USE OF TECHNOLOGY TO INCREASE FUNCTIONAL AUTONOMY AND FACILITATE COMMUNICATION FOR PEOPLE WITH DISABILITIES: DESIGN OF AN EMERGING "DIS(EASE)ABILITY" MODEL

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Abstract

Disability is not a choice, but a trauma that no one ever wants to live. Effectively connecting with peers and successfully participating in the processes of learning is an 'indispensable condition for not being discriminated against. While research continues to generate data to accurately diagnose and improve the inclusion of those with disabilities,such efforts sometimes contribute to an incorrect focus on the "disability" as a result of disease or disorder of the person. Although well-intentioned, unintentional discrimination may be the result. To counter such erroneous behavior, undergirded with field-proven educational theory, we began a complex search for solutions, built with the help of various technology skills that place focus on an array of options for differing needs, thus maintaining the dignity of each learner.

The State of the Art

Multiple fault lines that mark distances and differences between social groups, physical and mental health conditions and impairments in bodily and neurological functions and structures are one of the main reasons of inequality and discrimination, which are often associated with forms of "stigma" gravely injurious to the dignity of the human person. New technologies are helping learners overcome many limitations and encourage the expression of learners' potential in many dimensions, with the infinite panoply of possibilities they offer. Slowly, they help improve inter-functional communication and learning. The importance to fully understand the possible technological applications, especially when used for the information needs of people with limited autonomy was the inspiration of our

operational work. This approach led to the pragmatic implementation of our theory, making extraordinary implications for us, yet completely unpredictable. To claim that its applicability, from our point of view, could undermine what has been theorized and realized up to now, for and on behalf of the use of new technologies, and to say the least restrictive, because we wanted to shake the foundations of what was stated by theorists and empiricists. Therefore, the preeminent value we have chosen to deepen and transmit is an understanding of how each individual labeled "disabled," as distinguished from from "normal," regardless of gravity the of the diseases that afflict them, are hidden from the great potential of ideas and solutions for the social life of everyone

Our Theory: The Dis(ease)ability

In everyday reality school problems emerge simultaneously with difficulty in learning. The movement toward inclusion and integration.is unfortunately floundering in seeking solutions. Especially needed are paths of mediation between teachers' knowledge and skills of experts in the field, who are almost always seen as the only real resources.

In this field, the urgent need to meet the challenges that learning difficulties and mental disability generally reveal, convinced advocates that educating through what is said, but more by what you do, puts in place the need to develop an increased awareness and shared reflection (between teachers and “experts”) on the issues. According to a reinterpretation, employing a Holistic point of view, different ways and styles of learning are embraced as a resource for addressing the clinical pathology. Such a perspective of diversity should be the guideline observed and kept as a reference point to calibrate and adjust the method and teaching, thus encouraging the process of both teaching and learning. The idea is 'simple: instead of restricting the scope of autonomy of the person, partly because of one’s clinical and/or perceived pathological status (i.e., disease), raise awareness of the potential of technology to create ease-ability.. Indeed, although the appearance of disability involves both the subject and its surrounding world, the construction of technological devices enables personal autonomy, while triggering universes of relationships, feelings, and hopes, since the device has the strong power to overshadow the impairment, thus bringing the learner into the world of the learning community. Disregarding or not observing this basic thought, trivializes the clinical diagnosis as a barrier to the social and individual reinforcing the common stereotype of disability. In fact, the term we coined, *Dis(ease)ability*, redefines the real obstacles that children, students and people with disabilities generally live and/or encounter. Such difficulties include not just the deficit but anxieties, fears, adjustments to their environment, interactions, and reactions of those around them. Despite their disadvantages, they are still able to reach varying degrees of personal autonomy. This term provides a clearer focus on the learner’s

difficulties (i.e., dis-ease), thus affording an opportunity to "see" the problem and possible solutions to more autonomy in their entirety, in order to create a space, physical or virtual, where experience and professionalism can find the right expression with respect to roles and responsibilities. The strong point of reference with regard to this new term - *Dis(ease)ability* is to act on false interpretations that may have been perceived of such learners' behaviour. Working with a person with a disability, however serious the diagnosis, should not preclude respect and the developmental potential to lead a normal life: in other words, because of the deficit, mental physical or both, one should not be singled out as "one who is not able to understand or live" according to common standards of normalcy. The positive implication of this term and 'given by the *synergy*--that is, the optimal integration of several elements intended to achieve a common goal--to obtain an overall result more satisfactory than that which would be obtained separately: open the *Dis(ease)ability* technologies, designed as a resource for everyone including cultural differences and/or social, must be understood as an element of wealth in human ethics.

Our starting point and inspiration 'was not so much to consider that people with disabilities and/or otherwise disadvantaged people can learn different habilitation like everyone else; that' s obvious. We have reinterpreted the relationship that the school environment must have with the world of media and communication, in order to use new and creative technologies to promote efficient and effective learning of knowledge, mastery of approaches, monitoring and evaluation of impact of training, promoting specific skills in the areas of labor discipline. Our intent was not to teach the use of media. The new generations do not need them, let alone people with difficulties, who have been the first to appreciate them. Our emphasis was focused on how to understand and capture their experiences and how our educational project could become the new teaching. Media Education, as we reinterpreted it, refers to a new educational and technological reality, a true resource in the teaching process that has allowed us to create models and styles of teaching/learning that are not only innovative, but based on processes of collaborative communication and bi-directional, as they have been outlined in recent years with distance education. These concepts were reiterated in the interview broadcast that Dr. Conversano issued within the program "Different from Whom?" Aired on Rai Radio 1 on 20/11/2010, whose podcast can be listened to via the link published in the collection of websites (see references).

Our Doubts: Promoting Autonomy or Complicating the Reality?

"According to some authoritative texts of technical aeronautics, the bumblebee cannot fly because of the shape and weight of their bodies, in relation to the wing surface. But the bumblebee does not know and therefore continues to flow." (I. Sikorsky). Even in the discussion of these lines of Igor

Sikorsky the key to the application of dis(ease)ability (the important belief that has guided our steps), we identity, capacity, behaviours and environments, inverted with respect to limiting beliefs. Reversing the route allowed us to achieve common goals for all, with full consideration of success. The pervasive presence of disability or rather, the concrete contexts of *dis(ease)ability* in everyday social life, poses problems in individuals of various sizes: the goal was to design a functional technological application in order to facilitate access to social communication, while acquiring, a personalized approach necessary to compensate for what the disability is missing in the individual, as this would increase his gap of psychological distress to others, but we wanted to reinforce that phase between what the individual as a whole was able to do or might have done and what he still might be able to achieve, despite the disabling situation, with tutorial support technologies; thus moving the attention from what the individual can do alone (area of individual competence) to what could be done if supported by any help. So, even when technology is essentially designed for the field of electronics or computer, one could change any element to move matters from a state of passivity and dependence to one of independence and wellness (area of proximal development). In teaching what the person is already capable of doing one risks discouragment or devaluation of self-generating ideas.

Strengthening one's healthy part becomes essential. Unfortunately,various types of clinical and pathological disabling put into place a mode of being wherein the "disabled" had to communicate with us in a unique and standardized manner,,creating ongoing conflicts, depression, anxieties and frustrations with closures and escapes by the so-called "sick" and defeated by so-called "normal." A re-reading reverse would simplify everything. The application of our theory - the dis(ease)ability embraces a dynamics approach with regard to the differences not only in general, but detaching in fact empiricist lines of "psycho-technology" theorized by de Kerckhove aims, through pragmatic approaches instrumentally, to make concrete and operational the Vygotskian theory of the "zone of proximal development." In fact, interacting on the connection between language and mental organization, in its application being able to edit and/or speak at a deep level of an individual's psyche, we have acted strategically in the solution of needs not always met, because they are based exclusively on complex operation, thanks to the integrated skills of clinical, educational and technological domain. Conceived in its universal approach, this theory is well connected to life not only with the disabled but its plural facets. See for example the stranger with the difficulty of understanding the linguistic codes of communication; if he encounters a context that does not support the idea and recognition of these codes, a condition of living large with dis(ease)ability, it contributes to a further state of estrangement, exploitability and social distance. The same goes for those who have suffered disabling injuries that lead them to be excluded so temporarily or permanently from the context in

which one belongs. Our goal 'was to act on those structurally critical factors that normally affect the efficient approach to integrating, implementing solving assumptions for technological assistance to foster communication, experience it and create new bases for its transferability to all operational contexts of everyday social life.

Moreover, its focus is part of the heuristics. The heuristic process relies on intuition and temporary circumstances, in order to generate new knowledge as a method or approach to problem solving. In fact, the dis(ease)ability theory indicates, as this heuristic, the avenues and possible strategies to be activated to make progressive, developmental and applied intercommunication' with disabilities' or approaches to life contexts.

Our Facts: Testing and the Project

This project is a natural evolution of two prior works: "The enchanted maze" presented last year to the 9th Annual International Conference on Communication and Mass Media, and the project "The Virtual Media as a tool for development and integration of pupils with disabilities," conducted with a network of schools from Taranto. The project currently discussed focused upon 50 students with intellectual disabilities, but also those with specific disorders and learning disabilities (ASD, dyslexia, dysgraphia, dyscalculia), often due to a maturational delay, with a low investment and low motivational experiential background. This educational project is strongly oriented to the adoption of specific technologies for teaching and the use of technologically advanced software platforms for the integration of children with various intellectual disabilities.

The knowledge that different and innovative ways of support can facilitate training and educational opportunities, thus enabling focused and accessible recovery, led the teachers-authors of this initiative to design an educational system with technology intended to pursue the following objectives:

- Finding solutions and innovative development of new technologies applied to teaching Information and Communication;
- Support for pupils with temporary or permanent disabilities by making accessibility and usability of information compliant with W3C standards; and
- Development of autonomy in learning and experiential and motivational involvement of the disabled person.

The logic followed in the project was to develop a tool to foster the development of autonomy in learning of students with disabilities who, in addition to learning problems, have difficulties in the application of knowledge and in carrying out tasks. or use of instruments such that they are not able to act on their own. The project aims to strengthen the capacity of

abstraction and logical thinking--reinforcing basic skills and operational real capabilities of the recipients, through the use of innovative technology that decreases the difficulties the disabled pupil experiences, thus reducing the gap with the class group. These students, in fact, often present a low level of self-esteem and psycho-emotional and behavioral immaturity and for this reason, in any educational activity, they are usually restrained by fear of failure, as argued by the engineer Mr. Manzulli in his radio interview released within the program "Service Area" of October 2, 2011 aired on Rai Radio 1 in Italy. The podcast can be heard via the link provided in the site links. Each disabled person is "foreigner" in the entire world because they often live in their isolation also among their own countrymen. Therefore, the issues addressed in this article are aimed at both Italian and foreign people with disabilities, who share such concerns. The design concept, therefore, is based on the premise of making contents (that are often difficult to understand and redress when using traditional approaches to teaching) most easily assimilated by the disabled population. Moreover, understanding the didactic message is strongly affected by attentional liability, and so the student needs constant reminders to focus attention. Often, the teacher provides such a function. Technology, used innovatively and effectively, can provide such a function and thus reduces the gap between the disabled and the world around him, eliminating the isolation and encouraging his integration.

It should be noted, furthermore such students are often low performing in tasks of working memory, so it is important to provide a tool that gives the opportunity for self-control, resulting in the possibility of error correction in real time, given the immediacy with which feedback, positive or negative, is presented. Thus they are able to independently manipulate and transform information. This tool would help the user become a more independent, active, constructive learner.

From the point of view of technological innovation, the objective is to promote learning through the use of a mode of communication adopted by the latest models of mobile phones such as smart phones, because, when used in communication activities and educational applications, smart phones allow the creation of a learning environment whose characteristics are the immediacy of understanding, ease of use and the adoption of mechanisms, which they are motivated to use. In fact, this generation of students already uses the Internet and the new frontiers of communication, as a natural space for learning and play; so that they have been called *digital natives* (Marc Prensky, 2001) since they are growing inside of a world already digital.

The involvement of the student with a disability in the use of such tools would allow the ability to break down the "digital divide" often due to the not always practical use of technology; that is, what is referred to as isolation technology of which one is often the victim. Applying language and actual

tools close to the current way of communicating in everyday life may help overcome any personal isolation such a student might feel in the classroom.

The now-essential use of new communication technologies can, therefore, truly innovate learning environments by rethinking the paradigms that underlie the educational process: if the traditional paradigm was based on the transfer of knowledge from teacher to learner, in the new reading it relies on the mechanisms of constructivist knowledge.

In fact, “virtual” learning environments promote new learning systems based on relativistic models of knowledge where, through cooperation and communication based on the use of images, sounds and electronic messaging, students find creative ways to improve their knowledge, using the community as a meeting place for the production, distribution and management of knowledge but also as a space for socializing (social learning) and virtual dimension of confrontation and dialogue.

The first experience made with the introduction of mobile phone use at school was conducted in a multiethnic class of variable composition that saw the presence of several students with disabilities.

After conducting a technical investigation of cell types and how they had worked, a calendar was created of "slang" common to all. In a very simple and natural way, we realized that students had become more independent (typing is easier than writing) and did not lose any opportunity to engage in this new teaching methodology in order to use their phones. Moreover, in a subsequent theatrical experience in school, students texted the various adjustments to the beats of the script, procured by the Bluetooth various mp3 sound files and created the backstage photos by participating actively in the creation of the show.

Translated into educational terms, this teaching method provides, in addition to a particular attention to the relational and affective aspect (with the activation of mechanisms to facilitate group dynamics), the exposure to various subjects and planned routes in a form simplified to facilitate both learning content and increasing autonomy.

Teachers can now choose the content and set minimum targets, with specific interventions coordinated not only by the support teacher, but also by use of various methods mainly for tutoring, teaching multimedia, orientating activities that are of an interactive and multidisciplinary nature. Accordingly, they may realize special orientation activities for children with disabilities.

It is in this context that the school's new mission can be realized: to direct its pedagogical activity as educational action. In reference to our current research project, after success in the use of the techniques mentioned above,

attention has been given to some limitations that the current technology of the smart phone shows when users are disabled.

For example, for visually impaired users the graphic richness of a smart phone can be a daunting exercise because the display appears to be small compared to that of a computer. Those who are suffering from impaired mobility of the limbs cannot use their hands properly, so correctly using the property of a capacitive screen smart phone (sensitivity to small current of fingertips) is challenging. Facing these obvious difficulties, the project idea initially saw the realization of a software platform that, through a dedicated operating system, could reconstruct on a computer or a tablet PC, the exact reproduction of a smart phone and its unique operating characteristics. Thus, using the tools made for disabilities currently available as accessories for the PC (for each type of disability there is a specific aid, a tool able to facilitate the movement or improve the vision of the screen) everyone can use functions such as navigating with the touch while on the screen everything is exactly as in the phone screen: all functions, including the telephone can be switched from the PC, through an appropriate interface with SIM cards. The interface with the computer is not an amazing thing. There are many programs that today allow one to drive the most common mobile phones with one's computer, even Mac OS X lets one write SMS messages directly from the keyboard with many Bluetooth phones. For a disabled person, however, the simplicity and flexibility of a smart phone interface directly on the computer would enable them to use their mobile phones with display and control systems they already routinely use, without suffering the limitations of the available solutions today. Moreover, the evolution of the project, with the advent of the Tablet PC, consisted of thinking about an application that would allow disabled children to improve communication with others and with their teacher using the screen of I-Pad and its touch screen functionality. The interface to touch, and devices like the I-Pad have been created for the intuitive ability of a user of 2 years. In essence, the application uses a kind of "slang" of images that helps the disabled to express themselves through some buttons, making the device a real communication tool, allowing them to interact with the class. The project includes an enforcement phase of testing in a properly equipped classroom, but soon the application will be available in all stores. The application has been made with the development environment Xcode 4.2 for Leopard and Lion operating systems, using the Software Development Kit available from Apple on devices with IOS5 (I-Pad, I-Phone and Mac).

Conclusion

Special education does not walk on roads other than the "normal," and the study of disability and that of the person, even if they belong to different areas of knowledge and action, require professionally valid input, but based on choice or need. Developing concrete skills should be contextualized by

giving precedence to appropriate action in relation to the emerging needs of individuals in their existential dimension, pedagogical-didactic and clinical education.

Finding the best solutions to help build these skills is a challenging and difficult task, which raises many questions and problems to be addressed because each student has specific characteristics and difficulties that make one unique and different from others. So the best teachers are able to cut their work around the specific characteristics of each learner, where such action cannot be exhausted in sterile technological performance.

Innovation is not just about managing to have good insights but new ideas to improve the old to understand and anticipate even if the path is still all uphill, complicated, full of disappointments, true and false hopes that we, with perseverance, we have decided to dedicate our lives, daily supported by the words that still vibrate to the graduates of the late Steve Jobs at Stanford University in 2005: "... If you cannot find what suits you, keep looking, do not stop ...", [in order to] provide better quality of life for our less fortunate friends or, to use McLuhan's aphorism: "... If you do not like our idea .... no matter .... We have many others ...!"

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Useful Links:

RAI RADIO 1 : "Area di servizio" - Interview Gaetano Manzulli
http://www.rai.it/dl/radio1/2010/popup.html?t=Area%20di%20Servizio%20del%202%20ottobre%202011&p=Area%20di%20Servizio%20del%202%20ottobre%202011&d=&u=http%3A%2F%2Fwww.radio.rai.it%2Fpodcast%2FA41316018.mp3
RAI RADIO 1 : "Diversi da chi?" – Interview Raffaella Conversano
www.radio.rai.it/radio1/diversidachi/view.cfm?Q_EV_ID=321903
HANDIMATICA 2010 – Migrants and disabled Seminar: Technology mediation and mediators
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