



Report on Cognishine User Experience in a Pediatric Rehabilitation Setting

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Cognishine Platform

Cognishine (<https://cognishine.com/en-us/>) is a software platform consisting of a set of proprietary therapeutic tools that use a rich collection of high quality, real-life multimedia resources (e.g. games, puzzles, stories, etc.) to provide an advanced solution for cognitive and metacognitive training for children. It provides clinical and educational teams with a toolbox of ready-to-use activities that target individual's areas of interest and are appropriate for both remote and in-person therapeutic sessions. The activities are dynamic and personalized to the individual's current abilities and real-time progress. It currently contains over 2000 activities in four main domains: Cognition, Communication, Speech and Social-Emotional.

Objectives of usability study

To evaluate the feasibility and effectiveness of the Cognishine platform for intervention to improve cognitive impairments such as memory, visual scanning and sequencing in children who have moderate cognitive impairment. This will be accomplished by:

1. documenting the user experience (UX) of the Cognishine platform focusing on therapist's perception that it provides effective therapy in a way that facilitates the children's motivation and satisfaction with the therapeutic.
2. comparing pre- and post-intervention responses to clinical outcome measures that assess decrease in cognitive impairment via a single subject design protocol.

Participants

Ten children with moderate cognitive impairment, aged 8-18 years, were recruited from children treated in the rehabilitation department, school and outpatient clinics at ALYN Hospital who have an Acquired Brain Injury or neurodevelopmental condition such as cerebral palsy. They met with the following inclusion criteria: (1) time since injury/event is between 30 days and 1 year after the injury/event or chronic conditions such as cerebral palsy; (2) they are able to maintain stable and dynamic positioning of the head or use a head rest; (3) they are able to understand basic instructions; they have sufficient visual acuity and visual field to identify images (photographs and figures) on a screen. Potential participants will be excluded from the study if they have psychological, neurological or cognitive disorders which could impede participation, such as a history of epileptic seizures; significant motor impairment that would limit their ability to use a pointing device or keyboard to

interact with the Cognishine activities. The characteristics of the participating children are shown in Table 1. All interacted with the Cognishine tasks via a tablet or computer touch screen.

Number	Sex	Age (years)	Language	Educational Setting	Diagnosis
1	M	11	H	MainStrm	CP
2	F	12	H	SpecCls	CP
3	F	8	H	MainStrm	ABI
4	M	12	H	SpecCls	ABI
5	M	11	H	SpecEd	CP
6	F	16	A	MainStrm	ABI
7	M	9	H	MainStrm	ABI
8	M	9	H	MainStrm	Oncol
9	M	10	A	SpecEd	ABI
10	M	13	A	SpecEd	ABI

Table 1. Characteristics of the participating children. F=female, M=male, H=Hebrew, A=Arabic, MainStrm= main stream, SpecCls=special class within a mainstream setting, SpecEd=special education, CP=cerebral palsy, ABI=acquired brain injury.

As shown in Table 2, 10 therapists who work in pediatric cognitive rehabilitation will participate in a focus group in order to document their experience in using this platform with patients. They had a minimum of two years' experience in this clinical field.

Profession	Age Group (years)	Seniority (years)
OT	51-60	11-20
OT	30-40	1-5
OT	30-40	1-5
OT	41-50	11-20
OT	30-40	1-5
OT	41-50	21-30
ST	41-50	11-20
ST	30-40	6-10
OT	41-50	11-20
ST	30-40	1-5

Table 2. Professional background, age group and seniority of therapists participating in the Cognishine usability study.

Tools

1. **Demographic questionnaire** was used to compile patient data from parents and hospital clinical records. Age, sex, amount of previous VR experience, date of injury/event and confirmation that the participant does not have a history of epilepsy/seizures.

2. **Usability tests** The children completed the Short Feedback Questionnaire (SFQ), a 6 item 5-point scale to document their responses to Cognishine including enjoyment, effort and suitability. Therapists responded to the System Usability Scale is a 10 item 5-point Likert scale to assess the usability of a technology- based system (Brooke, 1995).

Procedures

Ten children participated in two 30-minute sessions in which they performed a range of Cognishine tasks related to their age and therapeutic objectives. The sessions were provided by two different therapists for a total of 10 different therapists; each therapist treated two children, and each child was treated by two therapists

Results of Usability Study

As shown in Figure 1, the therapist SUS scores for all 10 usability items were positive with a total mean score 87.0/100 for the first session (blue) and 86.4 for the second session (red). These scores are consistent with other positive virtual gaming experiences and are indicative of excellent usability.

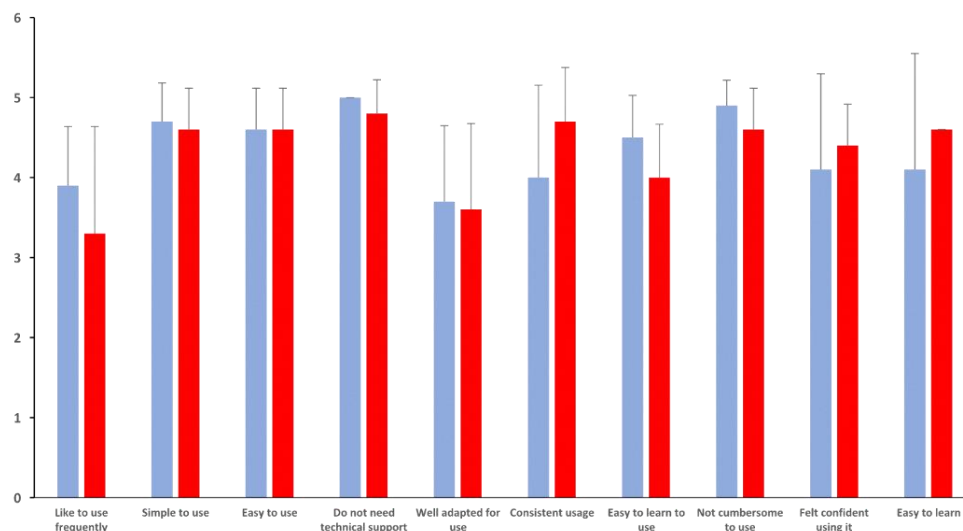


Figure 1. Therapist SUS scores for all 10 usability items for the first (blue) and second (red) sessions.

Moreover, as shown in Figure 2, the children’s four SFQ scores during the first (blue) and second (red) sessions showed very good enjoyment, wanting to “play” again and feeling comfortable interacting with the tasks ease of use. They also reported that the tasks were challenging. These scores are consistent with other positive virtual gaming experiences and are indicative of excellent usability.

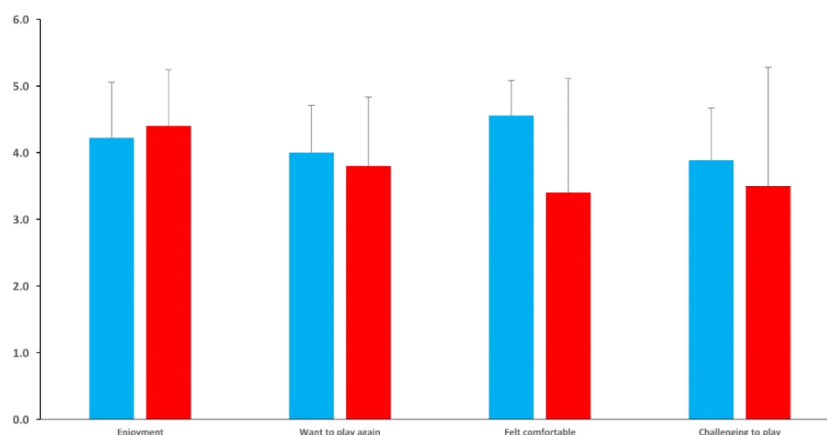


Figure 2. Children's four SFQ scores during the first (blue) and second (red) sessions

Intervention Study (ongoing)

The objective of the intervention study was to assess improvement in cognitive components of the participating children using a single-subject design protocol. The participants are 10 children with moderate cognitive impairment and the same inclusion and exclusion criteria as indicated above.

Procedures

Each child receives six weeks of treatment via the Cognishine platform that is relevant to the specific therapeutic objectives. There are three treatment sessions per week with each session's duration = 30 min. Outpatient children receive up to two sessions remotely via Zoom. Outcome measures are recorded before the intervention commences. Outcome measures are recorded immediately after treatment is completed) and at follow-up, one month after treatment.

Results

To date, 6 out of 10 children have completed the intervention. Based on the Cognitive and Linguistic Scale (CALS) outcome measure, all participating children showed improvement in key cognitive components. The SUS as rated by the therapist is high and the children reported very good satisfaction and interest in continuing to use the program.

Summary & Key Findings

- Therapists found Cognishine easy to use, felt confident using it, and were eager to use it frequently.
- Children enjoyed the program and wanted to play it again.
- Cognishine presents a promising tool for both Occupational Therapy and Speech and Language Therapy.