Sara Pellegrini

International Itard Study Center, Chiaravalle, Italy
Lexiplus Start Up, Civitanova Marche, Italy
e-mail: nuove2020@gmail.com

Principles of ecological construction

Abstract. The gamification can be organized to disseminate the cognitive sense by ecological way of the joystick, hardware, software and storyboard. This can help spread the cognitive exercise, shaping the architecture of the gaming function, consoles and device in self-paced so that the games can allow the activation of strategies, creating a real training, to relaunch cognitive, organizational and planning potentials.

Keywords: cognitive gaming function, device, ecological construction.

Perspective. The fusion is far

From the videogame market research industry's we can detect what are the trends of the time to understand which console, joystick and software usually use children in general. From the observations that there is a certain degree of discontinuity between what the market offers and the educational intent. As we can see the market research does not perform studies that relate technology to chronological age, but invites families to protected their child pointing out the dangers of the product as a scary or violent. The trend is so scarce to observe this aspect that the industries not are interested in a different functional and clinical sensitivity for the understanding of consumer performance in relationship to technology.

Of different sign are the thoughts of Bettetini 1996 and Aarseth 1997 (Bittanti, 2004), which already at the end of the last century indicate the

skills and functions that the user must possess; the authors suggest the functions that each player must possess to be able to act efficiently and effectively. The paradigms interact between know and act, as follows:

"Competencies and functions of a computer game" by Bettetini (Bettetini, 2004):

1) epistemic Knowing → Knowing – be (interpretative function)
   cognitive Knowing → Knowing – do (interpretative function)
2) act or practice (gameplay) → be able to use (exploratory and configurative functions)

<div align="center">→ be able to realize (configurative function)</div>

3) be able to codify (textonica or/and programming functions).

Then the keen observation of C. Molina (Bettetini, 2004) amplifies the cognitive sense of the game, when the author makes a fine reflection among the activities and the agency or between the play and being played, stating that the pure machine performances, it never turn into agency of the man, according to the cognitive capacity to undertake actions. C. Molina and J. H. Murray (Bettetini, 2004) point out that in some games, the player behaves with skill, but without resourcefulness, so they note that good and functional results are only partially achieved.

A series of considerations disrupting therefore the new conception of the videogame, entailing renovate technological references and possible avant-gardes. In light of the above, the innovation can move towards a functional conception of the game, to create a new dimension of education and to filter innovations that populate the market. Therefore, a new articulation of the way of thinking the game might create on the one hand new business expansions and the other to make the buyer aware of the effects that the game, the console and joystick, together can produce or not produce. This detailed attention to products becomes imminent and imperative because the *gamification* (Viola, 2011) is a process in place and now the game seems to be used to entertain, to treat and to train adults and children. For children there are many kinds of games, but these are primarily developed from the content for adults and they may represent scenes of violence or otherwise not suitable. Beyond the relevance of their content we can analize to single out the types of gaming according to Colin Wilkinson (Wilkinson, 2012), such as *Action and Adventure Games, Arcade Games, Strategy Games, Sports Games and Educational Games*.

However, M. Bittanti claims that the enucleation of videogames is partially satisfactory because the combinatorials are endless, and then is not possible to think to the differents genres and subgenres, in any case by way of example he gets further articulation of the classification, such as:

– games action;
– shooter in subjective or third person;
– games driving;
– motor games;
– brain teaser;
– simulation-games or serious game;
– strategy games;
– role games;
– adventure-games;
– video games such as stages of mental development, that F. Antinucci (Antinucci, 2011) divided into skill, adventure and strategy games.

As for the subject with disorders is fundamental change reasoning, making a real strategic conversion. This is not to think about the game in terms of quantity but especially in quality, combining it with the stages of mental development of the child, but most of all to cognitive skills. The consistency of the relationship between cognitive ability and the game focuses on the action of the thought processes. It is therefore to develop video games by referring to cognitive processes, such as:

– videogames to exercise the sensory-motor coordinations;
– videogames that allow to plan actions within a story;
– videogames that exercising the timing (Chiarenza, 2008);
– videogame that exercising the opening words and the braking action (Crispiani, 2011);
– videogames shaping the architecture of function in self-paced in articulation with externally paced (Tanenbaum, Eklund, 2007; Pellegrini, 2016);
– videogames that allow activating strategies.

So with reference to this aspects, the cognitive issue in relation to the videogame for disorders is widely referenced in processes of the mind and in the experience of the professional developers.

Regardless of the adequacy of content, none of these hardware and software are suitable for dyslexic that only in part they use it with skills.

Then they do not have the necessary steps to generate a winning performance. Also for the dyslexic these videogame do not produce special benefits though, from a structural perspective these videogames, the relative console and joysticks, that are distributed in shop, they are perfectly embodied with the features of the classic games, such as:
–   interaction and participation;
–   immersion;
–   exploration and mastery.

The issue assumes a renewed attention which is expressed in different structural complexity. Just think of the different types of console, the quality of the required actions that are not always recommended to training for cognitive disorder. In reference to studies, we can analyze the consoles and reflect on some of their aspects.

The console needs a high performativity controller that allow the bi-manual actions of the mind and the eye-foot coordination. The wide range of motor games and the final feedback and immediate *interfeedback* (Pellegrini, 2013), albeit to improve, make it adequate and articulable in plural motor tasks. From a technical point of view there are no substantial differences between a console and a computer. Many and thick are the differences from a practical point of view, as well as the production and commercial philosophy. The consoles are ready to be used to play, reducing errors, are more efficient and cost less. In fact, if a child intends to play on the computer, the application will be more efficient and faster, so the computers will be equipped with capacious hard drives, audio and 3D cards, and more, depending on the characteristics of the game.

The consoles are changing the concept of the dedicated machine. Now they are dedicated not only to play, because they are becoming the center of electronic home entertainment, spreading the procedurality of video play system, conveying cognitive influences on the degree of participation and interaction, on simulation and diving, exploration and mastery.

It follows that the three classic general features of the game are subject to a renewed interest declined in:
–   interaction and participation, the videogame has to trigger interaction totally governed by the subject that self-modifying the speed/spatiality, altering consequently the space and time and participating in self-regulated way to the action without sudden distractor elements;

- simulation and diving, are activated with advance and in this case the immersive carrier is the speed;
- explorating and mastery, the explorating activity takes place before training to ensure better mastered.

For the person with the disorder the relationship between interaction, fun and challenge of the videogame come to assume as the only common denominator the "to be performing" means of the speed/time/space (Crispiani, 2016) and so the objective is concreted in reaching the lower speed and greater accuracy in the portion of the space, realizing a good praxis. So the video game with enabler function has the following features, which I give a possible interpretation.

Functional technology features

Despite the discordant and qualitative opinions about the goodness of the videogame, the non-neutrality of the videogame seems to find a broad agreement. Indeed, when you build a videogame you will operate the choices on the basis of educational purposes or of the entertainment purposes.

The Science, developers and manufacturers themselves are aware that the videogame leads the child at a repeating of the same stimuli or motor behaviors with an uncertain grades of strength, and the consumer is not always aware. This appearance, however, must be met with positivity. If the producers study and organize with clinicity (Crispiani, 2016) the videogame, in that case you can get important educational gains because videogame synergistically imprint and revived the cognitive, organizational and planning potential.

With this scientific sensitivity, the clinical vision of technology could be correlate at an ecological conception of the instrumentations. This conception underlies the cognitive coherence between the hardware, software, joystick and not in the end the stroryboard. The ecological cognition of technological kit could be designed using the following features.

Hardware features

Setting aside the online videogame, the machines to play games are nothing more than the classic laptop or the console or a computer without

a keyboard and monitor. While the laptop has plural functions, the console is designed to dedicate it-self to the game and for this reason the console would seem easier to use because immediate and organized in a dedicated processing, so do not need any special knowledge to install or configure software. Another significant difference, it is the cost of which, however, it can vary depending on market trends. In this case we choose the laptop because it appears to meet the cost indicator in relation to repeatability and product distribution, dedicated to maintaining and immediate processing. Also it meets the conditions allow the self-paced mode.

Not all consoles globally express interactive qualities appropriate to the disorder and not always manage to visualize the goal, not always they have a satisfactory feedback, tending to lend itself better to training situations That require repeated performance with externally paced mode.

Joystick features

The joystick is a device that allows moving the object in the video. It is very common in games with the laptop and it must meets the requirements under the convenience, ease of handling and and it has the properties to comfort for the control of the movement. You may have a plurality of buttons, but for the disorder they could be a source of confusion and error. I created my model of right joystick and in the just created prototype the joystick has a minimum excursion and other devices that allow to the people the perfect housing of the all the portions of the hand integrated with cognitive action, which always ensures the consistency of the mechanics properties, without margin of error.

All this is fundamental because the tapping of the thumb, according to a directional and a orderly succession seem to train the corpus callosum. For this reason, the joystick should have an essential and basic shape, with no margin of error and it responds only to two commands that is start and stop. So we have designed the characteristics of the joystick for disorder such as the following indicators.

–   Organizational (Pellegrini, 2004). They are arranged in a sequential manner and they infuse at the same time sequentiality the correct use, also they training the procedural memory.

- Support the succession of motor sequences and related sequential processes within the same motor sequences, perceptual and mnemonic.
- Work on the entirety of the performance and predictability of performance because it does not allow error.
- Activate and dis-activate the starting point and the braking, or solicit brain electrical activation and his arrest (Crispiani, Pellegrini, 2016).
- Directional or they should induce the continuity of execution and the perseverance.
- Favor the hemispherical tuning, so that the subject can perform alternating movements, overcoming the midline of his own body.
- Plastic, which is easy to use immediately and thus they should then be quickly comprehensible to use (Pellegrini, 2014).
- Reassuring, which help to gain the confidence and make it unlikely the error.

Software videogame features

The video game for dyspraxic and dyslexic subjects is a motor and cognitive videogame and it is meant to encourage the overall functionality of the subject and it should have many of the following features.

- Improving the praxic-motor coordinations and eye-hand and eye-foot circuits.
- Narratives, according to the succession of playful story in relation to cognitive directionality.
- Metaphorics, offer interpretations of the context with the intent to stress the mental rotations (Chiarenza, 2008).
- Activate the the predictability of behavior in relation to the context by the insert of the ad hoc objectives.
- Encourage the perceptual tracking.
- Encourage the re-rewrings (Pellegrini, 2014) or a new registration of functional abilities.
- Present elements of *cognitive cheating* (Wilkinson, 2012), organized and implemented by the different articulation of the target, of space and time.

–   The cognitive *briefing* (Wilkinson, 2012) if it is on online mul-
    tiplayer mode in a party-lan or in an online meeting, in a later
    time.
–   Must be *flow* (Muzio, Meda, 2009), which should instill in the
    child a positive experience for the best performance.
–   Favoring the tuning of the elements for the best self-regulation
    through successive and sequential actions.
–   Organizational (Pellegrini, 2004), must express infinite func-
    tional levels in order to avoid the ceiling effect (Chiarenza, 2008),
    namely saturation or habituation.
–   No levels, to allow to make free exercises and implement the
    functionality with echo-behaviors.
–   Own different degrees of interaction in order to exercise the
    somatosensoriality.
–   To encourage the best feed-back and feed-forward (Sabbadini,
    2013).
–   Self-paced, which should foster self-control action with immedi-
    ate feedback.
–   To encourage the shift (Crispiani, Pellegrini, 2006) on the screen
    according to an organized and directional proceed.

Storyboard features

The storyboard is an important tool for the development of videogames
and it forms a path for images, annotations and symbols of the videogame
history. For its implementation, the designer, the programmer and the
graph must work together for the two-dimensional drawing.

The main processing times are as follows.

–   The mapping, where you represent environments, regions, places
    or different location. In the videogame the space is fixed and is
    an essential environment, which does not affect the game, but
    rather serves to contextualize the action.
–   The character sheets, where we insert the features and possible
    actions. In this case the lights can make the shift motor actions
    and segmentations.
–   The ranking for colors. It represents a very important aspect be-
    cause it serves to distribute the space. The definition of the space

by means of the distribution of color implies both the definition of the Time, where to place the feedback or the cheating, that the description of the action.

There are different types of storyboard (Genovesi, 2006) and they are never standard. There is however the literature that suggests the general settings which can adapt secondary aspects in relation to the designer's choices, which:

– linear storyboard,
– space storyboard,
– schematic storyboard,
– wallen garden storyboard,
– storyboard technical,
– live storyboard.

We could add an interpretation of cognitive storyboard for the disorders. The storyboard is useful to motor games facts on structured advances, the cognitive storyboard is strongly related to the feedback, to which is assigned a visual privileged condition and a series of autonomous functions coordinated. The environment is not unpacked into levels and sublevels, but is photographed in standard and globally mode. There are not environmental changes but any changes are generated by a system that depends on the choices of the player. Unlike from the procedures laid out in task, the action is organized in a comprehensive and unified manner, now the unit of reference is the entire action in the totality of the behavior that is played in the relation action/objective.

References

Antinucci, F. (2001), *Computer per un figlio*, Bari: Laterza.

Bittanti, M. (2004), (a cura di) *Per una cultura dei videogames. Teorie e prassi del giocatore*, Milano: Unicopli.

Chiarenza, G. A. (2008), *Le disprassie dello sviluppo e i disturbi motori associati,* Amsterdam: Suyi.

Crispiani, P. (2016), *The Crispiani Method. Clinic of dyslexia and Dyspraxia*, Parma: Junior.

Crispiani P., Pellegrini S. (2016), *Le vie della pedagogia. Tra linguaggi ambiente e tecnologie*, Macerata:EUM.

Crispiani P., Pellegrini S. (2006), *Dislessia-Disgrafia. Azione 7 – I Barrages*, Bergamo: Junior, , ISBN: 88-8434-248-1.

Genovesi, R. (2006), *L'ABC dei videogiochi*, Roma: Dino Arduino, p. 98–101.

Murray, J. H. (1997), *Hamlet on the Holodeck. The Future of Narrative in Cyberspace*, Cambridge (MA, USA): MIT Press.

Muzio, M., Meda S. (2009), *Per raggiungere il tuo flow*, Milano: RED.

Pellegrini, S. (2016), *Technology enhanced learnng for specific learnings disorders*, in D. Siemieniecka (ed.), *Nee technologies in education and Communication*, Torun: NCU, pp. 255–267).

Pellegrini, S. (2014), "Giochi ed artefatti oggettuali ludici per l'attivazione delle funzioni prassico-motorie fluide e sequenziali", in Sidoti E. (ed), Dentro la dislessia, Bergamo: Junior, pp. 221–238. ISBN 978-88-8434-708-4

Pellegrini, S. (2013), *The relationship between learning and technology in Human Formation*, (a cura di) Ramik Mazewska I. et Zolkoska T., *Special education: learning, education and rehabilitation*, Szczecin (PL): Uniwersytet Szczecinski, pp. 36–42. ISBN 978-83-64277-05-4.

Pellegrini S. (2006), *Disturbi specifici di apprendimento e trattamento educativo*, in Serio N., Moliterni P. (ed.), *Qualità della didattica, qualità dell'integrazione. Dal dire al fare,* Vasto: Gulliver, pp. 202–217. ISBN/ISSN: 88-6013014-X.

Pellegrini, S. (2004), E. *Morin e l'educazione complessa*, in *Annali della Facoltà di scienze della formazione I. 1.*, Macerata:Università degli Studi di Macerata, pp. 97–116. ISBN 88-8147-416-6.

Sabbadini, L. (2013), *Disturbi specifici del linguaggio, disprassie e funzioni esecutive*, Milano: Springer.

Viola, F. (2011), *Gamification*, Italia: Arduino Viola.

Wilkinson, C. (2012), *Gaming. Playing safe playing smart*, New York: Rosen Publishing's.