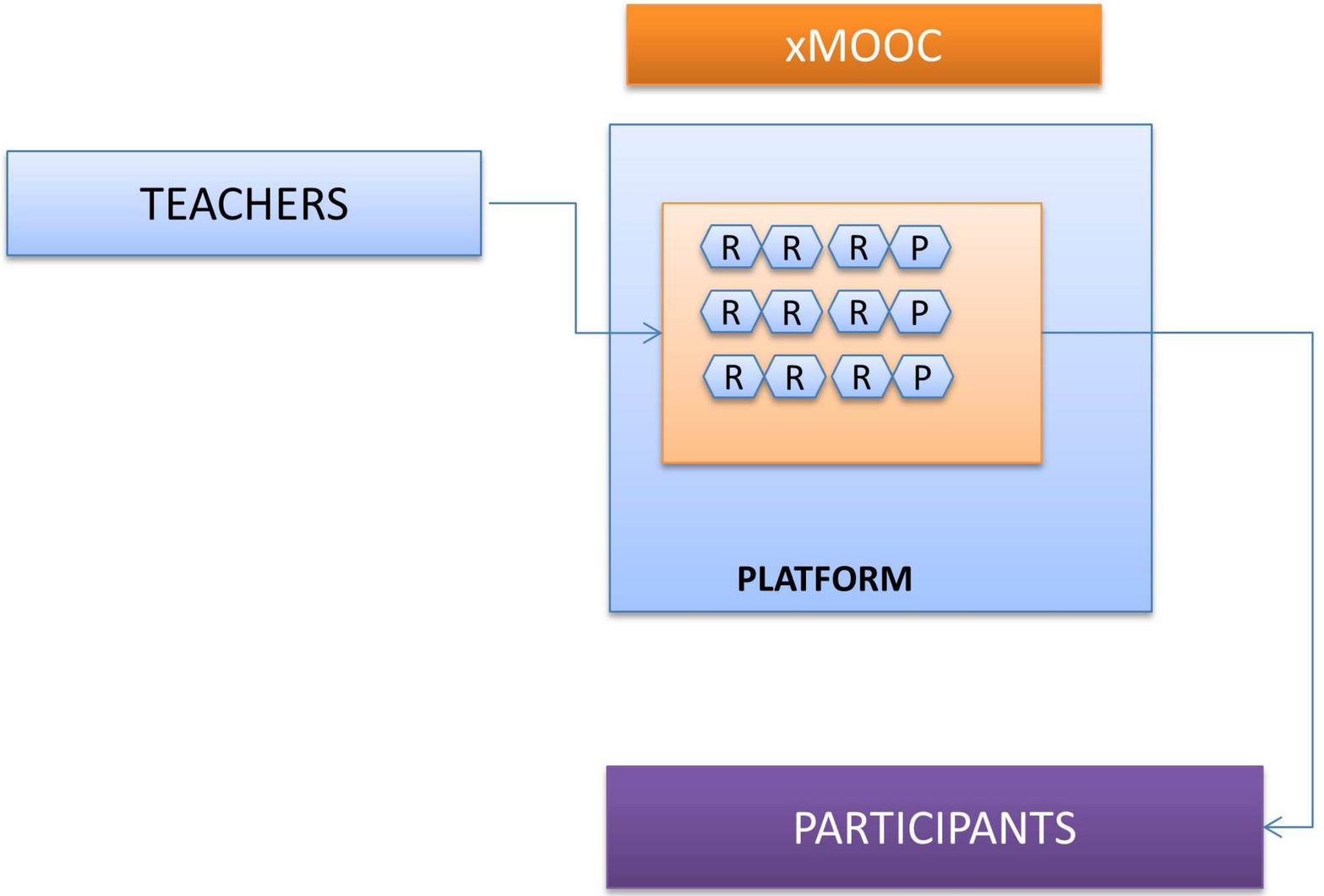


MOOC models: cMOOC

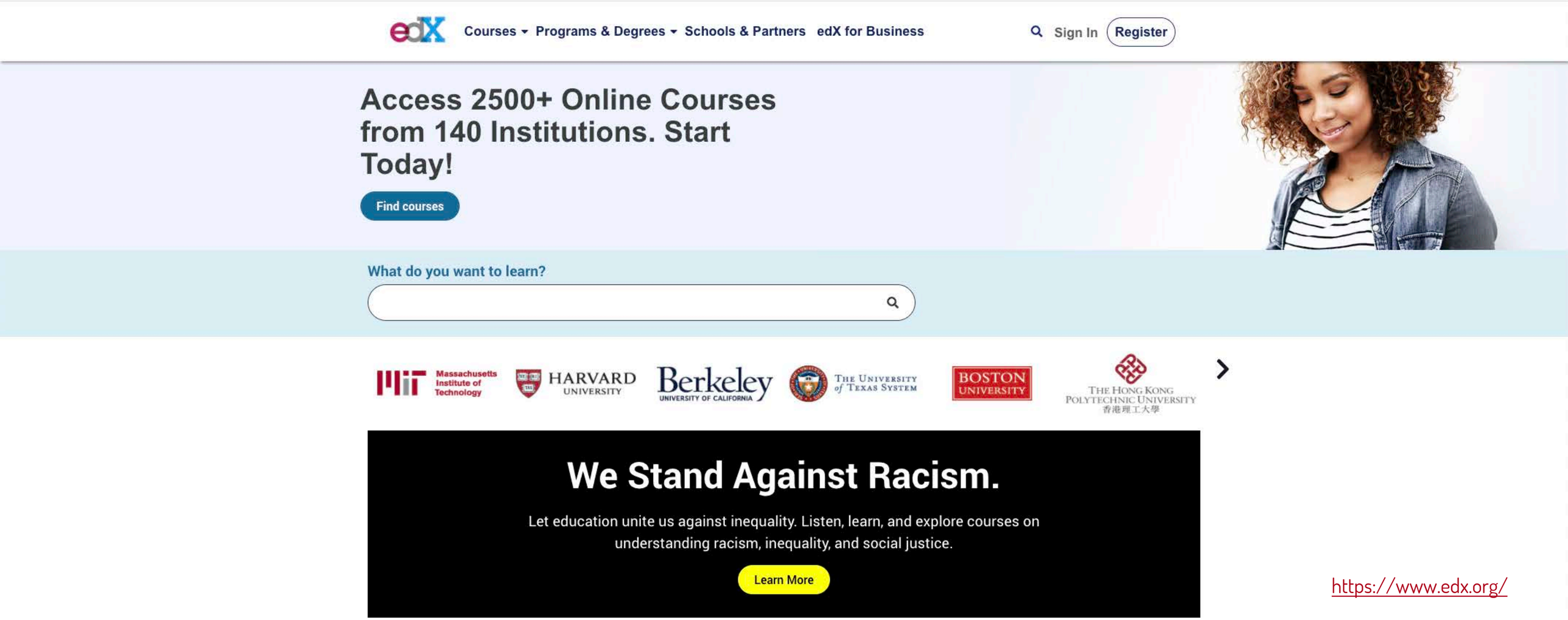


https://www.futurelearn.com/

MOOC models: xMOOC [68]

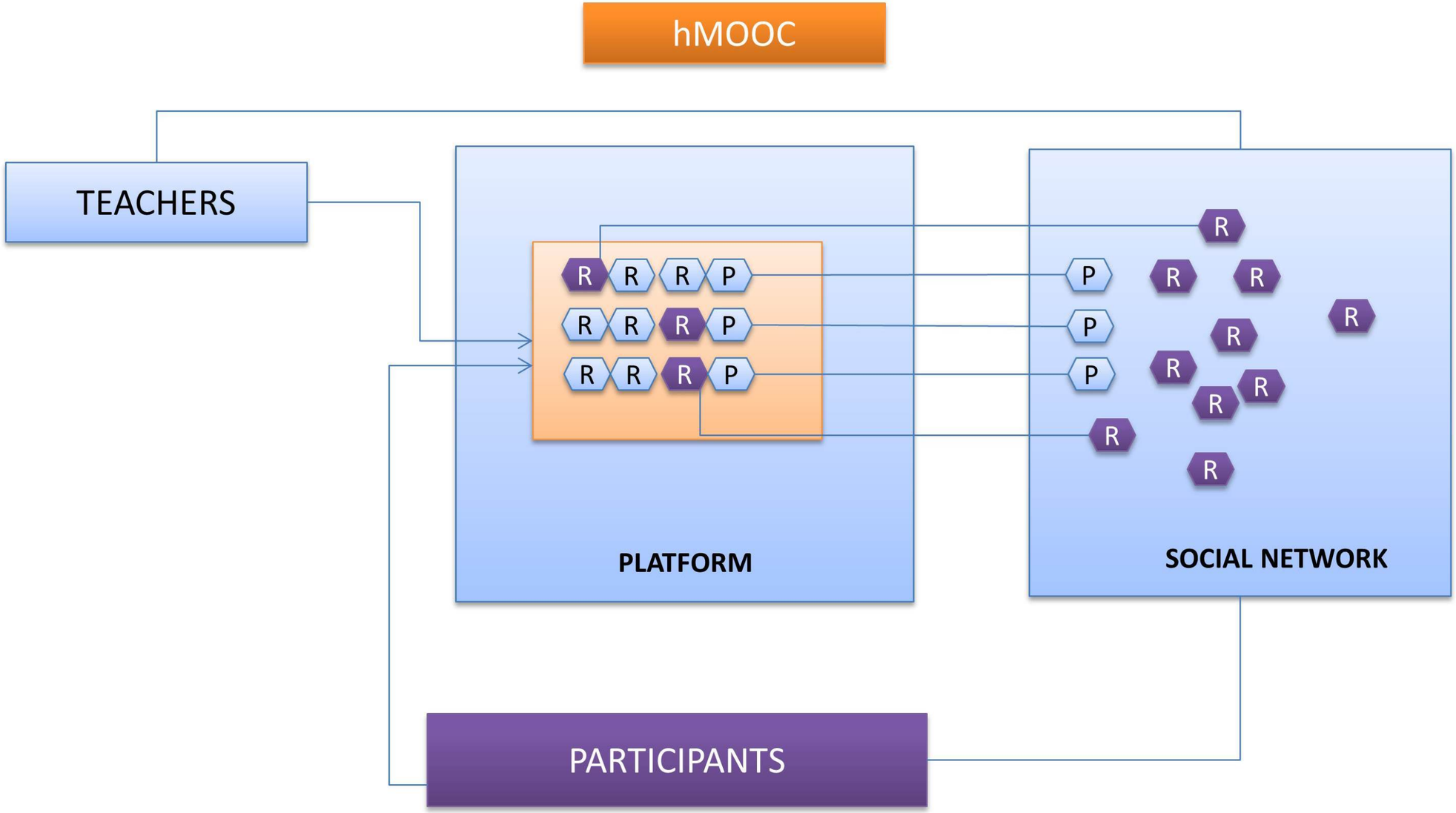


MOOC models: xMOOC



https://www.edx.org/

MOOC models: hMOOC [68]

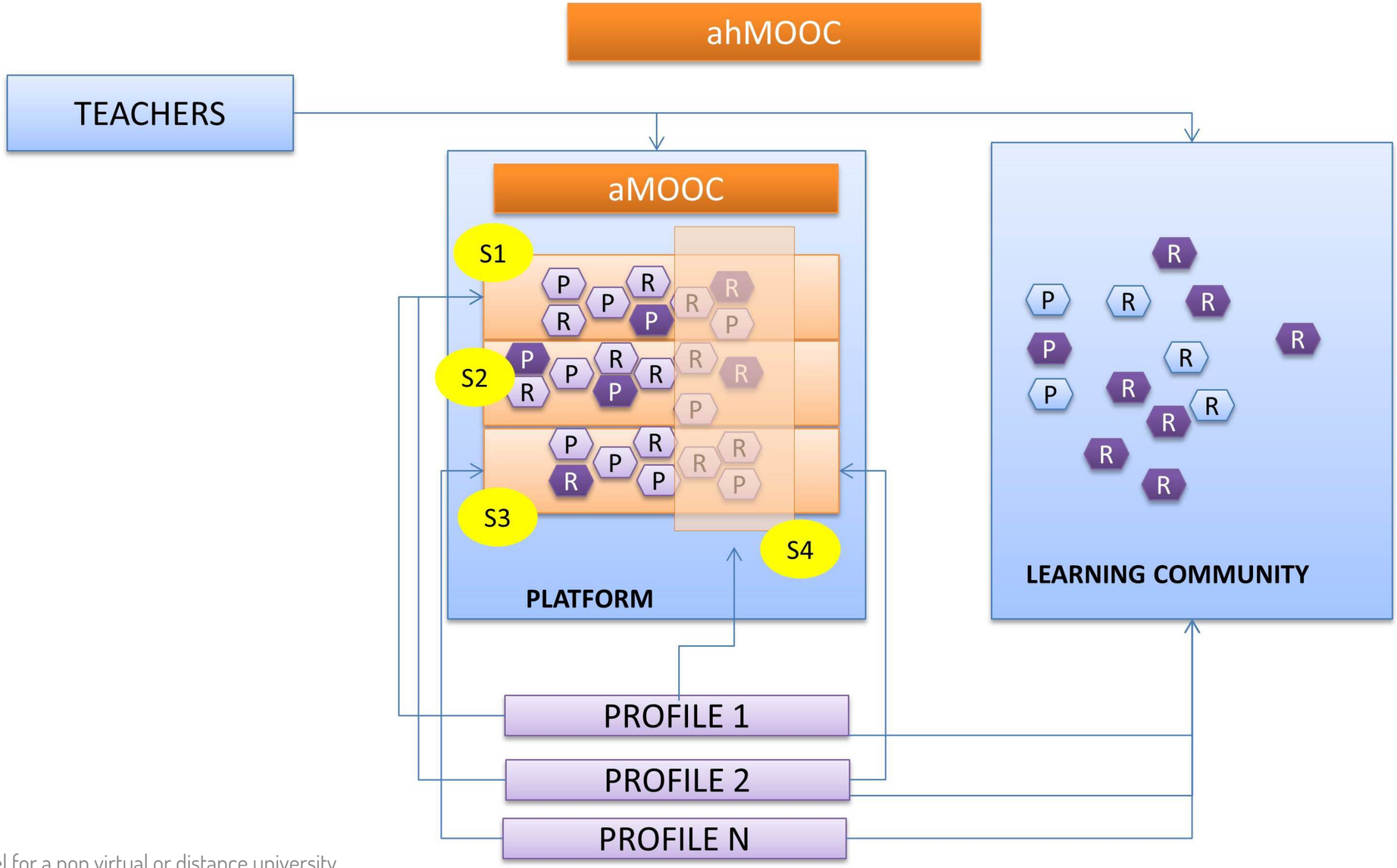


MOOC models: hMOOC

iMOOC platform [69]

http://gridlab.upm.es/imooc/

MOOC models: ahMOOC [68]

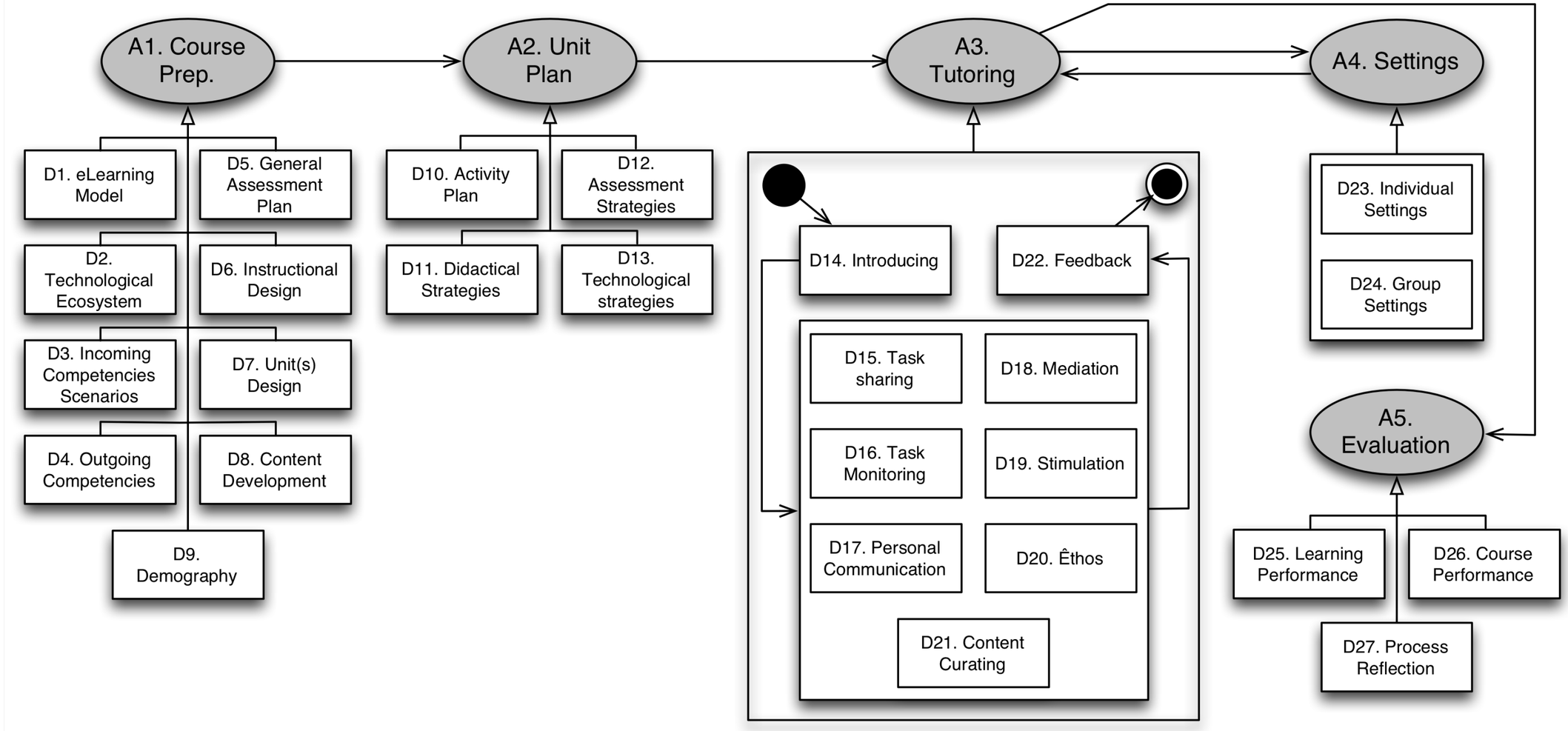


4. GRIAL eLearning model

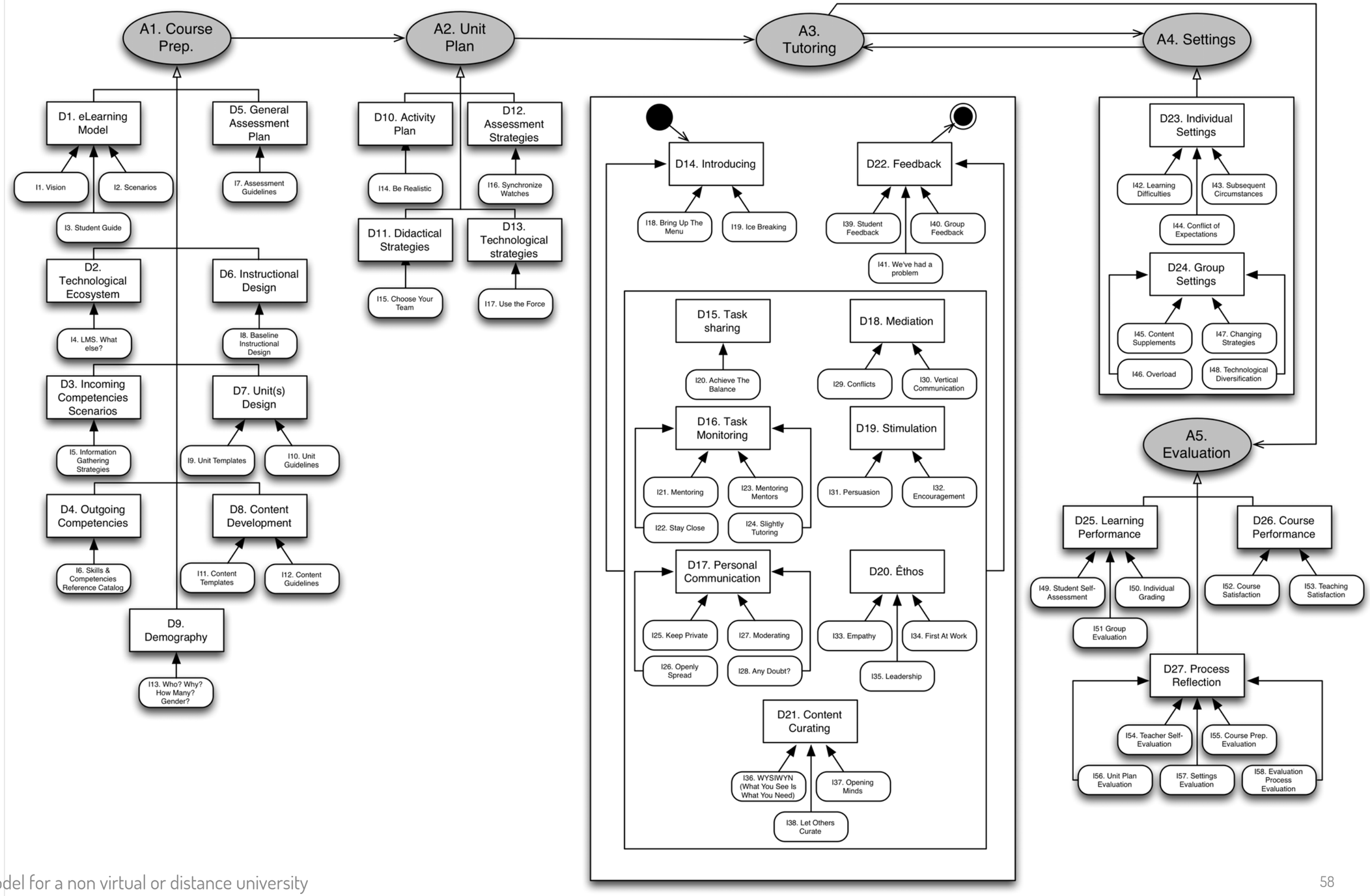
Formalization the eLearning experience

- ≈ 175 training initiatives in 15 years
- > 22,500 hours of training
- ≈ 5,000 students (≈ 10,000 if MOOCs are considered)
- Seeds of the virtual university at the University of Salamanca

GRIAL pattern language [70-71]



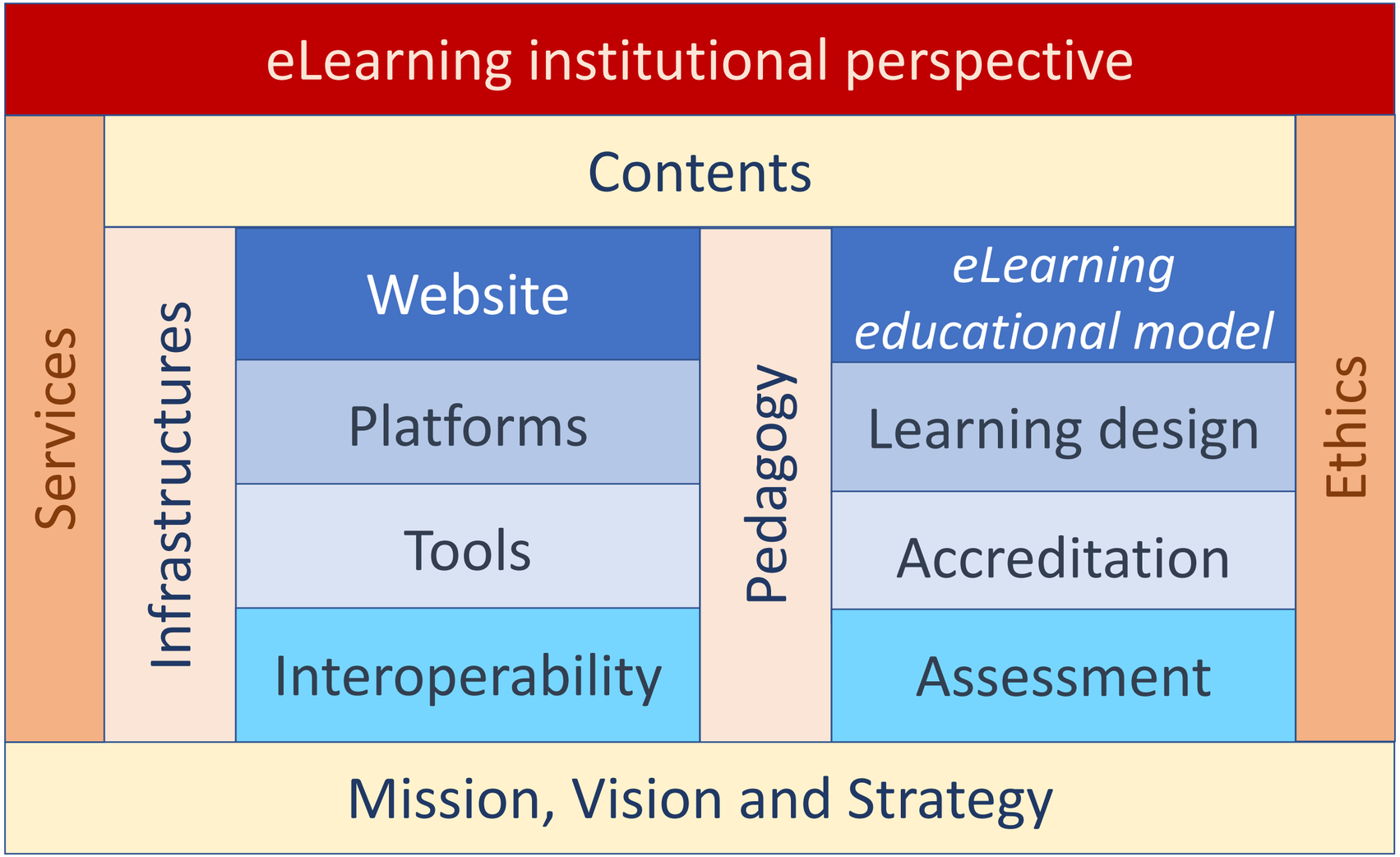
GRIAL pattern language [70-71]



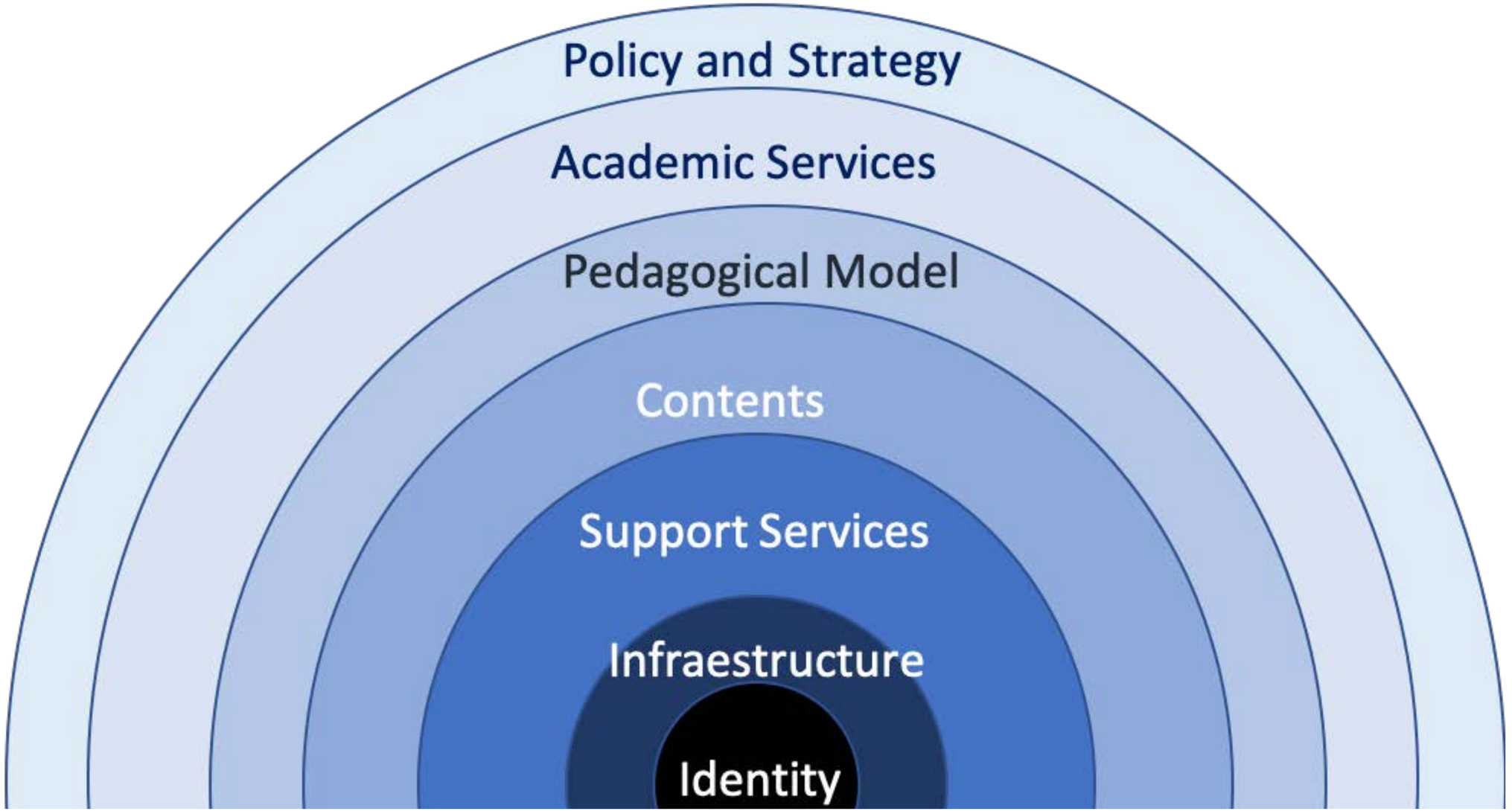
5. eLearning reference model

https://bit.ly/2kwd0hM

Pillars of the model [72]

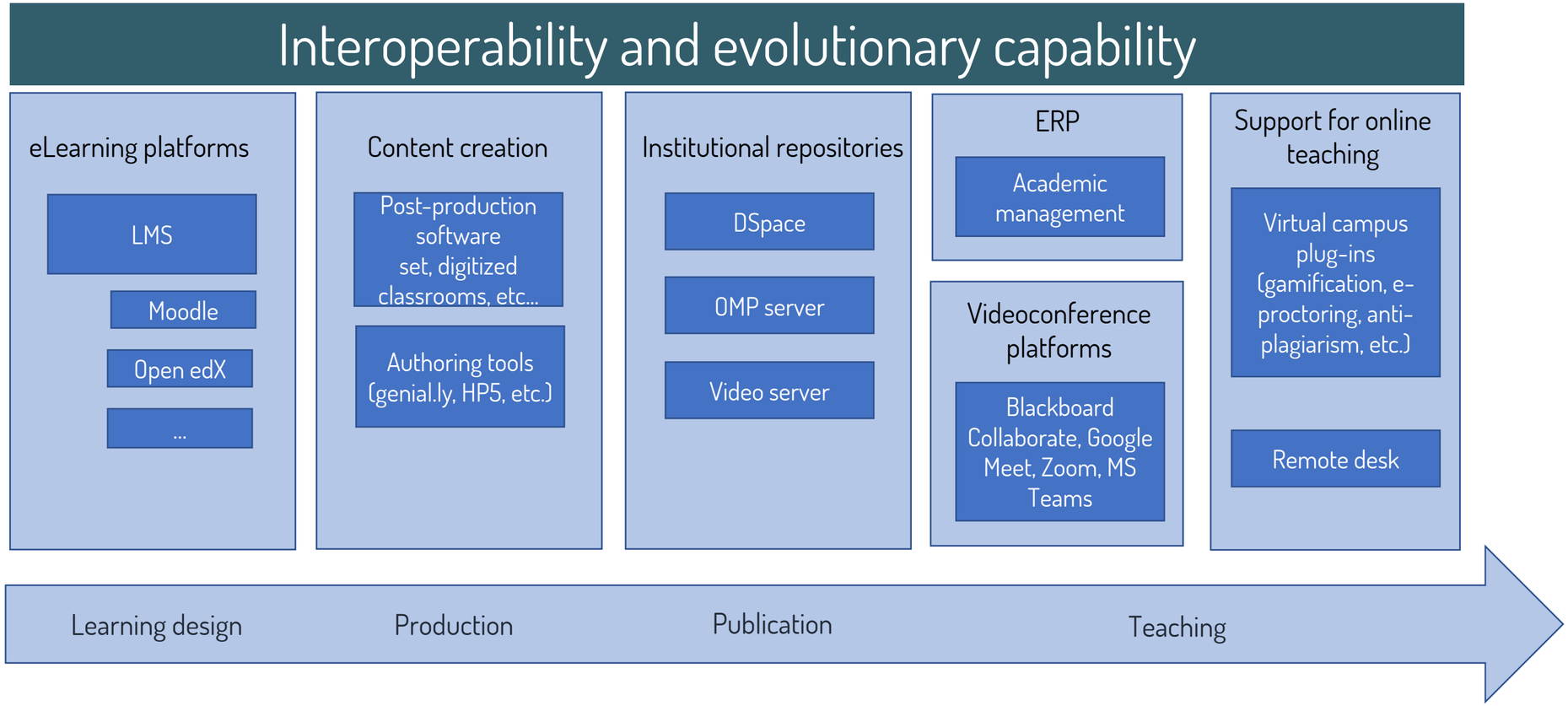


eLearning reference model [72]

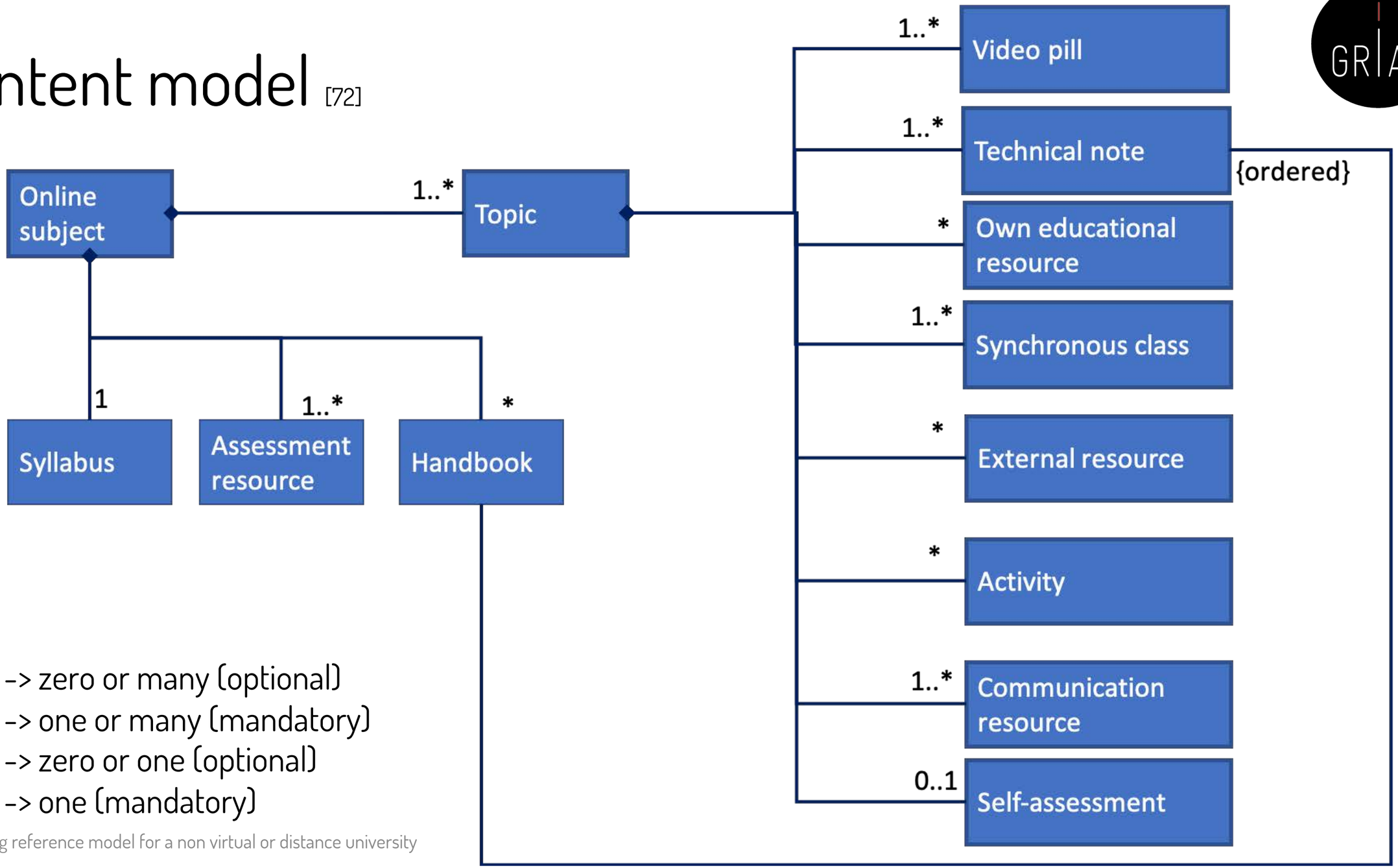


Relevant aspects of the model

Infrastructure - Definition of a technological ecosystem [72]



Content model [72]



Caption

- * -> zero or many (optional)
- 1..* -> one or many (mandatory)
- 0..1 -> zero or one (optional)
- 1 -> one (mandatory)

Content model - keys [72]

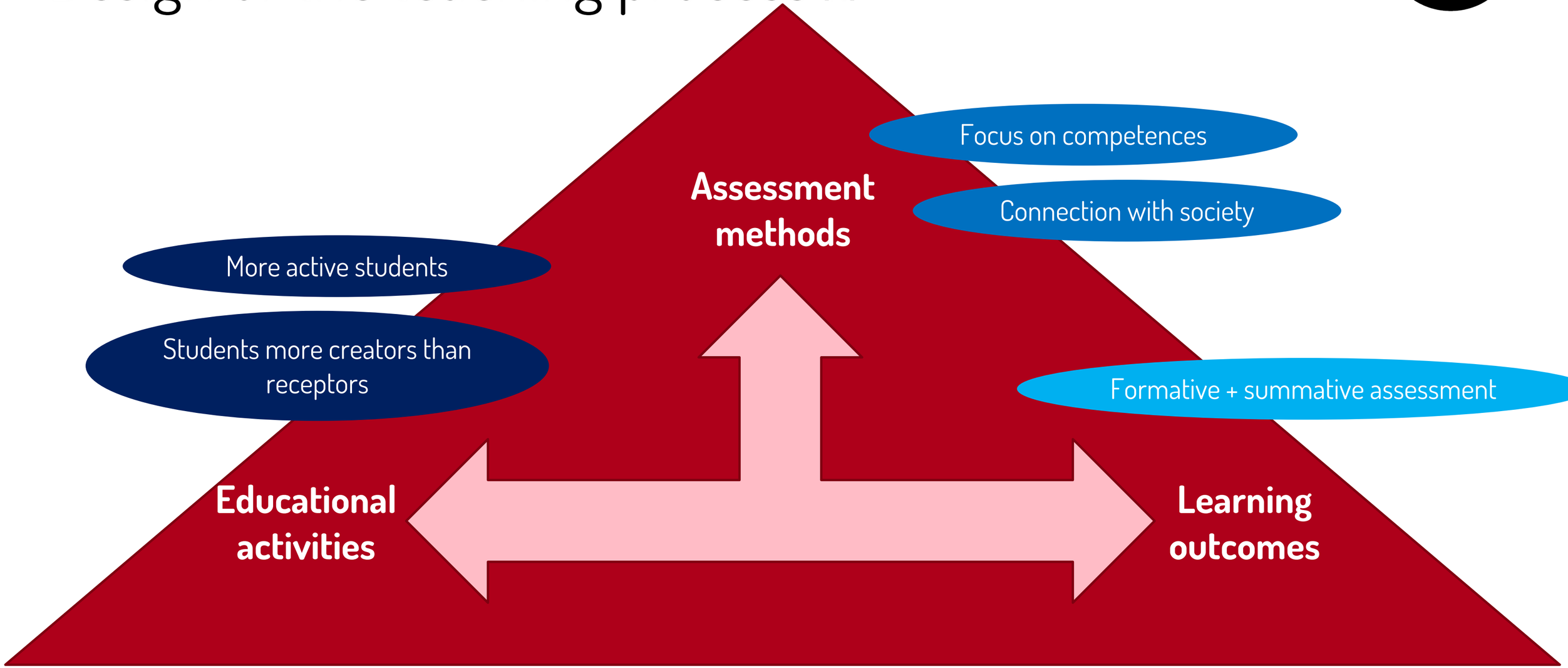
Photo by Nils Stahl on Unsplash

- Ensure corporate content with a regular update program
- Incorporate flexibility so that the teacher can contribute new content, activities, etc. without finding a packaged and closed format
- Balance between an institutional production and the contents of the teaching staff (templates should be provided and their use recommended)
- Incorporating the synchronous component
- Provide visibility to the institution through open licensing content

Pedagogical model [72]

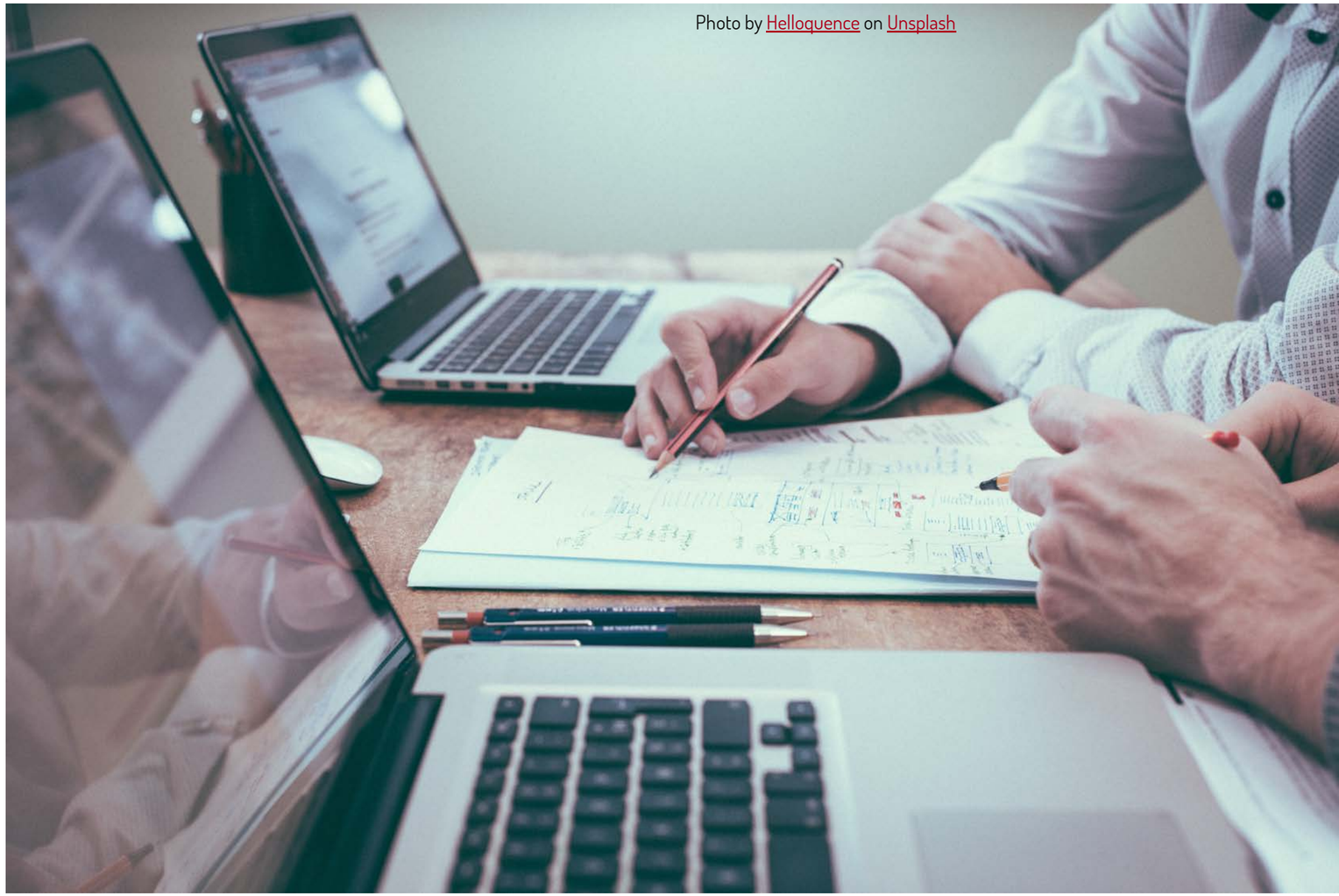
- Virtual institutional space for each degree, complying a set of minimum common requirements (based on the content model)
- Teacher certification requirements
- Group size
- Sequencing of subjects on the calendar
- Interaction both synchronous and asynchronous
- Collaborative vs. personalized learning
- Time of response
- Assessment
- Ethical aspects
- Coordination
- Quality assurance

Design of the teaching process [73]



Pedagogical model – Teacher's responsabilities [72]

1. The creation of content to be used in the course
2. Instructional design and planning of the virtual environment
3. Synchronous teaching by video conference
4. Asynchronous mentoring and monitoring of activities and interaction
5. The assessment of students
6. Mentoring or personalised follow-up of the students to prevent them from dropping out



Policy and strategy – Strategic corporate vision is needed

The adoption of an online learning model requires a commitment from the University

Photo by Mark Duffel on Unsplash

https://unsplash.com/photos/cbIKeuURaq8

A win-win strategy must be applied, the actors involved (teachers, students, service staff) win, the institution wins

Personalized learning

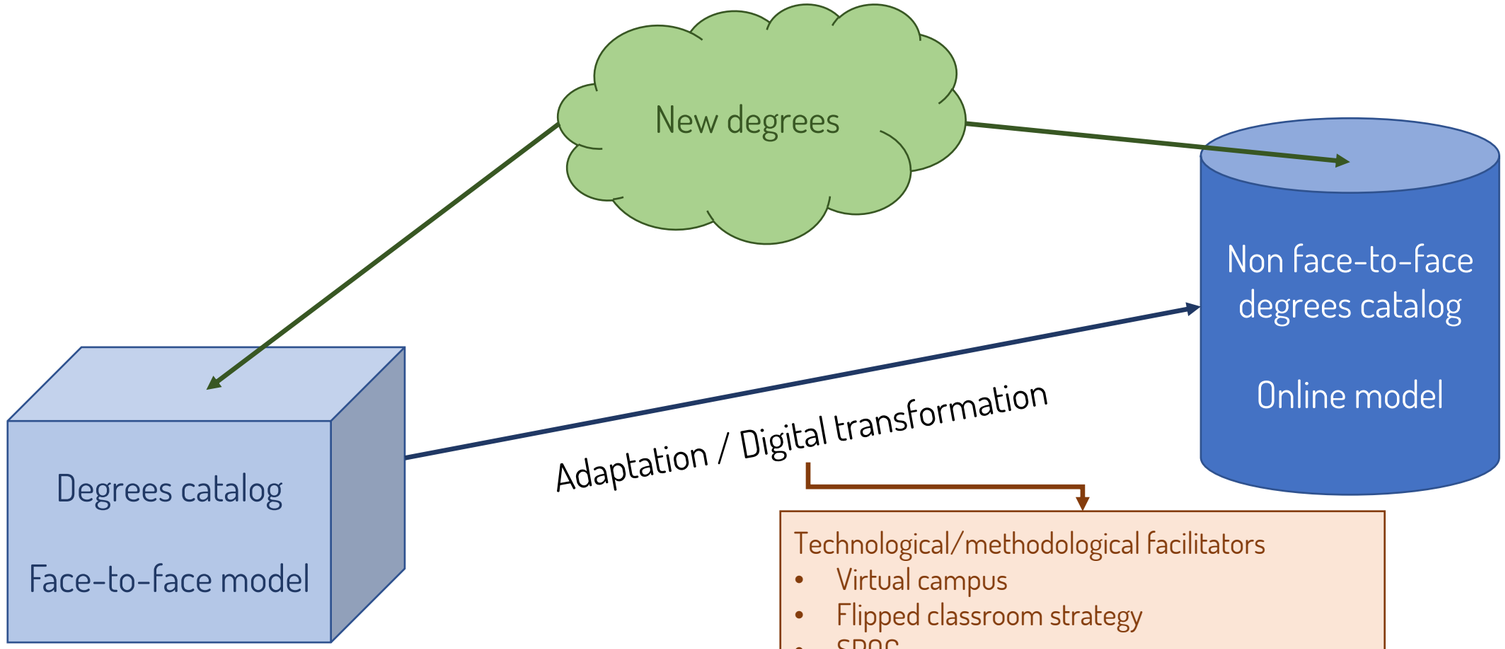
https://bit.ly/2k1udmm

vs.

Massive learning

http://www.thebounce.co.za/wp-content/uploads/2010/03/going-home-for-eid-dhaka.jpg

Policy and strategy – Action plan



6. Reflections

Photo by Valentin Antonucci on Unsplash

Institutional challenges

Digital transformation, strategy, reference model, technology ecosystem, service ecosystem, strengthen the workforce

Institutional challenges

Communicate the strategy, attract and convince teachers, ensure the quality and ethics of the process, sustainability and return of the investment

Photo by Torsten Dettlaff from Pexels

https://bit.ly/2m2roCj

Faculty's challenges

Recognition of the effort, training and continuous certification, coordination, time management, interaction and time of response, integration of the soft skills in the subjects

Students' challenges

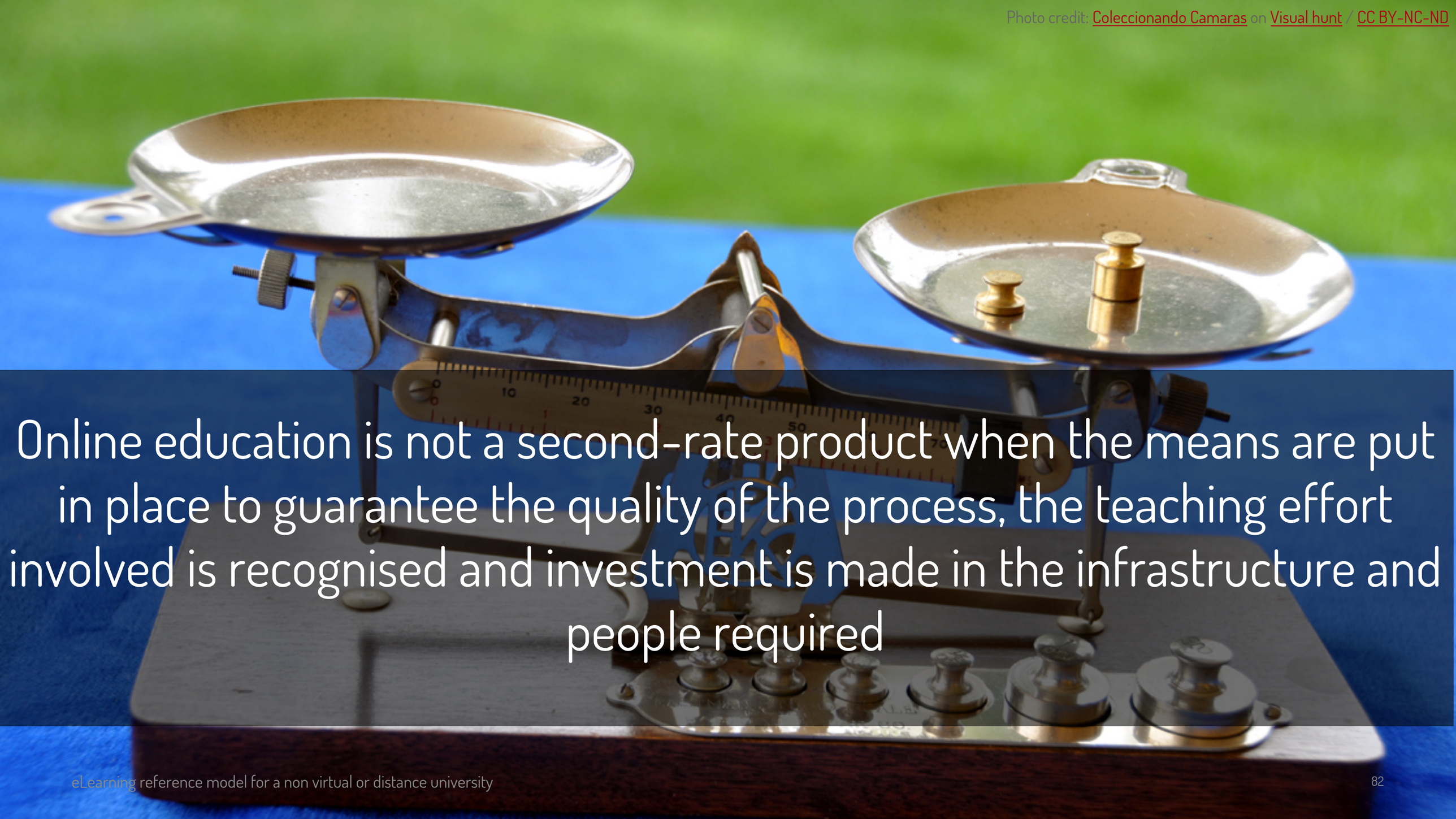
Membership, privacy, ethics, loneliness, abandonment, time management and flexibility

The online model is part of a strategic transformation of the university

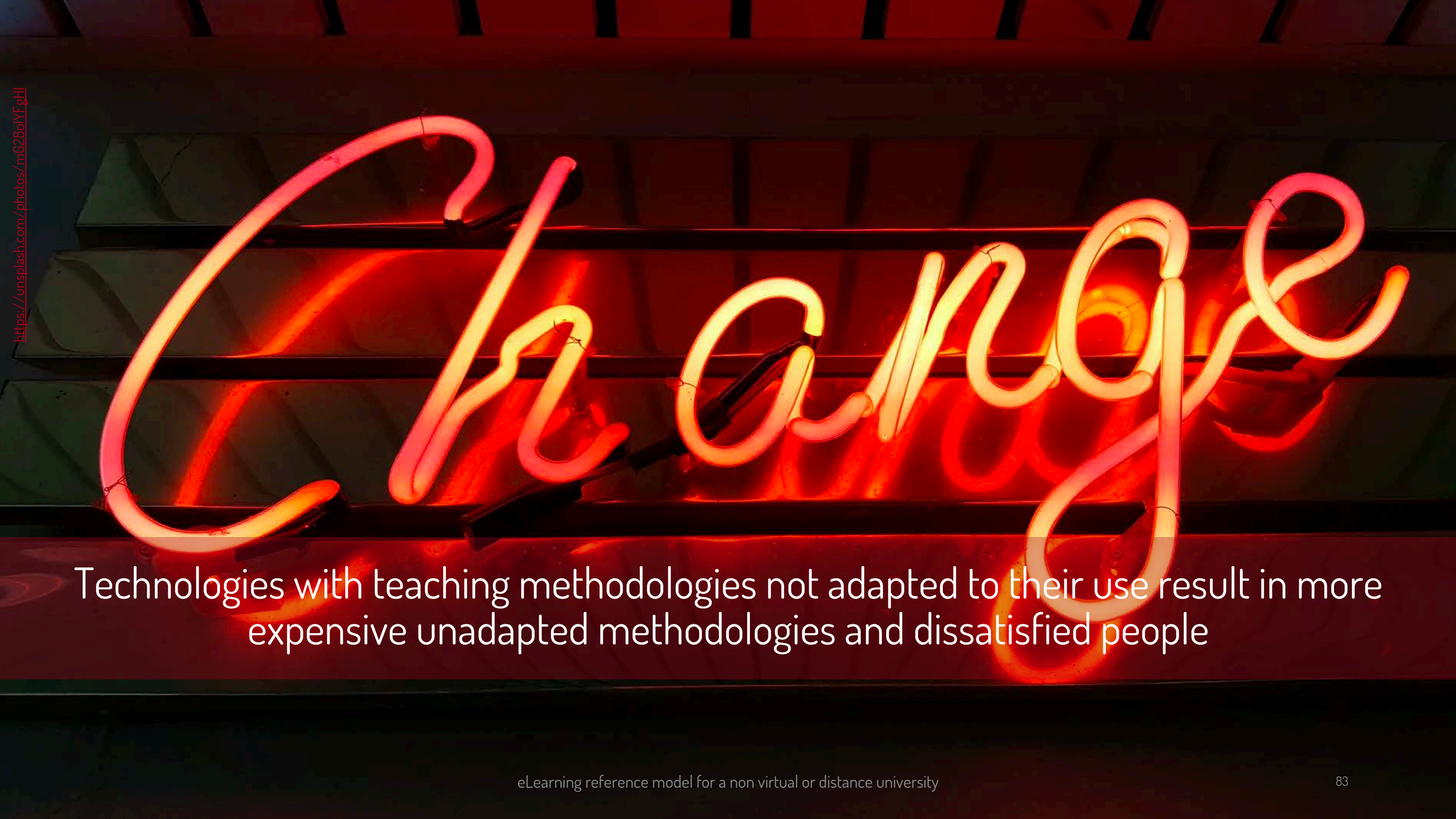
The nomadism of this time has to do above all with the continuous and rapid transformation of the scientific, technical, professional and mental landscapes. Even if we didn't move, the world would change around us [74]

Photo by Yeshi Kangrang on Unsplash

The traditional University is facing a new scenario that gives vertigo: risks and opportunities; those who better adjust their mission, redefine their vision and adapt their processes will have greater opportunities in the immediate future



Online education is not a second-rate product when the means are put in place to guarantee the quality of the process, the teaching effort involved is recognised and investment is made in the infrastructure and people required



https://unsplash.com/photos/m628olYFgHI

Technologies with teaching methodologies not adapted to their use result in more expensive unadapted methodologies and dissatisfied people

7. Activities

https://unsplash.com/photos/jEOA0Vq39Z4

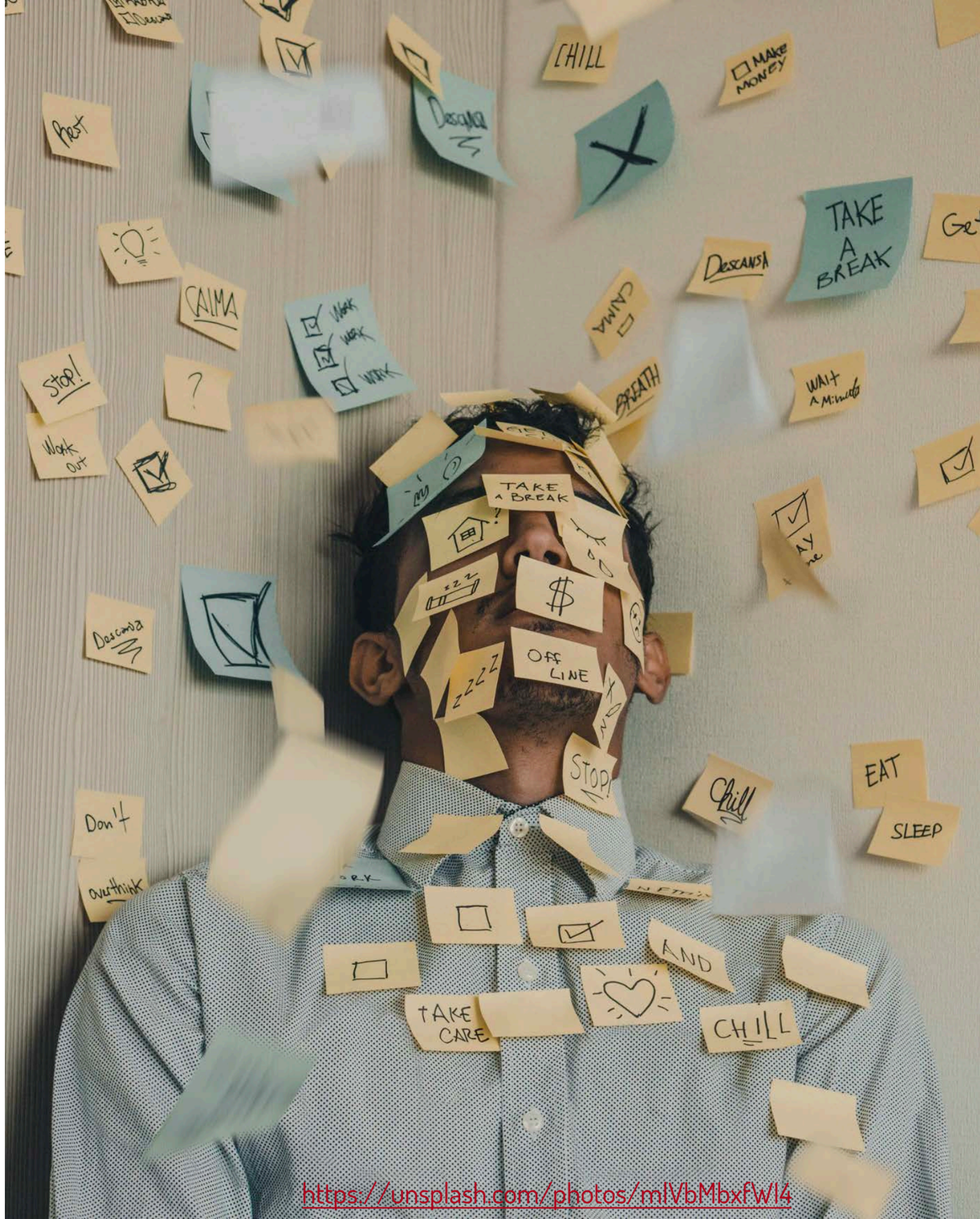
Open questions

- Do you think that an IT Government approach is needed to organize the online teaching in a university?
- Are the universities really digital transformed?
- Are the university stakeholders ready for the digital transformation?
- Have been the universities passed the digital transformation test during the coronavirus pandemic?
- What do you think about online assessment procedures?
- How do you foresee teaching in the universities in the next academic year?

https://unsplash.com/photos/hhq1Lxtuwd8

Deliverable tasks

- Choose one
  - Systematic mapping about online teaching or online assessment during COVID-19 time (5-page report as limit)
  - Reflective post about digital transformation in higher education (academic blog format, around 1,500 words maximum)
  - Infographic or mind map representing a case, procedure or workflow related to online education and/or open educational practices



https://unsplash.com/photos/mlVbMbxfWI4

https://unsplash.com/photos/L04Kczg_Jvs

8. References

References

1. F. J. García-Peñalvo, "Education in knowledge society: A new PhD programme approach," in *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13) (Salamanca, Spain, November 14-15, 2013)*, F. J. García-Peñalvo, Ed. ACM International Conference Proceeding Series (ICPS), pp. 575-577, New York, NY, USA: ACM, 2013. doi: 10.1145/2536536.2536624.
2. F. J. García-Peñalvo, "Formación en la sociedad del conocimiento, un programa de doctorado con una perspectiva interdisciplinar," *Education in the Knowledge Society,* vol. 15, no. 1, pp. 4-9, 2014.
3. F. J. García-Peñalvo, "Engineering contributions to a Knowledge Society multicultural perspective," *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA),* vol. 10, no. 1, pp. 17-18, 2015. doi: 10.1109/RITA.2015.2391371.
4. A. García-Holgado, F. J. García-Peñalvo and M. J. Rodríguez-Conde, "Definition of a technological ecosystem for scientific knowledge management in a PhD Programme," in *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)*, G. R. Alves and M. C. Felgueiras, Eds. ACM International Conference Proceeding Series (ICPS), pp. 695-700, New York, NY, USA: ACM, 2015. doi: 10.1145/2808580.2808686
5. F. J. García-Peñalvo, M. J. Rodríguez-Conde, S. Verdugo-Castro and A. García-Holgado, "Portal del Programa de Doctorado Formación en la Sociedad del Conocimiento. Reconocida con el I Premio de Buena Práctica en Calidad en la modalidad de Gestión," in *Buenas Prácticas en Calidad de la Universidad de Salamanca: Recopilación de las I Jornadas. REPOSITORIO DE BUENAS PRÁCTICAS (Recibidas desde marzo a septiembre de 2019)*, A. Durán Ayago, N. Franco Pardo and C. Frade Martínez, Eds. Aquilafuente, no. 284, pp. 39-40, Salamanca, España: Ediciones Universidad de Salamanca, 2019. doi: 10.14201/0AQ02843940.
6. F. J. García-Peñalvo, M. J. Rodríguez-Conde, R. Therón, A. García-Holgado, F. Martínez-Abad and A. Benito-Santos, "Grupo GRIAL," *IE Comunicaciones. Revista Iberoamericana de Informática Educativa,* no. 30, pp. 33-48, 2019.
7. Grupo GRIAL, "Producción Científica del Grupo GRIAL de 2011 a 2019," Grupo GRIAL, Universidad de Salamanca, Salamanca, España, GRIAL-TR-2019-010, 2019. Available from: https://bit.ly/30I9mLh. doi: 10.5281/zenodo.2821407.
8. F. J. García-Peñalvo, "Women and STEM disciplines in Latin America: The W-STEM European Project," *Journal of Information Technology Research,* vol. 12, no. 4, pp. v-viii, 2019.
9. F. J. García-Peñalvo, A. Bello, A. Dominguez and R. M. Romero Chacón, "Gender Balance Actions, Policies and Strategies for STEM: Results from a World Café Conversation," *Education in the Knowledge Society,* vol. 20, art. 31, pp. 31-1 – 31-15, 2019. doi: 10.14201/eks2019_20_a31.
10. A. García-Holgado, A. Camacho Díaz and F. J. García-Peñalvo, "Engaging women into STEM in Latin America: W-STEM project," in *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality (Leon, Spain, October 16th-18th, 2019)*, M. Á. Conde-González, F. J. Rodríguez-Sedano, C. Fernández-Llamas and F. J. García-Peñalvo, Eds. ICPS: ACM International Conference Proceedings Series, pp. 232-239, New York, NY, USA: ACM, 2019. doi: 10.1145/3362789.3362902.
11. A. García-Holgado *et al.*, *Handbook of successful open teaching practices*. European Union: OpenGame Consortium, 2020.
12. M. Á. Conde *et al.*, "RoboSTEAM - A Challenge Based Learning Approach for integrating STEAM and develop Computational Thinking," in *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality (Leon, Spain, October 16th-18th, 2019)*, M. Á. Conde-González, F. J. Rodríguez-Sedano, C. Fernández-Llamas and F. J. García-Peñalvo, Eds. pp. 24-30, New York, NY, USA: ACM, 2019. doi: 10.1145/3362789.3362893.
13. M. Á. Conde, F. J. Rodríguez Sedano, C. Fernández-Llamas, J. Gonçalves, J. Lima and F. J. García-Peñalvo, "RoboSTEAM Project Systematic Mapping: Challenge Based Learning and Robotics," in *2020 IEEE Global Engineering Education Conference (EDUCON), (27-30 April 2020, Porto, Portugal)* pp. 214-221, USA: IEEE, 2020. doi: 10.1109/EDUCON45650.2020.9125103.

References

14. F. J. García-Peñalvo. (2018). Universidades traslúcidas más que transparentes. In: *Universídad*. Available from: https://goo.gl/6wEgKi.
15. F. Llorens-Largo. (2018). ¿Qué es la transformación digital de las universidades? In: *Universídad*. Available from: https://bit.ly/2GaL4fZ.
16. F. Llorens-Largo. (2019). Siete claves para preparar a tu universidad para su transformación digital. In: *Universídad*. Available from: https://bit.ly/2klRdwM.
17. F. Llorens-Largo. (2020). Transformación digital versus digitalización. In: *Universídad*. Available from: https://bit.ly/2tmYFMr.
18. Telefónica. (2019). *Formación online o presencial: ¿cuál es mejor?* Available from: https://bit.ly/2ImA0Bo.
19. M. Fernández Enguita. (2020). Una pandemia imprevisible ha traído la brecha previsible. In: *Cuaderno de campo*. Available from: https://bit.ly/2VT3kzU.
20. F. J. García-Peñalvo, "La metodología antes que la tecnología para afrontar la nueva normalidad docente en la universidad," presented in Webinar en el Ciclo de Webminars "La nueva realidad docente de la Universidad de Salamanca: Lecciones aprendidas y reflexiones", Salamanca, España, 2020. Available from: https://bit.ly/2A0G1Rx. doi: 10.5281/zenodo.3900279.
21. Á. Sánchez Tabernero, J. A. Juanes Méndez, F. Hernández Zaballos, B. Curto Diego, V. Moreno Rodilla and P. Alonso Hernández, "Use of new technologies in the acquisition of clinical skills in anesthesiology," in *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14)*, F. J. García-Peñalvo, Ed. ACM International Conference Proceeding Series (ICPS), pp. 31-34, New York, NY, USA: ACM, 2014. doi: http://dx.doi.org/10.1145/2669711.2669874.
22. S. Villagrasa, D. Fonseca and J. Durán, "Teaching Case: Applying Gamification Techniques and Virtual Reality for Learning Building Engineering 3D Arts," in *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14)*, F. J. García-Peñalvo, Ed. ACM International Conference Proceeding Series (ICPS), pp. 171-177, New York, NY, USA: ACM, 2014. doi: http://dx.doi.org/10.1145/2669711.2669896.
23. Gartner, Inc. (2020). *Gartner Hype Cycle*. Available from: https://gtnr.it/2BzwfmI.
24. G. Conole, "Digital identity and presence in the social milieu," presented in Pelicon conference, 2013, 10-12th April, Plymouth, 2013.
25. G. Conole, "Reviewing the trajectories of e-learning," in *e4innovation.com. E-learning innovation: Research, evaluation, practice and policy*, Retrieved from https://bit.ly/1acMj9k, 2014.
26. D. R. Garrison and T. Anderson, *E-Learning in the 21st century: A framework for research and practice*. New York, NY, USA: RoutledgeFalmer, 2003.
27. B. Gros *et al.*, *El modelo educativo de la UOC. Evolución y perspectivas*, 2nd ed. Barcelona: España: Universitat Oberta de Catalunya, 2009.
28. A. M. Seoane-Pardo and F. J. García-Peñalvo, "Los orígenes del tutor: Fundamentos filosóficos y epistemológicos de la monitorización para su aplicación a contextos de e-learning," *Education in the Knowledge Society,* vol. 8, no. 2, pp. 9-30, 2007.
29. S. Downes. (2012). E-Learning generations. In: *Half an hour*. Available from: https://goo.gl/YixPzN.
30. F. J. García-Peñalvo and A. M. Seoane-Pardo, "An updated review of the concept of eLearning. Tenth anniversary," *Education in the Knowledge Society,* vol. 16, no. 1, pp. 119-144, 2015. doi: 10.14201/eks2015161119144.
31. B. Gros and F. J. García-Peñalvo, "Future trends in the design strategies and technological affordances of e-learning," in *Learning, Design, and Technology. An International Compendium of Theory, Research, Practice, and Policy*, M. Spector, B. B. Lockee and M. D. Childress, Eds. pp. 1-23, Switzerland: Springer International Publishing, 2016. doi: 10.1007/978-3-319-17727-4_67-1.
32. F. J. García-Peñalvo and J. García Carrasco, "Los espacios virtuales educativos en el ámbito de Internet: Un refuerzo a la formación tradicional," *Education in the Knowledge Society,* vol. 3, no. 1, 2002.
33. D. Sleeman and J. S. Brown, *Intelligent Tutoring Systems*. London, UK: Academic Press, 1982.

References

34. A. J. Berlanga and F. J. García-Peñalvo, "Learning Technology Specifications: Semantic Objects for Adaptive Learning Environments," *International Journal of Learning Technology,* vol. 1, no. 4, pp. 458-472, 2005. doi: 10.1504/IJLT.2005.007155.
35. A. J. Berlanga and F. J. García-Peñalvo, "Learning Design in Adaptive Educational Hypermedia Systems," *Journal of Universal Computer Science,* vol. 14, no. 22, pp. 3627-3647, 2008. doi: 10.3217/jucs-014-22-3627.
36. M. Specht and D. Burgos, "Implementing adaptive educational methods with IMS learning design," presented in Adaptive Hypermedia, Dublin, Ireland, 2006.
37. F. J. García-Peñalvo, "Docencia," in *Libro Blanco de la Universidad Digital 2010*, J. Laviña Orueta and L. Mengual Pavón, Eds. Colección Fundación Telefónica, pp. 29-61, Barcelona, España: Ariel, 2008.
38. B. Collis, *Tele-learning in a digital world. The future of distance learning*. London, UK: International Thomson Computer Press, 1996.
39. T. A. Urdan and C. C. Weggen, *Corporate e-learning: Exploring a new frontier*. San Francisco, USA: WR Hambrecht, 2000.
40. F. J. García-Peñalvo, "Estado actual de los sistemas E-Learning," *Education in the Knowledge Society,* vol. 6, no. 2, 2005.
41. T. O'Reilly, "What is Web 2.0: Design patterns and business models for the next generation of software," *Communications & Strategies,* vol. 1, no. 65, pp. 17-37, 2007.
42. S. Downes, "E-learning 2.0," *eLearn Magazine*: ACM, 2005, Available from: https://goo.gl/MwNGZ6
43. J. P. Campbell, P. B. DeBlois and D. G. Oblinger, "Academic Analytics. A new tool for a new era," *Educause Review,* vol. 42, no. 4, pp. 40-42,44,46,48,50,52,54,56-57, 2007.
44. J. C. Sánchez-Prieto, S. Olmos-Migueláñez and F. J. García-Peñalvo, "Understanding mobile learning: devices, pedagogical implications and research lines," *Education in the Knowledge Society,* vol. 15, no. 1, pp. 20-42, 2014.
45. A. Davis, J. Murphy, D. Owens, D. Khazanchi and I. Zigurs, "Avatars, people, and virtual Worlds: Foundations for research in metaverses," *Journal of the Association for Information Systems,* vol. 10, no. 2, art. 1, 2009.
46. M. Á. Conde-González, F. J. García-Peñalvo, M. J. Rodríguez-Conde, M. Alier and A. García-Holgado, "Perceived openness of Learning Management Systems by students and teachers in education and technology courses," *Computers in Human Behavior,* vol. 31, pp. 517-526, 2014. doi: 10.1016/j.chb.2013.05.023.
47. M. Á. Conde-González, F. J. García-Peñalvo, M. J. Rodríguez-Conde, M. Alier, M. J. Casany and J. Piguillem, "An evolving Learning Management System for new educational environments using 2.0 tools," *Interactive Learning Environments,* vol. 22, no. 2, pp. 188-204, 2014. doi: 10.1080/10494820.2012.745433.
48. F. J. García-Peñalvo, C. García de Figuerola and J. A. Merlo-Vega, "Open knowledge: Challenges and facts," *Online Information Review,* vol. 34, no. 4, pp. 520-539, 2010. doi: 10.1108/14684521011072963.
49. E. C. Wenger and W. M. Snyder, "Communities of Practice: The Organizational Frontier," *Harvard Business Review,* vol. 78, pp. 139-145, 2000.
50. P. D. Long and G. Siemens, "Penetrating the Fog: Analytics in Learning and Education," *EDUCAUSE Review,* vol. 46, no. 5, pp. 30-32, 2011.
51. F. J. García-Peñalvo, "Learning Analytics as a Breakthrough in Educational Improvement," in *Radical Solutions and Learning Analytics: Personalised Learning and Teaching Through Big Data*, D. Burgos, Ed. Lecture Notes in Educational Technology, pp. 1-15, Singapore: Springer Singapore, 2020. doi: 10.1007/978-981-15-4526-9_1.
52. M. A. Chatti, A. L. Dyckhoff, U. Schroeder and H. Thüs, "A reference model for learning analytics," *International Journal of Technology Enhanced Learning,* vol. 4, no. 5/6, pp. 318-331, 2012. doi: 10.1504/IJTEL.2012.051815.
53. R. C. Clark and R. E. Mayer, *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*, 3rd ed. San Francisco, USA: Pfeiffer, 2011.

References

54. F. J. García-Peñalvo Ed. "Advances in E-Learning: Experiences and methodologies." Hershey, PA, USA: Information Science Reference (formerly Idea Group Reference), 2008.
55. F. Llorens-Largo, R. Molina-Carmona, P. Compañ and R. Satorre, "Technological ecosystem for open education," in *Smart Digital Futures 2014.*, R. Neves-Silva, G. A. Tsihrintzis, V. Uskov, R. J. Howlett and L. C. Jain, Eds. Frontiers in Artificial Intelligence and Applications, no. 262, pp. 706-715, Amsterdam, The Netherlands: IOS Press, 2014. doi: 10.3233/978-1-61499-405-3-706.
56. A. García-Holgado and F. J. García-Peñalvo, "Architectural pattern to improve the definition and implementation of eLearning ecosystems," *Science of Computer Programming,* vol. 129, pp. 20-34, 2016. doi: 10.1016/j.scico.2016.03.010.
57. A. García-Holgado and F. J. García-Peñalvo, "Validation of the learning ecosystem metamodel using transformation rules," *Future Generation Computer Systems,* vol. 91, pp. 300-310, 2019. doi: 10.1016/j.future.2018.09.011.
58. F. J. García-Peñalvo, M. Johnson, G. Ribeiro Alves, M. Minovic and M. Á. Conde-González, "Informal learning recognition through a cloud ecosystem," *Future Generation Computer Systems,* vol. 32, pp. 282-294, 2014. doi: 10.1016/j.future.2013.08.004.
59. S. Wilson, O. Liber, M. Johnson, P. Beauvoir, P. Sharples and C. Milligan, "Personal Learning Environments: Challenging the dominant design of educational systems " *Journal of e-Learning and Knowledge Society,* vol. 3, no. 3, pp. 27-38, 2007.
60. F. J. García-Peñalvo, "Ecosistemas tecnológicos universitarios," in *UNIVERSITIC 2017. Análisis de las TIC en las Universidades Españolas*, J. Gómez, Ed. pp. 164-170, Madrid, España: Crue Universidades Españolas, 2018.
61. F. J. García-Peñalvo, Á. Fidalgo-Blanco and M. L. Sein-Echaluce, "Los MOOC: Un análisis desde una perspectiva de la innovación institucional universitaria," *La Cuestión Universitaria,* vol. 9, pp. 117-135, 2017.
62. Á. Fidalgo-Blanco, M. L. Sein-Echaluce and F. J. García-Peñalvo, "From massive access to cooperation: Lessons learned and proven results of a hybrid xMOOC/cMOOC pedagogical approach to MOOCs," *International Journal of Educational Technology in Higher Education (ETHE),* vol. 13, p. 24, 2016. doi: 10.1186/s41239-016-0024-z.
63. S. Salzberg, "How Disruptive Are MOOCs? Hopkins Genomics MOOC Launches In June," *Forbes,* 2015.
64. C. M. Christensen and M. R. Weise, "MOOCs' disruption is only beginning," in *The Boston Globe.* Available from: https://bit.ly/2RjDTok, 2014.
65. M. R. Weise and C. M. Christensen, *Hire Education. Mastery, modularization, and the workforce revolution.* USA: Clayton Christensen Institute, 2014.
66. J. Farmer. (2013). MOOCs: A Disruptive Innovation or Not? In: *e-Literate*. Available from: https://bit.ly/2WLhvdy.
67. J. Reich. (2012). Summarizing All MOOCs in One Slide: Market, Open and Dewey. In: *EdTechTeacher*. Available from: https://goo.gl/i7zR9z
68. F. J. García-Peñalvo, Á. Fidalgo-Blanco and M. L. Sein-Echaluce, "An adaptive hybrid MOOC model: Disrupting the MOOC concept in higher education," *Telematics and Informatics,* vol. 35, pp. 1018-1030, 2018. doi: 10.1016/j.tele.2017.09.012.
69. M. L. Sein-Echaluce, Á. Fidalgo-Blanco, F. J. García-Peñalvo and M. Á. Conde-González, "iMOOC Platform: Adaptive MOOCs," in *Learning and Collaboration Technologies. Third International Conference, LCT 2016, Held as Part of HCI International 2016, Toronto, ON, Canada, July 17-22, 2016, Proceedings*, P. Zaphiris and I. Ioannou, Eds. Lecture Notes in Computer Science, no. 9753, pp. 380–390, Switzerland: Springer International Publishing, 2016. doi: 10.1007/978-3-319-39483-1_35.
70. Seoane-Pardo, A. M. (2014). *Formalización de un modelo de formación online basado en el factor humano y la presencia docente mediante un lenguaje de patrón.* (PhD Dissertation), Universidad de Salamanca, Salamanca, Spain. Retrieved from http://gredos.usal.es/jspui/handle/10366/123342

References

71. Seoane Pardo, A. M., & García-Peñalvo, F. J. (2014b). Pedagogical Patterns and Online Teaching. In F. J. García-Peñalvo & A. M. Seoane Pardo (Eds.), *Online Tutor 2.0: Methodologies and Case Studies for Successful Learning* (pp. 298-316). Hershey, PA: IGI Global.
72. F. J. García-Peñalvo, "Modelo de referencia para la enseñanza no presencial en universidades presenciales," *Campus Virtuales,* vol. 9, no. 1, pp. 41-56, 2020.
73. Agencia Nacional de Evaluación de la Calidad y Acreditación, *Guía de apoyo para la redacción, puesta en práctica y evaluación de los resultados del aprendizaje. Versión 1.0*, Madrid, España: ANECA, 2013. [Online]. Available from: https://goo.gl/6JFC1k.
74. P. Lévy, *L'Intelligence collective: Pour une anthropologie du cyberspace*. Essais, France: La Découverte, 1994.

Cita recomendada

- García-Peñalvo, F. J. (2020). *eLearning reference model for a non virtual or distance university*. Enhancing Technology in Teaching & Learning (Course ID: 471707) - Learning & Teaching PhD Programme, An-Najah National University (Palestine, July 7 – 9, 2020). Salamanca, Spain: GRIAL Group. Available at: https://bit.ly/2ZIRFpf. doi:10.5281/zenodo.3937537

This presentation is available at

https://bit.ly/2ZIRFpf

Acknowledgements

Junta de Castilla y León
Consejería de Educación

FONDO EUROPEO
DE DESARROLLO
REGIONAL

Europa impulsa nuestro crecimiento

Enhancing Technology in Teaching & Learning
(Course ID: 471707)
Learning & Teaching PhD Programme
An-Najah National University
Palestine

July 7 – 9, 2020

eLearning reference model for a non virtual or distance university

Francisco José García-Peñalvo
Computer Science Department
Research Institute for Educational Sciences
GRIAL Research Group
University of Salamanca, Salamanca, Spain
fgarcia@usal.es

CAMPUS DE EXCELENCIA INTERNACIONAL