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Neuro-Linguistic Programming, Positive Psychology & VR in Special Education

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Abstract. In the era of rapid change, special education is in the quest to 'drive up standards' with alternative intervention strategies ensuring optimal outcomes for parents, teachers and learners. Automatic thoughts, negative beliefs and implicit bias demotivate, disrupt students' behavior, and lower the quality of learning outcomes. Neuro-linguistic programming (NLP) is a psychological approach that employs appropriate techniques to help individuals deal with their dysfunctional schemas. The present paper aims at reviewing the research studies regarding the effectiveness of neurolinguistic programming in challenging situations as those that people with disabilities face. In addition, we will co-examine the possible applications of NLP on virtual reality (VR) environments. The findings of this review support the idea that neuro-linguistic programming provides influencing strategies for people with special educational needs to be rapidly engaged in those states of mind that eliminate implicit bias and promote positive behaviors and academic achievement. It was found that VR is in line with NLP methodology contributing to unintended bias reduction, cultivating users' ability to change perspective with flexibility, expecting a positive future and perceiving themselves more realistically with less symptoms of depression. This study takes the view of a new pedagogy in Special Education that integrates the overlapping areas of neurolinguistic programming, positive and social psychology and recognizes their role in developing brain rewiring and sub-conscious training techniques -even in virtual environments-.

Keywords: neuro-linguistic programming, social learning theory, positive psychology, metacognition, mindfulness, virtual reality, avatars, special education, brain rewiring techniques, sub-conscious restructuring

Introduction

Neuro-linguistic programming (NLP)

NLP is a model of human interaction and communication that facilitates the analysis and reproduction of excellence in a range of clinical and non-clinical settings (Wake & Leighton, 2014). It emphasizes on peoples' subjective experience and constructed reality. It deals with the internal representations of experience and how people communicate with themselves as well as others. It mainly depends on non-verbal communication (Tosey, Mathison & Michelli, 2005; Anderson, 1986).

Neuro-linguistic programming (NLP) was established in the 1970s by Richard Bandler, a

mathematician and information scientist and John Grinder, a linguist. Bandler and Grinder developed a new methodology with the aim of identifying and coding effective practices from a range of practitioners and theories, their models and strategies and making them transferable to other people in an attempt to follow their example and achieve the optimal performance (Tosey, Mathison & Michelli, 2005; Tosey & Mathison 2010). NLP practitioners focus not only on theories but also on the words and the way they make use of them, their tone of voice, the tempo of their speech, their gestures and movements, their breathing patterns (Anderson, 1986).

The substantial resource of NLP was the Human Potential Movement of which Abram Maslow and Carl Rogers were the leading pioneers. Koerzybski, Virginia Satir, Fritz Perls, Bandura, Erickson, Bateson have had a considerable influence on NLP and are considered by many as the originators of NLP. Specifically, NLP practitioners take the view that all individuals can make full use of the resources for their full development. People take the responsibility to manage their own cognitive maps modifying language processes, thoughts, feelings, experiences, and physiology. NLP is a solution-based approach since it does not search for roots of problematic behaviors but seeks to motivate behavior change. NLP harnesses strengths, focuses on meanings, possibilities and solutions, talks about feedback not 'failure', amplifying what works, suggesting that if something doesn't work it is preferable to try something different. (Linder-Pelz & Hall, 2007).

NLP practitioners also recognize the importance of language in the creation of beliefs and thought patterns which eventually contribute to the greater picture of who we are. The role of NLP is to help individuals correct the inappropriate nature of these negative beliefs and thoughts (Kudliskis & Burden, 2009).

NLP has since achieved popularity as a method for communication and personal development. It is already recognized as an effective mode of psychotherapy in the United Kingdom. NLP is used by professional practitioners of many kinds, including educators, managers, trainers, salespeople, market researchers, counsellors, consultants, medics, lawyers (Tosey, Mathison & Michelli, 2005). However, it has been the subject of considerable criticism in academic and clinical psychology departments due to the lack of robust clinical evidence (Wake & Leighton, 2014; Witkowski, 2010).

In recent years, many researchers explore the role of NLP in education and the ways it could improve learning and teaching (Kudliskis & Burden, 2009; Lashkarian & Sayadian, 2015; Tosey & Mathison, 2010).

NLP & Social learning theory

NLP has major commonalities with the social-cognitive theory (SLT) of learning, developed in 1985 by Bandura, emphasizing the importance of observing, imitating and modelling behaviours, attitudes and emotional responses of others (Furduescu, 2019). Social learning theory aims at promoting of desirable behavioural change. This theory is based on the idea that we learn from our interactions with others in a social context, by observing others and developing similar behaviours. After observing the behaviour of others, people assimilate and imitate that behaviour, especially if their observational experiences are positive ones or include rewards related to the observed behaviour. Social learning theory recognizes the fundamental

role of attention, memory and motivation in developing new habits and behaviours. According to SLT, students can learn by observing and imitating teachers, parents, siblings, peers even from virtual avatars (Nabavi, 2012).

NLP & Positive psychology

Positive Psychology is the scientific study of the conditions and the processes that contribute to the optimal functioning of people and groups. Positive psychology, in line with NLP, supports the idea that beliefs shape our emotions and actions. Research has revealed that people are hardwired to negativity and as a result they may be sabotaging themselves. Positive psychology is in search of the factors and the ways that people feel joy, build strengths and resilience, develop the full spectrum of human experience. Because of this, positive psychology researchers recommend several training strategies that cultivate positive beliefs as well as a sense of personal control (Gable and Haidt, 2005). There is substantial evidence from well controlled studies that skills increasing resilience, gratitude, positive thinking, positive emotions, engagement and meaning can be effectively taught to schoolchildren. Schools may be an excellent location for well-being initiatives. Positive education prevents symptoms of depression and anxiety, reduces behavioral problems, enhances social skills, and brings hope. Furthermore, positive thinking training is synergistic with better learning, improved attention processes, more creative and holistic thinking (Seligman, Ernst, Gillham & Linkins, 2009).

NLP & Metacognition

Metacognition refers to a set of consciousness-raising skills and strategies through which individuals direct their actions towards excellence. Metacognition involves individuals' ability to observe, regulate and adapt their own internal cognitive processes, recognize the difference between functional and dysfunctional states of mind and consciously choose those states that awaken the full range of their own abilities and identity (Drigas & Mitsea, 2020). Drigas and Mitsea (2021) described metacognition using a layered structure. Each layer represents a distinct state of mind where an ever-higher control system responds to the necessity of creating more abstract mental representations, upper class motivations, beliefs and emotions. The optimal state of metacognition coincides with the state of mindfulness (Drigas and Mitsea, 2020). Neuro-linguistic programming recognizes individuals' ability to take control of themselves with the aim of unlocking their authentic potential. NLP examines how conscious mind works except that it focuses on the sub-conscious variables (i.e. beliefs, values, attitudes and past memories) that implicitly influence conscious processes (Furduescu, 2019).

NLP & Brain rewiring techniques

It is suggested that techniques such as affirmation, visualisation, anchoring, reframing, role-playing and role modelling could have a positive impact on brain rewiring resulting in learning improvements and behavioural modification (Kudliskis & Burden, 2009; Lashkarian & Sayadian, 2015; Tosey & Mathison, 2010):

Affirmation: A pithy statement of a goal that assumes the goal is achievable, and keeps the mind focused on it. Goals are like belief statements they should be positive and carefully phrased.

Visualization: Seeing images in one's mind that generate powerful performances, especially when they are linked to a very specific goal.

Anchoring: Stimulus or representation (internal or external) that is connected to a trigger. For instance, every time one has a 'down moment' thinking "Oh God I'm going to fail!" then, he/she recalls a previous experience of successful performance.

Reframing: Students place 'frames' around experiences, deriving meaning from the experience. Within the context of learning, some children, especially those with disabilities, frame their experience of education negatively based on various unhelpful interactions (Kudliskis, 2014). Reframing is the technique the teacher utilizes by relating to personal experiences and makes it concrete and tangible for the learners. It can be used to modify students' conception of themselves or of the language, which makes it a powerful motivational tool.

Rapport: Rapport can be seen as that shared sense of oneness amongst the people in the classroom when there is a willingness to engage and focus on tasks. Rapport assures the creation of cohesive learning communities especially when student response is lacking, when the class is tired or bored, or when students' behaviour is considered "problematic."

Role-Playing: Role-playing is a powerful strategy for rewiring students' brain. Role-playing allows a person to practice new behaviours, until they become second nature. Without taking risks, the students interact with their environment by adapting their actions to suit the characters and situations encountered as in real life. Role-playing familiarizes students with the social world and enhances specific behaviours and social skills (Daniau, 2016)

Modelling: Modelling involves copying (imitation) of an expert's behavior. Modeling is essentially a non-conscious assimilation of the ideal behavior. However, modeling requires alertness and motivation that impel the individual to observe the positive behavior while anticipating the positive consequences derived by the observed behavior (Tosey & Mathison, 2010; Al Farah, Bawalsah & Khateeb, 2015).

Metaphors, allegories & storytelling are cognitive restructuring techniques that facilitate information processing and recalling. They help students to cultivate empathy and escape from entrenched patterns of thought. Analogies are used to provide

children a simple way to understand complex reasoning techniques. Through stories and metaphors, children can learn to view their problems from an objective perspective (Friedberg & Wilt, 2010).

Virtual Reality

Virtual reality (VR) can be defined as an interactive 3D "imaginal system" that replaces real-world environment with a virtual one. VR is different from other media because it induces the sense of presence, the feeling of being inside the virtual experience. Virtual reality has the potential to re-organize internal and external experiences facilitating behavioural change. Thus, VR can play a significant role in managing symptoms of distress produced by traumatic events. VR with its intense focus on the present experience reduces the conflict and makes Self a catalyst to change. It also alters the conceptual system of the users cultivating positive beliefs (i.e. self-efficacy). The use of VR helps users to develop new skills, to improve communication and imitation skills and learn to cope with challenging social situations (Riva, Baños, Botella, Mantovani & Gaggioli, 2016).

Learning Difficulties

Learning disabilities are neurologically based impairments in learning and/or processing that specifically interfere with higher-level cognitive skills. Impacted skills can include reading/writing/spelling, mathematics, organization, time management, abstract reasoning, working memory, and attention. There are several types of learning disabilities such as dyslexia, dysgraphia, dyscalculia, dyspraxia, attention deficit/hyperactivity disorder, autism (Brennan, 2021). Students with learning disabilities differ from typically achieving peers in self-concept and self-efficacy beliefs. They often experience a negative reality because of faulty cognitions, inaccurate perceptions, misconstrued feedback, leading to the reinforcement of the negative 'state' of mind namely anxiety, depression and academic underachievement (Kudliskis, 2013; Tabassam & Grainger, 2002).

The scope of the review

There are few precise data about the usage of NLP and positive psychology in education, training and teaching, especially in the area of special education. In addition, it is a subject about which few educators and parents have awareness (Tosey & Mathison, 2010). However, the face of education constantly changes in the quest to 'drive up standards' ensuring optimal outcomes for learners (Kudliskis, 2014).

For that reason, the aim of the present paper is to review the research regarding the effectiveness of neurolinguistic programming and positive psychology in challenging situations as those that people with disabilities face. In addition, we will co-examine the possible applications of NLP on virtual reality environments.

Neuro-Linguistic Programming in Special Education NLP & Attention-Deficit/Hyperactivity Disorder

In a case study, Jeyanthi et al. (2016) investigated the effectiveness of an intervention program that combined NLP techniques with exercise on attention and motor skills. A 9-year-old boy diagnosed with ADHD, disobedient, impulsive, with reduced attention span and frequent falls participated in the 6 weeks intervention treatment. Researchers used the reframing technique by which hyperactive/impulsive behavior was altered to a positive behavior. Overall, the intervention program had a positive impact on attention, gross and fine motor skills of the child.

Kudliskis (2014) examined whether NLP strategies could be effective ways of boosting learning experiences and school performance of students with mild special educational needs such as ADD and ADHD. Teaching assistants attended two workshops involving didactic teaching and applications of NLP strategies by an advanced master practitioner. Afterwards, a sample of 12 students aged 11 to 13 participated in the NLP intervention program over a period of 12 weeks. The program focused on techniques based on meta-model of language and reframing. This study did not demonstrate a measurable impact on students' learning experience. However, teachers reported that NLP enhanced students' confidence and self-esteem. In addition, they observed significant improvements on students' behavior.

According to Lashkarian and Sayadian (2015), NLP techniques can increase motivation, decrease students' anxiety leading to learning improvement. Sixty students from a junior school were randomly divided into two groups. The experimental group was taught by NLP techniques, while the control group received no treatment. The attitude/motivation questionnaire was administered to the two groups before and at the end of teaching sessions in the form of a pre-test and a post test. The results indicated that the young learners not only improved their motivation level because of receiving NLP techniques, but also showed a considerable improvement in language proficiency. Furthermore, NLP techniques contributed positively to teachers' success enabling them to communicate better with students, strengthen the learning environment, and develop positive interaction in favor of the academic effectiveness, motivation and proficiency of learners.

Self-affirmation is a strategy to bolster and appraise the self as worthy, efficacious, and capable of controlling important outcomes. Albaloooshi, Moeini-Jazani, Fennis and Warlop (2020) found that positive affirmations increase an efficacious self-view and improve inhibitory control abilities. Harris, Haris and Miles (2017) explored the effect of self-affirmation on two aspects of performance that have been related to executive functioning: working memory and inhibition. Eighty-three participants were randomized to either a self-affirmation or a

control task and then completed the computerized tasks. The results showed that self-affirmed participants performed better on both tasks. Thus, self-affirmation can improve aspects of performance related to cognition and self-regulated behavior.

According to Kross et al. (2014) self-talk, the internal monologue that people engage in from time to time during introspection influences the ability of self-regulation. They also found that using non-first-person pronouns during introspection enhances self-distancing, which in turn helps individuals to effectively regulate their thoughts, feelings, and behavior under social stress, even for vulnerable individuals.

NLP & Dyslexia/ Dysgraphia

Prabavathy (2020) explored the effect of NLP techniques on enhancing reading comprehension among 22 children with dyslexia. The intervention program was formed to improve reading comprehension, phonological awareness, vocabulary development and reading fluency using the following NLP techniques: rapport, perceptual positioning, pacing, leading creative positive states and anchoring, reframing, mirroring, maintaining flow and modelling. Progressive test and post-test of reading comprehension showed that NLP methods enhanced the reading comprehension of children with dyslexia. In addition, these techniques raised students' awareness and promoted the readiness to learn. The children felt confident and more motivated to do their schoolwork and interact with peer group.

In a multi-centred, randomized controlled trial, Bull (2007) examined the clinical and perceived effectiveness of a new therapy that included applied kinesiology, physical manipulation, massage, homeopathy, herbal remedies, and neuro-linguistic programming in the treatment of 70 dyslexic children aged 6–13 years. Children in the intervention as well as the control group were assessed using a battery of standardized cognitive, literacy and self-esteem tests before and after the intervention. The results revealed statistically significant improvements in academic and reading self-esteem for the treatment group. Most parents (57.13%) reported that the therapy was effective in the treatment of learning difficulties.

According to Connor (1994), NLP provides a model for good spelling performance, teaching children to visualize words. However, there is a lack of clear data by which to determine the level of effectiveness.

Alekseeva (2018) examined the role of NLP as a personally differentiated approach in dysgraphia correction of primary school children with general speech under-development. The experimental group consisted of 50 children with dysgraphia and 15 children with normal development in the control group. Teachers tried to cultivate children's positive expectations, to help them set their goals using positive statements, explaining the reasons beyond their goals. They were asked to visualize themselves feeling pleasure

of being praised for a well-written postcard. They were asked to observe the expression of them and other persons, to 'hear' grateful or laudable voices, to feel what they feel, to describe the 'picture', to feel this state of joy and try to remember it. The results showed that methods of NLP could be effectively utilized as a means of improving writing difficulties. The authors concluded that NLP helps teachers enter full communion with students, to be understood while speaking in an accessible language, using friendly expressions and codes.

NLP & Autism

Kudliskis (2013) conducted a study to investigate whether NLP could encourage preparation for learning in the classroom for students with special educational needs. The sample consisted of seven students aged 11–12-year-old with Asperger, autism, and severe dyslexia. Students were taken on a 'guided walk' using visualization and appropriate language. The teacher described a walk in a specific location (i.e., a grassy meadow). Great care was given to ensure that the description would provide cues that would appeal to each representational system. This NLP strategy brought calmness, improved readiness to learn and enabled students with autism to engage with the learning processes more quickly and efficiently. Kudliskis concluded that NLP helps student to move from a negative state of mind (not ready to learn) to a more positive state (ready to learn).

According to Kassim et al. [] NLP tools such as modelling, reframing, perceptual position and meta-programs known as chunk size could be used on children with autism. Perceptual positions technique could be utilized as a method to develop empathy, helping students to see the same situations from different perspectives. Modelling could help autistic children to imitate positive behaviors. Finally, they outline that NLP could facilitate filtering of information.

NLP & Giftedness

Gifted students often lack basic social and communication skills. For that reason, Farah et al. [] investigated the effectiveness of NLP on the development of social communication skills among gifted six grade students. Sixty gifted students were divided into two groups, the experimental and the control group. The training program was designed for 10 training sessions adopting five skills namely: sensory language, representational systems, compatibility, and reframing. The results of the statistical analysis showed significant improvements in social communications skills for the experimental group.

Creativity, imagery, and intuition play a significant role in giftedness. Even when a person has innate talents, they will not become obvious without effective strategies and skills. According to Rosemarin (2016), NLP enhances superior visual-spatial skills and provides modelling tools by which gifted students can identify reproducible patterns in

the language and behavior of effective role models, especially the most creative ones - like Albert Einstein. Specifically, she tried to extract the strategies of Einstein's thinking as a model for enhancing creativity, intuition, and innovative thinking. The basic elements of Einstein thinking include: sensory experience, identification of the fundamental elements in the system to be modelled, the visualization of these elements, engagement in a "combinatory play" with these elements, switching back and forth between the different frames of reference, a broader "visual survey" that encompasses the other systems or perceptual positions, explicit description of the "generating rules", making new predictions which can then be tested against the evidence of sensory experience. She concluded that NLP constitutes an effective educational strategy of understanding, supporting and developing the child's enormously rich inner life.

NLP & Anxiety

Mohammadi al. (2016) examined the effectiveness of NLP on generalized anxiety in comparison with schema therapy and a non-intervention control group. Thirty patients (24 women; age M: 28.7 years) were randomly assigned to one of the three conditions. Results showed that NLP and schema therapy were equally effective in reducing anxiety and improving social functioning in patients with generalized anxiety disorder.

Ahmad and Zaman (2011) used three alternative techniques namely hypnosis, NLP and Timeline Therapy as a means of reducing the intensity of negative emotions attached to memories of stressful events. The research involved 32 test subjects and 32 control group participants. The researcher utilized the NLP dissociative technique. Specifically, the participants were asked to recall vividly a stressful event, associate themselves into the memory that is to see through the first person view and indicate the level of intensity of their negative emotions. Then, they were asked to see through the third person view altering the 'sub-modalities' of the mental picture. Specifically, they were asked to change the color of the mental image to black and white, reducing its clarity, pushing the picture further and further away. The patients confirmed that there was a significant reduction in the intensity of their negative emotions.

Hemmati et al. (2016) conducted a quasi-experimentally study with the aim to evaluate the effectiveness of NLP on stress reduction. Sixty participants with high stress were divided into either the experimental or the control group. The experimental group received NLP program (such as goal setting, time management, assertiveness skills, belief changing techniques, reframing techniques, communication skills, understanding of the neurological level, and Disney strategy). After intervention, the score average of stress decreased to 64.53 in the experimental group while that of the control group remained relatively unchanged (120.96). In addition, subjects developed a more

realistic perception of themselves and the world around. They adjusted their personal feelings and beliefs and controlled their emotions and behaviors. After the intervention, they chose a more purposeful life toward their designated goals. Furthermore, they developed more effective interpersonal skills. They also enhanced their ability to control themselves and others and had a positive attitude towards themselves and others. They also increased their self-confidence and feelings of self-efficacy.

NLP & Phobias

Bigley et al. (2010) assessed the success of NLP in reducing anxiety in 50 patients with claustrophobia. The total training involved 20 days spread over a six-month period. During the NLP process, the patients were asked to describe the feelings they experienced when they thought about a stressful situation. They were also asked to associate those feelings with something that they could see in the room. The patient was then asked to think about pleasant memories on other occasions when they were relaxed, happy or confident. As the patient thought about the good experiences, the NLP practitioner touched them on the hand or shoulder, thus anchoring the experience. By using the same touch and simultaneously looking at the object that they had chosen and by holding both anchors until the previously phobic anchor “collapsed”, the previously anxious thoughts associated with stressful situation became much more comfortable and positive. Following the NLP session, the median anxiety score was significantly reduced while most of the participants (76%) overcame their phobia.

Smith (2021) investigated the impact of a two-day intervention which combined NLP and practical graded exposure therapy to help 8 individuals to overcome their fear of height. All eight individuals reported that their fear of heights had significantly decreased.

Karunaratne (2010) reviewed evidence about NLP’s effectiveness on phobia’s treatment. This study revealed that NLP techniques were successful in phobias treatment. In addition, the author outlined that NLP surpasses due to the relatively brief time period it takes to make an improvement. Karunaratne argued that NLP strategies facilitate direct processing, allowing sensory information to travel via the thalamus and cortex, where further integration and processing takes place, before accessing the center of fear, namely the amygdala. Unconscious memories in the amygdala are stored as conscious memories in the hippocampus. Later, they can be stored as long-term memories of past events with less attached emotional significance. In other words, NLP eliminates strong emotions through the emergence of a rational observer. However, it was outlined that the literature supporting the use of NLP techniques in this area are quite limited.

NLP & Depression

Stipancic, Renner, Schütz and Dond (2010). evaluated the effectiveness of neuro-linguistic psychotherapy on depression, psychological difficulties and perceived quality of life. A total of 106 participants were randomly assigned to either a therapy or a control group. Sessions took place weekly and lasted for about 60 minutes. The outcome was assessed by the structured clinical Interview for DSM-IV Personality Disorders and a scale that measured the quality of life. The results revealed that NLP significantly reduced the number of psychological difficulties. They reported that NLP intervention reduced dysfunctional ways of mental and emotional experience facilitating a more positive perception of their quality of life. Five months later, the participants showed greater satisfaction and positivity. It was assumed that NLP not only assists the clients in making desired changes but also gives patients reference experiences and tools to activate unconscious processes and continue to promote personal growth.

Wake & Leighton (2014) utilized NLP tools and techniques to alleviate the symptoms of depression and posttraumatic stress disorder (PTSD) of 29 participants. The interventions consisted of the following tools and techniques: Timeline Therapy, drop through, perceptual positions, parts integrations, anchoring, and relaxation. All candidates with complete pre- and post-treatment records showed a significant reduction in negative feelings and consequently an improvement in their emotional state.

NLP & Virtual Reality

Banakou, Kishore and Slater (2018) examined whether embodiment of people in a virtual body that is strongly associated with high performing cognitive abilities would result in them exhibiting enhanced cognitive performance. Specifically, they investigated whether people virtually represented as Einstein would show greater executing functioning (fluid intelligence & working memory). Fifteen participants were embodied in a virtual body of Einstein and fifteen in a virtual body of someone at a similar age as their own. The Einstein body participants performed better on a cognitive task than the normal body with the improvement greater for those with low self-esteem. In addition, embodiment of young participants in the older Einstein body led to a reduction of implicit bias and negative stereotyping against elderly.

Osimo, Pizarro, Spanlang and Slater (2015) investigated the effectiveness of the embodiment in a virtual reality body that represented a famous counselor on mood and personal problem solving. In one condition of the experiment, the counsellor body was a representation of Dr Sigmund Freud while in another the counsellor body was a duplicate lookalike representation of the participant. The results revealed that participants embodied in the Freud’s body solved more effectively their personal problems and improved their mood. The authors concluded that embodiment gave participants the

opportunity of detachment, changing perspective away from habitual ways of thinking about personal problems, and demonstrates the power of virtual body ownership to effect cognitive changes.

Rosenberg, Baughman and Bailenson (2013) examined how immersive virtual reality through an avatar with superhero abilities would increase prosocial behavior. A sample of 30 females and 30 males were assigned to receive either the virtual superpower of flight (like superman) or to fly as a passenger in a helicopter. Afterwards, participants were also assigned either to a helping condition to find a lost diabetic child in need of life-saving insulin or a touring condition to navigate and explore a virtual city. After completing the virtual tasks, the experimenter “accidentally” knocked over a cup of pens and waited before attempting to pick up the pens, giving the participant time to help. The results revealed that the flying participants were quicker to help than helicopter participants. Thus, the virtual power of flight facilitated subsequent helping behavior in the real world. The participants in the flying condition had also significantly higher scores on the measure of presence, indicating that the more the participants were immersed in the experience, the greater their intention to help. The authors concluded that embodiment of superpowers implicitly shifted participants’ self-concept in a powerful way as “someone who helps”.

Geraets et al. (2019) evaluated the effectiveness of a virtual reality-based cognitive behavioral therapy for patients with severe generalized social anxiety disorder. Fifteen patients explored the virtual environments of a street, bus, cafe and supermarket through a head-mounted display and moved around with a joystick. Software enabled therapists to manipulate the environments in terms of crowiness (0–40 avatars could be present), intensity and frequency of hostile looks, interpersonal distance and watching behavior. Pre-recorded sentences could be uttered by avatars. During VR exercises, patients tested their beliefs, approach behaviors were elicited and feedback was given on cognitions and behavior. Further therapy strategies included psychoeducation and cognitive restructuring of dysfunctional beliefs. Questionnaires on clinical and functional outcomes and diary assessments on social activity, social anxiety and paranoia were completed at baseline, post-treatment and at 6-months follow-up. Results showed that social interaction anxiety was significantly reduced. Depression scores were significantly lower at follow-up compared with baseline. Quality of life increased. In addition, ideas of social references had decreased by 25% compared with baseline. After intervention, patients reported that, in real life, they experienced social encounters more positively with less negative expectations about possible threats.

Depression and negative mood are characterized by negative imagery, negative expectations about the future, a diminished ability to access and recall positive memories and verbal processing bias. Habak et al. (2021) explored the

impact of a mental imagery-based processing model utilizing virtual reality on mood, state of well-being and future thinking. Seventy-nine participants took part in a 10-minutes mixed reality experience yielding positive imagery. They were presented a series of spectacular landscapes accompanied by environmental effects (i.e. warm breeze, with the aim to provoke interpersonal warmth), intensifying sensory experience. Through virtual exploration aimed also at provoking a sense of hopeful anticipation, to help users to realize that openness and curiosity lead to a positively reinforcing experience. The results indicated that almost all participants felt less hopelessness. The negative mood decreased whilst sense of presence, positive mood and positive future thinking increased.

Discussion & Conclusions

The findings of this review support the idea that NLP provides a wide range of opportunities for students with special educational needs to be rapidly engaged in learning activities. NLP modifies the students’ state of mind, so that they can -even voluntarily- move from those states that slow down learning, to those that accelerate readiness to learn in meaningful ways. NLP helps individuals to be more motivated, to build confidence and self-esteem, giving access and processability to those inaccurate perceptions that fuels negative mood. It also provides them with reference-experiences, tools and strategies to voluntarily choose and master those states of mind that promote self-development.

It was also found that NLP techniques boost students’ interpersonal and intrapersonal skills. After intervention, participants seem to have a more realistic perception both of themselves and others. Consequently, they can better regulate dysfunctional ways of mental and emotional experiences.

NLP techniques eliminate the basic factors of academic underachievement such as anxiety and phobia. NLP make individuals to feel calm, tolerant, ready to accept or re-interpret the situations that they characterize as stressful.

This review gave evidence that NLP may have a positive impact on higher mental abilities such as working memory, inhibition control and creative thinking. Furthermore, it boosts decoding skills, language learning, reading comprehension and phonological awareness. Most important, they raise awareness of their personal comprehension process.

Virtual reality is being -even indirectly- in line with NLP methodology. Specifically, it was found that VR with the use of avatars contributes to implicit bias and negative stereotyping reduction. In addition, VR gives users the opportunity of detachment, to change perspective away from habitual ways of thinking. Embodiment in VR implicitly shifts users’ self-concept in a powerful way as “someone who can transcend his/her own limitations”. It was also revealed that virtual environments cultivate positive imagery, positive expectations, hope and positive future thinking. The

most important advantage of VR in cognitive restructuring is the enhanced sense of presence, the gateway of positive thinking.

Parents of children with disabilities play an important role in their development. NLP methods could help them to cope with anxiety and provide the optimal assistance to their children. Miranda et al. (1999) evaluated the impact of NLP on child development, home environment and maternal mental health of forty-five mother/child pairs. NLP intervention aimed at raising mothers' awareness of the need to participate more positively in their children's development. The topics included in the program were: self-esteem, communication, parent/child relationships, internal and external interpersonal relationships. After the intervention, mothers' mental health was improved as well as mother-child interaction.

Teachers should gain awareness about the positive impact of NLP in teaching and learning, taking in consideration that each student perceives and represents the world differently. NLP has the potential to improve differentiated instruction. Considering the unique characteristics of each student, its special abilities and needs, the teacher has the unique opportunity to design his/her NLP-based strategies. NLP methods could upgrade teaching skills ensuring the optimal communication/connection between teachers and students with disabilities. It is appropriate that NLP practitioners initiate teachers to NLP practices enabling them to form appropriate NLP strategies within the educational context.

Thus, we conclude that NLP provides a powerful set of techniques for developing students' metacognitive abilities while shifting students into the higher levels of consciousness.

However, the effectiveness of NLP therapy should be tested in additional authentic clinical contexts by specialized practitioners. As Kudliskis and Burden (2009) outlined, evidence-based techniques could provide important feedback to teachers and students to develop, validate and implement their own NLP-based strategies.

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