ÉDUCATION SENTIMENTALE OF GAME PLAYING ASD KIDS

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Abstract: *The paper presents a pilot project developed in 2016 by lecturers and students from the Digital Humanities program at New Bulgarian University. The project focuses on the design of a practically oriented technological solution for introducing 6-7 years old participants with Autism Spectrum Disorders to the emotional alphabet. We present a multisensory educational game as a didactic solution which helps ASD kids to build a bridge between specific details of each universal emotion and its symbolic value as a whole. The game is designed to detect three of the seven universal emotions (based on Paul Ekman's theory) and derives from Violeta Boyanova's long-term therapy experience with PECS pedagogy. Lozanov's TENDER SUGGESTION also plays a crucial role in the introduction of musical background (Vivaldi) for the game.*

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Key words: *Multisensory Game, Educational Game, SEN / Special Educational Needs, ASD / Autism Spectrum Disorder, Visual Immediacy, Emotional Alphabet, Tender Suggestion*

1. Educational Concept

The paper will discuss the first steps in mastering an interdisciplinary didactic approach of participatory learning for children with special educational needs, esp. ASD kids. We will consider first four points of reference as a theoretical background:

The ***first point of reference*** is the generational context, i.e. *how* the so-called *Millennials* or *Digital Natives* (Palfrey/Gasser 2008; Tapscott 2008; Duridanov et al. 2013; Luckett/Casey 2016) dive in virtual environments which radically transform their social habits and personal identities. Virtual environments, especially the ones developed on the ground of the so-called Facebook strategy (i.e. Facebook, YouTube, Viber, Snapchat, WhatsApp, WeChat) and multiplayer games using the Minecraft – Lego principles, foster their attitudes, and more specifically their emotional interaction with the world and how they identify themselves. Their psychological reflexes are mastered by social playing and creative building in virtual spaces resembling to the ways previous generations (i.e. the so-called *Digital Immigrants* - Prensky 2001, Tapscott 2008, 2009) have built their first home or used a fridge, a car or a TV set. *Millennials* do not usually have more inside knowledge about the Digital (Romans 2015), which has often been misinterpreted by the *Digital Immigrants* with advanced technological knowledge. *Digital Natives* may not miss anything of the outside world when they are virtually immersed. They develop a

completely new social form of 'first home' ambience, where physical spaces are merged with virtual environments, if not nearly replaced, because of their attractiveness. Experiences of their virtual habitat are assembled via watching YouTuber movies, building Minecraft blocks and instant sharing. Therefore, they often have difficulties to acquire the social skills, *Digital Immigrants* have learned as children merely through real-life interaction.

The ***second point of reference*** is to highlight how globally expanding information and communication technologies over the last 25 years have boosted the development of virtual environments, esp. professionally used live chats, video conferencing and mobile banking, which have had a strong impact on the virtual building of a 'first home' for all generations. The professional experience of a *Digital Melting Pot* (including *Digital Natives* and *Digital Immigrants*), mints socially and psychologically the category of ***GENERATION C*** as opposed to all ***NON-CONNECTED GENERATIONS*** who merely use offline ways to communicate in the outside world. The ***Gen C*** (Solis 2015) or the ***NETWORKED CLIENT*** / ***PARTNER*** (first introduced as the ***CONNECTED COLLECTIVE CONSUMER*** – Pankraz 2010, Nielsen 2012 or the ***CONNECTED CUSTOMER*** – Solis 2011) has been produced as a mix across social and generational differences, based on the functional classification principle. It is questionable, if they are not trying to erase the multi-generational dilemma in a working and educational context. Or is a functional opportunity a new option on the way to be developed as a working and educational solution in the ***DIGITAL AGE OF ACCESS***.

The ***third point of reference*** is marked-off by three questions: how are the emotional impairments of ASD children to be situated within the educational context of normally developed *Digital Natives*; could a functional education solution for 6-7 years old ASD children be applied also to normally developed ones; to what extent the advanced technologies which build a preferred space to communicate for ASD children, because everything is predictable, could be used as a tool to socialize them within a messy, sometimes emotionally overloaded reality, where ASD children's expectations often cannot be matched?

The ***fourth point of reference*** is to set a ***GAME STRATEGY*** of ***HOMO LUDENS*** which is in compliance with the special needs of ASD children, because through diving into a game environment, children may perceive a virtual space as a real one and acquire the necessary social skills to be applied later in real-life solutions. A crucial position can definitely be assigned to the game, even in traditional didactics, since 18th century the *STURM UND DRANG* concept of Schiller's *spielerische ästhetische Erziehung* and 19th century *ENLIGHTENMENT* concept of Flaubert's *éducation sentimentale*. ***PLAYING A GAME*** means opening the emotional gateways for acquiring serious knowledge, highlighted by Friedrich Schiller as a 'spontaneous awakening of the mind' (*Erweckung der Spontaneität der Vernunft* – Schiller 1795). Schiller's humanism highlights here an educational concept, literally quoted in his 15. letter („Der Mensch spielt nur, wo er in voller Bedeutung des Wortes Mensch ist, und er ist nur da ganz Mensch, wo er spielt") and should not be overlooked, only

because psychology and didactics advanced further. The only question here is about the ***SELECTION CRITERIA*** which should be applied designing a game for ASD preschoolers and first graders.

2. The pilot game project – context and development

Autism Spectrum Disorders and Emotional Impairment

It has been nearly a century since the first publication of the clinical account on autistic cases of children by Kanner (1943). Kanner was the first to define a form of children's inability to relate with others in their environment as child autism or 'autistic alone'. Since then, diverse scientific fields such as developmental psychology, cognitive science, neuropsychology and others have contributed to the understanding of autism. Importantly, despite the necessity of examining and diagnosing autism properly, throughout this paper we are going to stress on the educational importance especially for Bulgarian children with Autism Spectrum Disorders (ASD) during the early years of development and acquisition of reading skills.

Nowadays, Autism Spectrum Disorders diagnostic criteria include impairment on areas related to social communication and emotional rigidity (American Psychiatric Association 2013). Other often reported symptoms are delayed or impaired recognition of others' emotions (Harms/Martin/Wallace 2010; Hobson 2005, 2012; Uljarevic/Hamilton 2012) as well as several comorbidity factors (for a full review see (Mannion/Leader 2013). However, there are also studies claiming that ASD children are able to explicitly recognize six of seven basic emotions (see Ekman 1989) including anger, fear, happiness, sadness, disgust and surprise (Wallace et al. 2011), and yet others that report a diminished recognition of sad and fearful facial expressions (Ashwin et al. 2007; Wallace et al. 2011).

Are ASD children "emotionally detached" from others? Despite studies that challenge the view that ASDs are not emotionally detached from others (BaHomer/Rutherford 2008; Vivanti et al. 2011), the general consensus of studies is that a significant proportion of ASDs exhibit atypical emotional processing (for a review see (Nuske/Vivanti/Dissanayake 2013). Recognition of emotions is a core factor for social interaction and emotional calibration (Nuske/Vivanti/Dissanayake 2016). Importantly, research on the Theory of Mind (ToM) in autistic children between 4 and 14 years old, reports a significant enhancement in understanding others' emotions which is primarily dependent on language improvement (Steel/Joseph/Tager-Flusberg 2003). As reported by (Bauminger/Kasari 2000; Losh/Capps 2006), the enhancement of emotional awareness during the early stages of the child's development can have a significant impact on the ability to form friendships and understand social interactions.

Game Design Concept

The following ASD gaming concepts have influenced the designing of our pilot project to build the game *Disclose the emotion* by our ***interdisciplinary NBU team*** (*Violeta Boyanova*, with more than 100 ASD kids therapy experience; *Ludmil Duridanov*, exploring virtual reality since 2005 and mediator of game ideas; *Diana Tsenova*, with ten years of experience in animation design; *Asenia Giagtzidou*, with four years of experience in psychology and cognitive science; and *Ivaylo Ivanov*, with 20 years in web design and programming experience):

1. The designing concept of a virtual tutor for ASD kids from the University of Oregon (Herring 2010, 2015) modernized the PECS (Picture Exchange Communication System) therapy using pictures on cards to socialize ASD individuals, and developed it further to a CAPE (Computer Assisted Picture Exchange) therapy in 1985 by Lori Frost and Andy Bondy (Overcash/Horton 2010). The only issue here is the emotional recognition of a human voice having been taught by the synthesized voice of a virtual tutor. Therefore, we decided to use for the first the influence of a non-standardized female voice (of a 22 years old student), recorded and used for the purposes of our game. Several studies (Kuhn 2014, 2017; Lin 2016) show that a human voice is faster perceived and may warm up the first rapport of ASD children (also with other special educational needs) with a "stranger". The voice may be effectively used as a tool to connect when the intonation also recalls a favourite character to ASD children (Chasen 2011; O'Leary 2013). Our idea is to test the human voice' impact during the auditory processing – as integral part of our game – when already repetitively "memorized" in their mind beforehand.

2. The use of animated vehicles in the Transporters, developed as a game for ASD children in 2007 at the Cambridge Autism Research Centre (Golan et al. 2009) gave us the incentive for the idea to introduce a human facial expressions on a painted train animation. So, an ASD kid has to choose take a facial expression and match one of three emotions (happy, sad, angry) that depicts, whilst dragging the face from the train to its corresponding match in a gallery madden by clouds.

3. In a recent study Conallen and Reed (2016) analyzed how autistic children label drawings of everyday situations with a child painted in the drawings which implied emotions of anger, fear and happiness. Tagging these situations was accomplished via matching respective situations with card drawings of a boy's face which depicted happiness, sadness or fear. Critically, the authors report that training of the ASD children to tackle emotions and their respective context was not only successful but it was transferred, thus generalized, to novel situations using the cards that

depicted them. The implications of the study (Conallen/Reed 2016) sustained our idea that ASD children can acquire at least a basic understanding of emotional states.

4. Following Lozanov's suggestopedic approach (Lozanov 2005; Gill/Lozanov 2010) that influencing an individual to acquire creatively knowledge can be facilitated by 'tender suggestions', esp. classical music as a background (Mozart, Vivaldi etc.), we integrated a musical background (Vivaldi's *Four Seasons*) in our animated game.

- **Pilot Game Project *Disclose the emotion***

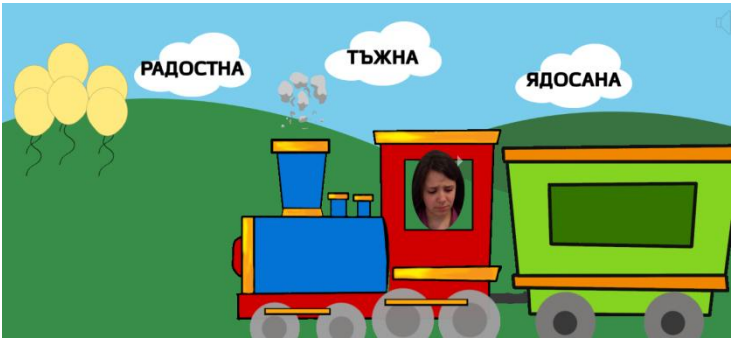
The interactive game uses a plain design, not to cause unnecessary sensory overloading to our target group of ASD preschoolers and first graders. Therefore, we decided to design a game architecture as simple as possible, structured on three levels (as suggested by Prof Boyanova). Each level fosters different social skills to interact with three of the seven universal emotions (Ekman, 2003).

1. **First level (nonverbal identification - visual immediacy /face/).** The ASD kid has to identify a happy, sad and angry female face (of a 22 years old DH student of our seminar), dragging the face from an animated train to its match in the gallery situated above. It wins a balloon by matching the right face or loses one if a failure occurs. Winning three points (visualized with balloons) takes the kid to the second level.

2. **Second level (nonverbal and verbal identification - visual /face/ and auditory immediacy /voice/).** At this level the ASD kid gains

points (i.e. balloons) dragging a face (from an animated train) to its match in the gallery situated above. Each match with the right face wins a point (balloon), the emotion is verbalized with a previously recorded, female voice. Winning three points (balloons) takes the kid to the next level.

3. **Third level (nonverbal and verbal identification – bundled visual/auditory immediacy /face, voice/ and visual abstraction /written word/).** At this level the face from the animated train should be matched with the emotion (corresponding to a written word). The visual immediacy of a universal emotional expression is linked with the auditory immediacy of the voice and initiates a connection with the visual abstract code of a written word. When matching the right emotion, the player wins a point (visualized by a balloon) and hears a previously recorded female voice speaking out the written word. The auditory and visual channels are bundled to cover the necessary requirements of abstraction in literacy taught in-class for normally developed first graders.



3. Conclusion

The key objective of our pilot project was not only to test the bundling of visual and auditory impact on ASD kids as a good practice suggested by other Autism scholars in a game environment. The vision was to build a 'cognitive bridge' between emotional and rational skills for educational preschool purposes integrating ASD children. Starting to acquire the emotional alphabet of universal facial expressions in a simple multisensory animated ambience may take ASD preschoolers to build step by step associative connections between visual immediacy (i.e. facial universal expressions of basic emotions), using the human voice as a mediator to arrive at the abstract (visual) level of writing and spelling words, which corresponds to the usual preschool literacy.

If the pilot project was merely initiated by ideas of Violeta *Boyanova* and *Ludmil Duridanov*, derived from the long-term therapeutic experience of *Violeta* and guided by *Ludmil* as a Virtual Reality researcher, its further development – in the second phase – is planned by the young psychologist, *Asenia Giagtzidou*, who intends to use facial and vocal standardization and has the élan vital to complete the game with its functionality, assisted further by our animation designer, *Diana Tsenova*, and programmer, *Ivaylo Ivanov*.

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