DEVELOPMENT OF A MOBILE APPLICATION AS AN ASSISTIVE DEVICE FOR PEDIATRIC OCCUPATIONAL THERAPY- THE HOME INSTRUCTION PROGRAM

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ABSTRACT

Background: Home Instruction Programs are individually made programs specifically for one patient in mind. They are to extend the benefits of occupational therapy services throughout the week. Children with special needs are different from one another, they may have the same diagnosis, same problem areas but their needs, capabilities and environment are completely different form
Aim: To develop an assistive device that will help parent and child participate with their Home Instruction Program that will enable them to achieve their targeted goals
Method: Study population (n=75), 40 parents of children with special needs and 35 pediatric occupational therapists used the developed Theraplay mobile application for 1 month. After which questionnaires were answered by the respondents to determine the level of acceptance and five IT experts evaluated the level of effectiveness of the app using the ISO 9126.
Results: Results have shown that under Perceived satisfaction the parent population have shown 87.50% satisfaction rate on the contents of the Theraplay mobile app.Perceived satisfaction the OT population have shown 75% satisfaction rate
Conclusion: That the parent and pediatric occupational therapist population of the study has deemed the Theraplay mobile app acceptable to be used as assistive device to participate with HIP. That the IT experts has evaluated the Theraplay mobile app as an effective mobile app.

Keywords: Home Instruction Program (HIP), Pediatric occupational therapy, adherence, mHealth apps, assistive device.

INTRODUCTION

Home Instruction Programs are individually made programs specifically for one patient in mind. They are to extend the benefits of occupational therapy services throughout the week. Children with special needs are different from one another, they may have the same diagnosis, same problem areas but their needs, capabilities and environment are completely different form one another. Typically, a child avails for two to three (2-3) with one-hour (1) long occupational therapy sessions for a whole week. Individualized activities are given as intervention planned according to their therapeutic goals. These one-to-two-hour long session a week are not enough for them to have significant progress which is why Home Programs are given emphasis to the parent. The supplemental instructions and the responsibilities for remediation fall to the parents as occupational therapy services are limited. Home Instruction Program are delivered to the parent to be implemented at home to maximize the potential for skill learning and retention. Parents are normally not taught with the information regarding intervention, or methods of teaching effective for their children to improve and establishment

of skills. Furthermore, support and guidance are often not given such as a Home Instruction Program (Poole, 2017). In the recent years, mobile technology has advanced to the point of bringing enormous change in the everyday lifestyle of individuals. Mobile devices are now widespread in all aspects of human life. Mobile phones are now considered necessity by many, people of all ages use their phones to stay in touch with their family, friends, and colleagues. It is used in many ways but still connected to our daily lives such as participating in social networking sites to share stories and photos, going online to browse for either work, play or entertainment. They are also used in work-related matters like checking e-mails, coordinating schedules for meetings and gatherings. As mobile phones became more available through its numerous supply and affordability, they are also increasingly owned by people of all ages. One of the few uses of mobile phones is that they can be used by persons with disability as an assistive device. Assistive devices are under the scope of assistive technology, they enable and promotes inclusion and participation. Assistive device enables people with disabilities and normal bodied individuals to be productive, independent, live healthy, to participate in education, work and their everyday life with dignity. As mobile phones are technologies that are usually blank, other than the common functionalities what makes them an assistive device are the enormous supply of mobile applications that are programmed specifically on a population and one of its samples are mHealth apps.Mobile health or simply mHealth is the medical and public health practice supported by mobile devices which was defined by the WHO Global Observatory for eHealth (Rowland et al., 2020).

There are many available mHealth apps in the market catering to different medical fields and the perspective of the healthcare professional and patient were taken into account as many studies evaluate the use of mHealth apps (Al-Azzam, 2021). Many platforms that offer opportunities for healthcare providers to render high-quality care remotely. These are available due to the advancement of mHealth technologies through the years. The increasing number of mHealth solutions has allowed these challenges to be overcome and provided new opportunities. (Inupakutika, 2020). There might be many mHealth apps in the market but only a few are designed for Rehabilitation, specifically in the Occupational therapy profession. The use of mHealth app in the practice of occupational therapy brings several benefits and advancements that help both practitioners and clients. The current practice of delivery for Home Instruction Programs are through written and oral means but compliance is not high. This creates a huge problem in the practice as HIPs is an integral part of rehabilitation process. The barriers of time, interest of both child and parent and miscommunication. The researcher has experienced the problem of non-compliance, which resulted to wasted time, money and potential of the child with this problem the researcher developed a mobile application that can be used as an assistive device to help the parent and child participate to their dynamic and personalized Home Instruction Program.

LITERATURE REVIEW
Assistive Devices

In enhancing the quality of life of persons with disabilities, the use of assistive device is sought for to countervail their lost functions. Said assistive devise helps individuals with disabilities in overcoming different obstacles such as pursuing education, gaining employment, seeking out for medical treatment, and finding an equal prospects to participate in society. As a result thereof, it improves the independence of a person with disabilities in their mobility as well as develops potential. (Bonnacio et al., 2020). In the recent years, mobile phones have become advanced that it reached the potential to be used as an assistive

technology as well. The continued improvements in the field of digital assistive technologies created opportunities in solving the different challenges faced by people with disabilities *i.e.* by providing accessible built-in features and applications that can be used in their daily functions. (Senjam et al., 2021). In the study of Nordström et al. (2018), it was shown that mobile apps are successful as an assistive device despite only 82% of younger and 47% of olders student continued the use of the application after intervention. However, notwithstanding the improvements in technology and the potential success of using it in interventions, it must first be accessible to its end-users. In various studies made on assistive technologies, the concept of "accessibility" was delved by analyzing the following: (1) design choices, (2) practicability or technological barriers, and (3) interface options. The importance of accessibility is that it translates as to whether the application will be useful to its users or not. To be particular, there are apps which provides online engagement by letting different users to interact which each other that increases one's social skills. However, when such application has impractical design or complicated interface, then users cannot completely utilize the purpose of the app (Ochsner et al., 2022).

Home Instruction Program

Occupational therapists and other rehabilitation professionals recommend Home Programs on regular basis as an integral part of the rehabilitation experience. The importance of which is that it serves as an extension and additional care to particularly answers the patient's continued challenges at their home and in the community (Donoso Brown et al., 2017). The delivery of Home Instruction Programs is proven as standard of care to assist patients meet their goals and outcomes. Home Instruction Programs are made by occupational therapists, personalized for their clients which may include lifestyle modifications which compliments treatment provided and/or discharge recommendations (Riveland et al., 2020).

Home Instruction Programs will preferably promote a patient's rehabilitation and guarantee that the rehabilitation gains reached while a supervised treatment are maintenance (Ouegnin et al., 2018). These home programs are therapeutic activities given by a therapist to the parent to be executed by the child at home which are catered to produce the effect of therapy made at a clinic (Smidt &Oftedal, 2020). Home programs are conventionally written delivered as paper hand-out to patients, however there is already a slow introduction of technology-based home instruction programs on devices *i.e.* computers, tablets or mobile phones (Lambert et al., 2017). In the occupational therapist setting, home programs are also handed out to parents in Paper hand-outs accompanied by the following in order to give guidance to the caretaker/parent: (1) visual demonstration or direct training with feedback, and (2) explanation on how to integrate activities into routine (Donoso Brown &Fichter, 2017)

Adherence with Home Instruction Program

The World Health Organization (WHO) defined adherence as "the extent to which a person's behavior corresponds with agreed recommendations" an example of which is lifestyle modifications "from a health care provider". The term adherence was chosen to do away with using the term compliance in identifying the whether the therapy recommendations were followed or not. The reason for which is that the latter gives negative implication that clients have to abide by the "orders" of the rehabilitation professional (Radomski, 2018; WHO, 2003). For the purpose of this study, adherence or compliance denotes the initiation and completion of the recommended treatments. To achieve tangible clinical health outcomes, the person's capability to comply to agreed-upon recommendations of home programming is

necessary (McLean et al., 2017). The limited time, knowledge, and resources of Occupational Therapists in finding and converting evidence-based literature into practice may negatively impact adherence to home programs (Radomski et al., 2018).Studies have shown that adherence rates towards Home Program are lower than satisfactory range with only 40-70% through various population (Donoso Brown et al., 2017; Emmerson et al., 2017; Picha et al., 2018) which presents an issue of concern.

The cost of low Adherence towards Home Instruction Programs

According to the WHO (2003), adherence is an essential variable for it influence the effectiveness of treatment and optimalization of client outcomes, particularly when considering lifestyle modifications. Poor health outcomes and increased health costs were associated with non-adherence to treatment recommendations, which is a problem seen across health disciplines. The amount of expenditure for healthcare, the therapeutic relationship, and the rehabilitation professional's effectiveness may be adversely effected by low or non-adherence (Argent et al., 2018; McLean et al., 2017). The patient outcomes are greatly affected by the patient's treatment adherence to the given home instruction programs, such that low adherence negatively affects the patient outcomes (Argent et al., 2018), while high exercise adherence is reflected on the positively patient outcomes. (McLean et al. ,2017). Often, there is a direct correlation between compliance with Home Instruction Programs and the outcomes of therapy. The use of the Home Instruction Program has been deemed necessary and has become popular in the pediatric occupational therapy setting over the past years. An opportunity was given by the Home Instruction Program for the child to utilize the skills obtained in the therapeutic setting of the rehabilitation centers to their natural home environment. (Carlson & Schwartz, 2019).

Ouegnin and Valdes (2018) supported the use of Home Exercise Program (HEP) wherein adherence becomes the determinative factor for its effectiveness. Given that existing paper handouts that are generally used for home program is not at par to the effectiveness of a consultation made by a therapist, it will require an additional direct intervention which gives additional economic burden on the client. Therefore, there is a need to create a medium that can facilitate the participation of both the caretaker and therapist in a patient's care while being economical (Riveland et al., 2020).

Parent Engagement

In treatment intervention, the term engagement goes beyond its usual textual definition of mere "attending" or "participating". Engagement is considered as a process of "engaging with" and being on a state of "engaged in". Hence, when there is engagement, it comes along with the shifting of one's internal state which is now influenced by individuals and contextual factors (D'Arrigo et al., 2017). Consequently, it plays a significant role in the succeed of therapeutic process in occupational therapy. In the study of Kelty& Wakabayashi (2020), it was found that family engagement results to an improved social experience which indicates improvement on the child's cognitive skills as well as social-emotional skills. It must be stressed that engagement is a reciprocal process. Hence, it is necessary to engage both child and parent in pediatric occupational therapy. Using evidence-based Occupational Therapy Home Programmes (OTHPs) involves an amount of difficulty which requires the participation of the parents, child, and therapist, to make the said program successful. (Milton & Roe, 2017). Lin et al. (2018) noted the effectiveness of parent participation in Occupational therapy; there is a substantial difference of cognitive, gross motor, verbal, fine

motor abilities, total score of social, motor, and self-care abilities of children with developmental delays after a more involvement of the parents towards their OT sessions. Parent participation in rehabilitation enhances parenting skills, parents' self-growth, family cognition, and treatment knowledge. It also promotes the development of the child and their functional skills in several fields. It even enhances the quality of learning of children with developmental delay, furthering parent–child interaction that positively establishes the collaboration between parents and rehabilitation experts. The importance of family engagement are that aside from holding authority over the child, they are also the bridge between home and rehabilitation centers. To be specific, it is the family of the child who can provide relevant information regarding their child's strengths and weakness (Kennedy et al., 2019). By working together with a parent in setting a targeted goal, the therapist can give an appropriate activity at home in accordance to parents' discernment and their desired outcome (An et al., 2017; Neuwar, 2017).

Having engagement with families, who are treated as equal partners, during the evaluation stage of the outcomes of parent-mediated early intervention in ASD will help the moderators to create a tailorfit program for the child. In addition, through the collaboration with families, the families will become aware of the additional supports or key areas that will improve the efficacy of the intervention models. At the same time, it will improve successful translation of skills in the "real world" (Wainer et al., 2017). According to Akamuglu (2018), when it is the parents who implemented the interventions, it results to a positive parent and child outcomes. In sum, parent's engagement in the therapeutic environment was proved to have a positive correlation on the adherence in the implementation of home instruction programs. Consequently, skills learned in therapy are carried over to the home setting.

A study regarding parents' engagement, participation and attendance in the services delivered at their child's rehabilitation centers have found that families are facing numerous contending demands that affects their capacity to be present and participate in services (Phoenix et al., 2019). The Phoenix Theory of Attendance, Participation and Engagement shows how different variables such as the total of adults supporting to the child's therapy, the number of children living in the home, access to transportation, full-time work and challenges finding childcare for other children lead to difficulties attending and participating in therapy services. Although not directly generalizable to the school environment, it is probable that similar demands also would apply to families who are asked to attend meetings with school-based therapists. Greater parental participation has been shown to result in increased student success (Đurišić&Bunijevac, 2017).

Professional and societal burdens on therapists and families are increasing. Although face to-face communication is still highly regarded by therapists, different means are required for therapists and families to connect. The importance of parent engagement in the availed therapy service and their responsibility of their role should be given emphasis. The caregiver's role in therapy goes beyond "following instructions" they have fully understood their role and means for them to truly engage in occupational therapy (Carlson & Schwartz, 2018). Bearing in mind the growing amount of evidence on the importance of the family unit and family-centered practice, it is imperative for occupational therapist to have confidence and make the most of caregivers' perspectives, while they are involved and engaged in occupational therapy (Waldman-Levi et al., 2017). The parents' sense of feeling overwhelmed and stress towards their interactions with their child dropped significantly as they grew in their learnings and understanding about their child's needs. They felt

empowered when they were able to figure out ways that can better their child's quality of life. (An, 2017).

Barriers to Parent Engagement

There are numerous barriers that impede the engagement of caregivers in rehabilitation services availed for their children. Most of the parents identified the following as barriers towards participation: their expectancy of what their role is about, the time they had on hand for attending occupational therapy sessions, and the stress that they are under. The study made by Tal-Atzili&Salls (2017), indicated that stress related to parenting are four-times greater compared to the other group of children with other developmental delays. Parents are often under the misconception that their participation and engagement in their children's therapy is not necessary as they think that the professionals know better than them. Consistent with the findings from previous studies, socio-demographic caregiver factors were not found to be predictors of adherence. However, different parents' cognitive factors showed a strong association with compliance to duration and frequency of Home Exercise Program (HEP) (Medina-Mirapeix et al., 2017).

Family-centered care

The foundation of the occupational therapy profession offers its support on the emphasis of early intervention on family-centered practice. Parents are included in the creation of the goals and outcomes of their children and determining the frequency of the therapy services in early intervention (Bowyer et al., 2017). The core of family-centered practice in the pediatric occupational therapy is to collaborate with the family, caregiver and the child to facilitate their participation in occupations. Occupational therapists use family-centered practice when creating goals for their children with the caregivers' engagement (Fingerhut, 2013). However, family-centered practice goes beyond the goal setting, it focuses in altering the quality of life of the whole family. A collaborative relationship with open communication is the ideal relationship between occupational therapists and caregivers as it fosters trust, honesty, and support (Rico-Mena et al., 2019). Early intervention uses the family-centered practice as its foundation, family-centered practice is the term used to define managements that concentrate the inclusion of caregivers and parents. Dignity and respect are given to the family as they work in partnership in making informed decisions and choices therapists provide them the information needed and helping them actively in obtaining support and resources when using the family-centered practice model (National Resource Center for Family-Centered Practice, 2019).

Family-centered care can be measured through the reflective discussion of the expectations of the caregiver and the occupational therapists, as well as the satisfaction of therapy outcomes. The practice of open discussion and reflection with the direct addressing of concerns, expectations and satisfaction is essential to family-centered practice. (Waldman-Levi et al., 2017). The philosophy of care by the family-centered practice accepts the control of the parent throughout the rehabilitation services availed, it regards every member family as the client not just the child. It also centers formation of positive relationship among the family and occupational therapists. The following theoretical constructs are used by pediatric occupational therapist that utilizes the family-centered practice to generalize the children's execution and transfer of skills to their home setting: problem solving by using coaching, intervention to be use must be in their home setting, the use of consultation to support, social skills group and the generalization of motor learning principles. (Gal & Steinberg, 2018). In

client-centered care, family members and children play an active role in decision making. The decision makers for the child's healthcare are usually their parents as they are the ones who know their children's needs the best (Liao et al., 2019)

Telehealth vs mHealth

The facilitation and delivery of health and health-related services which includes patient education, medical care, health information services, provider and self-care through digital communication technologies and telecommunication is the definition of telehealth. Mobile health apps, live video conferencing, remote patient monitoring and "store and forwards" electronic transmission are some of the technologies used in telehealth. Teleradiology and telepsychiatry are historically among the earliest telemedicine applications. Most of these programs were gone by 1980, for unclear reasons. The industry of telemedicine started again in the early 1990's and has grown, evolved and refined in terms of implementation. The cause of the recovery of telehealth is multidimensional, a few of the important factors for its recovery is the development and fast expansion of the Internet. The surge of the digital communication technology and the decline of expenditure of the cost of technology pushes the innovations in telemedicine. There are numerous patients around the world that has received telehealth and telemedicine services from the many available service providers.

There is a large increase in the investment in start-up telemedicine service companies in the recent years. Selected gap services and urgent services are outsourced by thousands of hospitals. One of the more recent services in the market is the direct-to-consumer telemedicine and telehealth services where patient targeted services that are delivered at a defined set of healthcare services directly to the patient in their chosen venue and fixed, low prices (Weinstein et al., 2018). In short, the lowering cost of technology, reliability of telecommunications and proliferation of use of technology has made telehealth a preferable choice for patients compared to a more expensive direct or face-to-face consulting. The use of technology in Lowman et al. (2020) in using game console home-based exercise in adults with cystic fibrosis shows potential to maintain sustainability as home-based exercise training has been shown to result in greater long-term adherence to exercise. The feedback on the performance of alternative to face-to-face session are provided by telerehabilitation, call centers and other system-based technology. It was found that the alternative method was effective as usual care, cost-effective and provides faster accessibility towards treatment (Palazo et al., 2016).

The WHO Global Observatory has defined mHealth as "medical and public health practice supported by mobile devices" (Rowland et al., 2020). There were an approximate of 79 million smartphone users in the Philippines in 2020, which reflected the upward trend seen since 2017. By 2025 it was forecasted that there would be 91.5 million smartphone users in the Philippines (Statistica,2021). Better health outcomes and increased access to care are leveraged to mhealth and mobile devices. Healthcare applications and programs are used by the patients in their laptops, mobile phones and tablets. There are numerous mHealth applications in the market, they help patients to track health measurements, schedule medication, reminders for appointments and to share information to their health professionals (Vasseli et al., 2021).

Many mobile applications rely on social networking sites and the community experience that allows the users to continuously check their activities and compare them with family, friends and the community. Apps are more consumer friendly compared to most portals available,

they are consumer centric in design and are easier to use. There is a growing interest in wearable devices and applications that will enable and engage patients for their homecare which gives rise in the health apps and health tracking software (Baldwin et al., 2017). There are recent studies in the occupational therapy practice that focuses more on the improvement of technology use that is intended to support engagement rather than enhancing engagement in occupations supported by technology (patomella et al., 2018; Swan et al., 2018). The use of technology nowadays is inescapable part of occupation, same with the assessment of occupational performance (Smith, 2017). As such the focus on technology use is an occupational-based practice. To support the older adult's digital engagement the technology or the relevance of the occupational performance are considered (Fischl et al., 2020, Ryd et al., 2018). Mobile apps have great potential to have a major role in the promotion and measuring adherence. There are implementing behavior modification features are seen and is acknowledged to help increase adherence with home instruction programs (Gal & Steinberg, 2017). A study made by Johansson et al. (2020) on the acceptability of the clinicians and parents of mHealth apps for obesity in pediatrics treatment. The mHealth app was deemed acceptable and was received positively by the clinicians and parents. It proves that the intervention is an innovative approach has generated better results than the standard of care. In Lee et al. (2018) systemic review health promoting programs based on mobile apps, many apps implemented in the study was described to have the intention to produce change in health related behaviors. It was said that the attitude of the caregivers and the stroke patients on mobile based home exercise have high percentage of agreement to the service. Many of the participants have accepted that there are benefits in the use of the mobile based exercise program, that it has reduced costs of service and that their confidentiality is secured (Mahmood et al., 2019)

METHODOLOGY
Research Design

Descriptive developmental research designed was utilized in the study. The objective of the descriptive developmental method is to describe the characteristics, nature, and components of population (Barrot, 2017). Developmental research design involves the designing, developing, and evaluating instructional programs, processes, and products by meeting the set criteria on internal consistency and effectiveness (Cruz &Dizon, 2021). Therefore, the descriptive developmental design is a study of developing, putting into design and careful assessment of procedures, programs and outcomes that must meet a definite criterion.

This design was utilized by the researcher in the study to ascertain the current practice in providing home instruction program and the barriers encountered while using the current delivery of practice. The results led to a developed mobile application for providing Home Instruction Program. The level of acceptance of the developed mobile application was evaluated by the parents and occupational therapists as the respondents. At the same time the level of effectiveness of the mobile application evaluated by IT experts using the ISO 9126. The population of the study was Occupational Therapist and parents of children receiving Occupational therapy services from private pediatric centers and/clinics in Quezon City.

RESULTS &DISCUSSION
1. The current practice of delivery of Home Instruction Program and barriers encountered

The majority of the occupational therapy participants have identified written paper hand-outs with demonstration and return demonstration as the current practice of delivery of Home Instruction Program. The results conformed with the study made by Lambert et al. (2017) and Denoso-Brown &Fichter (2017) that Home Instruction Programs are commonly written hand-outs with visual demonstration or direct training with feedback. Occupational therapists have also noted high rate of non-compliance as observed by the Therapist as more than one of the OTs have the same perspective with the follow-through made by the parents at home. "nakikita naman if ginagawanilayung Home Program sabahay, dun sabilis ng progress ng kid. Yung ibailangbuwanna nag OT same pa rin, peropag may follow-through sabahayhalatarinyungiba 1 to 2 weeks pa lang may na solve ng problem area". They have also cited that when they asked the parents about their follow-through at home, that the answer given by most of the parents were time constraints due to work, followed by having forgotten to do the prescribed activities at home and financial constraints, that they don't have the materials at home for follow-through

Table 1. Parent's preferred medium in receiving Home Instruction Program

What medium would you like to receive your child's Home Instruction Program?	Frequency	Percent
Mobile app	13	33%
Oral/ Spoken Communication	8	20%
Paper handout	7	18%
Website	7	18%
Video	5	13%
Total	**40**	**100%**

Table 1 shows what medium the parents would like to receive their child's Home Instruction Program from their Occupational therapist. There are thirteen (13) respondents or 33% of the population that states the mobile app as a preferred medium in receiving their child's Home Instruction Program. Home Instruction Program through oral or Spoken communication was the next preferred choice with eight (8) respondents or 20%. There are seven (7) respondents that would prefer paper handout as their medium of choice that comprises 18%, There are also seven (7) respondents or 18% that would prefer website as their medium of choice. While five (5) respondents or 13% answered video as their preferred medium.

The results implies that parents prefer the use of the mobile application the most as medium of receiving their child's Home Instruction Program followed by Oral or spoken communication, paper handouts, website and lastly through videos. According to Kravela et al. (2018) with the fast development and lowering price of mobile devices which lead to its widespread use in daily life, many of these technologies are used as assistive device by people with disabilities. Currently there are only a few mobile applications that are suitable for children with special needs, but a more large-scale application will be of greater benefit for children with special needs and their parents.

2.The Theraplay Mobile application

The developed "Theraplay" mobile application, was made to transmit data from the mobile application and a designated Theraplay website. The data was stored in the server which makes the Theraplay mobile app easy to install, as it does not take huge amount of storage and RAM usage. The mobile app has rich graphics and interactive features that makes it

easier and pleasant to use. The end-users create their own password protected account; they would then be recognized by the server every time they log-in. There is a separate portal for occupational therapists, where they may view the uploaded picture from the parent account to review and monitor their participation with the home instruction program.

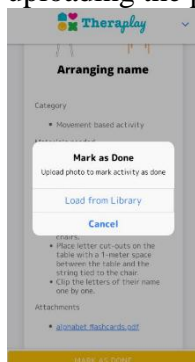**Steps in using the Theraplay mobile application (Parents)**
1. Create your personal account.
2. Go to Assignments placed on the lower right of the dashboard to receive your child's Home Instruction Program
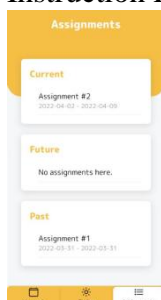
3. Go to My Week to schedule your child's Home Instruction program by going to the date assigned for the week. Press schedule activity, choose the activity your want to do for the day and press save. The activities saved will then show up on Today on your dashboard, press the activity icon that will lead you to the Instructions and supplementary materials for your chosen activity.
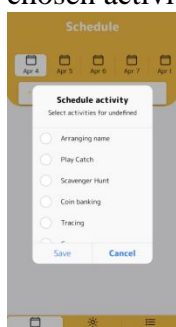

4. To mark the activity done, go to Today and press Mark as Done at the bottom of the instruction page of your scheduled activity and upload picture from your phone. After uploading the picture, your activity will then be marked as Completed.

**Steps in using the Theraplay mobile application (OTs)**
1. Create your personal account with the help of your admin staff.
2. Your dashboard will let you see the available activities for your Home Instruction Program. The activities are categorized under Cognitive skills, Fine Motor Skills, Movement based activity, Self-care Skills, and Social Skills.
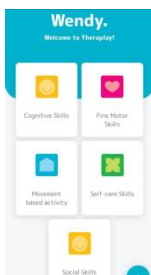
3. Press the plus (+) sign on the lower right side of your dashboard
4. Another dashboard will come out, select the name of your client under Patient.

5. Go to Date Range to select the time frame when the activities may be done at home.
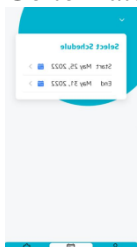
6. Go to Activities to select activities to be sent to your client. Afterwards press send to user. A report of the selected patient, date range and activities will come out as verification. If all areas are correct press Send Activity to Patient
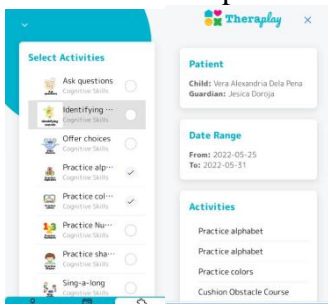
7.   To monitor the Home Instruction Program activities of the parents go to the https://theraplay-app.com/login and click monitoring. The names of your patients will be shown, click the date corresponding where the uploaded picture of the activity done will pop out.

3. The Level of Adherence towards Home Instruction Program while using the Developed Theraplay Mobile Application

Table 2. The Level of Adherence towards Home Instruction Program while using the Developed Theraplay Mobile Application

Level of Adherence	Frequency	Percentage
Always (7x a week)	9	22.50
Often (5-6x a week)	9	22.50

Sometimes (3-4x a week)	10	25.00
Occasional (1-2x a week)	12	30.00
Total	40	100.00

Table 2 shows the frequency of use of the parents towards the Theraplay mobile application. There are twelve (12) respondents equivalent to 30% of the population that used the Theraplay mobile application on Occasional basis. There are ten (10) respondents who used the mobile application Sometimes which comprises 25%. Often has nine (9) respondents or 23% frequency on the use of the developed mobile application and another nine (9) respondents answered Always which made up of 23% of the data. This implies that there is higher adherence rate towards Home Instruction Program with the use of the developed mobile app.

The findings conformed to the work of Gal et al. (2018) who found strong correlation between the usage frequency and the adherence of parents towards Home Programs. This supports the numerous literatures that mHealth apps help promote adherence of healthcare clients towards their Home Programs which will help them achieve their targeted goals faster that will help decrease the amount of money and time spent for rehabilitation.

4.The Level of Acceptability of the Theraplay Mobile Application among Parents and OTs

Table 3. The Level of Acceptability of the Theraplay Mobile Application among Parents and OTs

Level of Acceptability	Parents				OTs			
	Maybe		Yes		Maybe		Yes	
	F	%	F	%	F	%	F	%
Perceived Satisfaction								
I am satisfied with the contents of the Theraplay mobile app.	5	12.50	35	87.50	5	12.50	30	75.00
I will recommend the use of the Theraplay mobile app to other parents.			40	100.00			35	87.50
Perceived Usefulness								
The Theraplay mobile app gives me clear instructions for Home Program.	3	7.50	37	92.50	8	20.00	27	67.50
The Theraplay mobile app helps in monitoring Home Programs given by my Occupational therapist	2	5.00	38	95.00			35	87.50
The Theraplay mobile app can improve collaboration between parents and Therapist	13	32.50	27	67.50	5	12.50	30	75.00
Perceived Ease of Use								
The information in the Theraplay mobile app is clearly written and are easy to understand.	8	20.00	32	80.00	3	7.50	32	80.00

The Home instruction Program are placed in an organized manner.	4	10.00	36	90.00	4	10.00	28	70.00
The pictures support the textual information and can be clearly visualized.			40	100.00			35	87.50

Table 3 shows the level of acceptability of the developed Theraplay mobile application by both parents and occupational therapists (end-users). Results have shown that under Perceived satisfaction the parent population have shown 87.50% satisfaction rate on the contents of the Theraplay mobile app and 100% will recommend the developed app to other parents. Under Perceived usefulness 92.50% said that the app was able to give them clear instructions for their Home program. 95% in helping monitor Home Program given by their therapist. As for improving collaboration between parents and therapist 67.50% of the population said yes. For Perceived ease of use 80% said that the information was clearly written and are easy to understand, 90% has said that the Home Instruction Program was placed in an organized manner and lastly 100% said that the pictures support the textual information and can be clearly visualized.

 In comparison to the OT population of the study where under Perceived satisfaction the OT population have shown 75% satisfaction rate on the contents of the Theraplay mobile app and 87% will recommend the developed app to other parents. Under Perceived usefulness 67.50% said that the app was able to give them clear instructions for their Home program. 87.50% in helping monitor Home Program given by their therapist. As for improving collaboration between parents and therapist 75% of the population said yes. For Perceived ease of use 80% said that the information was clearly written and are easy to understand, 70% has said that the Home Instruction Program was placed in an organized manner and lastly 87.50% said that the pictures support the textual information and can be clearly visualized. Based on the results of both population it can be said that there is high percentage of acceptability towards the developed Theraplay mobile app by both parents and Occupational Therapists.

5. The Effectiveness of the Theraplay Mobile Application as evaluated by IT Experts

Table 4. The Effectiveness of the Theraplay Mobile Application as evaluated by IT Experts

Indicators	Weighted Mean	Verbal Interpretation	Rank
Functionality			
Functional completeness	4.00	High	
Functional correctness	3.60	High	
Functional appropriateness	3.80	High	
Average	**3.80**	High	8
Efficiency			
Time Behavior	4.80	Very High	
Resource Utilization	4.20	High	
Capacity	4.60	Very High	
Average	**4.53**	Very High	1
Compatibility			

Co-existence	4.00	High	
Interoperability	3.80	High	
Average	**3.90**	High	6
Usability			
Appropriateness Recognizability	4.40	Very High	
Learnability	3.40	High	
Operability	3.40	High	
User Error Protection	4.00	High	
User Interface Aesthetics	4.20	Very High	
Accessibility	3.60	High	
Average	**3.83**	High	7
Reliability			
Maturity	4.20	Very High	
Availability	4.00		
Fault Tolerance	4.20	Very High	
Recoverability	4.40	Very High	
Average	**4.20**	Very High	3
Security			
Confidentiality	4.20	Very High	
Integrity	4.40	Very High	
Non-repudiation	4.00	Satisfied	
Accountability	4.00	High	
Authenticity	4.00	High	
Average	**4.12**	High	5
Maintainability			
Modularity	3.60	High	
Reusability	4.60	Very High	
Analyzability	4.60	Very High	
Modifiability	4.00	High	
Testability	4.00	High	
Average	**4.16**	High	4
Portability			
Adaptability	4.60	Very High	
Installability	4.60	Very High	
Replaceability	4.00	High	
Average	**4.40**	**Very High**	2
Overall Average	**4.12**	**High**	

Table 4 shows the level of usability of the developed mobile application. Figures show that indicators "efficiency" ranked 1 with the weighted mean of 4.53; indicator "portability" with the weighted mean of 4.40; indicator "reliability" with the weighted mean of 4.20, indicator "maintainability" with the weighted mean of 4.16; indicator "security" with weighted mean of 4.12; indicator "compatibility" with weighted mean of 3.90; indicator "usability" with weighted mean of 3.83; indicator "functionality" with weighted mean of 3.80. The results implied that the developed mobile application for Home Instruction Program as to its level of usability is highly commendable. Its functionality, reliability, usability, efficiency, maintainability, and portability revealed to be very useful to the users. The results implied that the developed mobile application for Home Instruction Program offers competent

technical and technological services evident of the high acceptability rating for functionality, reliability, usability, efficiency, maintainability, and portability.

CONCLUSIONS

Based on the results of the study, the following conclusions were drawn: That there is a need for an alternative delivery of Home Instruction Program that will encourage compliance and participation. This alternative method of delivery developed in this study is a mobile application "Theraplay" will serve as an assistive device is the alternative medium of delivery will help increase compliance to Home Instruction Program. There is noted increase of adherence level of the parents towards Home Instruction program is while using the Theraplay mobile app compared to the current practice of delivery, which shows its effectivity in increasing adherence level to home programs. Moreover, parents and Occupational therapist have high percentage of acceptability of the developed Theraplay mobile application and has shown that it is acceptable to be used in the pediatric OT setting as adjunct to the traditional OT service. The Theraplay mobile app was found to be effective program to be used by the general public as evaluated by the five IT professionals using the ISO 9126.

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REFERENCES

An, Sun-Joung L. (2017). Parent training occupational therapy program for parents of children with autism in Korea. Occupational therapy international, 2017(), 1–8. Retrieved from doi:10.1155/2017/4741634

An, M., Palisano, R. J., Yi, C. H., Chiarello, L.A., Dunst, C. J., &Gracely, E. J., (2019) Effects of a Collaborative Intervention Process on Parent Empowerment and Child Performance: A Randomized Controlled Trial, Physical & Occupational Therapy In Pediatrics, 39:1, 115, DOI: 10.1080/01942638.2017.1365324

Akamoglu, Y., Meadan, H. Parent-Implemented Language and Communication Interventions for Children with Developmental Delays and Disabilities: a Scoping Review. Rev J Autism Dev Disord **5,** 294–309 (2018). https://doi.org/10.1007/s40489-018-0140-x

Al-Azzam M. K. (2021). Research on the Impact of mHealth Apps on the Primary Healthcare Professionals in Patient Care. Applied bionics and biomechanics, 2021, 7611686. https://doi.org/10.1155/2021/7611686

Argent, R., Daly, A., & Caulfield, B. (2018). Patient involvement with home-based exercise programs: Can connected health interventions influence adherence? JMIR MHealth and UHealth, 6(3), E47. doi:10.2196/mhealth.8518

Baldwin, J. L., Singh, H., Sittig, D. F., &Giardina, T. D. (2017). Patient portals and health apps: Pitfalls, promises, and what one might learn from the other. Healthcare (Amsterdam, Netherlands), 5(3), 81–85. https://doi.org/10.1016/j.hjdsi.2016.08.004

Barrot, J. (2017). Practical Research 2 for Senior High School (1st ed.). C & E Publishing, Inc.

Bonaccio, S., Connelly, C.E., Gellatly, I.R. et al. The Participation of People with Disabilities in the Workplace Across the Employment Cycle: Employer Concerns and Research Evidence. J Bus Psychol **35,** 135–158 (2020). https://doi.org/10.1007/s10869-018-9602-5

Bowyer, P., Moore, C. C., Tiongco, C. G., Tkach, M. M., Thom, C. (2017). Perspectives of occupational therapists on the challenges of early intervention practice: A pilot study. Journal of Occupational Therapy, Schools, & Early Intervention, 10(1), 18–26. doi:10.1080/19411243.2016.1257966

Camden C, Silva M. (2021) Pediatric telehealth: Opportunities created by the COVID-19 and suggestions to sustain its use to support families of children with disabilities. Physical & Occupational Therapy in Pediatrics.; 41(1), 1-17. doi: 10.1080/01942638.2020.1825032

Carlson, S. and Schwartz, S. (2019), "Engaging Caregivers in Family-Centered Pediatric Occupation Therapy". Occupational Therapy Capstones. 408. https://commons.und.edu/ot-grad/408

D'Arrigo, R., Ziviani, J, Poulsen, A. A., Copley, J., King, G. (2016). Child and parent engagement in therapy: What is the key?. Australian Occupational Therapy Journal, (), n/a–n/a. doi:10.1111/1440-1630.12279

D'Arrigo, R., Copley, J. A., Poulsen, A. A., Ziviani, J. (2020). Strategies occupational therapists use to engage children and parents in therapy sessions. Australian Occupational Therapy Journal, (), 1440-1630.12670–. doi:10.1111/1440-1630.12670

D'Arrigo R., Copley, J. A., Poulsen A. A. &Ziviani, J. (2020) Parent engagement and disengagement in paediatric settings: an occupational therapy perspective, Disability and Rehabilitation, 42:20, 2882-2893, DOI: 10.1080/09638288.2019.1574913

Diop, E. B., Zhao, S., &Duy, T. V. (2019). An extension of the technology acceptance model for understanding travelers' adoption of variable message signs. PLOS ONE, 14(4), e0216007. doi:10.1371/journal.pone.0216007

Donoso Brown, E. V., Fichter, R. (2017). Home programs for upper extremity recovery post-stroke: a survey of occupational therapy practitioners. Topics in Stroke Rehabilitation, (), 1–6. doi:10.1080/10749357.2017.1366013

Đurišić M, Bunijevac M. Parental involvement as an important factor for successful education. Center for Educational Policy Studies Journal [Internet]. 2017 [cited 2021 Dec 22];7(3):137–53. Available from:https://files.eric.ed.gov/fulltext/EJ1156936.pdf

Fischl C, Malinowsky C, Nilsson I. Measurement of older adults' performance in digital technology-mediated occupations and management of digital technology, British Journal of Occupational Therapy. 2020; 0(0), 1- 12. DOI:https://doi.org/10.1177/0308022620937971.

Gal, E., & Steinberg, O. (2018). Using Home-Program Adherence App in Pediatric Therapy: Case Study of Sensory Processing Disorder. Telemedicine journal and e-health : the

official journal of the American Telemedicine Association, 24(8), 649–654. https://doi.org/10.1089/tmj.2017.0118

Habes, M., Pasha, S. A. (2021). Statistical Package for Social Sciences Acceptance in Quantitative Research: From the Technology Acceptance Model's Perspective. FWU Journal of Social Sciences . Winter2021, Vol. 15 Issue 4, p34-46. 13p.

Inupakutika, D., Kaghyan, S., Akopian, D., Chalela, P., Ramirez, A. G. (2020). Facilitating the development of cross-platform mHealth applications for chronic supportive care and a case study. Journal of Biomedical Informatics, 105(), 103420–. doi:10.1016/j.jbi.2020.103420

Jansons, P., Robins, L., O'Brien, L., & Haines, T. (2017). Gym-based exercise and homebased exercise with telephone support have similar outcomes when used as maintenance programs in adults with chronic health conditions: A randomised trial. Journal of Physiotherapy, 63(3), 154-160. doi:10.1016/j.jphys.2017.05.018

Johansson, L., Hagman, E., & Danielsson, P. (2020). A novel interactive mobile health support system for pediatric obesity treatment: a randomized controlled feasibility trial. BMC pediatrics, 20(1), 447. https://doi.org/10.1186/s12887-020-02338-9

Kelty, N. E., & Wakabayashi, T. (2020). Family Engagement in Schools: Parent, Educator, and Community Perspectives. SAGE Open, 10(4), 215824402097302. doi:10.1177/2158244020973024

Kennedy, J.N., Missiuna, C. A., Pollock, N. A., Sahagian W., Sandra, Dix, L., Campbell, W. N., (2019). Making connections between school and home: Exploring therapists' perceptions of their relationships with families in partnering for change. British Journal of Occupational Therapy, (), 030802261987656–. doi:10.1177/0308022619876560

Lambert, T. E., Harvey, L. A., Avdalis, C., Chen, L. W., Jeyalingam, S., Pratt, C. A., … Lucas, B. R. (2017). An app with remote support achieves better adherence to home exercise programs than paper handouts in people with musculoskeletal conditions: A randomised trial. Journal of Physiotherapy, 63(3), 161-167. doi:10.1016/j.jphys.2017.05.015

Lee, M., Lee, H., Kim, Y., Kim, J., Cho, M., Jang, J., & Jang, H. (2018). Mobile App-Based Health Promotion Programs: A Systematic Review of the Literature. International journal of environmental research and public health, 15(12), 2838. https://doi.org/10.3390/ijerph15122838

Liao, Y. T., Hwang, A. W., Liao, H. F., Granlund, M., & Kang, L. J. (2019). Understanding the Participation in Home, School, and Community Activities Reported by Children with Disabilities and Their Parents: A Pilot Study. International journal of environmental research and public health, 16(12), 2217. https://doi.org/10.3390/ijerph16122217

Lin, C. L., Lin, C. K., & Yu, J. J. (2018). The effectiveness of parent participation in occupational therapy for children with developmental delay. Neuropsychiatric disease and treatment, 14, 623–630. https://doi.org/10.2147/NDT.S158688

Lowman, J. D., Solomon, G. M., Rowe, S. M., & Yuen, H. K. (2020). Gaming Console Home-Based Exercise for Adults with Cystic Fibrosis: Study Protocol. International journal of caring sciences, 13(2), 1530–1540.

Mahmood, A., Blaizy, V., Verma, A., Stephen Sequeira, J., Saha, D., Ramachandran, S., Manikandan, N., Unnikrishnan, B., & Solomon, J. M. (2019). Acceptability and Attitude towards a Mobile-Based Home Exercise Program among Stroke Survivors and Caregivers: A Cross-Sectional Study. International journal of telemedicine and applications, 2019, 5903106. https://doi.org/10.1155/2019/5903106

McLean, S., Holden, M., Potia, T., Gee, M., Mallett, R., Bhanbhro, S., . . . Haywood, K. (2017). Quality and acceptability of measures of exercise adherence in musculoskeletal settings: A systematic review. Rheumatology, 56(3), 426-438. doi:10.1093/rheumatology/kew422

Medina-MirapeixF, Lillo-Navarro C, Montilla-Herrador J, Gacto-Sánchez M, Franco-Sierra MÁ, Escolar-Reina P. Predictors of parents' adherence to home exercise programs for children with developmental disabilities, regarding both exercise frequency and duration: a survey design. Eur J Phys Rehabil Med 2017;53:545-55. DOI: 10.23736/S1973-9087.17.04464-1

Milton, Y. M., Dunford, C., & Newby, K. V. (2019). Occupational therapy home programmes for children with cerebral palsy: A national survey of United Kingdom paediatric occupational therapy practice. British Journal of Occupational Therapy, 82(7), 443–451. https://doi.org/10.1177/0308022619830263

Milton, Y. M., Roe, S. A., & Newby, K. V. (2020). Home programmes based on evidence of best practice for children with unilateral cerebral palsy: Occupational therapists' perceptions. British Journal of Occupational Therapy, 83(7), 447–457. https://doi.org/10.1177/0308022619898073

Nakamura, Wendell M., "Client Adherence with Home Programs after Discharge from a Campus-Based Occupational Therapy Adult Clinic" (2017). School of Occupational Therapy Doctoral Theses. 4. https://soundideas.pugetsound.edu/drot_theses/4

National Resource Center for Family-Centered Practice. (2019). What is family-centered practices? https://clas.uiowa.edu/nrcfcp/what-family

Neuwar, S. C. (2017). "A Study Exploring Parents' and Occupational Therapists Views on Facilitating Social and Emotional Development" (2017). University Honors Program Theses. 281. https://digitalcommons.georgiasouthern.edu/honors-theses/281

Nordström, Thomas; Nilsson, Staffan; Gustafson, Stefan; Svensson, Idor (2018). Assistive technology applications for students with reading difficulties: special education teacher's experiences and perceptions. Disability and Rehabilitation: Assistive Technology, (), 1–11. doi:10.1080/17483107.2018.1499142

Ochsner, B., Spöhrer, M. & Stock, R. Rethinking Assistive Technologies: Users, Environments, Digital Media, and App-Practices of Hearing. Nanoethics 16, 65–79 (2022). https://doi.org/10.1007/s11569-020-00381-5

Ouegnin, & Valdes. (2018). Client preferences and perceptions regarding a written home exercise program or video self-modeling: A cross-sectional study. Journal of Hand Therapy. Article in press. doi:10.1016/j.jht.2018.09.006

Palazzo, C., Klinger, E., Dorner, V., Kadri, A., Thierry, O., Boumenir, Y., Martin, W., Poiraudeau, S., & Ville, I. (2016). Barriers to home-based exercise program adherence with chronic low back pain: Patient expectations regarding new technologies. Annals of physical and rehabilitation medicine, 59(2), 107–113. https://doi.org/10.1016/j.rehab.2016.01.009

Patomella AH, Lovarini M, Lindqvist E, et al. (2018) Technology use to improve everyday occupations in older persons with mild dementia or mild cognitive impairment: A Fischl et al. 11 scoping review. British Journal of Occupational Therapy 81(10): 555–565.

Pereira, I. J., &Seruya, F. M. (2021). Occupational Therapists' Perspectives on Family-Centered Practices in Early Intervention. The Open Journal of Occupational Therapy, 9(3), 1-12. https://doi.org/10.15453/ 2168-6408.1848

Phoenix, M., Jack, S.M., Rosenbaum P.L., Missiuna, C.A. (2020) Grounded theory of parents' attendance, participation and engagement in children's developmental

rehabilitation services: Part 2. The journey to child health and happiness. Disability and Rehabilitation [Internet]. 2020;42(15):2151–60. Available from: http://dx.doi.org/10.1080/09638288.2018.1555618

Picha, K., & Howell, D. (2018). A model to increase rehabilitation adherence to home exercise programmes in patients with varying levels of self-efficacy. Musculoskeletal Care, 16(1), 233-237. doi:10.1002/msc.1194

Picha, K.J. (2018). The assessment and utilization of patient's self-efficacy for exercise during rehabilitation (Doctoral dissertation, University of Kentucky, Kentucky, United States). Retrieved from https://uknowledge.uky.edu/rehabsci_etds/50. doi: https://doi.org/10.13023/etd.2018.257

Picha, K., Jochimsen, K., Heebner, N., Abt, J., Usher, E., Capilouto, G., &Uhl, T. (2018). Measurements of self-efficacy in musculoskeletal rehabilitation: A systematic review. Musculoskeletal Care, 16(4), 471-488. doi:10.1002/msc.1362

Radomski, M. V., Anheluk, M., Arulanantham, C., Finkelstein, M., & Flinn, N. (2018). Implementing evidence-based practice: A context analysis to examine use of task-based approaches to upper-limb rehabilitation. British Journal of Occupational Therapy

Rico-Mena, P., Palacios-Ceña, D., Martino-Alba, R., Chocarro-Gonzalez, L., &Güeita-Rodríguez, J. (2019). The impact of home-based physical rehabilitation program on parents' experience with children in palliative care: a qualitative study. European journal of physical and rehabilitation medicine, 55(4), 494–504. https://doi.org/10.23736/S1973-9087.19.05474-1

Riveland, N., Pettit, C. (2020). The Home Program Adherence Tackle Box: A Fishing-Themed Toolkit for Rehabilitation Clinicians, https://commons.und.edu/cgi/viewcontent.cgi?article=1487&context=ot-grad

Rowland, S.P., Fitzgerald, J.E., Holme, T. (2020) What is the clinical value of mHealth for patients?.npj Digit. Med. 3, 4 (2020). https://doi.org/10.1038/s41746-019-0206-x

Ryd C, Malinowsky C, Ohman A, et al. (2018) Older adults' experiences of daily life occupations as everyday technology changes. British Journal of Occupational Therapy 81(10): 601–608.

Senjam, S. S., Manna, S., &Bascaran, C. (2021). Smartphones-Based Assistive Technology: Accessibility Features and Apps for People with Visual Impairment, and its Usage, Challenges, and Usability Testing. Clinical optometry, 13, 311–322. https://doi.org/10.2147/OPTO.S336361

Sandhu, H., Wilson, K., Reed, N., &Mihailidis, A. (2019). A Mobile Phone App for the Self-Management of Pediatric Concussion: Development and Usability Testing. JMIR human factors, 6(2), e12135. https://doi.org/10.2196/12135

Smith RO (2017) Technology and occupation: Past, present, and the next 100 years of theory and practice (2017 Eleanor Clarke Slagle Lecture). American Journal of Occupational Therapy 71(6): 7106150010p1–7106150010p14.

Smidt, K. B., Klevberg, G. L., &Oftedal, B. F. (2020). Home Programme to Improve Hand Function for Children with Bilateral Cerebral Palsy: Beneficial but Challenging. Physical & occupational therapy in pediatrics, 40(4), 410–422. https://doi.org/10.1080/01942638.2020.1711842

Spanakis, E. G., Santana, S., Tsiknakis, M., Marias, K., Sakkalis, V., Teixeira, A., Janssen, J. H., de Jong, H., &Tziraki, C. (2016). Technology-Based Innovations to Foster Personalized Healthy Lifestyles and Well-Being: A Targeted Review. Journal of medical Internet research, 18(6), e128. https://doi.org/10.2196/jmir.4863

Swan J, Hitch D, Pattison R, et al. (2018) Meaningful occupation with iPads: Experiences of residents and staff in an older person's mental health setting. British Journal of Occupational Therapy 81(11): 649–656.

Tal-Atzili, O. &Salls, J. (2017). Qigong Sensory Training pilot study: A tactile home program for children with or at-risk for autism. Journal of Occupational Therapy, Schools, & Early Intervention, (), 1–23. doi:10.1080/19411243.2017.1325819

Vasselli, J.R., Juray, S., Trasino, S.E. (2021). Success and failures of telehealth during COVID-19 should inform digital applications to combat obesity. https://doi.org/10.1002/osp4.551

Waldman-Levi, A., Hirsch, I., Gutwillig, G., &Parush, S. (2017). Psychometric properties of the Parents as Partners in Intervention (PAPI) Questionnaires. American Journal of Occupational Therapy, 71(2), 1-8.

Wainer, A. L., Hepburn, S., & McMahon Griffith, E. (2017). Remembering parents in parent-mediated early intervention: An approach to examining impact on parents and families. Autism : the international journal of research and practice, 21(1), 5–17. https://doi.org/10.1177/1362361315622411

Wilansky, P., Eklund, J. M., Milner, T., Kreindler, D., Cheung, A., Kovacs, T., Shooshtari, S., Astell, A., Ohinmaa, A., Henderson, J., Strauss, J., & Mills, R. S. (2016). Cognitive Behavior Therapy for Anxious and Depressed Youth: Improving Homework Adherence Through Mobile Technology. JMIR research protocols, 5(4), e209. https://doi.org/10.2196/resprot.5841

Weinstein, R. S., Krupinski, E. A., Doarn, C. R. (2018). Clinical Examination Component of Telemedicine, Telehealth, mHealth, and Connected Health Medical Practices. Medical Clinics of North America, 102(3), 533–544. doi:10.1016/j.mcna.2018.01.002