Co-funded by the Erasmus+ Programme of the European Union

Play2Do – A Simulated Training Framework for Skills Development addressing students with intellectual and developmental disabilities and their trainers

PROJECT CODE - **2016-1-UK01-KA202-024613**

Play 2Do IO1 - Pedagogy

Outcomes No.			
Intellectual Output No.	O1-A3	Intellectual Output Title	Pedagogical Framework for simulated practice learning
Partner Leader		University of Athens (UoA)	
Authors		UoA - all partners	
Status (F: final; D: draft; RD: revised draft):		F	
Internal content review:		All Partners	
Quality assurance review:		George Milis (EuroCy)	

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Version History table

Version no.	Date	Dates and comments
0.1	19/01/2017	Initial internal draft by UoA
0.2-1.5	28/01/2017 – 26/02/2017	Work in progress by UoA staff
2.0	03/03/2017	Complete draft submitted to partners for subsequent reviews
2.1-2.8	18/03/2017	Feedback received by all partners and incorporated accordingly
2.9	11/04/2017	Finalisation of document by UoA and submission to EuroCy

The Play2Do project (2016-1-UK01-KA202-024613) has been partially funded under the Erasmus+ program, sub-programme KA2 - Cooperation for Innovation and the Exchange of Good Practices - Strategic Partnerships for vocational education and training, of the European Commission. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained herein.

1 Introduction

1.1 Scope of the document

The following document comprises the supporting pedagogy that can be used by educators to train VET/school students with intellectual and/or developmental disabilities in an inclusive and non-inclusive educational setting. This pedagogy will be also incorporated in the training material of the simulated practice learning environment. This document includes some of the most heavily used theories and pedagogies in the training experience of students with intellectual and/or developmental disabilities and is also complemented with some more recent and pioneering theories of pedagogy. This document provides initial information and guidance and should be used as an initial guide regarding these pedagogies and/or complimentary to teachers' professional training. This brief pedagogical guide aims to connect educators' theoretical training with currently used pedagogies and further it by introducing, authentic pedagogies and socially just pedagogies and complimentary games based learning methodologies. Its aim is not to substitute the theoretical training of educators or impose specific pedagogy models, but to **highlight the pedagogies and current methodologies** that have emerged during the Play2Do Research by teacher training experts, SEN educators and teacher training professionals.

1.2 Outline of document

The rest of the document is outlined as follows. Chapter 1 provides a short description of the project and its expected outcomes. Chapter 2 provides an Introduction in Pedagogies in special and inclusive education. Then, Chapter 3 presents Applied Behavioral Analysis and Chapter 4 the approaches of Inclusive Pedagogy. In Chapter 5 we meet Pedagogies that follow the social pedagogy models and in Chapter 6 we present and discuss Pedagogies around Serious Games, Games-based Learning and training simulation environments.

1.3 Summary of the Play2Do project

The following organisations are involved in the Play2Do project as partners and have undertaken specific tasks for the production of the specified outputs:

- EuroCy Innovations (EuroCy, CY)
- University of the West Of Scotland(UWS, UK)
- University of Athens(UoA, GR)
- Education and Innovation Centre(EIC, BG)
- Smart Bananas soc. coop. a r.l. (Smart Bananas, IT)
- THEOTOKOS FOUNDATION - IDRYMA PROSTASIAS APROSARMOSTON PAIDON I THEOTOKOS (Theotokos, GR)
- MARIE CURIE ASSOCIATION (MCA, GR)

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The Play2Do project deals with supporting current and future teachers of people with intellectual and developmental disabilities, as well as the workers/carers who work with these people, to participate in a more inclusive education, particularly using tools (i.e., computer games) that they commonly use in their leisure activity and they typically find engaging and motivating. The proposed approach uses a more modern, constructivist approach to education and represents an example of innovative education in a digital era, particularly a computer-games era.

The Play2Do project will develop an immersive 3D virtual environment, built on digital gaming architecture and driven by emotional Artificial Intelligence (AI), to provide a safe and readily accessible environment where VET/school students studying to become teachers of people with intellectual disabilities can learn by interacting with Non-Player Characters (NPCs) in a simulation of a real world service. Educators and trainers will be trained to use the framework and trainees will engage with simulations and will be required to navigate their way through choices to arrive at the best resolution. Each simulation can be replayed and evaluated by the trainer/mentor and the trainee can use the same simulation as many times as required. This is an offering of a measurable, controlled environment where learners can gain a command of the basics of the job role they are training for, with minimal resource requirements and zero risk to the public, thus providing a sound basis from which to progress to real work practice placement.

In addition, the project will develop a pedagogy for trainers/mentors around the use of the simulated practice learning environment and develop and deliver a curriculum around simulated practice learning. An important intellectual output for the project is the identification of appropriate content and problem solving scenarios to be incorporated into a 3D game, meeting the aim of developing “quality learning content”. The project supports synergies between education activities, technical activities and research and innovation activities. The resulting 3D game is planned to be offered under open access schemes.

The project aims to train 200 trainers/mentors to use the new curriculum and environment of special education or education in general. The impact of the project will be the introduction of an integrative and motivating VET/school framework designed for teachers of people with intellectual disabilities and their educators/trainers, using a 3D game platform for supporting practice learning using qualities of Emotional Artificial Intelligence and adaptability.

2 Pedagogy of People with Intellectual Disabilities in EU

According to the European Association of Service providers for Persons with Disabilities, addressing the educational needs of learners with an intellectual disability is not a once-off endeavour, but a continuing phenomenon that is a core part of education provision throughout the European Union (EASPD, 2016). In the year 2000 with the launch of the Lisbon Agenda the provision of educational and training opportunities for adults with a learning disability has been the subject of significant policy development. The expansion of the EU has resulted in new Member States joining with existing members and all Member States have been encouraged to define and develop appropriate and acceptable inclusive education strategies (EASPD, 2016). However Special education Schools are still a necessity in many Member States since the inclusion practices and the mainstreaming of education for all has not been accomplished in full effect due to various financial, social and practical reasons. A shifting educational landscape has seen special education provision become less separate and segregated, and this is reflected in a number of different ways, for example, in placement, curriculum frameworks and expectations of students. There is a pronounced tendency for the process of integrating disabled people into society to start as early as possible (Social Protection Committee on the social dimension in the EU2020 strategy, 2011; Review of recent social policy reforms, 2015). This is reflected in different ways in the already established practices in various EU countries. For example, in Bulgaria, an Act amending and supplementing the Protection against Discrimination Act was adopted on March 2015 in order to incorporate the provisions of Directive 2006/54/EC on the protection from discrimination against transgender and burden of proof into national law. The Bulgarian authorities have also been implementing several projects aimed at overcoming discrimination on the grounds of disability and on other grounds such as gender, age, etc. This is reflected in the new Pre-school and School Education Act as well. Despite moves towards inclusion in terms of placement for students with Special Educational Needs SEN in England and the USA, the majority of students with severe intellectual disabilities continue to be educated in special schools or units, with a smaller proportion fully included in mainstream schools (Almazan, 2009; DfE, 2014)

In this proposed pedagogy guide, we provide some of the pedagogy theories and practices that have been used extensively in inclusive and non-inclusive educational premises along with more novel pedagogical approaches that can be effective both in mainstream and special education. Last but not least, it should be mentioned that as one would expect, in such an important educational field, a significant number of projects that address the educational needs and integration of students with intellectual disabilities have been supported with the help of the European Commission under the old Lifelong Learning Programme and the current Erasmus+ Framework. In a majority of cases, projects have focused on the use of ICT in education and the support of students with disability and their educators, to support their further integration into mainstream provision[1].

[1] One extensive catalogue of frameworks, practices and procedures can be found in "Inspiring Practices : Education for Learners with Intellectual Disabilities" by EASPD, the "European Association of Service providers for Persons with Disabilities" produced in 2016

3 Applied Behavioral Analysis

Applied Behavioral Analysis (ABA) rests on a solid foundation of research. This research has investigated how humans learn. It comprises a large body of literature known as behavioral analysis psychology. Behavior Analysis is the scientific study of the principles of learning and behavior. This field of science is concerned with describing, understanding, predicting, and changing behavior. They seek answers by looking at the biological and environmental factors, although they are primarily interested in the role of environment in behavior change. There are three main branches to the field: Conceptual Behavioral Analysis, Experimental Behavioral Analysis, and Applied Behavioral Analysis. The Conceptual branch focuses on the philosophical, theoretical, historical and methodological issues that underlie the field. Experimental Behavioral Analysis involves basic research intended to add to the body of knowledge about phenomena that control and influence behavior. Applied Behavioral Analysis focuses on the application of the principles of behavior to the needs of individuals to promote behavioral change and improve quality of life (The Association for Behavior Analysis International, 2017; New Mexico Association for Behavior Analysis, 2014).

The Science of ABA, is an empirically-validated or evidence-based approach to teaching using behavioral principles, laws and strategies, backed by over 60 years of research. Typically ABA is applied to teaching children, adolescents and adults with developmental disabilities, including Autism Spectrum Disorder (ASD), learning disabilities, intellectual disabilities, behavioral disorders or challenges, speech impairment and mental health disorders (Cooper, Heron & Heward, 2007). ABA can be used to improve skill areas or behaviors and/or decrease maladaptive behaviors that are socially significant for the family and student, the client or the child.

"The ABA approach utilizes two, well-researched learning theories. These are: 1) classical conditioning, and 2) operant conditioning. In its most basic form, ABA is very simple and follows common sense. It rewards a person for making a correct choice. Incorrect choices are ignored, or not rewarded. Therefore, students learn by making simple associations between cause and effect. With repetition, a student learns to associate a correct action with a reward. As such, this correct choice will be repeated. An incorrect action does not earn a reward. When not rewarded, behaviors begin to slowly fade away. This process is known as extinction." (Reynolds et al, 2013).

Here is the basic approach for ABA:

First, complex tasks or behaviors are broken down into smaller steps. For instance, suppose a student needs to learn raising his hand before speaking in a classroom. Skills are systematically introduced in small steps. As one small skill is mastered, the next step is introduced. **Students learn by making simple associations between cause and effect. If they respond correctly for that step, they are immediately rewarded. If they respond incorrectly, nothing happens.** Once a step is consistently mastered, the next step is rewarded, instead of the previously mastered step. This process is known as chaining. ABA's emphasis on providing immediate rewards for correct behavior

is crucial to motivation. However, the reward must be valuable or desired. Each student will find different things rewarding. Only rewards that are intrinsically rewarding have a motivational effect. Rewards that are not gratifying will not satisfy or motivate someone (Stephenson, 2006). Further information, guidelines and training methodologies can be found online[2].

Special education pedagogy customarily used with this population has its roots in applied behavior analysis and thus has had a strong focus on teaching functional and observable skills. However, within the field of applied behavior analysis there has been a longstanding vein of criticism of the extent to which its research has focused on technical demonstration rather than, or possibly even at the expense of, theoretically driven, experimental study. This criticism has emerged in various forms, including emphasizing the value of science over technology (Deitz, 1978).

There is a strong drive for 'evidence-based practices' for all students in the USA (Marzano et al, 2001) and increasingly so in Europe (Nelson and O'Beirne, 2014). This drive includes learners with complex and severe disabilities (CDC, 2014)

Moreover, in a recent research, teachers prioritised reflective observation of students and their specific individual responses to curricular experiences as central to the meaning-making they make of their own learning (Jones and Lawson, 2015). It is important, therefore, that teacher educators, when developing teacher learning opportunities, are aware of this connection so that teacher professional learning is designed to support educators in engaging in such reflective observations in an intentional and thoughtful way.

[2] For further information, the Autism Center of Excellence at Western Michigan University has developed a series of video interviews with national experts in applied behavior analysis, autism and behavioral pediatrics. These videos (http://wmich.edu/autism/resources) are available free of charge.

4 Inclusive Pedagogies

According to Spratt and Florian (2013) policy demands for inclusion have often been met with notional responses whereby all children attend school in the same building but continue to receive separate 'in-house' provision for those identified as having 'special needs'. Such divisions are also often evident within mixed-ability classrooms, whereby teachers differentiate work, according to perceptions of ability (Hamilton and O'Hara, 2011). These approaches perpetuate labels of 'special needs' (Riddell, 2007) and have been shown to place a ceiling on the learning opportunities of those thought to be less able (Hart, Dixon, Drummond & McIntyre, 2004). An alternative view maintains that social and educational inclusion can only be achieved when these practices are disrupted and replaced with other more participatory approaches to teaching and learning (Ainscow, Booth and Dyson 2006).

Instead of providing something different or additional for children who experience difficulties in their learning, inclusive pedagogy seeks to extend what is ordinarily available to everybody (Florian and Black-Hawkins, 2011). These are the three main principles of inclusive pedagogy:

1. Difference must be accounted for as an essential aspect of human development in any conceptualisation of learning.
2. Teachers must believe (can be convinced) they are qualified/capable of teaching all children.
3. The profession must continually develop creative new ways of working with others.

The study of inclusive pedagogy can equip teachers with the language to justify decisions about practice (Florian and Spratt, 2013).When it comes to pedagogy of inclusion we can say that Inclusive pedagogy rejects that:

– The notion that children have a fixed 'ability'

–A child's current learning can be used to predict future 'potential'

–Intelligence can be defined in terms of tests based on logical / mathematical / reasoning skills

Instead, Inclusive pedagogy believes that every child's capacity to learn is changeable:

– What teachers choose to do (or not to do) in the present can alter a child's learning capacity for the future

– Nothing is neutral - whatever the teacher does will have an effect, positive or negative.

(Hart et al, 2004)

As part of the debate around inclusion, there is also ongoing consideration about the distinctiveness (or not) of pedagogies for teaching students with SEN (Jones & Lawson, 2015). According to research by Jones and Lawson, some argue that specialist pedagogies are required for teaching students with SEN (Narayan et al. 2010 ; Imray and Hinchcliffe 2012). However, Lewis and Norwich's (2005) work in England proposes that "*there are no distinct and separate teaching strategies for teaching different groups of students*", although there may be some specialist knowledge; rather, *"there is a continuum*

and, for some students, including those with severe intellectual disabilities, the strategies, instead of being different, may be much more overt and have a more intense application" (Jones & Lawson, 2015).

Regardless of the deliberations around distinctiveness of pedagogy, Carpenter (2010) suggests that "*the complexity of learning profiles of this group of learners calls for pedagogic understandings that reflect a level of intricacy*" (Jones & Lawson, 2015). It is argued that educating students with intellectual disabilities cannot be approached through a single pedagogy and that the integration of individual learning profiles and curricular demands requires a more holistic and comprehensive approach that mirrors the complexity of learners' needs (Ryndak et al. 2010).

5 Beyond Inclusion - Social Pedagogy Models

Over the last decade "evidence-based practice" has emerged as a leading objective for educational research, policy and practice development. Consequently there has been a resurgence in professional interest in examining and improving pedagogy (Hattie, 2012; UNESCO, 2008). It is widely acknowledged that teaching quality is the strongest variable affecting learning quality; particularly in school education (Hattie, 2012) and special (and mainstream) education increasingly benefit from the emerging consensus about the nature and qualities of evidence-based practice (Carter, Stephenson, & Strnadova, 2011). Recent models of effective pedagogy in schools, such as authentic pedagogy and productive pedagogy have a strong focus on "intellectual quality" – the teaching and learning of significant ideas and concepts, higher order thinking skills, metalanguage, substantive communication and problematic knowledge (Stephenson, 2006).

For example, in New South Wales (NSW) the current model of effective pedagogy advocated by the NSW Department of Education is the NSW Quality Teaching (NSWQT) model, is developed from the Queensland productive pedagogy (The University of Queensland, 2001) and Newmann and associates' authentic pedagogy (Newmann, King & Carmichael, 2007; Newmann, Marks, & Gamoran, 1996). Within these models there is a strong emphasis on academic learning, on students producing rather than reproducing knowledge, on in-depth understanding and on elaborated and sustained communication (Stephenson, 2006).

The first recommended curricula for these students had a strong developmental focus. Students were taught skills that corresponded to their "mental age," in the belief that they must progress through "normal" developmental stages and once particular stages were reached, the students would be "ready" to learn more complex and functional skills. These curricula did not serve the population well. The skills addressed were frequently drawn from norm-referenced assessments of development and were irrelevant to real life. They resulted in the teaching of trivial skills (such as colour recognition), skills that were not chronologically age-appropriate (teenagers stacking blocks) and exclusion from some significant areas (such as teaching communication skills) because supposed pre-requisites were not present (Stephenson, 2006).

If teachers of students with severe disabilities can use the Quality Teaching to enrich behavioral approaches of known effectiveness through a more careful consideration of the deep understanding and thinking skills that underlie behaviors and clusters of behaviors, their teaching is likely to be more productive and inclusive. The emergence and now contemporary pre-eminence of the principles of inclusion for people (of all ages) with disabilities (of all "types") across communities generally, and the UNESCO Policy Guidelines on Inclusion in Education (UNESCO, 2009), throw a broader spotlight on these possibilities.

According to research, it is not only a matter of inclusion but also a matter of socially just pedagogies (Slater, 2012; Barnes, 2002, Gabel, 2002). *"...relational understanding of pedagogy as a form of*

caring for or transforming others and oneself, as a way of living together in the community. In this sense, pedagogy is a product of the social discourse between diverse individuals rather than a manuscript of discourse about discourse." (Gabel, 2002, p. 179)

Moving beyond inclusion, Gabel's (2002) dynamic pedagogy, focusing on social relations, removes the end-product prioritisation, allowing for the unpredictability of learning. Gabel (2002) highlights the belief that central to pedagogy of students with or without disabilities, are the social relations of human beings.

Special education is moving towards the need to create the concepts of a socially just pedagogy. According to Goodley, new approaches moves us towards not only inclusive forms of pedagogy but, simultaneously, deeper conversations about theory and educational rights of people with disabilities (Goodley, 2007). Lynn (2004) also provides a number of points that (should) guide the work of associated scholars, researchers and educators and among them is the embrace of 'interdisciplinarity' and 'intersectionality'. Lynn proposes an epistemology of transformation and liberation; an arena for the development of theoretical constructs that ensure the cultural sensitivity of empirical work (Lynn, 2004). We are encouraged to adopt an '*engaged pedagogy*', as bell hooks (2003; 1994) and Freire (1970) have articulated, in relation to caring about students whilst encouraging dissent and resistance (McLaren and Leanord, 1999). Engaged pedagogy is an approach to holistic learning. It is a practical theory formulated by social critique and educator bell hooks (2003; 1994) and is deeply concerned about education as freedom. It sees education as a liberation force and not a measure of memorization. It challenges standard pedagogical practice in its insistence on spontaneity and joy.

According to Slater when designing the pedagogy of students with disabilities, it is important to stop being passive spectators and provide an alternative, more socially just approach to education (Slater, 2012). Freire's (1970), A Pedagogy of The Oppressed, steers clear of a goal-driven curriculum, instead advocating that, *"given the right education, everyone has the ability to critically engage with the world around them*" (Slater, 2012).

The above mentioned pedagogies provide an alternative discourses of education and disability disrupting stereotypes while at the same time providing us with a glimpse of an alternative, more socially just approach to education of people with intellectual and/or developmental disabilities.

6 Games based learning and serious games.

Games are genuinely used in educational processes since early age, as they allow learners to acquire knowledge and skills in a more natural, close to the context environment, in a playful and less-stressful manner. They are often associated with fun providing not only different kinds of knowledge/competence / skills acquisition, but they allow people to interact, to socialize, to explore and test both reality and others.

Serious games are commonly described as (digital) games used for purposes other than mere entertainment or fun. They usually refer to games used for **training**, advertising, **simulation**, or education that are designed to run on personal computers or video game consoles. With wide implementation of sophisticated mobile applications even more dynamic mobile gaming models emerge. A substantial difference between games and computer simulations should be noted. Computer simulations may provide less involvement of the end-users (learners). Computer simulations have a strong educational value, concerning observational learning and illustrating complex relationships.

The logic of serious games (SGs) and training simulations is to develop **complex scenarios**, where learners can develop skills coping with a number of challenging situations. In serious games, Kolb's learning cycle (Antonova & Todorova, 2010) is adopted, where learning is developed through a number of trial-and-error situations. Building successful serious games includes the synchronization of multiple elements (game mechanics, appealing graphic environment, engaging scenarios), and therefore achieving a good mix of learning elements can prove very difficult. Moreover, expert knowledge should be incorporated in good quality and form within the game scenarios and game elements in order to form a learning path. So expert knowledge is crucial in making the learning simulation useful and meaningful to learners, and in putting them in situations where they can substantially build new skills. On the other hand, the design of a serious game should fulfill several objectives, namely to transfer knowledge, to develop skills and desired attitudes at the same time remaining enjoyable and engaging the personality of the player.

Serious games are playful, engaging and interactive alternatives to more passive media. They are context-related and involve learners in the educational content thus leading to a successful and rich learning experience.

Computer simulations and computer games actively involve people in educational processes. Thus the learner is not only an observer in the learning process (as compared to using other educational media), but can take part in a number of activities and decision-making learning from his own experience and own participation in the process. Connolly et al (2008) define computer games-based learning as "the use of a computer games-based approach to deliver, support, and enhance teaching, learning, assessment, and evaluation". Further definitions of games-based learning often overlap or extend the terms of e-learning, "edutainment" (coming from *education* and

entertainment), serious games, video-games and games based learning (Susi et al., 2007; De Freitas, 2008).

7 Considerations in relation to the Play2Do project

The above mentioned pedagogy frameworks, present a pedagogical paradigm shift in teaching and learning for students with intellectual disabilities. From this perspective, teaching this group of learners requires teachers to have *"a sophisticated pedagogic knowledge and a skills base that they can apply creatively in response to student need."* (Jones and Lawson, 2015). Considering what to teach, how to teach it and how to know when students have learned are elements of teacher learning for all teachers, but especially regarding students with intellectual disability, the value of appreciating individual student response appears particularly important (Jones and Lawson, 2015).

Teacher learning opportunities occur in many forms from formal teacher education programmes, including school, district or graduate course attendance, to less formal learning interactions with other teachers, professionals, parents and interaction with the students themselves (Hoekstra et al, 2007). The Play2Do Project aims to produce such a learning and training opportunity in a safe, interactive environment that takes into consideration the different learning practices of the educators, as well as their influences by local and national social and political contexts.

The above mentioned pedagogies have been taken into consideration in the design of the Play2Do simulated practice scenarios and can also be used by the educators in furthering their theoretical formation and educational training. Serious Games, Games Based Learning Approaches and Training Simulations, can provide a helpful and versatile tool in SE both in teacher preparation and education as well as a helpful medium in their educational practices.

According to Play2Do Research Report that took place in five different partner countries (UK, Greece, Bulgaria, Italy and Cyprus), educators, special education experts and teacher's trainers are positive in using games based learning and training simulations both (1) as an educational tool for the practice learning of educators as well as (2) an educational tool in their everyday practice within the classroom. Educational games have been characterized as “a helpful tool for practicing how to tackle challenging situations in a safe environment” and a “well designed educational experience that would provide us feedback and allow us to see both the positive and the negative aspects of our decision would be valuable”. However, it has been also highlighted that even though a digital simulation would be very helpful for new professionals, nothing can replace the actual physical practical training in the class as a tool to prepare teachers. According to Play2Do study results and literature review, the pronounced belief is that despite its value and dynamic games-based learning could not replace practice learning and be sufficient to use on its own and that educators should always be aware of the pedagogy they should follow both in theory and practice. As described in the introductory paragraph, this brief pedagogical guide aims to connect their theoretical training with currently used pedagogies and further it by introducing, authentic pedagogies and socially just pedagogies and complimentary games based learning methodologies. Its aim is not to substitute the

theoretical training of educators or impose specific pedagogy models, but to highlight the pedagogies and current methodologies that have emerged during the Play2Do Research by teacher training experts, SEN educators and teacher training professionals.

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