# VR'S ROLE IN THE TEENAGER'S PSYCHOLOGICAL POTENTIAL

**Svatenkova Tetyana Ivanivna,**
PhD in Psychological Sciences, Doctoral student in Psychology,
Vasil Stefanik Precarpathian National University
ORCID ID: 0000-0002-4921-9033
Web of Science Researcher ID: AAE-8146-2022

*The article contains an overview of the latest research in the field of research into the possibilities and effects of virtual technologies on the psyche and personality development in adolescence, in particular on the activation of internal psychological potentials in this age period, when the situation of military invasion of our country often does not give teenagers the opportunity to realize themselves in the usual socially acceptable ways according to the social situation of development and leading activity. The extensive use of various media devices has made it possible to introduce various forms of virtual communication and entertainment into their daily lives, seamlessly integrating online and offline communications to support social networks, easily switching between media communication types. There has been a research discourse on the digital spaces' potential, both off-the-shelf (COTS) and educational games, to develop cognitive skills such as working memory, attention, and spatial cognition [33; 32] and the adolescent's psychological potential as a whole [41]. A theoretical model of the teenager's personality psychosemantic identity and a teenager's psychological potential rhizomorphic model in virtual space have been developed. The relevance of using virtual reality for versatile personality development in adolescence is substantiated. The virtual world serves as a playground for simulating situations of psychological development from the physical world, such as identity construction and self-expression, a reasonable question arises about the effectiveness of the virtual for the processes of improving or worsening cognitive skills, developing or wasting psychological resources of the individual. The design and development of any virtual environment should be exciting for children and young people to realize the full potential of the creator and the technology.*

*Key words: adolescent's psychological potential, identity, virtual space, avatar.*

***Сватенкова Тетяна. Роль віртуальної реальності у психологічному потенціалі підлітка***
*Стаття містить огляд останніх досліджень у галузі вивчення можливостей та впливу віртуальних технологій на психіку та розвиток особистості в підлітковому віці, зокрема на активізацію внутрішніх психологічних потенціалів у цей віковий період, коли ситуація військового вторгнення в нашу країну часто не дає підліткам можливості реалізувати себе у звичних соціально прийнятних формах відповідно до соціальної ситуації розвитку та провідної діяльності. Широке використання різноманітних медіапристроїв дало змогу запровадити різноманітні форми віртуального спілкування та розваг у їхньому повсякденному житті, плавно інтегруючи онлайн- та офлайн-комунікації для підтримки соціальних мереж, легко перемикаючись між типами медіакомунікації. Проведено дослідницький дискурс щодо потенціалу цифрових просторів як готових (COTS), так і навчальних ігор, для розвитку когнітивних навичок, таких як оперативна пам'ять, увага та просторове пізнання [33; 32] та психологічного потенціалу підлітка загалом [41]. Розроблено теоретичну модель психосемантичної ідентичності особистості підлітка та ризоморфну модель психологічного потенціалу підлітка у віртуальному просторі. Обґрунтовано актуальність використання віртуальної реальності для різнобічного розвитку особистості в підлітковому віці. Віртуальний світ служить ігровим майданчиком для моделювання ситуацій психологічного розвитку з фізичного світу, таких як побудова ідентичності та самовираження, виникає резонне питання про ефективність віртуального світу для процесів покращення чи погіршення когнітивних навичок, розвитку чи втрати психологічних ресурсів особистості. Проєктування та розроблення будь-якого віртуального середовища має бути захоплюючим для дітей та молоді, щоб усвідомити весь потенціал творця та технології.*

*Ключові слова: психологічний потенціал підлітка, віртуальний простір, ідентичність, аватар.*

**Introduction.** Teenagers grow up in two worlds – real and virtual today. More time is spent on new media, virtual communication devices, and entertainment than on any other type of leisure, except for sleep [15]. The various media devices extensive use has made it possible to introduce various forms of virtual communication and entertainment into their daily lives, seamlessly integrating online and offline communications to support social networks, easily switching between media communication types. Communicating with others is the main reason for new media teenagers' use [45], and this communication content is mostly related to identity management [30]. The teenagers' new media use goes beyond the Internet and is increasingly becoming a new type testing form of behavioral reactions and communication strategies, acting as a kind of "tests" before using the one's own psychological potential possibilities in real life.

**Materials and methods.** Teenagers use multiple media simultaneously rather than sequentially in an environment where there is open access to different types of media. The teenagers' main virtual activity aspects can be defined as the following [3]: leisure activities organization and provision (games, entertainment applications, video content joint viewing, virtual tours and trips, etc.); communicative space construction (communication with friends, teachers, relatives, search for new acquaintances, etc.); educa-

156

*Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024*

tional activities organization (search for information, tests, online lessons and competitions, educational trainings and video applications, etc.); testing the self-realization variability (testing one's own strengths on different platforms and in different activities types); virtual environment earnings (game awards, small part-time work on your own, creating applications, etc.); using services (ordering food, drinks, making purchases).

The virtual self has been described as a copy or extension of the self, imbued with all the necessary physical equivalent's psychological components [8]. Although the virtual self's existence seems increasingly realistic and relevant, it is not an equivalent person, but rather a psychological characteristics projection (for example, personality traits) that are necessary to work in a directly chosen environment with given parameters in combination with content, purpose, limitations and the environment capabilities in which the avatar exists. Therefore, it would be reasonable not only to limit the construct's definition, but also to conclude that the virtual self may differ from environment to environment depending on the intended outcomes, goals, and system structures of each.

**Context, current state, concepts.** The adolescent's flexible nature is appropriate for virtual self-representation in virtual environments (VR) in any case, including massively multiplayer online role-playing games and virtual worlds where users can construct their own identities at their own discretion., users can transform and customize their avatar's several attributes (virtual personality) in these VS, such as ethnicity, gender, body shape, face, and clothing. Options for creating and customizing an avatar can range from a relatively simple icon, such as a two-dimensional character containing preset elements selected by the user, as in some social media platforms, to a completely personally constructed avatar, as in three-dimensional virtual worlds. The virtual worlds proliferation, described as laboratories for the identities' construction [51], has gone hand in hand with increased attention to these metamorphic avatars and the perception that the digital body is a desirable self-representation [11; 53; 9]. The ability to experiment with different personality aspects and body image in VR by expressing or altering various physical and psychological parameters has prompted scholars to explore the virtual self-representation's meaning to better understand its relationship to users' identity [55; 24]. If we consider this phenomenon from the identity's performative concept perspective in addition, then virtual worlds represent opportunities for embodying performances that definitely complement the self's concept. For example, Cover R. [12] noted that social network profiles (which include avatars) are tools to develop identity as a narrative according to cultural requirements.

Taking into account numerous studies presenting the relationship's nature between real and virtual personality, it is possible to depict the teenager's virtual identity model in the dynamic psychosemantic field's form, which is generated and supplemented in the virtual space constantly, synchronizing with the user's digital context (Fig. 1).
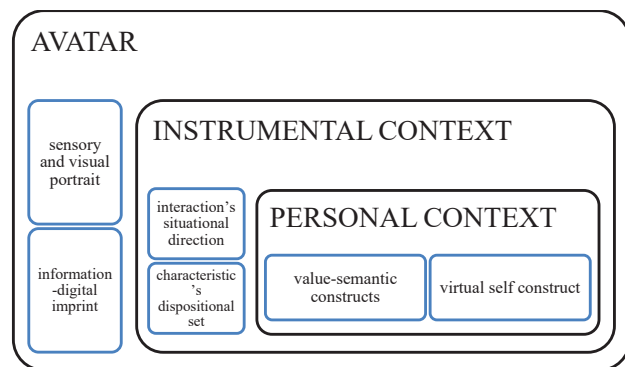


**Figure 1. Virtual identity's psychosemantic field: theoretical model**

Virtual identity appears in the virtual personality's psychosemantic field form, which is generated by content digital data and dynamically changes depending on the content choice and the avatar digital interaction direction with various types of virtual space (games, social communities, sites, platforms, etc.) and other avatars.

The avatar is the general contour background here, which is directly the subject of interaction in the digital world. The avatar has its own unique sensory-visual portrait, consisting not only the selected portrait or simulated appearance, but also other visual attributes that accompany it in the digital world (text color and font, iconic attributes, accompanying pictures, emojis, dynamic effects, spatial and architectural additions, etc.). In addition to this, the avatar has an information-digital fingerprint containing any actions that the avatar performed during its existence in the virtual space (requests, messages, ratings, comments, etc.).

The virtual identity's instrumental context characterizes the interaction's direction and specificity in the virtual space. The characteristics' dispositional set includes interacting behavioral acts and ways selected schemes with information and avatars, it is traits' peculiar set that generates a one's own personality choice and those that are complemented by the neural network (according to the subscriber's actions). The interaction's situational direction contains the individual's depending goals, needs and motives on the interaction direction and form choice in the virtual space (entertainment, science, work, acquaintance, etc.).

The personal context is the central element of this structure – it contains the deepest constructs that form the virtual identity's core and are most closely related to the user's real self. It contains value-semantic constructs that are a real person's own values expression, cultural and moral-ethical norms, religious, gender, ethnic and other narratives. The virtual self-construct can be represented by the personified ideas about one self's variety, self-evaluation and the one's own activity nature within the chosen virtual space, fears and a real-virtual personality's deep experiences. In fact, the main feature of a teenager's virtual identity is its multifunctionality, constant change and addition due to the interaction's several devices and the construction use in different types of virtual space at the same time. It is teenagers' characteristic to experience different types of sensory-visual

Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024

157

portraits, virtual situational interaction's types, to represent different (often completely opposite) dispositional characteristics sets and to position and defend different values and worldviews. This confirms the fact that the virtual space is a springboard for teenagers to safely experiment with their own identity and test their psychological potential.

Identity is understood as the individual self's constant experience; the one's own personality uniqueness and authenticity, as well as identification with life roles and the larger or smaller social groups' belonging experience. The question arises about the term "virtual identity" purpose and meaning. A person is not present as a physical entity in the Internet environment, but only as a "virtual representation". That's why we do not influence ourselves on the Internet, but our virtual representations. A virtual representation has no identity in the psychological sense. This is a digital data "cluster", ordered in a certain way. This virtual representation often contains recorded digital and stored information about "who we are": name or alias, history, and status in a given virtual society. Just as in real life there is identity's physical representation/confirmation in the ID card form, birth certificate, passport, etc., there is an identity's record (this time in a non-psychological sense) or identification into a virtual environment. One such record is an email address, which is recorded and stored. In a way, a user's profile in social networks also partly represents our identity in the Internet environment. It becomes our virtual representation. We then project some of our real ideas and feelings – our multifaceted self's parts– into our virtual representation.

However, what we attribute to our virtual representation is only partially conscious. Part of the ideas and feelings transmission is projections in the fantasies, visions, unconscious tendencies, desires and complexes form. Our virtual representation is a kind of independent personality, which in some cases can act and behave to a certain extent autonomously, our will and consciousness independently. Although we create our own representations in the virtual environment, the representations are only partly our consciousness product. According to this understanding, virtual representation can be compared to a complex in the Jungian sense: it demonstrates activity, is represented by symbols, and encourages fantasy. What we call this representation virtual identity is the identity we ourselves ascribe to that virtual representation. Virtual identity is a concept that has no meaning in itself – after all, a virtual representation does not and cannot feel anything. Talking about virtual identity is really about what thoughts, ideas, visions or fantasies we ascribe to our representations in the online environment and what part of ourselves we present to others. Like conventional identity, virtual identity has personal and social aspects. Personal virtual identity is related to who the individual is as a person in the virtual environment, or rather, what is the representation of that person in the virtual environment. Social virtual identity characterizes an individual's place in the virtual environment, which this individual is a part of and to whom the virtual representation belongs [44].

Dalgarno B. and Lee M.J.W. [13] identified a number of learning opportunities in 3D virtual environments, such

as presenting spatial knowledge, allowing more opportunities for experiential learning, increasing motivation/engagement, improving contextualization of education and collaborative learning. Accordingly, Parong J. and Mayer R.E. [41] investigated the immersive VR games effects on specific cognitive components, like perceptual attention, mental performance, working memory, visualization, visual field, and visual processing speed. They argued that immersion can increase a presence, motivation, and attention learner's sense in a virtual world, although their study results did not provide conclusive evidence that the game affects cognition's specific components. Mayer R.E. [33] reached the same conclusion by examining the so-called brain training games' effects that contain mini-games series.

Educational games can promote learning and improve students' cognitive, behavioral and emotional potential [6]. Checa D., Bustillo A. ([9] provided recommendations for improving this gaming type in immersive virtual reality environments to enhance both educational and developmental tasks. Numerous surveys show positive learning outcomes from using digital media in which users can consume and actively create content [14; 17; 18; 22; 43], while as some scholars view games more critically, not only in motivation terms, but also in terms of discovery, constructivist and problem-based learning pedagogies, and performance-based metrics [20]. Indeed, games combine powerful structural elements (rules, goals and objectives, feedback, challenges, interaction, and plot) [42] that attract, engage, and motivate participants. However, these elements are not enough for the game to be considered sufficient for the psychological potential development [27]. Palaus M. and colleagues [39] argued that despite the field's heterogeneity, a number of connections between neural and cognitive aspects have been established, including attention, cognitive control, visuospatial skills, cognitive load, and reward processing.

Digital media have increased opportunities for sharing social contacts and support. Adolescents who played games 1-2 hours per day demonstrated prosocial behavior's higher levels (actions that benefit others, such as helping, sharing, donating, cooperating, and volunteering), life satisfaction, and negative effects lower levels such as hyperactivity, problems with peers, emotional difficulties, and sleep disorders [48; 25]. On the contrary, teenagers who spent more than half of their daily free time playing games showed some negative behavior. A group of scientists led by Lobel A. [31], studying the video games impact on the children and adolescents' psychosocial well-being, concluded that only frequent competitive games (approximately 8 hours or more per week) may be a risk factor for reduced prosocial behavior. In terms in teaching children and adolescents with ASD, virtual reality has become an effective tool for improving emotional and social skills, including emotion recognition, cooperation, and social interaction tasks [36; 38].

Games can promote cooperation and prosocial behavior, especially during social distancing times. The World Health Organization [54] endorsed the gaming industry's social media campaign (#PlayApartTogether) for communication, relaxation and stress reduction. MMORPGs can improve

158

*Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024*

social interaction and thus eliminate social isolation [54]. In VR communities, you have to make quick decisions about who to trust, who not, and how to most effectively manage the group. Granic I. and colleagues [22] argued that gamers quickly acquire social skills and prosocial behaviors that can generalize to their peer and family relationships outside of the gaming environment. The online gaming's rise is seen as a complement to public health efforts to promote social distancing during the StayAtHome period, support physical and psychological well-being, and encourage social interaction and cooperation, as gaming is not necessarily problematic and reduces loneliness. Balanced screen and gaming time are strongly recommended to prevent addiction and other disorders [28].

Virtual reality provides an opportunity to develop imagination, constructing the world around you, your own virtual appearance and persona. The virtual design unlimited possibilities take a minimum of time and devices, instead giving the "creator" a satisfaction's full sense with his own creativity's products and providing the need for his own talent's significance and uniqueness. Intricate quests, game scenarios and virtual tasks' grids motivate the thinking development and non-standard solutions. The one's own reward awareness and the one's own "heroic" achievements public announcement becomes a powerful motivating component in VR. The opportunities to choose different heroes and scenario solutions, to play the various characters' "destinies" provide an opportunity to diversify the one's own behavioral reactions repertoire and to try out new action strategies in unexpected situations. Bright realistic landscapes, a well-chosen background and audio accompaniment help you relax, relieve tension, lift your mood and strengthen your own uniqueness sense. Of course, these are only momentary and short-term emotions, but it is important for teenagers to experience them, because the psyche generates them reality's regardless. Designing one's own choice space and the ability to choose the inter-action's direction, intensity (closeness) in communicative activity and partner (partners) determines the teenagers' virtual activity nature, which is determined by selectivity, involuntary, affectivity, temporality and depersonalization [3]. Analyzing the scientists' research on the personality's psychological characteristics manifestation in adolescence in the virtual environment, it is possible to present the teenager's virtual potential approximate model (Fig. 2).

Considering this model in its psychological context view and implementation in the virtual environment with the adolescent's personality psychological potential model real connection, the following features can be seen:

1) The teenager's virtual identity is in the center, which is at the same time a dynamic entity that develops and changes, remaining at the same time partially the user's personality real identity manifestation. It is the virtual identity that generates and constructs the space and nature of the individual's interaction in the virtual environment. The virtual identity here acts as a kind of the virtual self-image prototype, accumulating and combining the user's psychological potential and the individual's avatar virtual subjectivity.

2) The affective-regulatory component is close to the emotional one, but it is characterized by affectivity – short-term emotional manifestations, represented by some sensory-visual contexts' wide range (sounds, pictures, visual effects, animated pictures, etc.). The number and intensity of the affects' representative part is regulated by the user and the neural network.

3) The value-instrumental component is represented by the content's nature and the user's virtual environment capabilities using goals. So far, it is difficult to assert that the virtual environment can form deep semantic value constructs in users, but it is known for sure that the virtual environment itself is created according to the principles of instrumentality and meeting the users' needs [10], therefore, values are instrumental in nature.
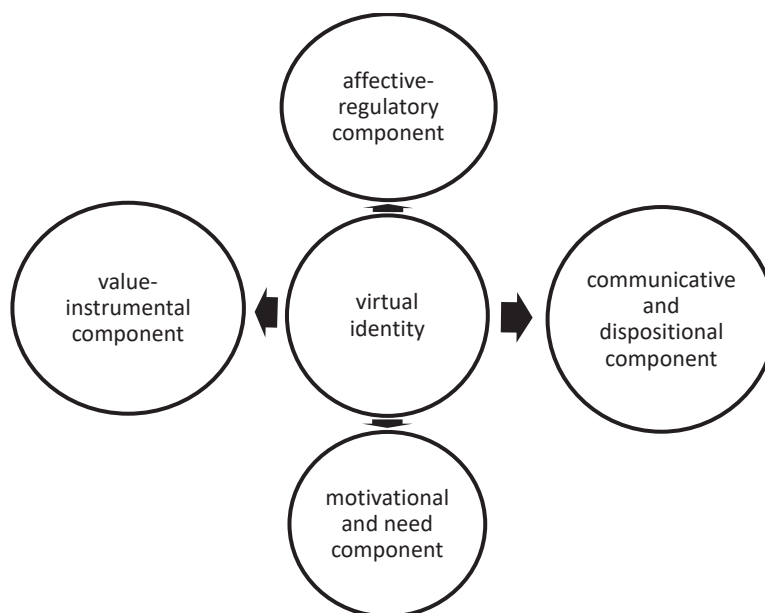


**Figure 2. Adolescent's virtual potential theoretical psychosemantic model**

Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024

159

4) The motivational-need component is due to the user's meeting possibilities variability needs in the virtual environment. In addition, the motives' nature and content for using the virtual space resources are somewhat limited and do not provide the individual's basic needs, so the individual's self-realization in the usual sense will not be complete here. That is why this teenager's virtual potential component is more similar to the construct "need – motivation to satisfy a need – virtual activity – need's satisfaction", although variability gives a choice limitlessness sense.

5) The communicative-dispositional component is related to the adolescent's communicative activity nature in the virtual space: it includes communication with others, meaningful content transmission in social networks and virtual platforms, interaction with other avatars, and one's own virtual personality behavior construction.

**Discussion.** The relationship between the digital avatar's creation and customization and the user's personality is an open debate in the literature. On the one hand, some researchers recognize a significant discrepancy between an individual's actual self and his or her avatar [47]. On the other hand, some researchers argue that an avatar customized by an individual is his or her personality's significant extension [1; 2; 4], as the avatar can be considered the individual's true identity expression. This congruence between people and their avatars has been found to be related to both personality, mental states, self-esteem, and interests [16; 19] as well as to behaviors that manifest within the virtual environment [34]. According to this view, avatars can express people's "true self", their needs, motives, preferences, goals and other. But teenagers, having fewer opportunities for self-realization and psychological potential development due to social restrictions and dependence on adults, are more active in the virtual world, transferring there not only communicative activity, but also other mental activities, using virtual reality as a springboard for realizing psychological potential. It is in this way that they have the opportunity to safely test their own identity various aspects, experiment with appearance, social interaction abilities and forms manifestation, which leads to the psychological potential resources release, the acceptable social identity construction and transfer it to the real interaction's world.

Avatar embodiment appears to be an identity's development and construction recursive process, and the identity's new interpretations encourages virtual self-representation fluidity [21]. This is especially noteworthy, since virtual worlds are becoming more and more popular among children and adolescents, and appearance, communication and behavior type, emotional regulation method, value representations can play an important role in the using avatars' ways for communication or self-expression in the virtual world. Thus, teenagers, modeling their own virtual world and constructing a virtual personality, participate in the identity' development process, and are called to demonstrate their own psychosocial characteristics on the Internet, directly, indirectly or virtually, using in this process psychological potential much more than their own physical capabilities, because the self-presentation

and interpersonal interaction success in the SC depends on the individual's mental characteristics development. In addition, adolescents are more likely than adults to identify with their avatars and develop emotional attachment to them [5]. As a result, there is growing attention to the relationship between identity development and virtual self-representation in adolescence [37].

Suler J. argues that teenagers' interest in the Internet is partly due to the coming to terms difficulty with their own identity when dealing with values, relationships issues and choosing a partner [46, p. 131]. The Internet helps them clarify their values and attitudes. According to Suler J., teenagers also learn social skills during the hours spent in online conversations in the virtual world.

Wallace P. argues that identity experiments are an integral part of human development and considers these experiments valuable for personal growth [52]. He also emphasizes that identity experimentation is not limited to adolescence, and describes what he calls the MAMA ("Moratorium-Achievement-Moratorium-Achievement") pattern in which adults repeatedly revisit identity, values, and goals issues. The Internet, where subtle or even dramatic changes in virtual identity are easy, is an ideal place to "test" different aspects of identity. Teenagers often change their "virtual identities" or even appear on the Internet under different names at the same time.

On the one hand, studies prove the VRT's positive impact on cognitive, motivational, emotional and social development, as well as on improving the solving both educational and training tasks processes [40], while other researchers claim that virtual reality and games can cause strong negative emotional consequences [29], and lead to distraction or even addiction, sleep disturbances, cardio-metabolic deficits, obesity, etc. [7; 26; 49; 50].

Researchers suggest that the media's spread provides an opportunity not only to play, communicate, and socially support each other, but also to share knowledge among peers, which leads to psychosocial development and the development of psychological potential. At the same time, the media influence on the adolescents' psychological potential is a more controversial issue than research on their general use popularization [23]. Media opportunities extensive use contributes to the adolescent's self-esteem formation and the socialization process in more ways than one. That is why such an option satisfies the teenagers' need for "trial" self-realization, as it provides an opportunity to correct one's personal and behavioral characteristics, avoiding public condemnation and responsibility for one's own wrong decisions. Research shows that teenagers use media technology not only for communication and entertainment, but also for learning and social support. Online interactions are "laboratories for identity construction" [14]. Some findings suggest a link between computer games intensive use among adolescents and negative consequences for self-esteem and sociability. Most research on electronic games focuses on the problems rather than the benefits [35]. On a more positive note, some research shows that some electronic games are also used as social networks. It is known that games can activate

the expression of fantasy, the feelings' release and can be used in children's therapy.

Subrahmanyam K. and Greenfield P. [45] argue that new media is an important social variable for today's youth, and that the physical and virtual worlds are psychologically connected. Thus, the virtual world serves as a playground for psychological development simulating situations from the physical world, such as identity construction and self-expression, a reasonable question arises about the virtual effectiveness for the cognitive skills' improving or worsening processes, developing or wasting the individual's psychological resources.

**Conclusions.** It is becoming increasingly clear that the Internet is becoming an attractive place for teenagers to establish new relationships – friendships and romances, as well as work relationships. Creating virtual relationships is very easy, and the ability to build relationships with an unlimited number of people from all over the world is a motivating force. A teenager communicates "via a safe keyboard", often anonymously and unencumbered by the embarrassment he might have in a real environment. Thus, the virtual environment as a means of meeting others can help "socially shy" adolescents, in particular, overcome the shyness and anxiety they have in the real world. These teens are more likely to meet potential partners and friends online, while having fewer friends in the real world than their peers.

Incorporating the psychological systems' design as a VE's development component opens up numerous new possibilities for such spaces. Psychologists can develop and use VEs to provide scenario-based assessments, remedial interventions, and stabilization interventions. For example, scenarios that accurately represent self-interest and social harmony, emotional stability and adaptation, and/or goal-directed behavior can be used to assess people's aggressiveness or violent tendencies based on behavioral actualization; or perhaps use more psychologically representative avatars to deepen the therapist-client connection during virtual therapy sessions.

It is clear that many of the new systems have been developed for today's generation, which is proficient in technology and actively uses virtual resources to acquire personal and social experiences. Most of these systems are designed to entertain and divert attention in such a way that by using the virtual reality capabilities, they gain opportunities to attract as many users as possible who are actively taking the digital world's advantage. More recently, the computer simulation's and virtual reality use has gained momentum in education, particularly in science, mathematics, geography, architecture and archaeology, where students can immerse themselves in virtual environments for experience and learning. Multi-user virtual environments such as Second Life have been an attractive teaching and learning tool for both teachers and students. In health care, several systems have been developed to help young patients manage and alleviate symptoms such as pain, depression, distress, and obesity.

Young people's trust in information consumption and production technologies requires the new tools' development for the knowledge and information transfer. These tools can be developed using methodologies that involve and include children and adolescents as equal partners in design teams. Their experience is invaluable; they are experts at being children and can make significant contributions to the design process. By giving a teenager access to the virtual environment, it is also important to give the opportunity to be not only a passive consumer, but also a creator of creative and meaningful content, which will motivate the individual's psychological potential development and disclosure in the virtual world and the successful achievements' transfer into reality.

However, the research's vast majority on the VE's use in education, health care, and information retrieval points to one crucial factor: engagement. The modern new generation is used to active participation in both consumption and production of information and knowledge. Participation means involvement. The any virtual environment's design and development should be exciting for children and young people to realize the creator's and the technology's full potential. Unfortunately, the virtual technologies' active involvement in modern life emphasizes fun, communication's accessibility and the views' and likes' number. This in no way motivates teenage users to self-development and reveal their psychological potential.

**References:**

1. Ata R., Rojas A., Ludden A.B., Thompson J.K. (2011). Factors influencing body image during adolescence. In: Preddy VR, Watson RR, Martin CR (eds) Handbook of behavior, food, and nutritio. Springer, New York, 3221–3240.

2. Beasley B., Standley T.C. (2002). Shirts vs skins: clothing as an indicator of gender role stereotyping in video games. Mass Commun Soc, 5 (3): 279–293. DOI: 10.1207/S15327825MCS0503_3.

3. Beheshti, J. (2012). Virtual Environments for Children and Teens. InTech. DOI: 10.5772/51628.

4. Bell B.T., Dittmar H. (2011). Does media type matter? The role of identification in adolescent girls' media consumption and the Internet of different thin ideal media on body image. Sex Roles. DOI: 10.1007/s11199-011-9964-x.

5. Blinka L. (2008). The relationship of players to their avatars in MMORPGs: differences between adolescents, emerging adults and adults. Cyberpsychol J Psychosoc. Res. Cybersp., 2, 1–7.

6. Boyle E.A., Hainey T., Connolly T.M., Gray G., Earp J., Ott M., Lim T., Ninaus M., Ribeiro C., Pereira J. (2016). An update to the systematic literature review of empirical evidence of the impacts and outcomes of computer games and serious games. Comput Educ., 94, 178–192. DOI: 10.1016/j.compedu.2015.11.003.

7. Calvert, M., Blazeby, J., Altman, D. G., Revicki, D. A., Moher, D., Brundage, M. D., & CONSORT PRO (2013). Group Reporting of patient-reported outcomes in randomized trials: the CONSORT PRO extension. JAMA, 309 (8), 814–822. DOI: https://doi.org/10.1001/jama.2013.879.

*Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024*

161

8. Chang, S., Pierson, E., Koh, P.W. et al. (2021). Mobility network models of COVID-19 explain inequities and inform reopening. Nature 589, 82–87. DOI: https://doi.org/10.1038/s41586-020-2923-3.

9. Checa D., Bustillo A. (2020). A review of immersive virtual reality serious games to enhance learning and training. Multimed Tools Appl., 79, 5501–5527. DOI: 10.1007/s11042-019-08348-9.

10. Chou, C.H., Hwang, C.L., & Wu, Y.T. (2012). Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: a meta-analysis. Archives of physical medicine and rehabilitation, 93 (2), 237–244. DOI: https://doi.org/10.1016/j.apmr.2011.08.042.

11. Comello M.L.G. (2009). William James on "possible selves": implications for studying identity in communication contexts. Commun Theory. DOI: 10.1111/j.1468-2885.2009.01346.x.

12. Cover R. (2012). Performing and undoing identity online: social networking, identity theories and the incompatibility of online profiles and friendship regimes. Conv Int J Res New Media Technol, 18 (2), 177–193. DOI: 10.1177/1354856511433684.

13. Dalgarno, B., & Lee, M. J. W. (2010). What are the learning affordances of 3-D virtual environments? British Journal of Educational Technology, 41 (1), 10–32. DOI: https://doi.org/10.1111/j.1467-8535.2009.01038.x.

14. de Freitas S. (2018). Are games effective learning tools? A review of educational games. Educ Technol Soc., 21, 74–84.

15. de Haan, J., & Huysmans, F. (2004). IT/Media Use and Psychological Development among Dutch Youth. IT & Society, 2 (1), 40–53.

16. Dunn R.A., Guadagno R.E. (2012). My avatar and me. Gender and personality predictors of avatar-self discrepancy. Comput. Hum. Behav., 28, 97–106.

17. Erhel S., Jamet E. (2019). Improving instructions in educational computer games: exploring the relations between goal specificity, flow experience and learning outcomes. Comput Human Behav., 91, 106–114. DOI: 10.1016/j.chb.2018.09.020.

18. Fokides E. (2020). Digital educational games in primary education. In: Daniela L. (ed.) Epistemological approaches to digital learning in educational contexts. Routledge, 54–68.

19. Fong K., Mar R.A. (2015). What does my avatar say about me inferring personality from avatars? Pers Soc. Psychol. Bull. DOI: 10.1177/0146167214562761.

20. Fowler C. (2015). Virtual reality and learning: where is the pedagogy? Br J Educ Technol. DOI: 10.1111/bjet.12135.

21. Fox J., Ahn S.J. (2013). Avatars: portraying, exploring, and changing online and offline identities. In: Luppicini R (ed.) Handbook of research on techno self: identity in a technological society. IGI Global, Hershey, 255–271.

22. Granic I., Lobel A., Engels R.C. (2014). The benefits of playing video games. Am Psychol., 69 (1), 66–78. DOI: 10.1037/a0034857.

23. Heim, C., Brudelie, R., Block, P. (2020). Identity Development within adolescents and how educators and parents can positively affect this development. Empowering Research for Educators, 4 (1/4). URL: https://openprairie.sdstate.edu/ere/vol4/iss1/4.

24. Hoffner C. (2008). Parasocial and online social relationships. In: Calvert S.L., Wilson B.J. (eds) The handbook of children, media, and development. Wiley-Blackwell, Malden, 309–333.

25. Kardefelt-Winther D. (2017). How does the time children spend using digital technology impact their mental well-being, social relationships and physical activity? An evidence-confused literature review. Innocenti Discussion Paper 2017-02, UNICEF Office of Research – Innocenti, Florence.

26. Kenney, E.L., & Gortmaker, S.L. (2017). United States Adolescents' Television, Computer, Videogame, Smartphone, and Tablet Use: Associations with Sugary Drinks, Sleep, Physical Activity, and Obesity. The Journal of pediatrics, 182, 144–149. DOI: https://doi.org/10.1016/j.jpeds.2016.11.015.

27. Kenny R., Gunter G. (2011). Factors affecting adoption of video games in the classroom. J Interact Learn Res., 22, 259–276.

28. King D.L., Delfabbro P.H., Billieux J., Potenza M.N. (2020). Problematic online gaming and the COVID-19 pandemic. J Behav. Addict., 9, 184–186. DOI: 10.1556/2006.2020.00016.

29. Lavoie, H., Gagnon, J., & Therrien, M. (2020). ERK signaling: a master regulator of cell behavior, life and fate. Nature reviews. Molecular cell biology, 21 (10), 607–632. DOI: https://doi.org/10.1038/s41580-020-0255-7.

30. Livingstone S. (2002). Young People and New Media: Childhood and the Changing Media Environment. SAGE Publications Ltd. DOI: https://doi.org/10.4135/9781446219522.

31. Lobel A., Engels R.C.M.E., Stone L.L., Burk W.J., Granic I. (2017). Video gaming and children's psychosocial wellbeing: a longitudinal study. J Youth Adolesc., 46, 884–897. DOI: 10.1007/s10964-017-0646-z.

32. Makransky G., Borre-Gude S., Mayer R.E. (2019). Motivational and cognitive benefits of training in immersive virtual reality based on multiple assessments. J Comput Assist Learn., 35, 691–707. DOI: 10.1111/jcal.12375.

33. Mayer R. (2019). Computer games in education. Annu Rev Psychol., 70, 531–549. DOI: 10.1146/annurev-psych-010418-102744.

34. McCreery M.P., Kathleen Krach S., Schrader P.G., Boone R. (2012). Defining the virtual self: personality, behavior, and the psychology of embodiment. Comput. Hum. Behav. DOI: 10.1016/j.chb.2011.12.019.

35. McKenna, K.Y.A., & Bargh, J.A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. Personality and Social Psychology Review, 4 (1), 57–75. DOI: https://doi.org/10.1207/S15327957PSPR0401_6.

36. Mesa-Gresa P., Gil-Gómez H., Lozano-Quilis J.-A., Gil-Gómez J.-A. (2018). Effectiveness of virtual reality for children and adolescents with autism spectrum disorder: an evidence-based systematic review. Sensors., 18, 2486. DOI: 10.3390/s18082486

Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024

162

37. Milani L., Brambilla F., Confalonieri E. (2014). What does it mean? What can I do? Social networks and identity experimentation in adolescence. Qwerty, 9, 30–50.

38. Northam, J., Dar, H., Hawes, D., Barnes, K., McNair, N., Fisher, C., & Dadds, M. (2023). More than a feeling? An expanded investigation of emotional responsiveness in young children with conduct problems and callous-unemotional traits. Development and Psychopathology, 35 (2), 494–508. DOI: 10.1017/S0954579421001590.

39. Palaus M., Marron E.M., Viejo-Sobera R., Redolar-Ripoll D. (2017). Neural basis of video gaming: a systematic review. Front Hum Neurosci. DOI: 10.3389/fnhum.2017.00248.

40. Pallavicini F., Pepe A. (2020). Virtual Reality Games and the Role of Body Involvement in Enhancing Positive Emotions and Decreasing Anxiety: Within-Subjects Pilot Study. JMIR Serious Games, 8 (2), e15635. DOI: 10.2196/15635.

41. Parong J., Mayer R.E. (2020). Cognitive consequences of playing brain-training games in immersive virtual reality. Appl Cogn Psychol., 34: 29–38. DOI: 10.1002/acp.3582.

42. Prensky M. (2007). Fun, play and games: What makes games engaging. In: Digital game-based learning. Paragon House, St Paul, Minnesota, 105–144.

43. Reid Chassiakos Y.L., Radesky J., Christakis D., Moreno M.A., Cross C. (2016). Children and adolescents and digital media. Pediatrics., 138, e20162593. DOI: 10.1542/peds.2016-2593.

44. Smahel D., Blinka L., Ledabyl O. (2008). Playing MMORPGs: connections between addiction and identifying with a character. Cyber Psychol. Behav. DOI: 10.1089/cpb.2007.0210.

45. Subrahmanyam K., Greenfield P. (2008). Online communication and adolescent relationships. Future Child, 18 (1), 119–146. DOI: 10.1353/foc.0.0006.

46. Suler, J. (2003). The psychology of cyberspace. DOI: https://doi.org/10.23668/psycharchives.10362.

47. Trepte S., Reinecke L. (2010). Avatar creation and video game enjoyment: effects of life-satisfaction, game competitiveness, and identification with the avatar. J Media Psychol. DOI: 10.1027/1864-1105/a000022.

48. Trepte S., Reinecke L., Behr K.M. (2009). Creating virtual alter egos or superheroines? Gamers' strategies of avatar creation in terms of gender and sex. Int J Gaming Comput-Mediat Simulat. DOI: 10.4018/jgcms.2009040104.

49. Turel, O., Brevers, D., & Bechara, A. (2018). Time distortion when users at-risk for social media addiction engage in non-social media tasks. Journal of psychiatric research, 97, 84–88. DOI: https://doi.org/10.1016/j.jpsychires.2017.11.014.

50. Turel, O., Romashkin, A., & Morrison, K.M. (2016). Health outcomes of information system use lifestyles among adolescents: Videogame addiction, sleep curtailment and cardio-metabolic deficiencies. PLoS ONE, 11(5), Article e0154764. DOI: https://doi.org/10.1371/journal.pone.0154764.

51. Turkle, S. (1997). Constructions and reconstructions of self in virtual reality: Playing in the MUDs. In S. Kiesler (Ed.), Culture of the Internet (pp. 143–155). Lawrence Erlbaum Associates Publishers.

52. Wallace, P. (1999). The Psychology of the Internet. New York, NY: Cambridge University Press. DOI: https://doi.org/10.1017/CBO9780511581670.

53. Williams D., Kennedy T.L.M., Moore R. (2011). Behind the avatar: The patterns, practices, and functions of role playing in MMOs. Game Cult 6, 171–200. DOI: 10.1177/1555412010364983.

54. World Health Organization, (2020). Looking after our mental health. URL: https://www.who.int/news-room/campaigns/connecting-the-world-to-combat-coronavirus/healthyathome/healthyathome---mental-health.

55. Yee N., Bailenson J.N. (2007). The Proteus effect: the effect of transformed selfrepresentation on behavior. Hum Commun Res, 33, 271–290.

Слобожанський науковий вісник. Серія Психологія, випуск 1, 2024

163