FLIK: DESIGN TOOL ON ADAPTATION PROCESS FOR NON-DESIGNERS IN A REHABILITATION SETTING

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ABSTRACT

Adaptation is a key practice in rehabilitation that assists the client's recovery following a disease or injury. Lack of design skills and problem solutions has turned the process into a fuzzy front, especially for entry level therapists. Furthermore, the low adaptation tool rate usage has listed several contributing factors, which includes non-compliance, uncomfortable designs, low aesthetic values, scant personal acceptance, inadequate instructions, and training. However, the design thinking concept has seen an increase with the adoption of interdisciplinary studies in recent years. From the aspect of innovation, the concept seems difficult to implement without close supervision from design experts. That said, a proper design process shall be introduced to therapists for better adaptive tools in the future. The purpose of this study is to assist in the adaptation process for occupational therapy as a self-assisting tool through the design process. This method is a convergence of OT and design practice into a design-health system, which resulted in the development of FLIK (Function-led Innovation Kit), that supports non-designers (therapists) while performing adaptation activities, albeit not possessing formal design knowledge. Overall, this study investigates the opportunity of an interdisciplinary collaboration between design and health sectors; as well as to enhance work practices which is imperative for more effective services and recoveries in future.

Keywords: *adaptation process, client-centered, design strategy, occupational therapy, research tool*

1. INTRODUCTION

1.1 Occupational Therapy practice

Occupational therapy (OT) can be elaborated as the therapeutic use of daily activities (occupations) by individuals or groups to better or enable involvement in their designations, habits, and routines; while being at home, school, workplace, community, and various settings (American Occupational Therapy Association, 2014). Participation outcome became the primary focus for health care and social care professionals, where it requires suitable adaptations or improvisations of the recovery process's objects or environments. To achieve this, OT is employing Occupation-focused models that were integrated with practical knowledge, process knowledge, and procedural knowledge, with the adaptation of impressions, interpretations and experiences during the development of practice knowledge (Ashby, 2015).

This collection of knowledge navigates them through the adaptation process (intervention planning) and provides the practice's theoretical groundwork by supplying baseline and outcome counteractions that tracks advancement and/or fluctuation among clients (Asaba et al., 2017). Models were mostly built referring to the Western context, like the Canadian Model of Occupational Performance and Engagement (CMOP-E), Model of Human Occupation (MOHO), Human Activity Assistive Technology (HAAT), and Patient-Environment-Occupation

model (PEO); while the Kawa model is the sole representative for the Asian context, with many more yet to state. Each of these models operate differently but are catering towards a client-centred approach, as demonstrated by MOHO and PEO who prioritizes their client's needs through the matching of activities or occupations according to their ability when using the adaptive tool. The main theme of these models is the relationship between individuals, the environment, and the client. HAAT model provided additional core in the relationship context, namely the physical, social, cultural, and environment elements (Giesbrecht, 2013).

That said, the main challenge faced by students while learning the practice model is its translation into their practice education (Ashby, 2015)(Asaba et al., 2017). Regardless, Ashby had summarized that curriculum design affects practitioner's practice and due consideration should be accorded on the effects of student values and attitudes towards those models. To provide a better practice OT, alternative approaches had s been devised to improve OT curriculum, such as designating longer fieldwork duration from three months to a year of placement (Ot & Phil, 2009). Others applied strategic approaches to OT services to establish a range of learning and practice methods that incorporated distinct adult learning ways, necessities, and experiences (Folland & Forsyth, 2011). Overall, service enhancement is being performed but the same cannot be said for the adaptation practice.

The adaptation process resulted in adaptive equipment that includes walking aids, wheelchairs, self-care aids and developmental aids. Thus, the adaptation practice improvement requires adaptation process comprehension, whose characteristics mimic the design process of certain product's production.

1.2 Creativity in Occupational Therapy's practice

For OT to maintain its historical foundation, it must creatively enhance better client serving capacity apart from elevating the profession's credibility to the public. OT is illustrated as a creative profession, both as a practice and its employment of interesting activities for the benefit of its clients. As noted by the American Occupational Therapy Association (AOTA), the OT profession is transforming to be more science backed and evidence oriented with the advancement of time (AOTA, 2008). This in turn changes creativity to be more evidence oriented, sidestepping creative craft use although not entirely rendering them ineffective.

Blanche (2007) studied creativity in occupation and discovered that intrinsically it was added to enjoy the process of creating something, as opposed to creating the final product. Two types of creative processes were presented in the study, namely process-based creativity, and product- or outcome-based creativity. The process needed to be performed to obtain the desired outcome in outcome-based creativity is known, but it is the opposite for process based creativity, since the process idea and outcome goal might be present but the method remains obscure for the lack of its execution experience (Blanche, 2007).

For over thirty five years, therapists had reported the significance of creativity to the profession, in contrast to early practitioners of the same field (Ernst & Moore, 2017)discover how they defined creativity, and determine their views on its importance to the field. A survey was sent to a random sample of 250 therapist members of the American Occupational Therapy Association. Seventy surveys were returned (28%. It comes as no surprise since creativity is emphasized more in activities compared to the adaptation process in occupational therapy. Interventions and treatments of different areas frequently employed creative activities like arts and crafts, but as for its practice, the definition of creative activity remains ambiguous (Müllersdorf, 2012).

1.3 Creativity and the use of design in intervention and adaptation for Occupational Therapy

Schmid (2005) authored a book entitled 'Promoting Health through Creativity', where she insisted the importance of creativity as a beneficial resource in occupational therapy. Schmid proposed several insights that could help its implementation in the service:

i. Policymakers and politicians should consider the promotion of creative activity integration into public health as a long-term strategy.
ii. A change in the belief and perception towards creativity; that it is capable to better daily lives and anyone could participate in solving the challenge.
iii. Establishing partnerships with multidisciplinary experts of diverse backgrounds, ranging from health, art, and education for creativity research and learning centres; for the purpose of substantiating and validating novel directions.
iv. Building research and study centres in universities that offers academic courses with wide-ranging opportunities like creativity for health professionals, creativity in therapy, creativity in leadership and such.

She further added that resources and strategies have the potential to be optimized, provided the government adopts and supports the educative motion, which will then lead to the general recognition and acceptance of creativity value and consequently catalyse an exciting development in health improvement (Schmid, 2005).

Earlier approach in the combined worlds of design and disability was brought forth through Universal Design; where entire designs were accessible to all, including the disabled, and was inspired by the design community, especially from architecture back in 1991. Most of the issues were related to accessibility and mobility around the hospital, in addition to home renovation for the disabled (Souza et al., 2016). The efforts flourished through the establishment of specific courses at the School of Design, Edinburgh College of Art; and was a drive to create awareness towards the needs of the disabled (Gieben-gamal & Matos, 2017). Professional therapy education considered the principles of interaction in universal design to enhance the education material and its environment for students from all categories (Rickerson & Deitz, 2003). The Universal Design of instruction was touted to be compatible with occupational therapy approach towards patient-centred service and communication, as evident in its seven principles; i) equitable use, ii) use flexibility, iii) simple and intuitive use, iv) tangible information, v) error tolerance, vi) minimal physical exertion, and viii) size and space for approach and usage. That said, its application in occupational therapy warrants specific approach for the curricula.

Forging ahead, rehabilitation exposed itself to design features since assistive technology (technology for adaptive tool) is related to the human computer interaction (HCI). There have been attempts to implement rapid prototyping technologies to support Do-It-Yourself (DIY) assistive technology between voluntary 3D designers and clinicians (Hook et al., 2014)(Hofmann et al., 2016)(Meissner et al., 2017). Although clinicians expressed uncertainties regarding the matter, expertise from both parties are guaranteed support for future collaborations. There were also limitations in the form of caretaker availability, skills, and aesthetic appearance of the DIY assistive technology (since most of the assembly instructions were provided through online videos and was greatly leaning towards the participants' individual motifs compared to the technology itself). Although the value of teaching and learning the benefits of creativity is exposed to the public, the creative thinking and process remains unexplained (Schmid, 2005).

2. METHODOLOGY

2.1 Design thinking for Occupational Therapy (Theoretical framework)

In recent years, the design thinking (DT) concept has spread into the interdisciplinary innovation's environment of multiple sectors. As it grew, the concept's knowledge is delivered through a course called design workshop, a short course provided with the assistance of experienced design facilitators, either physically or virtually (online courses) who used s design templates as a tool. The goal of design thinking approach generally ranges from the creation of new environment/practice/vision to the way of organisation practice management for enhanced outcome. Moreover, the design thinking core comprises of general design process elements, which are define, ideate, prototype, test, and analyse. However, it has been subjected to numerous interpretations, often depending on the attributes of the implementing field or sector.

The researchers incorporated design research-based tools into Occupational therapy practice using the Double Diamond Diagram (Design Council, 2004), with support from Experience-led Innovation framework (Fenn and Hobbs, 2017) for this study. Hence, this study tries d to achieve the goal of creating a self-checking tool that assists therapists to implement design thinking within the nature of Occupational Therapy practice. As stated by Kimbell (2014) in her study, design-in-practice is recommended as a guide to non-designers whose taking on roles in design practice that solely involves the natural re-representation of design while designing using tools; the real tools which designers produce and utilize synergistically during facilitation.

This is an initial attempt to use such design research tools; several factors influencing its use in this study are:

i. Therapists have a tight work schedule, thus rendering them incapable to attend continuous design workshop physically for days; an effective solution has to be implemented to deliver design influence through limited amount of interventions and face-to-face meetings (Hammel & Mosely, 2017).

ii. Previous experience of design workshops with hired design consultants was shown to be beneficial on fast returns but less so at knowledge maintenance and capability loss (Nusem et al., 2017).

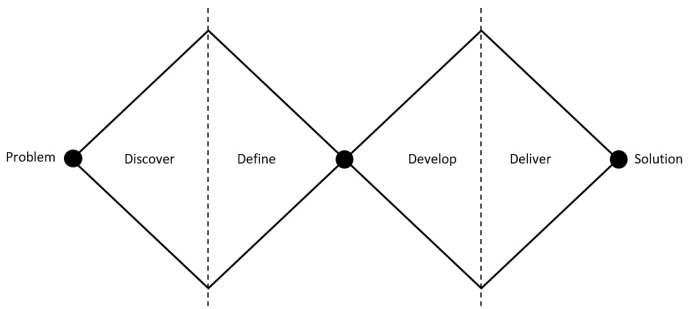

Figure 1 : *Double Diamond Diagram by Design Council (2004)*

There are four main steps emphasized in the Double Diamond Diagram (Design Council, 2004):

i. Discover – The first diamond helps people to better comprehend, rather than making assumptions, about the problems at hand. It consists of talking and spending time with people directly afflicted by the issues.

ii. Define – The information curated during the discovery phase can assist your definition of the challenge in a different light.

iii. Develop – The second diamond prompts people to provide alternative answers to the clearly defined problem, based on inspiration from other sources in addition to engaging in co-designing with different types of people.

iv. Deliver – Different solutions are tested on a small-scale during the Delivery step, where defected ones will be eliminated and the ones with potential are improved.

These steps are sequenced by phases, from discover to deliver, but the processes can always be circulated back to the front as an idea is never completed until it fulfils the purpose. The processes may be iterated to avoid risk and high cost in building the complete model.

In the adaptation process, the act of modifying or imitating an existing product in the market and transforming them into adaptive tool/assistive tool to match the patient's impairment and their ability to interact during occupation is as opposed to creating a new product is an inevitable requirement. This adaptation process requires experience to guide the creation of desired adaptive tool. Experience can be sourced from the therapist or provider's experience, the client's, and product's experience. However, therapist experience was found to be quite challenging when it attempted to integrate with client-centred and occupational therapy specific assessments in practice (Asaba et al., 2017). Therapists had the tendency to select assessments largely due to its access, rather than the pressing need of clients who are prone to decline habitual practice change, which might risk poor outcome. In his (Asaba, 2017) study to investigate the utilization of occupational therapy specific evaluations, several issues were highlighted; (1) its use or the risk losing it, (2) availability only after hours, (3) colleagues being the biggest challenge, and (4) specifically: communication. Therefore, it is important for therapists to be open towards social network for the latest methods and do not held onto what they believed to be the best practice for them all this time.

In a bid to facilitate therapists with the appropriate experience of adaptive design or creation, Experience-led relationships model by Fenn and Hobbs (2017) was adapted with occupation and design needs to fully realize the client-centred purposes.

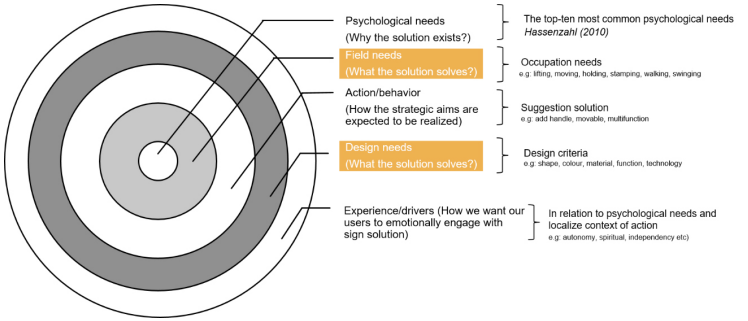

Figure 2 : *Adapted Experience-led Relationship model*

2.2 Converging design thinking with OT practice

A comparison of attributes from both practices was made through their similarities and differences in practice. The adaptation attributes were identified from a qualitative study that employed semi-structured interviews with six professionals, three occupational therapists, and three designers who participated in the rehabilitation creations. Consequently, three adaptation process attributes were demarcated into three themes, namely i) fundamental characteristics, ii) technical characteristics and, iii) management characteristics (Yusof et al., 2019).

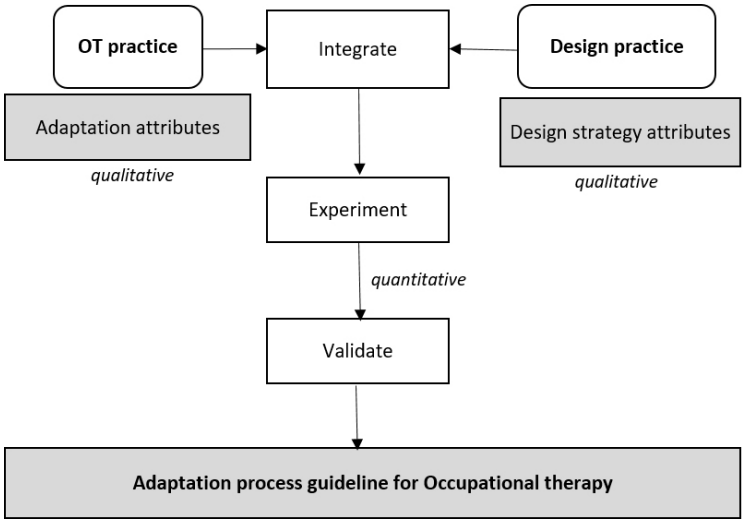

Figure 3 : *Research framework developed by the researcher*

Both attributes were adapted in the aspects of similarities and differences to find the balance in both practices; so that therapists will not feel alienated by the jargon of the new exercise when implementing design strategy and can still relate to OT practice. Adaptation attributes were represented by the themes from qualitative study, while design attributes were supported by the elements of the Double Diamond Diagram by Design Council (2004).

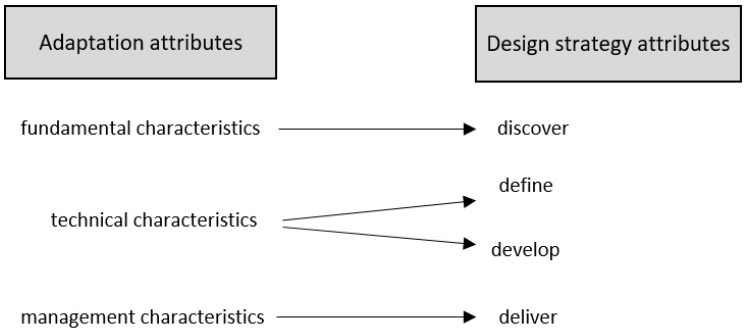

Figure 4 : *Integration of attributes prepared by the researcher*

3. ANALYSIS

When designing individual-level interventions, there are four tasks that needs to be completed: barrier identification, intervention component selection, theory application, and end-user engagement (Colquhoun et al., 2017). In this study, barrier is described by the different adaptation process approach occurring between therapists and designers. Therapists operate s through occupation-focus model, while designers do so via the design process. Hence, the adaptation process became the main intervention component in this study. The attributes of both practices were compared, and task suitability was determined in the adaptation system by referring to the design process stages.

i. For a therapist, early steps of adaptation process included fundamental characteristics. It represents the therapist's adaptation knowledge comprehension. Every therapist must understand the purpose of adaptation and recognize the skills they must master to complete the task. These attributes integrated well with the first stage of design process that is to discover, which requires the designer's understanding on issues and purpose s of every product designed.

ii. Technical characteristics stands as the second attribute of adaptation process and involves a certain concept of approach towards clients. This attribute illustrates the concept of 'client-centred', where it prioritizes the client's need as the main goal. It also describes the method of data development by the therapist, who used research and copy techniques (adapted from existing products in the market), engaging with inter-professional expertise, and self-experience reflection during the adaptation process. This attribute contributed to the second and third stage of the design process, which is being defined and developed. Similar concept is being used, but additional design skills is highly desired to strengthen the existing skills, such as mock-up and prototyping, selection of material, technology application (if needed), and testing evaluations. Training and instructions are also highlighted in the same stage; to prepare the therapist with proper information for the client.

iii. On the other hand, management characteristics as the third attribute involves the ability of providers (therapists and hospital management) to deal with the acceptance and feedback of clients. It also simultaneously involves hospital policy and facilities, which are provided towards the fulfilment of satisfactory services for clients. This attribute is related to the fourth stage of design process, which is Deliver. At this stage, the implementation and evaluation of product is performed. The feedbacks from clients help to improve future improvisation and better policy formulation.

Table 1: Table of analysis on adaptation that attributes implementat

Design process attributes	**Adaptation process attributes**	**Integration system (FLIK)**
Stage 1: Discover The first diamond helps people to better comprehend, rather than making assumptions, about the problems at hand. It consists of talking and spending time with people directly afflicted by the issues.	**Fundamental characteristics** • Adaptation knowledge • Adaptation purpose • Adaptation skills	**Stage 1: Discover** Discover requires the comprehension of client's personal traits and this helps the therapist to gain further understanding of their background, environment and lifestyle, to better complete their needs. Basic required details of clients are as follows: i. Profile ii. Personality iii. Routine

Design process attributes	Adaptation process attributes	Integration system (FLIK)
Stage 2: Define The information curated during the discovery phase can assist your definition of the challenge in a different light.	**Technical characteristics** • Client-centered design • Research and copy • Inter professionals • Self-experience • Innovative skills	**Stage 2: Define** Define necesitates the user-centered approach to identify specific solution for the client. It is a framework of processes where usability objectives, characteristics of the user, environment, tasks and workflow of a product, service or process were awarded with detailed focus at every design process stage. Basic details of the client's case needs were recorded to meet the requirements in the next stage.
Stage 3: Develop and test The second diamond prompts people to provide alternative answers to the clearly defined problem, based on inspiration from other sources in addition to engaging in co-designing with different types of people.	• Design features • Mock-up and prototyping • Material • Technology application • Testing evaluation • Training and instructions	**Stage 3: Develop and test** Develop and test stage requires the most stage time. Design ideas are generated through research and copy and is enhanced by the collective experience of the therapists, patients and caretakers. Basic ideation details of the existing product that needs to be recorded are: i. Existing product ii. Technology iii. Material iv. Construction v. Suggested testing
Stage 4: Deliver Different solutions are tested on a small-scale during the Delivery step, where defected ones will be eliminated and the ones with potential are improved.	**Management characteristics** i. Patient acceptance ii. Patient feedback iii. Hospital policy iv. Facilities provided	**Stage 4: Deliver** This stage requires the implementation and evaluation activities towards intended design solution, which involves: phasing, final testing and evaluation. Feedbacks are gathered for improvements in the future.

4. RESULT

This study resulted in the development of a self-administered system for adaptation design activities in occupational therapy. It is called Function-led Innovation Kit (FLIK) and objectively provides a relevant experience to aid therapists in exploring the adaptation of design process like a designer. This is a solution proposed by the researcher to assist expert-user (therapists) with non-design background who are capable in performing adaptation activities or innovation, albeit not possessing formal design knowledge. Its content reflects the design stages (empathy, define, develop, and test, deliver) that was adopted from the design thinking process, and was enhanced with adapted Experience-led relationships model by Fenn and Hobbs (2017). This was done in order to guide the therapists with basic design process by incorporating their working or life 'experience' into the adaptation design process for rehabilitation.

Since therapists have tight schedules, they need a self-ministered system that assists them in the process while simultaneously performing their daily duties (adaptation activities to patient). As suggested in a study by Wrigley (2017), visual tools are the most valuable to an organisation when they extend beyond their perceived purposes. Thus, with the goal of being a future design catalyst, the researcher created an effective way to fulfil the influence of design through a limited amount of interventions and face-to-face time with the FLIK system (Hammel & Mosely, 2017). This is to educate therapists about the role of design catalyst. FLIK will benefit therapists in numerous ways, such as:

i. FLIK will guide the adaptation design process starting from the client's problems and needs to design solutions through the process of design thinking and experience-led innovation elements; that may counteract the fuzzy front of solving problems for client's recovery process by the client himself/herself in the beginning of the design stages.

ii. FLIK can reduce the frequency of consultation sessions between OTs/ rehabilitation practitioners and clients, as the kit works by stages and are equipped with the client's profile and routine information.

iii. OTs/rehabilitation practitioners can develop design skills that are required within the recommended design solution and reduce the outsourcing cost of making the adaptive tool in the future.

5. CONCLUSION

Overall, this system will enhance the capability of OTs/rehabilitation practitioners and even medical/rehabilitation designers in the adaptation design process. Additionally, more effective adaptive tools and design solutions can be made to match the patients/client's needs and problems during the recovery process. It also works as a self-checking application that doubles as a working tool by therapists, hence expediting the design adaptation process in the future. This study also uncovered the state of minimal collaboration and understanding between the design and rehabilitation industries in Malaysia. Thus, suggestions to organize more initiative works towards enhancing professionalism through other design practices would be an instrumental added value to the nation's occupational therapy and rehabilitation practice.

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