# THE USE OF INNOVATIVE TECHNOLOGY IN SPECIAL EDUCATION:

# OCCUPATIONAL THERAPY INTERVENTION AND DAILY LIFE

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# Η ΧΡΉΣΗ ΤΩΝ ΝΈΩΝ ΤΕΧΝΟΛΟΓΙΏΝ ΣΤΗΝ ΕΙΔΙΚΉ ΑΓΩΓΉ:

# ΕΡΓΟΘΕΡΑΠΕΥΤΙΚΉ ΠΑΡΈΜΒΑΣΗ ΚΑΙ ΚΑΘΗΜΕΡΙΝΌΤΗΤΑ.»

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**Abstract**

Nowadays new technologies are increasingly used in the treatment of patients and people experiencing difficulties. The plethora of research based upon the use of new technologies with reference to special disorders. The aim of the conducted research is to proceed into an in-depth examination regarding the use of innovative technologies-technological tools in occupational therapy intervention, as well as with the frequency of their use in special education. At the same time our study examines in which disorder types occupational therapists prefer to use new technologies so as to achieve the required learning result during the intervention. In order to conduct this pilot study, we collected data from 27 occupational therapist participants. A short questionnaire was constructed. The data showed that occupational therapists make use of new technologies, more in children than in adults. Moreover, the majority of occupational therapists use new technologies as a reward for patients, while avoiding their use during the starting point of the therapy session, to introduce new goals and/ or proceed into a generalization of them.

***Keys words:*** *new technologies, innovative technologies, occupational therapy, occupational therapy intervention, daily life*

**Abstract**

Οι νέες τεχνολογίες χρησιμοποιούνται όλο και περισσότερο κατά τη θεραπεία ασθενών και ατόμων που αντιμετωπίζουν δυσκολίες. Η πληθώρα των ερευνών βασίζεται στη χρήση των καινοτόμων τεχνολογιών με αναφορές σε συγκεκριμένες διαταραχές. Δεν γίνονται αναφορές σε συγκεκριμένα μέσα υποστηρικτικής τεχνολογίας ή βοηθημάτων, ούτε και στη συχνότητα χρήσης αυτών από τους εργοθεραπευτές κατά την διεξαγωγή των θεραπευτικών προγραμμάτων. Σκοπός της εργασίας είναι διερεύνηση σχετικά με τη χρήση των καινοτόμων τεχνολογιών κατά την εργοθεραπευτική παρέμβαση, καθώς και με τη συχνότητα χρήσης αυτών. Παράλληλα, εξετάζεται ποιες είναι οι διαταραχές στις οποίες οι εργοθεραπευτές επιλέγουν τη χρήση της τεχνολογίας προκειμένου να επιτευχθεί η απαιτούμενη μάθηση κατά την παρέμβαση. Για τη διεκπεραίωση της παρούσας πιλοτικής έρευνας επιλέχθηκαν 27 συμμετέχοντες, οι οποίοι ήταν εργοθεραπευτές χωρίς ηλικιακό περιορισμό. Κατασκευάστηκε ένα σύντομο

ερωτηματολόγιο. Από τα δεδομένα προέκυψε πως οι εργοθεραπευτές χρησιμοποιούν τις νέες τεχνολογίες, περισσότερο σε παιδικό πληθυσμό παρά ενηλίκων. Ακόμη, οι περισσότεροι χρησιμοποιούν τις νέες τεχνολογίες για επιβράβευση, ενώ αποφεύγουν τη χρήση τους κατά την αρχή της συνεδρίας, για εισαγωγή νέων στόχων ή/και γενίκευση αυτών.

***Λέξεις-κλειδιά:*** *νέες τεχνολογίες, καινοτόμες τεχνολογίες, εργοθεραπεία, εργοθεραπευτική παρέμβαση, καθημερινότητα*

## 1. INTRODUCTION

As technology develops and progresses it is observed that it is an important element for the changes of the society. The use of supportive and communication media began to be used significantly in recent years, as it offers greater functionality and autonomy in the daily life of individuals. These innovative tools can be used for projects such as work, learning, knowledge and communication (Toki & Pange, 2009, Garrison et al, 2010). The use of new technologies in special education  a way of independence and autonomy in order to serve the needs of those people. There are multimedia programs and software which are specially designed and manufactured so as to be used from people with limited mobility, vision and / or other disabilities (Triantafillou et al. 1997). People with special needs, but also patients who are in need of occupational therapy are called to cope with the demands of everyday life. Their support with the use of innovative technologies so as to be characterized as autonomous and functional in their daily lives is considered essential. It is internationally proven that there are numerous clinical data which are related with the use of technology during the treatment, however there is insufficiency regarding the empirical data. In addition, it is worth mentioning that in Greece not enough research has been conducted regarding the new technologies used in occupational therapy intervention (Cook & Hussey, 2002; Shaper & Pervan, 2007).

Therefore, there is a need for further research to be carried out in which the sample will be a larger one and concurrently to study the difficulties of people with special needs in reducing their functional level and how this can be improved by using specific technological achievements is of great importance. The importance of new technologies is extremely important in special education, since the difficulties that reduce the functionality of daily living occur with great frequency. It is crucial to investigate whether occupational therapists are willing and able to use new technologies in the implementation of their treatment plan as there is not so much research data. The frequency of use of new technologies also plays an important role, as the daily lives of these people are directly affected by them (McAlister, 2014; Shaper & Pervan, 2007).

The aim of the conducted research is to investigate the use of new technologies in occupational therapy intervention, as well as the frequency of their use. At the same time the study examines the disorders in which occupational therapists choose to use technology so as to achieve the required learning during the intervention with relevant references to the modification and improvement of daily life

## 2. LITERATURE REVIEW

The World Federation of Occupational Therapists (WFOT) defines occupational therapy as "the science that promotes health and well-being through involvement in work». Occupational therapist’s role in carrying out the therapeutic programs is of great

importance and a key member of the interdisciplinary team. The occupational therapist evaluates the general needs, abilities and expectations taking into consideration the same person in combination with different environments (eg physical, social). Daily activities play a special role but also the application of new technology in them (Georgopoulou, 2013; Reed & Sanderson, 1999).

Innovation is defined as "the applied use of knowledge which aims at producing and / or providing new or substantially improved products, processes and / or services that find direct productive, useful and / or commercial application». Innovative technologies are based on the results of new technological developments, new combinations of existing technologies or the use of other types of knowledge acquired by the company (Cason, 2015). Assistive technology is defined as a large environment which includes devices, services, strategies and methods that contribute to the development of individual's functionality in daily life without emphasis only on disruption or dysfunction. It is used to refer to the totality of devices and instruments selected for use in both the support, adaptation and rehabilitation of people with musculoskeletal deficits (Congressional Report, 1988; Cook & Hussey, 2002; ISO, 2013).

More specifically, assistive technology "any object, piece of equipment or system product, which is commercially available or adapted or specially manufactured which is used to promote or maintain or improve the functional level of persons with disabilities by restoring or extending human functionality" (Cook & Hussey, 2002). In the context of daily life of the modern individual, new technologies have greatly modified the manifestations of human activity. The technological means are used in everyday life by a growing population regardless of age, gender or/and the financial background (Farell & McKinnon, 2003).

The use of a computer is an important outlet for functionality in daily life of people who need special help. Through computers, individuals are able to perform several activities that in other cases they would not be able to perform. Regarding the therapeutic intervention, the use of the computer contributes not only in the increase of functionality but in the educational process for the acquisition of new knowledge as well. The benefits of the computer are multifaceted and through it, treatment and learning gain worth mentioning interest (Tsouroplis & Kliopoulos, 1991).

In the field of occupational therapy, the use of assistive technology during intervention is considered a separate treatment program. The above happens because the aim of such a therapeutic process is not only to ameliorate the skills of an individual but also to improve his functionality and the quality of his daily life. The occupational therapist first evaluates the individual and identifies his needs, performs an analysis of activities which are related to functional occupation, life roles, but also activities that are considered necessary based on the adaptive model. The occupational therapist after the assessment collects the data and chooses the suitable means for the individual (Bain, 1997b· Cook & Hussey, 2002).

Research findings have shown that with the use of new technology in occupational therapy but also in general therapeutic context, several services have been facilitated such as evaluation, control, monitoring, training and in general the provision of specialized services. Furthermore, it is worth mentioning that the development, but also the use of new technologies in various cases that require this type of intervention, it has contributed to the well-being and the reduction of stress from the side of caregivers and therapists. As it is proven even by findings from previous research, the need for caregiver in people with quadriplegia has decreased, as the quality of life has

been improved through improvements proposed by the occupational therapist in his environment (Demers et al., 2009· Farell & McKinnon, 2003· Ninnis et al., 2019· Seplowitz, 1984).

Based on the systematic review of Shoaib et al. (2017) children with Autism Spectrum Disorders need innovative technologies in order to better educated and improve the quality of their life. In other recent study that conducted regarding innovative applications in children with autism spectrum disorders, it was observed that despite the rapid development of technology, therapists seem to be faced with obstacles and for this reason they resort to its use at a slower pace (Ghanouni et al., 2020· Shoaib et al., 2017). In patients after stroke rehabilitation therapy, the use of new technologies is not a common method of rehabilitation. However, research has confirmed that the use of new technological means has positive effects on improving monitor performance and attracting patients through entertainment the use of objective feedback (Langan et al., 2018). Another research in which 12 articles have been studied, found that the use of in the elderly people with difficulties could be extremely helpful so as to avoid falls which are common due to their age. However, it is concluded there is a need for further investigation regarding the appropriate choice and the use of means in therapy (Miranda-Duro et al., 2021). Regarding the autonomous living of elderly people, the ergonomic arrangement of the house is necessary. Certainly, the occupational therapist is called upon to well-rounded evaluate not only the needs of an individual and the family, but also the environment (Auriemma, 2000).

## 3. METHODOLOGY

The research questions were:

***To what extent do occupational therapists use innovative technologies during the intervention and how often?***

***In what disorders do occupational therapists choose to use innovative technologies for learning?***

In this particular study, the type of research chosen is not quantitative research. The reason why the specific choice was made has to do with the existing data from previous studies, which the researcher is called to confirm or refute. In addition, there is a chance to control the hypothesis he can create comparing the relationships between variables in a relatively wide sample (Papageorgiou, 2014). The questionnaire was selected as a data collection tool for the quantitative research and its development stages were followed. Having understood the aim and the theoretical framework of the study, the variables created. These are the disruptions in which innovative technologies are used, as well as how they are used. The above variables formed the basis for the construction of this questionnaire. The answers and the data of each participant were recorded in the personal file of the participants (CRF), including all the required information for the conduction of the research process. The information is kept confidential in a secure filing office under the investigation of the principal investigator.

Research participants were asked to answer a questionnaire regarding the use of new technologies during the occupational therapy treatment program. Also, there were questions referring to cases in which innovative technologies were used, as well as the frequency of their use. The specific quantitative method of data collection was chosen because it is an immediate, short and economical one. Moreover, through the questionnaires that were offered, the statistical analysis of the results is facilitated.

Most of the questions were close-ended and specifically dichotomous (yes / no) and calibration ones (always, almost always, etc.).

The questionnaire included structured questions, 6 demographic questions and 17 closed-ended questions. More specifically, it includes 7 Likert scale calibration questions which focusing on the frequency and the manner of use of new technologies during occupational therapy intervention, but also 10 dichotomous questions (yes / no) regarding the disorders in which innovative technologies were used. In the questionnaire there were some demographical data at the beginning in the form of 5 questions, such as the gender of the participants, the level of their studies and the years of their work experience. The key questions were formed based on the research questions and the literature review and the findings of other researchers such as Arthanat et al, (2012) και Shaper & Pervan, (2007).

The method used for the distribution of the questionnaire was an online one. To be more precise, the questionnaires were created sing Google® forms and sent to occupational therapists via email. The research was conducted in the spring of 2021 and in particular in the month of April 2021.

The population that selected to participate in the conduct of the particular research is occupational therapists, who work as clinical therapists throughout Greece. The selection of occupational therapists who took part in the research process was made by the method of selecting sampling. This depended on the individuals who were available to take part in the research so that the sample of the study was not considered a random one. The measurement that we chose in the present research is part of the operative scale. More specifically, it concerns a subcategory of the ordinal scale, called the Likert scale (1: always, 2: almost always, 3: often, 4: almost never, 5: never) (Gitlow, 2014; Miranda-Duro et al., 2021; Papanastasiou & Papanastasiou, 2016). Regarding the validity and the reliability, in the particular questionnaire the answers were chosen in accordance with the experiences of the researchers and based on the topic's bibliography. The use of innovative technologies from the therapists constitutes a field of interest since there are limited studies that have being conducted.

## 4 RESULTS

30 questionnaires were issued to be completed, of which 27 were completed (n = 27). Therefore 90% of the answers were collected. The results are presented in detail in tables and graphs below. In more detail, Table 1 presents the demographics of the participants who took part in the research process. All the questionnaires were administrated to participants residing in Greece.

**Table 1:** ***Demographical Data***

| **Therapist's gender** | **Age** ***(in years)*** | **Academic Qualifications** | **Academic experience** ***(in years)*** | **Workplace** |
|---|---|---|---|---|
| man: 18.5 % (n=5) | 20: 3.7 % | TE / PE: 81.5 % | 1: 25.9 % | School: 11.1 % |
| woman: 81.5 % (n=22) | 24: 7.4 % | Postgraduate studies: 18.5 % | 2: 22.2 % | Public body: 7.4 % |
| other: 0% (n=0) | 25: 40.7 % | PhD studies: 0 % | 3: 11.1 % | Hospital / Clinic: 3.7 % |
| | 26: 22.2 % | | 4: 3.7 % | Rehabilitation center: 51.8 % |
| | 27: 11.1 % | | 5: 11.1 % | Home remedies: 0 % |
| | 28: 3.7 % | | 6: 3.7 % | Private domain: 3.7 % |
| | 29: 3.7 % | | 12: 3.7 % | Other: 22.2 % |
| | 36: 3.7 % | | | |
| | 37: 3.7 % | | | |

Based on the Shapiro-Wilk analysis it appears that the p-value> 0.05, since the sample was n = 27 <50. Thus, the null hypothesis is not rejected and the distribution of the population is approximately normal. Table 2 below lists all frequencies regarding the use of innovative technologies recorded from the findings of the questionnaire provided. These questions are related to the first research question.

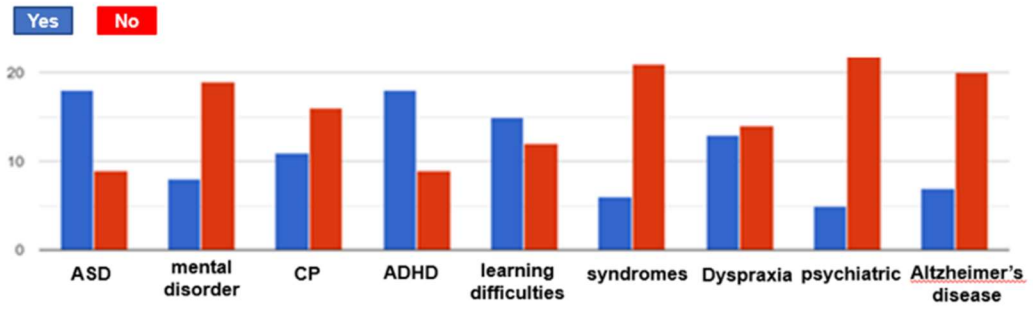
From the above, it is evident, at the beginning of the session innovative technologies are hardly used at all, since over 80% of occupational therapists gave this answer (not at all 62.9% and a little 22. 2%). During the session are used moderately (37%) and slightly (29. 6%). Interestingly the table shows that one does not use innovative technologies too much (0%).With a significant difference compared to the other frequencies, the innovative technologies are used a little (40.7%) at the end of the session. Moreover, it is interesting to note that how for reward 29.6% use some little innovative applications, while an equal percentage very. Furthermore, the occupational therapists choose to include in their treatment program the use of innovative technologies as motivation a little (29.6%) and moderate (25. 9%). According to the answers that were given regarding the learning of new goals, over 80% of occupational therapists use below average innovative technologies (40.7% at all, 22.2% little, 25.9% moderate). On the other side, only 11.1% use much or too much innovative technologies for this reason. As far as the generalization of goals is concerned, again it is observed that occupational therapists use only a little (29.6%) or not at all (37%) of innovative technologies. Only a few less than 15% use innovative technologies more or less.

**TABLE 2: Frequencies of use of innovative technologies.**

| USE OF INNOVATIVE TECHNOLOGIES | Frequency/Percentage(%) | | | | | | |
|---|---|---|---|---|---|---|---|
| | At the beginning of the session | During the session | At the end of the session | For reward | For motivation | To learn a new goal | To generalize a goal |
| Not at all | 17 (62.9%) | 7 (25.9%) | 5 (18.5%) | 5 (18.5%) | 4 (14.8%) | 11 (40.7%) | 10 (37%) |
| A little bit | 6 (22.2%) | 8 (29.6%) | 11 (40.7%) | 8 (29.6%) | 8 (29.6%) | 6 (22.2%) | 8 (29.6%) |
| Medium | 2 (7.5%) | 10 (37%) | 7 (25.9%) | 6 (22.2%) | 7 (25.9%) | 7 (25.9%) | 5 (18.5%) |
| A lot | 2 (7.4%) | 2 (7.4%) | 2 (7.4%) | 8 (29.6%) | 6 (22.2%) | 2 (7.4%) | 3 (11.1%) |
| Very much | 0 (0%) | 0 (0%) | 2 (7.4%) | 0 (0%) | 2 (7.4%) | 1 (3.7%) | 1 (3.7%) |

From the second graph answers were given concerning the second research question. More specifically, the occupational therapists answered in which disorders they use innovative technologies and in which they do not. It is found that greater use of innovative technologies during the intervention is used in Autism Spectrum Disorders (ASD), ADHD and less in learning disabilities and Dyspraxia. On the other hand, the vast majority of occupational therapists do not use innovative technologies in psychiatry (eg schizophrenia), syndromes (eg Down syndrome), Mental Retardation (AD), and Altzheimer's Disease.

**GRAPH 2: Cases of use of innovative technologies.**




## 5. CONCLUSIONS

From the present research study it appears that the innovative technologies are quite useful and contribute to the facilitation of everyday life, especially when they are used in the therapeutic context. According to the findings of this study, it appears that the use of new technologies is a faculty that needs further investigation in the field of occupational therapy intervention and other treatments. More specifically, it is of great

importance to draw conclusions about the cases of individuals (patients or with disorders) where new technologies help, which devices or applications are proposed in each case and by what criteria. It is observed that occupational therapists choose to use new technologies in their therapeutic intervention. However, it was expected a greater use of technological systems and applications as well as the majority of occupational therapists that filled in the questionnaire were young at age which is consistent with their technological familiarity. Nevertheless, the results show that the use is made at a moderate to low level.

In particularly, the great use of innovative technologies is found at the moment of the reward. On the other hand, most of the occupational therapists don't make use of technological equipment at the beginning of the session, for the introduction of a new goal or its generalization. Moreover, most of them seem to use new technologies in the pediatric population and more specifically in Autism Spectrum Disorders and children with ADHD. There are no reports of patients with Parkinson's or other diseases (eg after stroke, multiple sclerosis). Based on the bibliography it is clear that innovative technologies are used for a better quality of life and an easier daily life, however everything is at a relatively early stage as further investigation is deemed necessary.

In this research there are certain restrictions. First of all, regarding the methodology that was followed the restrictions were based mainly with the finding of the appropriate sample. More specifically, the sample was quite small compared to the actual number of the occupational therapist population. It is also worth mentioning that there was not enough time so as for the research to become complete, as it had to be completed in a short time. In the future, it is proposed to further explore the use of innovative technologies in occupational therapy intervention programs. It is almost necessary for the studies that are going to be conducted in the future, the researchers to delve into the disorders individually in relation to innovative technologies, so as to find applications or software that work best for each of them.

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