EXPRESSIVE ART-THERAPIES AND ASSISTIVE TECHNOLOGY IN EDUCATION AND REHABILITATION

EKSPRESIVNE ART-TERAPIJE I ASISTIVNA TEHNOLOGIJA U EDUKACIJII I REHABILITACIJI

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Summary

There are a lot of evidence, based on practical and clinical experience, about preventive and curative role of art in various field of human existence. Dealing with art is based on personal experience and inner freedom, and does not assume any restrictions in the process of own expression. But, some limitation can be occurred which are influenced by the lower level of functional and motoric ability, sensory deficit, intellectual disability or lack of motivation. In such conditions using different kind of assistive technology can be very helpful. That is mean that development of different kind of modern computer software and numerous technological discoveries enable persons with disabilities to be included in various areas of artistic expression. So, in this paper some possibilities of using assistive technology in the frame of art-therapy, music therapy, dance movement therapy and bibliotherapy will be considered. One of the most important assumptions is that program of expressive art-therapies should be defined following one person’s needs; its functional, intellectual and psychosocial abilities and levels of motivation and interest. In that way, a safe, playful and enjoyable environment could be arranged which can induce positive emotional response, stronger interpersonal communication and better acquisition of psychomotor skills. But also, additional efforts should be focused on creating new approaches in the frame of assistive technology that would facilitate experience and expression associated with art.

Key words: art, art-therapies, assistive technology, self-expression
Sažetak

Postoje mnogi dokazi, temeljeni na praktičnim i kliničkim spoznajama, o preventivnoj i terapijskoj ulozi umjetnosti u različitim područjima ljudske egzistencije. Bavljenje umjetnošću bazirano je na osobnom iskustvu i unutarnjoj slobodi te ne pretpostavlja nikakve restrikcije u procesu vlastite ekspresije. Međutim, određena ograničenja mogu se pojaviti kao posljedica sliženih funkcionalnih i motoričkih sposobnosti, perceptivnih oštećenja, intelektualnih teškoća, ili manjka motivacije i interesa. U takvim uvjetima korištenje različitih vrsta asistivne tehnologije može biti vrlo korisno. Naime, upravo razvoj suvremenih kompjuterskih softvera i brojnih tehnoloških otkrića omogućuje osobama s invaliditetom da se uključu u različita područja umjetničke ekspresije. U tom smislu, u ovom radu su razmatrane neke mogućnosti primjene asistivne tehnologije u području likovne terapije, muzikoterapije, terapije pokretom i plesom, te biblioteraapije. Jedna od glavnih pretpostavki primjene ekspresivnih art-terapija je da terapijski program treba biti definiran u skladu s potrebama pojedinca, njegovim funkcionalnim, kognitivnim i psihosocijalnim potencijalima, te razinom motivacije. Na taj način, okružje koje osobu ispunjava sigurnošću, ugodom i zadovoljstvom, može potaknuti pozitivno emocionalno stanje, uspješnije interpersonalne odnose, kao i uspješnije usvajanje psihomotornih vještina. U tu svrhu, potrebno je uložiti daljnji napor usmjeren na kreiranje novih pristupa u okviru asistivne tehnologije koji mogu olakšati umjetnički doživljaj i umjetničko izražavanje u osobe.

Ključne riječi: umjetnost, art-terapije, asistivna tehnologija, samo-izražavanje

Introduction

Art is present in human life in all historical and cultural periods. It is well-known that art can induce and support different dimension of human existence such as imagination, perception, emotional experience, cognitive functions and transcendence. Using sound, voice, colour, rhythm, drawing, movement etc. was used still in ancient history to convey thoughts, feelings or to overpower the nature or unknown forces. There are a lot of evidence, based on practical and clinical experience, about preventive and curative role of art in various field of human existence. Based on this knowledge the application of expressive arts-therapies in different areas of therapy, education and rehabilitation has increased in the past few decades.

*International Expressive Arts Therapy Association (IEATA) (2017)* defines expressive arts-therapies „as methods of using the visual arts, music, dance/movement, drama, poetry, writing and other creative processes to foster deep personal growth and community
Additionally, expressive art-therapies could be considered as "integrative approaches" or "multimodal approaches" when they purposively involve two or more expressive tools to foster awareness, encourage emotional growth, and enhance relationships with others (Malchiodi, 2012).

Expressive arts-therapies are predicated on the assumption that through creative expression and tapping of imagination, a person can examine different aspects of Self such as "....sensory experiences, symbolic expression, emotional expression, life enhancement, cognitive development and social connectedness "(Karkou & Sanderson, 2006). In that way, expressive arts-therapies could be one of the valuable approaches in different areas of therapy, education and rehabilitation, especially in the field of emotional disturbances, behavioural disorders, attention deficit and hyperactivity disorder (ADHD), chronic diseases, learning disabilities, sensory disabilities or motoric disorders.

Aim and method

Dealing with art is based on symbolic experience, imagination and free choice of form and subject matter. So, it could be assumed that in the process where we use different art-medias there are no restrictions from the outside world. But some limitation can be occurred which are influenced by the lower level of functional and motoric ability, sensory deficit, intellectual disability or lack of motivation. In such conditions using different kind of assistive technology can be very helpful. According to US Government Printing Office (2005) assistive technology is defined as: "... any item, piece of equipment, or product system, whether acquired commercially, off-the-shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disability."

Accordingly, the aim of this study was related to investigation whether assistive technology could improve using of expressive art-therapies in persons with disabilities. Also, the further aim of this study was to get insight how much is this problem area relevant issues in practice and contemporary scientific researches. For this purpose, a review of practical works and recent scientific researches cited in databases such as Scopus, Science Direct, Google Scholar etc. was done. In order to search data, the following keywords were used: art-therapies, assistive technology, art-therapy, music therapy, dance movement therapy and bibliotherapy.
Improving the use of expressive art-therapies by applying assistive technology

Results obtained in this study showed that development of different kind of modern computer software and numerous technological discoveries enable persons with disabilities to be included in various areas of artistic expression. So, in the next paragraphs, some possibilities of using assistive technology in the frame of art-therapy, music therapy, dance movement therapy and bibliotherapy will be considered.

Art-therapy

According to American Art Therapy Association (AATA) (2017) art-therapy can be defined: "...as therapeutic use of art media, images, and the creative process respecting client responses to the created products as reflections of development, abilities, personality, interests, concerns, and conflicts. Art-therapy integrates the fields of human development, visual art (drawing, painting, sculpting, and other art forms), and the creative process with models of counselling and psychotherapy."

Artmaking can be one of the most meaningful activities in which persons with (and without) disabilities can be independently engaged. However, some challenges can impede the persons’ ability to work with various media, art tools and techniques for personal exploration and completion of art tasks. In that case an adaptive art can be used that include means and approaches aimed to facilitating the drawing, painting and modelling. At the simplest level, for persons with physical disabilities, this may be retrofitting handles on paintbrushes, building up drawing tools for a wider grasp and seeking the most appropriate adapted scissors for a unique contractured hand grip (Loesl, 2012). Or, for example, assistive technology for persons with visual impairments can be electronic or computerized magnification; text provided auditorially using an MP3 player; use of tactile rather than visual materials; light box (similar to a Light Bright) used to provide visual contrast, etc. (Coleman, 2014).

The increase of technology among the general population and within counselling practice justifies interests in the use of digital media and software applications within art therapy (Diggs, Lubas & De Leo, 2014). There are also a few kinds of assistive technology which can help art-expression in persons with physical disabilities or with lack of interest for drawing or painting. For example, it could be that person can touch paint, scribble, stamp, draw, explore colours on touch with iPad, touch screen tablets, Promethian board or computer desktop with touchscreen (Coleman, 2014).
Also, there are more sophisticated devices. One of them is "Storyboard That" (www.storyboardthat.com). It is an online storyboard creator that helps visually communicate ideas and concepts to quickly tell a story. It enables creation of stories in a comic strip style with dozens of scenes, characters, and text bubbles to fill the storyboard's frames (Picture 1). By choosing different icons person can experiment with colour, shapes, numbers, symbols and pictures. Versatile materials and drag-and-drop technology make this program applicable across grade levels.

When considering how to combine digital media with already existing and proven therapeutic art therapy techniques, the concept of a computer-based collage program may be useful. Diggs at al. (2014) describes collage templates that allow users to plug pictures into premade templates. Software allows users to decorate their collage with embellishments such as shape, text, and background. Image editing tools allow users to edit their images. Photo collage software has a file organiser feature that organises image files that will be put into collages, making it possible for users to simply drag and drop the pictures they want into the collage they are creating. Create projects from scratch allows users to create projects on a blank “canvas”. Automatic collage maker places images in a collage for users.

Similarly, Mihailidis et al. (2010) created devices and software tools that will enhance art therapists’ work with persons with dementia. One of them is ePAD III - a flipbook animation (Picture 2). A user can create and review simple animations using freehand line drawing. Buttons are used to add a new frame, change from a pen to an eraser, and to play/stop the animation. Possible system actions are to suggest drawings, to highlight buttons, or to give prompts, although the dynamic nature of the artwork makes the precise modelling of the effects of system actions more involved. This small device is very portable, and has a sensitive single touch screen.
that can be used with a finger or a pen. Authors conclude that these new tools could have the potential to allow therapists to reach more clients and to facilitate therapeutic interventions more efficiently. In addition, this type of technology may provide a user with more frequent access to therapeutic entertainment in their own free time, giving them a greater feeling of independence and satisfaction.

*Picture 2. ePAD III a flipbook animation on a blade tablet PC (Mihailidis et al., 2010)*

As another example of the application of computer assistive technology can be mentioned *The Art Therapy Draw!* app (Picture 3) that includes a portfolio option (Mattson, 2015). The layout of the app proved easy to navigate and required little knowledge to operate. Results of evaluation indicated that the app would likely be suitable for use with disabled persons or those allergic to conventional art materials. Using this device could make a step toward instituting design considerations for emerging mobile art therapy.

*Picture 3. Progression making on *The Art Therapy Draw!* app (Mattson, 2015)*
Lazar at al. (2016) described using of interactive frame prototype to explore new opportunities for sharing and supporting interaction between older adults and their therapist. With this purpose the concept of the “Third Hand” was created based on an interactive art frame using a Samsung Galaxy Tab Pro tablet. Also, an Android application was created that runs on the tablet and can be used by a therapist and client to capture images of artwork through the tablet’s camera and then record audio messages that link to the image. Authors mounted the tablet inside the frame and added five reconfigurable physical buttons around the edges of them at inside the frame. The secondary tablet runs a separate application that issues commands to the interactive art frame via Bluetooth. Five of the physical buttons corresponded to the following commands: record, play, and go forward or back and share. Authors concluded that “Third Hand” could help in understanding how technology designed for creating and sharing could move beyond a rhetoric of helping to empowering individuals with cognitive impairments to be active and engaged in society.

With the purpose of having insight how art therapists’ perceptions, practices, and training are related to the use of digital media in art therapy Orr (2012) issued a survey on 250 art therapists. Regarding to result Orr concluded that the use of digital media as an art tool within practice is increasing quickly, but with reservations. The main reservation that art therapists cite about using digital media surrounds ethical issues. Generally, the training in the use of digital media by art therapists has not kept up with the adoption rate of technology by art therapists. Thus, more training for art therapists in the use of digital media is needed, particularly in the field of understanding ethics that surrounds its use.

Furthermore, the use of computer technology in conjunction with art therapy has many potential benefits, including the potential to create multiple outcomes of an image, quicker and easier translation of concepts into an image, multimedia capability, the potential to build quicker therapeutic relationships with younger clients, the potential to integrate existing therapy approaches such as cognitive behavioural therapy, and the easy integration of phototherapy interventions (Choe, 2014). But, as Tevyaw (2011) stressed, we should be aware that not everyone is comfortable working with new technology and this is something to be considered when deciding whether or not it would meet the needs of a particular person or some specific population of clients.

Music therapy

Music therapy includes a wide range of interventions, e.g.: receptive music listening, music improvisation, song writing, singing, rhythmic based
activities, combination of music and guided imagery, music performance, composing, etc. (Miholič & Martinec, 2013). *World Federation of Music Therapy* (WFMT) (2017) defined music therapy as: „...professional use of music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing. “

Different recent researches showed that assistive music technology can be used in populations with different special needs across life span. Music technology can be described as the tool, medium or instrument used in the music experiences. In this case, to achieve the music experiences, is either playing an instrument (e.g. electronic, amplified, assistive, computer based) or using an electronic device (e.g. computer, mobile phone, mp3 player, loop station) to play back, watch, record or manipulate music (Misje, 2013).

Furthermore, Magee at al. (2011) cited that music technologies that is used in music therapy could include computer-based applications such as software, devices using musical instrument digital interface (MIDI) and assistive devices to trigger musical applications. These computer music software and other MIDI devices are useful for adolescents and other persons who suffer of lack of motivation or have difficulties to be engaged. Also, Magee at al. (2011) explained that: “The clinical benefits of using composition software with adolescents with behavioural disorders include developing social skills, group decision-making, and learning development. Technology used with people with complex needs typically uses alternative input devices (e.g. assistive devices such as switches and sensors) to access music software or other MIDI devices. This enables active participation in music-making for clients whose physical disabilities prevent playing acoustic instruments.”

Cevasco and Hong (2011) carried out a study with the purpose of determining types of technology that board-certified music therapists (MT-BCs) and music therapy students and interns (MTSI) use in music therapy clinical practice. According to results, both MT-BCs and MTSI used technology for a variety of music therapy interventions, especially songwriting and making music choices. While MTSI had greater access to technology than MT-BCs, MT-BCs utilized technology more than MTSI for clinical work. Overall, most MT-BCs and MTSI agreed they would benefit from receiving basic training as well as occasional in-service training on how to use technology effectively.

For therapists, insecure about their education on technology, the iPad® may be a feasible piece of technology for a music therapy due to its
user-friendly nature and adaptability. For example, if a person has difficulty with processing abstract language and following directions, music can provide a clear signal of easily encoded information to the brain and the iPad® can provide a concrete location for the response (Scully, 2016).

When individuals have limited capacity for speech or physical interaction with their environment assistive computer based software could be helpful. Magee at al. (2011) described implication of devices that include switches, which can trigger musical output from computer-based applications similar to using a mouse and "voice output communication aids" (henceforth called "VOCA"). VOCA are typically used with individuals who cannot communicate using speech, involving switch activation to express a single word or short phrase that has been recorded onto the aid. In addition to spoken output, therapists can record single sung words, short sung phrases, single musical notes, or instrumental motifs onto VOCA quickly and easily during the session.

Though the use of technology is not new or uncommon in music therapy, its use in therapy application is not yet as thoroughly researched (Scully, 2016). One of researches that was focus to examine benefits of technology assisted music therapy is work of Simpson and Keen (2010) who used song to teach graphic symbols to children on the autism spectrum. The participants were taught to receptively label animal symbols. Animal names were embedded in a song and the animal symbols were simultaneously presented on an Interactive Whiteboard (IWB) using a PowerPoint presentation. Participants were required to correctly select the symbol corresponding to the animal named in the song by touching the symbol on the IWB. The use of the interactive song facilitated the receptive labelling task for all participants. The researchers acknowledged that without a condition that isolates the use of music (without technology use) it is difficult to say to what degree did the technology impact learning. Conceivably though, combining two highly motivating objects could be beneficial.

Crowe and Rio (2004) suggested that technology applications in music therapy can be organized and used according to the following categories: (a) adapted musical instruments, (b) recording technology, (c) electric/electronic musical instruments, (d) computer applications, (e) medical technology, (f) assistive technology for the disabled, and (g) technology-based music/sound healing practices. Similar, Knight and LaGasse (2012) reviewed several technology devices and suggested not one type of music is supreme but rather what the client prefers, even if presented through technological means. Given how important motivation is when pairing with a non-musical task, music therapists should consider technology for delivery when presenting music stimuli. Anyway, clinical
outcomes describe that using of music therapy facilitated by assistive technology may enhance quality of life; reduce feelings of isolation and withdrawal; a renew sense of purpose in life; and feelings of self-accomplishment, skill acquisition, and increase self-esteem (Magee at al. 2011).

Dance Movement Therapy

In dance movement therapy (DMT) body is the dominant media of therapeutic process. Thus, it may have a positive influence on physiological awareness, body expression of emotions, inducing unconscious impulses, and improving new strategies of behaviour through exploring new patterns and qualities of movement (Miholić & Martinec, 2013). DMT is referred to using and analysing different aspects of body-experience and body-expression such us movement, posture, gesture, mimics, pantomime, touch, etc. in connections with emotions, self-awareness and self-perceptions. In that way, movement is one of the basic part included in this kind of therapy process and assessment of clients.

Regarding to limitations of using movement, different body part and space in working with persons with physical disabilities a special effort is done in creating technology assisted tolls. First, it was done in the field of artistic use of dance. Namely, one of the pioneer in this area of investigation, Merry L. Morris (2015) noticed that some technological assisted tools should be created with the aim to improve tighter turning radius, faster speed, improved balance, stability or the ability to rotate in the persons with physical disabilities. Also, Morris (2013) stressed that the interactive relationship between the individual and their physical and social environment was her point of entry for examining the design of wheelchairs within a dance and movement-related context. So, the Rolling Dance Chair (Picture 4) was created that approaches a significantly different and innovative use of smartphone technology. It accomplishes this by applying the phone as a mobile wireless user-interface control through simple tilting action either when the phone is held by hand or worn on the body. Additional features for the chair include omnidirectional wheels, seat rotation independent from base, footholds for others to step on and off of, and height change, adding new integrated movement possibilities. Morris (2013) cited: “In this prototype chair, an individual user has the choice of wearing the wireless control (torso, head, arm, etc.) and simply utilizing their body to propel the chair in the desired direction or holding the mobile control and tilting it in the desired direction. For instance, when the wireless (phone) control is attached to the torso, this enables an individual to multi-task with their hands while transporting from place to place.
Additionally, a caregiver or another person nearby can control the device with the wireless smartphone control. This is particularly helpful in situations where a person may not be capable of operating a device very well themselves due to cognitive or other impairments. By freeing the hands for the user, the body-control option creates an ultimate freedom in multi-tasking activities and social interaction.”

This, or similar technology assisted devise can also be helpful in the frame of DMT because could induce and facilitate exploration of different forms of movement’s dynamics in categories of space, time, flow and weight. In addition, this kind of support allows taking an active role in the choosing and using body shape, posture and movement direction.

*Picture 4. Mowing through the space with free hands by using Rolling Dance Chair*

Regarding electronic assisted device, the E-learning tools could be mentioned. For example, Bakogianni, Kavakli, Karkou, & Tsakogianni (2007) described The WebDance project that experimented with 3D animation and Web technologies, and created a web-learning environment and associated lessons for traditional dance e-learning. Experience from the WebDance project has shown that (a) the same conceptualization schema can be used to document different European traditional dances, (b) Web3D can be used to create attractive and functional dance resources, (c) there is a great interest from teachers / trainers in formal and informal educational settings that would like to use the WebDance platform and, (d) there is a great interest from content providers (traditional dance experts) to use the platform in order to document traditional dances and create teaching resources. These findings could be platform for using E-learning tools in using DMT, for example, for facilitating motivation and engagement, for
improving the acquisition of the sequences or patterns of movement, or for recording important elements for further movement assessment.

Important aspects of DMT is also conceptualization of effective assessment framework. For this purpose, Dunphy, Mullane & Allen (2016) created Marking the Moves, an iPad app developed to expedite assessment of outcomes of DMT programs. This app is based on the Framework for Dance Movement Assessment devised by the authors for dance movement therapy programs for clients with disability, including intellectual disability, that measures progress across domains of physical, cognitive, emotional, personal and interpersonal growth. Findings of preliminary trials with therapists and peer professionals indicate favourable response to the app and its potential for use by dance movement therapists in different contexts and client groups.

It can be concluded that assistive technology may be valuable tools in many different aspects of using DMT, particularly in the frame of facilitating expression through movement, improving possibilities for inclusion different body part and different categories of movement's dynamics, and in the area of collecting and recording data for their assessment.

Bibliotherapy and narrative therapy

A special challenge is also an attempt to introduce assistive technology in bibliotherapy or narrative therapy. There are some examples such as research of Fridin (2014) that introduce Kindergarten Social Assistive Robotics (KindSAR) is a novel technology that offers kindergarten staff an innovative tool for achieving educational aims through social interaction. The basic principle of constructivist education is that learning occurs when the learner is actively involved in a process of knowledge construction. An interactive robot served as a teacher assistant by telling prerecorded stories to small groups of children while incorporating song and motor activities in the process. Obtained results showed that the children enjoyed interacting with the robot and accepted its authority. This study demonstrates the feasibility and expected benefits of incorporating KindSAR in preschool education.

Dealing with the unconscious contents also can be supported by using a specific software system that helps clients to explore Personal Myth within virtual reality environments (McCagie, 1998). Patented MYTHSEEKER software allow clients to work with mythic analogues of life shapes and aspirations. The clients build a Personal Depth System representing Personal Myth, based on experiencing other Depth System, which can itself be experienced in the virtual environment.
MYTHSEEKER combine virtual reality with mythic imagery and constructed- or musical-sound as systematically based on integration of assessment, facilitation, and enaction processes.

Discussion

Review of recent literature show that assistive technology may have an important role in using expressive art-therapies in persons with disabilities. Comer (2009) suggests a continuum of considerations for assistive technology in the field of recreation and leisure that also could be applied in the field of using expressive art-therapies. It includes some different stages such as: a) typical toys/puzzles/balls/utensils/instruments adapted; adjustable equipment; flexible rules; add visual/auditory clarity, b) specially designed utensils/equipment, c) electronically/mechanically adapted utensils and equipment, d) electronic aids (remote controls, timers, CD players, speech generating devices), e) computer-facilitated and computer-based activities and f) online and virtual recreational experiences.

One of the most important assumptions is that program of expressive art-therapies should be defined following one person’s needs; its functional, intellectual and psychosocial abilities and levels of motivation and interest. It should be respected in selection of art media and appropriate techniques, as well as in choosing the kind of assistive technology. Anyway, further investigations are needed to provide insight into the benefits and limitations of using assistive technologies in this area. Furthermore, additional efforts should be focused on creating new programs in the frame of assistive technology that would facilitate experience and expression associated with art.

Conclusion

All persons with disabilities have the potential to express themselves through art. But, because of specific sensory, motoric, intellectual or motivation limitations some of them have need to use adapted art tools, media and techniques. Also, different kinds of assistive technology can be valuable tools that could facilitate manipulation, experience and evaluation in the context of using expressive art-therapies in the frame of interdisciplinary education and rehabilitation. In that way, a safe, playful and enjoyable environment could be arranged which can induce positive emotional response, stronger interpersonal communication and better acquisition of psychomotor skills.
Literature


International Expressive Arts Therapy Association (IEATA). Retrieved February 1, 2017 fromhttp://www.ieata.org/who-we-are.html


