18 February 2015

MEET Discussion paper[1]

Educational games to learn, train and value competences.

di Marco Laganà[2]

There is a growing interest on high quality education and lifelong learning. New methods and tools are being explored by education providers especially to learn the key competences that are needed to promote innovation, youth employment and to cope with the new work challenges. This Discussion Paper presents the relevant literature and proposes a conceptual framework underpinning an initiative which gamifies learning, the I-TEC Games. In this initiative, a series of educational games could be prepared with the aim of learning, training and valuing competences, for a social impact. I-TEC Games would gather educational games under a coherent and motivating framework where I-TEC stands for Innovation, Talents, Education and Community. The Gamification of the learning of the key competences, especially interpersonal competences and emotional intelligence, is about having fun in the things we are asked to learn or to do, throughout the entire life. The paper shows that Educational Games are aimed to offer a mechanism providing a strong and deep motivation to the players (i.e. students, workers) to pursue serious goals. This is also because games engage, allow to experiment and failure, give a sense of control and progression which is deeply empowering and motivating.

1. Background

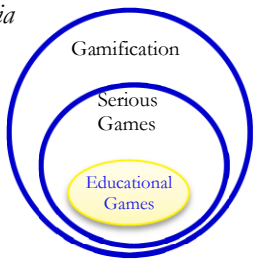
This discussion paper proposes a **conceptual framework** underpinning an initiative, which is named I-TEC Games, which the author is developing, in close cooperation with other professionals in the educational and lifelong learning fields**.** The I-TEC Games initiative intends to gamify the learning of competences by means of **educational games to learn, train and value competences.**

2. What about gamification and educational games?

"**Gamification** is the use of game elements and the use of game design techniques in non-game context." *Werbach Kevin*

"A **serious game** is a game designed for a primary purpose other than pure entertainment. The "serious" adjective generally refer to products used by industries like defense, education, scientific exploration, health care, emergency management, city planning, engineering, and politics." *Wikipedia*

"**Educational Games** are an interactive play that teaches us goals, rules, adaptation, problem solving, interaction, all represented as a story. They give us the fundamental needs of learning by providing - enjoyment, passionate involvement, structure, motivation, ego gratification, adrenaline, creativity, social interaction and emotion." *Wikipedia*



[1] This *Discussion Paper* aims at favoring the debate with *stakeholders* with a view to promote a high quality education and longlife learning by means of encouraging new and innovative educational tools.

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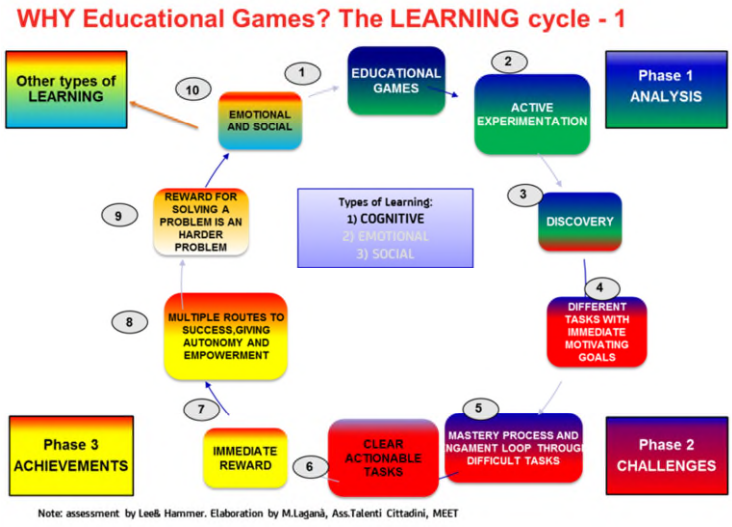
3. Why Educational Games?

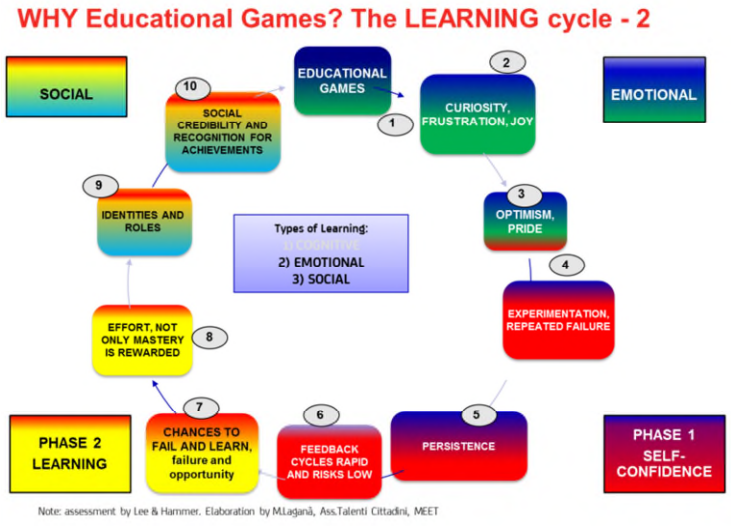
Educational Games are helpful to promote learning, and training, of competences. The two charts below describes the learning cycles where educational games play a key role in promoting learning from three perspectives: **cognitive, emotional and social** (Lee, & Hammer 2011).

Intuition indicates that gamification may be conducive to motivate students to learn better. Gamification can change the rules, but it can also affect students' **emotional** experiences, their sense of identity and their **social** positioning. Gamification projects offer the opportunity to experiment with rules, emotions, and social role.



Cognitive: games provide complex systems of rules for players to explore through active experimentation *[2]* and discovery *[3]*. Specific, moderately difficult, immediate goals are motivating for learners (Locke, 1991; Bandura, 1986), and these are precisely the sort that games provide (Gee, 2008) *[4]*. Games guide players through the mastery process and keep them engaged with potentially difficult tasks (Koster, 2004) *[5]*. Games also provide multiple routes to success, allowing students to choose their own sub-goals within the larger task. This, too, supports motivation and engagement (Locke & Latham, 1990) *[6]*.

Students in schools are often told what to do without understanding the larger benefits of the work. Gamification gives students clear, actionable tasks and promises them immediate rewards instead of vague long-term benefits. In the best-designed games, the reward for solving a problem is a harder problem (Gee, 2008) *[9]*.



In the above chart the **Emotional type** of learning is considered. Games invoke a range of powerful emotions, from curiosity to frustration to joy (Lazarro, 2004) *[2]*. They provide many positive emotional experiences, such as optimism and pride (McGonigal, 2011) *[3]*. Crucially, they also help players persist through negative emotional experiences and even transform them into positive ones.

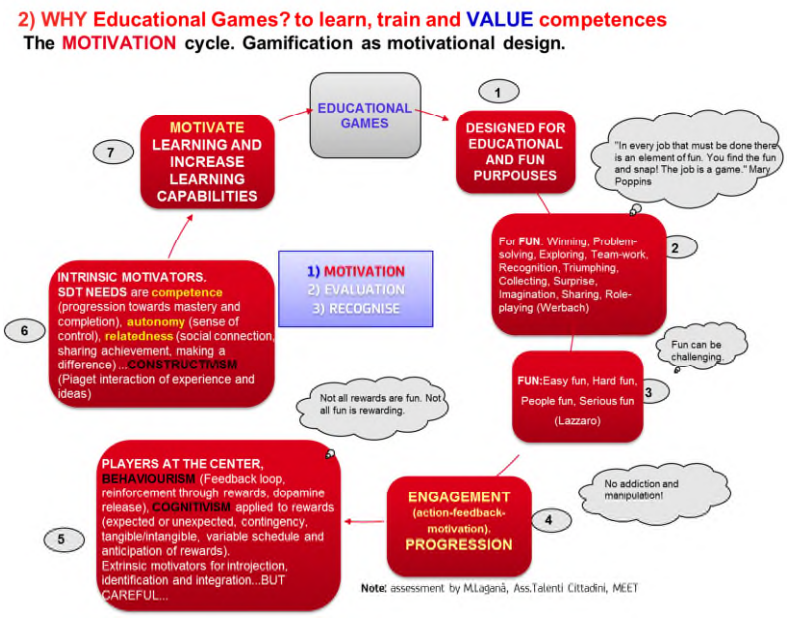
The most dramatic example of emotional transformation in a game is around the issue of failure which becomes a necessary part of learning. Because games involve repeated experimentation, they also involve repeated failure. In fact, for many games, the only way to learn how to play the game is to fail at it repeatedly, learning something each time (Gee, 2008) *[4] and [5]*.

Games maintain this positive relationship with failure by making feedback cycles rapid and keeping the stakes low *[6]*. The former means players can keep trying until they succeed; the latter means they risk very little by doing so. In schools, on the other hand, the stakes of failure are high and the feedback cycles long. Students have few opportunities to try, and when they do, it is high stakes. Little wonder that students experience anxiety, not anticipation, when offered the chance to fail (Pope, 2003) *[7]*.

Gamification can shorten feedback cycles, give learners low-stakes ways to assess their own capabilities, and create an environment in which effort, not mastery, is rewarded. Students, in turn, can learn to see failure as an opportunity, instead of becoming helpless, fearful or overwhelmed *[8]*.

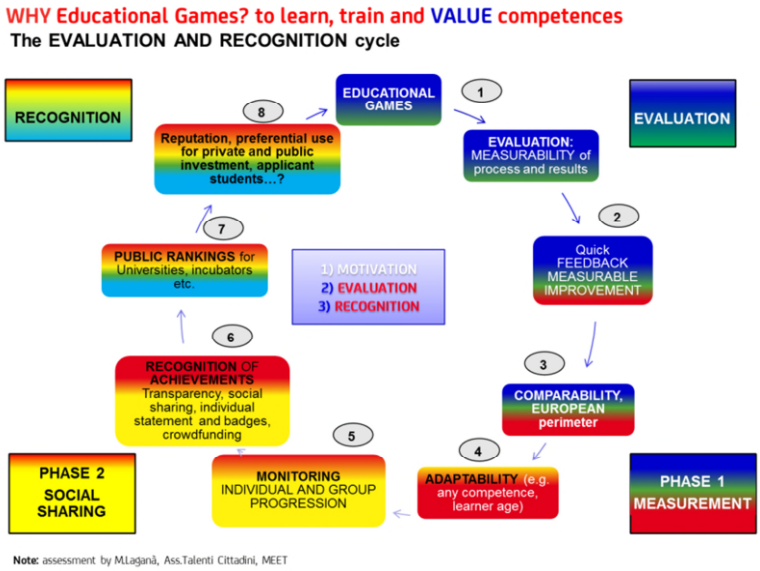
The **Social type of learning** is also mentioned. Games allow players to try on new identities and roles, asking them to make in-game decisions from their new vantage points (Squire, 2006; Gee, 2008). Developing a strong school-based identity helps engage students with learning in the long run (Nasir & Saxe, 2003) *[9]*.

Gamification also allows students to publicly identify themselves as scholars through playing the game. The game can provide social credibility and recognition for academic achievements, which might otherwise remain invisible (Lee, & Hammer 2011).



In the above chart the **Motivation cycle** is presented. Educational Games are designed for educational and fun purposes. Fun is the result of a variety of actions: winning, problem-solving, exploring, team-work, recognition, triumphing, collecting, surprise, imagination, sharing, role-playing (Werbach, 2012) *[2]* and can be of different types: easy fun, hard fun, people fun and serious fun (Lazzaro, 2004) *[3]*. In educational games, there should not be any addiction nor manipulation as players are at the center *[4]*. In other words the focus is on what motivates them, not just extrinsic but more importantly **intrinsic motivators**. *[5]* In this regard the self-determination theory indicate the main needs: **competence** (progression towards mastery and completion), **autonomy** (sense

of control), **relatedness** (social connection, sharing achievement, making a difference) (Deci and Ryan, 1999) *[6]*.



In the previous chart the **Evaluation and Recognition cycle** is presented. Educational Games are designed for educational and fun purposes. Fun is the result of a variety of actions: winning, problem-solving, exploring, team-work, recognition, triumphing, collecting, surprise, imagination, sharing, role-playing (Werbach, 2012) *[2]* and can be of different types: easy fun, hard fun, people fun and serious fun (Lazzaro, 2004) *[3]*. In educational games, there should not be any addiction nor manipulation as players are at the center *[4]*. In other words the focus is on what motivates them, not just extrinsic but more importantly **intrinsic motivators**. *[5]* In this regard the self-determination theory indicate the main needs: **competence** (progression towards mastery and completion), **autonomy** (sense of control), **relatedness** (social connection, sharing achievement, making a difference) (Deci and Ryan, 1999) *[6]*.

4. When Educational Games during the life cycle?

Educational Games are helpful through the lifecycle. The author and intuition suggest that the analysis presented in the following graphs may be considered as food for thoughts. It is conceived for a developed country such as Italy, where the educational and lifelong learning systems require important reforms, as confirmed by the non-encouraging comparative results with other OCSE and EU countries (Laganà 2013, 2014).

Graph 1: Comparison with the PAST, previous generation(s)

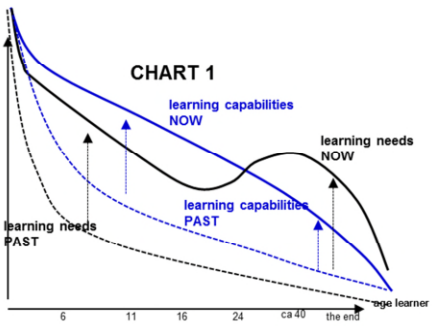
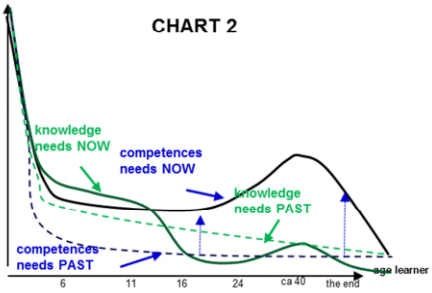


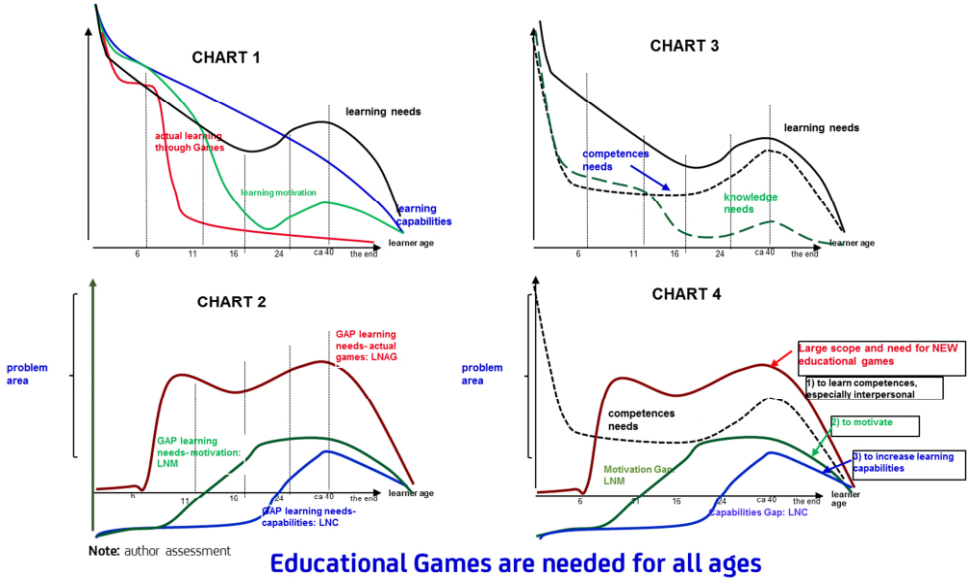
Chart 2: Structural changes have increased the importance of competences for all and especially for adults.



Note: author assessment

Chart 1: Structural changes, such as the global competition, global networks and collective intelligence, and the technological revolution have:
a) increased the learning capabilities for all and especially for the native digitals;
b) increased the learning needs for the adults as products, markets and infrastructures become obsolete at an higher speed due to innovation and knowledge turnover. Learning competences and motivation become key
c) increased the need for learning interpersonal competences which are less "practiced" during the youth because of the emergence of individual technological tools.
Chart 2 suggests that are indeed the competence needs to have increased much more compared to the previous generation, especially for adults on the job.

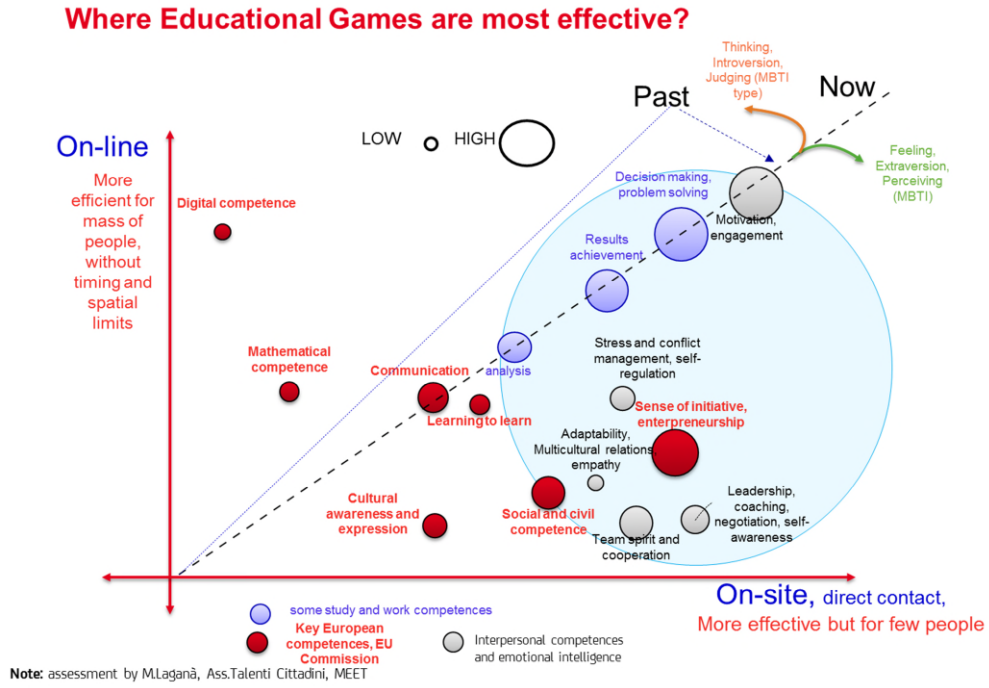
Graph 2: Static Analysis of the current situation



As for **Graph 2**, In **Chart 1** the author suggests the lifecycle for a number of self-built **very subjective indicators**: learning needs (already mentioned before), learning capabilities (which naturally decrease over time), learning motivation (which decreases over time but turn during the first part of the job time), actual learning through games (which sharply decreases with the secondary school as games are almost no longer used for educational purposes. It is recalled that no empirical rather anecdotal evidence is used for this subjective and therefore questionable assessment.
Chart 2 reports the differences between the above mentioned indicators and the learning needs.
Chart 3 shows other self-built **very subjective indicators**: competence needs (which are the main portion of learning needs), knowledge needs (which are the smaller portion of learning needs and decrease over time). Competence needs are considered to increase during the adult on the job period.
Chart 4 indicates that for all ages there is ample room for using educational games to address the learning needs. Importantly it also shows how educational games can do this: 1) by learning and training competences, especially interpersonal, 2) by motivating the learner, 3) by increasing the learning capabilities.

5. Where Educational Games?

This chapter aims at highlighting the potential impact that educational games may have with regard to the learning of the different competences. A subjective distinction between on-line and on-site educational game is proposed in the following graph, based on anecdotal evidence and therefore subject to debate.



The following main considerations may be highlighted:

- interpersonal competences and emotional intelligence should be more effectively learned by on-site educational games;
- on-line games are more efficient and less expensive for a huge amount of people globally, without timing and spatial limitations; on-site games are generally more effective but for much fewer learners;
- compared to the past the on-line educational games have expanded their area of influence.

6 About the I-TEC Games

a. Mission and goals

The "I-TEC Games" is an initiative whose feasibility and opportunity is being considered. This initiative would bring together a network of relevant stakeholders and gamify the learning of competences by means of educational games to learn, train and value competences, for a social impact. I-TEC stands for Innovation, Talents, Education and Community.

The I-TEC Games would also be aimed to have an **impact**. They would in fact try to engage and motivate young people, to foster innovation, entrepreneurship and therefore impact on the growth of the relevant community. The I-TEC games would explicitly designed with educational purposes aimed at learning and valuing talents. If well designed to motivate intrinsic motivation of players and coupled with a reasonable range of concrete awards (e.g. education, financing, student' grants, internships, professional advisory) as extrinsic motivators, the I-TEC Games may also help **to develop innovative ideas, promote growth and build the future.**

The **Gamification** of the learning and valuing the key competences of the European Framework is about having fun in the things we are asked to learn during our educational path or to do at work.

The I-TEC **Games** are being conceived to offer a mechanism to provide a strong but deep **motivation** to the players (i.e. students and workers) to pursue serious goals. This is also because games engage, allow to experiment and failure, give a sense of control and progression which is deeply empowering and motivating.

b. High-level principles and criteria

High-level principles and criteria for eligible I-TEC games

Merit: The I-TEC Games intend to disregard the "luck or random" factors and focus on merit and competences. Players are empowered and have autonomy to take some decisions, assess risks and opportunities, allocate limited resources.

Team spirit: In the I-TEC Games, trust, engagement, interaction and cooperation in the team are deemed more important than the individual excellence.

Key Competences: The competences (i.e. talents) underlying the I-TEC Games are mainly based on the European framework for lifelong key competences[3]. Currently they are: 1) communication in the mother tongue, 2) communication in foreign languages, 3) mathematical competence and basic competences in science and technology, 4) digital competence, 5) learning to learn, 6) social and civic competences, 7) sense of initiative and entrepreneurship, 8) cultural awareness and expression

Innovation sharing: the I-TEC Games should offer participants the chance to present their innovative ideas and have them shared by a variety of communication channels.

Social impact: the I-TEC Games should offer participants the chance to: i) raise *crowdfunding* for their ideas; ii) receive prizes in terms of financing or other concrete support to help the development of ideas (or business plan) and therefore impact on the communities .

Principles for eligible I-TEC participants

Entrepreneurship and citizenship: in the selection of the I-TEC participants, an important factor is to value the entrepreneurship of participants. In this regard, successful participations in competitions for social innovation ideas or business plans (or others eligible educational paths) will be a preferential condition for participation.

Youth: in the selection of the I-TEC participants, an important factor is to value the talents with the highest investment potential. In this regard, university students and researchers will have a preferential treatment for participation.

Openness: learning competences may have an impact at local and international levels. The **perimeter** of the I-TEC Games will gradually grow and ultimately intends to be European.

7. Conclusion

This Discussion Paper provides a contribution to the debate on high quality education and lifelong learning. New methods and tools are being explored especially to learn the key competences that are needed to promote innovation, youth employment and to cope with the new work challenges. To this end, Educational Games could play a key role in facilitating learning, training and valuing competences, throughout the educational path

[3] Source: European competence framework for lifelong learning by European Commission

of the entire life. A proper mix between on-line and on-site games would be advisable as they mainly target different competences.

The Gamification of the learning and valuing the key competences, especially interpersonal competences and emotional intelligence is the main objective of an initiative of the I-TEC Games initiative. The I-TEC Games initiative is being considered in order to gamify the learning of competences by means of educational games to learn, train and value competences.

8. Bibliography

- Alliance for Excellence in Education (All4Ed). (2009). High school dropouts in America. Retrieved from: www.all4ed.org/files/GraduationRates_FactSheet.pdf
- Anderson S. (2012) Just One More Game…, New York Times Magazine, April 8, 2012
- Bandura, A. (1986). Social foundations of thought and action: A social–cognitive theory. Englewood Cliffs, NJ: Prentice Hall.
- Blizzard. (2010). World of warcraft subscriber base reaches 12 million worldwide.
- Bridgeland, J., DiIulio, J., & Morison, K. B. (2006). The silent epidemic. Seattle, WA: Gates Foundation.
- Corbett, S. (2010, September 19). Learning by playing: Video games in the classroom. Retrieved from: http://www.nytimes.com/2010/09/19/magazine/19video-t.html
- Gee, J. P. (2008). Learning and games. In Katie Salen (Ed.) The ecology of games: Connecting youth, games, and learning. Cambridge, MA: The MIT Press.
- Deci, Koenster and Ryan (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.
- Freedman D. (2012), The Perfected Self, The Atlantico
- Klopfer, E., Osterweil, S. & Salen, K. (2009) Moving learning games forward.
- Koster (2004). A theory of fun. Paraglyph Press. New York, NY.
- Laganà M. (Feb 2014). La proposta di un APP INVALSI. MEET Discussion Paper
- Laganà M. (Jan 2014). Linee di intervento e strategie di sviluppo per l'INVALSI. Costi e Benefici di una valutazione trasparente. MEET Discussion Paper
- Laganà M. (Nov 2013). Un'Educazione europea di qualità elevata per migliorare le competenze per vivere e lavorare. MEET Discussion Paper
- Laganà M. (Jul 2013). Un'Educazione europea di qualità elevata per tutti. MEET Discussion Paper
- Lazzaro, N. (2004). Why we play games: Four keys to more emotion without story. Retrieved from: http://www.xeodesign.com/xeodesign_whyweplaygames.pdf
- Laster, J. (2010). At Indiana U., a class on game design has students playing to win.
- Leblanc, G. (2004). Enhancing intrinsic motivation through the use of a token economy. Essays in Education, 11(1).
- Lee, J. J. & Hammer, J. (2011). Gamification in Education: What, How, Why Bother? Academic Exchange Quarterly, 15(2).
- Locke, E. A. (1991). Goal theory vs. control theory: Contrasting approaches to understanding work motivation. Motivation and Emotion, 15, 9 –28.
- Locke, E. A., & Latham, G. P. (1990). A theory of goal setting and task performance. Englewood Cliffs, NJ: Prentice Hall.
- MacMillan (2011, January 19). 'Gamification': A growing business to invigorate stale websites. Retrieved from: http://www.businessweek.com/magazine/content/11_05/b4213035403146.htm .
- Mashable (2010, February 20). Farmville surpasses 80 million users. Retrieved from: http://mashable.com/2010/02/20/farmville-80-million-users/
- McGonigal, J. (2011). Reality Is Broken: Why Games Make Us Better and How They Can Change the World. Penguin Press. New York, NY.
- Nasir, N. S. & Saxe, G. B. (2003). Ethnic and academic identities: A cultural practice perspective on emerging tensions and their management in the lives of minority students. Educational Researcher, 32, 14-18.
- Pope, D. (2003). Doing school: How we are creating a generation of stressed-out, materialistic, and miseducated students. Yale University Press.
- Rock, M. (2004). Transfiguring it out: Converting disengaged learners to active participants. Teaching Exceptional Children, 36(5): 64-72.
- Rumberger, R. (2004). Why Students Drop Out of School, in G. Orfield (Ed.) Dropouts in america: Confronting the graduation rate crisis, p. 131–155 (Cambridge, MA: Harvard Education Press, 2004).
- Salen, K. & Zimmerman, E. (2003). Rules of play: Game design fundamentals. Cambridge, MA: MIT Press.
- Schell, J. (2010). DICE 2010. Design Outside the Box Presentation. Available at: http://www.g4tv.com/videos/44277/dice-2010-design-outside-the-box-presentation/
- Squire, K. (2006). From content to context: Videogames as designed experience. Educational Researcher, 35(8): 19-29.
- Werbach K, (2012) Hunter D. For the Win: How Game Thinking Can Revolutionize Your Business