The Women's Board of The Johns Hopkins Hospital
Billings Administration Building, Room 221
600 North Wolfe Street · Baltimore, MD 21287-0221
Phone: (410) 955-9341 · Fax: (410) 614-9856 · Email: jhhwb@jhmi.edu

GRANT APPLICATION FOR FISCAL YEAR 2024

DIRECTIONS: Please complete the entire form. If appropriate, indicate "Not Applicable" and justify. The original application plus an electronic version is due in The Women's Board office on or before 4:00 pm on Friday, January 6, 2023. Only one (1) application from each department will be accepted. Late or incomplete applications will not be considered.

****

DATE: 12/23/2022
CLINICAL DEPARTMENT: Physical Medicine and Rehabilitation

CONTACT PERSON: Sarah Hodgson,
Annette Lavezza
Phone: 443-287-5543

Email: swill211@jh.edu, alavezz1@jhmi.edu

TITLE OF REQUEST: Touch Accessible Platform Interactive Technology (TapIT) to promote pediatric rehabilitation

PHYSICAL LOCATION OF PROJECT: Bloomberg M2350 - Pediatric Rehabilitation Clinic

ABSTRACT (Non-technical overview - 150 words or less):
The pediatric rehabilitation team continues to grow significantly, with an increasingly higher proportion of complex patients with prolonged hospitalization requiring high intensity rehabilitation. Patients receiving rehabilitation daily for several weeks pose a challenge to therapists. Use of novel activities is needed to keep pediatric patients engaged and motivated during sessions. Pediatric patients are drawn to technology for leisure, with many children identifying it as a preferred activity. Use of technology during therapies not only supports engagement, but also prepares children for discharge to community settings in which they need to engage with technology daily for leisure and education. The TapIt is a large, adjustable screen that connects to a laptop to make any computer program touch accessible. The screen can be adjusted in height and angle to accommodate both seated and standing activities. Providing excellent pediatric rehabilitation requires state of the art technology to effectively engage children in therapies.

SIGNATURE OF CLINICAL DEPARTMENT CHAIRPERSON:

(Please type) Chairperson Name: Pablo A. Celnik, M.D.

Chairperson Title: Lawrence Cardinal Shehan Professor of Rehabilitation Director, Dept. of Physical Medicine and Rehabilitation, Johns Hopkins University School of Medicine Physiatrist-in-Chief, The Johns Hopkins Hospital Director of Rehabilitation for Johns Hopkins Medicine

Chairperson Email: pcelnik@jhmi.edu

NOTE: Questions 1-6 must be answered. Please be thorough and concise.

1. Impact on patient care:
The TapIt that is being requested will provide a new tool for physical therapists, occupational therapists, and speech language pathologists to use with children in sessions to help them achieve meaningful progress towards their goals. The

TapIt is a 42 inch touch screen device that connects to a laptop computer to make any computer activity touch accessible. The interface can be height adjusted from 7.5 to 56 inches from the floor and its screen angle can be adjusted from 0 to 90 degrees (fully vertical to fully horizontal). This allows accessibility for children with a wide variety of ages and functional abilities. It is durable and shatter resistant, and has four locking wheels for additional stability. This allows safety for children to bear weight through the device itself for added stability. It is also able to distinguish between weight bearing on one area of the screen and touching to interact on another part of the screen. It allows multi-touch as well for up to 80 different simultaneous touch points. For images and additional description and details of the TapIt, please visit the following link: https://thebrainary.com/product/tapit-touch-accessible-platform-interactive-technology/

The TapIt is extremely versatile, and can be used to address goals related to sitting balance, standing balance, coordination, activity tolerance, endurance, cognition, and fine motor coordination. Because it can be used for an unlimited number of activities done through the computer, it can be easily tailored to many different functional levels. Additionally, it incorporates technology, which is particularly engaging for pediatric populations during therapy sessions. Technology is relevant to integrate into therapies as it prepares many children for demands they face at school and in leisure participation at home. Adding a new tool that is extremely versatile with broad applicability in pediatric rehabilitation services will provide an effective way to engage children in challenging sessions to help them reach their functional goals.

Motivation is an important factor in successful rehabilitation; however, motivation to participate in therapies can vary significantly in pediatric populations. Focus groups with children have shown that children express interest in using technology during rehabilitation for hemiplegia to improve motivation and interest in repetitive practice activities (Lam et al., 2015). Use of gaming technology has shown potential in improving children's motivation to participate in rehabilitation (Lohse et al., 2013). Use of gaming has been shown to promote cognitive and motor skill acquisition (Lohse et al., 2013), balance, independence with activities of daily living (Tarakci et al., 2016), hand function, grip strength (Kamel & Basha, 2021), and orosensory desensitization (Budhan et al., 2019) in pediatric populations. It has also been shown that using video games can promote massed repetition through effective engagement to increase the dose of motor learning occurring during a therapy session (Lohse et al., 2013). This is especially helpful in promoting neuroreeducation needed for children with stroke, traumatic brain injury, or cerebral palsy, for example. The literature also supports the use of video games during rehabilitation with many diagnostic populations, including children with traumatic brain injuries (Wade et al., 2018), burns (Kamel & Basha, 2021), and cerebral palsy (Tarakci et al., 2016), among others.

The TapIt provides several benefits distinct from other gaming technologies currently available in the JHCC. First, it provides a large, touchscreen interface that can accommodate complex reaching tasks. Additionally, it offers adjustability in height and angle to allow accessibility for patients with a wide range of motor limitations. Furthermore, it provides a stable surface on which patients can bear weight while also engaging with the technology; this makes it ideal for practice of sitting and standing balance for additional stability. Finally, maintaining novelty with the TapIt can easily be done as it can access any activity available on the internet; this novelty will help to sustain patient engagement and motivation.

The requested Ginger Tiger software program will provide activities related to basic skills (e.g. object/color identification, sorting, visual memory), timing (e.g. attention, impulsivity moderation), math, speech and language (e.g. following commands, auditory memory concepts, definitions), and language arts (e.g. letter and word recognition, phonological awareness). These can be used to engage children of many ages and ability levels in games and activities that will help them reach functional goals. It will also reinforce concepts directly relevant to participation in school and community settings in preparation for discharge.

2. Number and type of patient who will benefit annually from this award:

The TapIt will be useful with a large variety of pediatric patients, both in the inpatient acute and outpatient settings. It is anticipated that pediatric patients as young as two to three years through adolescence and into young adulthood could use this technology. It can be used to work on sitting balance, standing balance, endurance, functional reaching, fine motor coordination, and cognition. As such, it could be used with many different patient populations. For example, this may include neurological rehabilitation or habilitation, e.g. patients presenting with stroke, cerebral palsy, brain tumor, or traumatic brain injury. It could also be used for rehabilitation in the context of orthopedic procedures or diagnoses and patients with burns. It may also be useful for pediatric patients with deconditioning from prolonged hospitalization. It is estimated that the TapIt could be used with 20-30 pediatric patients per week split between inpatient and outpatient caseloads, totaling over 1,000-1,500 per year between physical therapy, occupational therapy, and speech language pathology.

3. Significance:

By acquiring the TapIt, pediatric therapists will have another method to provide cutting edge rehabilitation. The landscape of acute care-based rehabilitation is shifting due to continued promotion of early mobility, particularly in the intensive care setting. This has further been promoted by the PICU Up! Program. As a result, children begin rehabilitation earlier in the hospitalizations, and receive rehabilitation for longer periods prior to discharge. This is especially true given recent challenges coordinating transitions to inpatient rehabilitation settings. Many of these children receive daily therapy from all three disciplines for several weeks. As a result, it becomes difficult to continue to find new ways to engage children and keep them challenged and motivated in sessions to help them reach their goals. The TapIt provides an exciting new way to engage children of all functional levels and almost any age in technology that is relevant to their daily demands. Children who are able to make functional progress will heal sooner from illnesses, discharge faster, and ultimately consume fewer healthcare resources. All of these will lead to a greater quality of life for the children served by the JHCC. Furthermore, the quality of care that can be provided to these children can improve and be grounded in evidence that supports the integration of technology in pediatric rehabilitative and habilitative settings.

4. Implications, if any, that this has to the Covid pandemic:
None identified currently.

5. Personnel (Please note that we cannot fund grants that incorporate any salaries.)
Members of the pediatric rehabilitation team, including physical therapists, occupational therapists, and speech language pathologists will have access to utilize this equipment with their pediatric patients, both in the inpatient and outpatient settings. The equipment could also be utilized for research and/or quality improvement purposes in order to educate the broader community of pediatric rehabilitation professionals.

6. Budget: **Total Request:** $14,613.04

A. Equipment - price per item and discount if applicable for multiples. Please add compelling justification if multiples are requested. (Itemize and justify):
1. Touch Accessible Platform Interactive Technology (TapIt) $10,000, 6% MD sales tax $600 ($10,600 total)
2. Shipping and customs clearance $2,486.64

B. Supplies (Itemize and justify):
NUC Computer for TapIt, $900, 6% MD sales tax $54.00 ($954.00 total)
Ginger Tiger Special Needs Education Software 3-year subscription, $540.00, 6% MD sales tax $32.40 ($572.40 total)
https://thebrainary.com/product/ginger-tiger-special-needs-education-software/

C. What is the out-of-pocket cost to the patient? (Itemize and justify):
There would be no out-of-pocket costs to the patient or family. These would be utilized during their physical therapy, occupational therapy, and speech language pathology treatment sessions.

D. Other Expenses, Hidden Costs (Please consider whether your grant proposal contains other costs that would require hospital funding, such as structural modifications for equipment installation, operating costs such as additional FTEs, training costs, etc.)*
No other associated costs have been identified.

7. Have you requested funds from any other source?

☐ **Yes (What was the result?)**
Click or tap here to enter text.

■ **No (Explain why)**
Due to the cost and recent declines in equipment requests, it was anticipated that the standard equipment budget would not accommodate such a costly purchase.

* If you have any concerns about additional costs of your grant to the hospital please feel free to contact the CFO Katina Williams @ kwill249@jhmi.edu. She is aware of our grant process. All grants selected for funding will eventually be submitted for final hospital approval by the Women's Board. It is not required for the departments to request approval from the hospital prior to submission on January 6, 2023.

References

Budhan, J., Scarborough, D., & Kuren, M. B. (2019). The Impact of a Novel Gaming Reinforcement System on Oral Intake Outcomes in Pediatric Feeding Therapy: A Single Case Study. *American journal of speech-language pathology, 28*(2), 394-407. https://doi.org/10.1044/2018_AJSLP-18-0120

Kamel, F. A. H., & Basha, M. A. (2021). Effects of Virtual Reality and Task-Oriented Training on Hand Function and Activity Performance in Pediatric Hand Burns: A Randomized Controlled Trial. *Archives of physical medicine and rehabilitation, 102*(6), 1059-1066. https://doi.org/10.1016/j.apmr.2021.01.087

Lam, M. Y., Tatla, S. K., Lohse, K. R., Shirzad, N., Hoens, A. M., Miller, K. J., Holsti, L., Virji-Babul, N., & Van der Loos, H. F. M. (2015). Perceptions of Technology and Its Use for Therapeutic Application for Individuals With Hemiparesis: Findings From Adult and Pediatric Focus Groups. *JMIR rehabilitation and assistive technologies*, 2(1), e1. https://doi.org/10.2196/rehab.3484

Lohse, K., Shirzad, N., Verster, A., Hodges, N., & Van der Loos, H. F. (2013). Video games and rehabilitation: using design principles to enhance engagement in physical therapy. *Journal of neurologic physical therapy : JNPT, 37*(4), 166-175. https://doi.org/10.1097/NPT.0000000000000017

Tarakci, D., Ersoz Huseyinsinoglu, B., Tarakci, E., & Razak Ozdincler, A. (2016). Effects of Nintendo Wii-Fit® video games on balance in children with mild cerebral palsy. *Pediatrics international : official journal of the Japan Pediatric Society, 58*(10), 1042-1050. https://doi.org/10.1111/ped.12942

Wade, S. L., Narad, M. E., Shultz, E. L., Kurowski, B. G., Miley, A. E., Aguilar, J. M., & Adlam, A. R. (2018). Technology-assisted rehabilitation interventions following pediatric brain injury. *Journal of neurosurgical sciences, 62*(2), 187-202. https://doi.org/10.23736/S0390-5616.17.04277-1

EXCEL LOGISTICS PTY LTD

ABN: 75 094 223 784

NSW
15 Fitzpatrick Street
Revesby NSW 2212
P: (02) 9792 2802
F: (02) 9792 2385

VIC
45B Metrolink Circuit West
Campbellfield VIC 3061
P: (03) 8339 0717
F: (03) 8339 0676

QLD
Unit 3, 218 Fison Avenue
Eagle Farm QLD 4009
P: 1300 964 958

Sea Freight (LCL) from Melbourne to Baltimore (DAP)

Valid From:	4 Jan 2023	**Valid To:**	15 Jan 2023	**Transit Time:**	45 Days
Service Level:	Standard	**Frequency:**	1 per Week	**Quote No:**	14965 - BRAINAMEL

SHIPMENT INFORMATION

This Quotation applies to the following shipment:

Weight:	225.000 KG	**Customs Entries:**	1
Volume:	1.091 M3	**Entry / Invoice Lines:**	1
Chargeable:	1.091 M3	**Value of Goods:**	0.00

Pick Up Address: THE BRAINARY
71 PAKINGTON ST
GEELONG WEST VIC 3218
AUSTRALIA

Delivery Address:

IncoTerm: Delivered At Place

Loose Cargo Information

1 PLT	1.32 x 0.81 x 1.02 M	General

QUOTATION DETAILS

			Quote Currency
Pick up Cartage Geelong West to Tullamarine	235.00 AUD		235.00 AUD
Export Customs Clearance Fee	90.00 AUD		90.00 AUD
Export Document Fee	45.00 AUD		45.00 AUD
Infrastructure Levy	19.64 AUD		19.64 AUD
Origin Fuel Surcharge	63.45 AUD		63.45 AUD
Origin Solas Fee	30.00 AUD		30.00 AUD
Origin Tolls	20.00 AUD		20.00 AUD
Sub-total (AUD)	**503.09**		
Overseas AMS Fees	40.00 USD	@ 0.670000	59.70 AUD
International Freight	321.84 USD	@ 0.670000	480.36 AUD
Overseas Terminal Handling	586.93 USD	@ 0.670000	876.01 AUD
Overseas Document and Handling Fee	230.00 USD	@ 0.670000	343.28 AUD
Overseas Customs Clearance	180.00 USD	@ 0.670000	268.66 AUD
Overseas Cartage Standard Dock to Dock delivery	300.00 USD	@ 0.670000	447.76 AUD
ISF Bond Fee	160.00 USD	@ 0.670000	238.81 AUD
Single bond: $5 per $1,000 invoice value or $150 min	150.00 USD	@ 0.670000	223.88 AUD
Sub-total (USD)	**1,968.77**		

TOTAL CHARGES:	AUD	**3,441.55**

QUOTE

Johns Hopkins Hospital
Attention: Sarah Hodgson
1800 Orleans Street
Bloomberg M2350
BALTIMORE MARYLAND 21287
UNITED STATES

Date
5 Jan 2023

Expiry
19 Jan 2023

Quote Number
QU-1192

Reference
050123

ABN
30 539 890 135

The Brainary
PO Box 1318
GEELONG VIC 3220
AUSTRALIA
Phone: +61 3 5229 2260
Email:
accounts@thebrainary.com

Item	Description	Quantity	Unit Price	GST	Amount USD
112	TAPit Platform (US)	1.00	10,000.00	GST Free	10,000.00
9876	NUC Computer for TAPit	1.00	900.00	GST Free	900.00
232181 - GT	Ginger Tiger Special Needs Software (3 Year Subscription)	1.00	540.00	GST Free	540.00
9876	*Complimentary* ArtRage 6 Software - Windows & macOS - 6.1.2 TAPit	1.00	0.00		0.00
123	Sea Shipping - Australia to USA*	1.00	2,486.64	GST Free	2,486.64
	*Subject to variation until time of scheduled shipment				

Subtotal	13,926.64
TOTAL USD	**13,926.64**

Terms

These prices are subject to manufacturer's increases and fluctuations in currency exchange rates should they occur prior to delivery. All products and software provided by The Brainary remain the property of The Brainary until paid for in full. Training prices do not include travel, which is charged at cost to the customer.

Important: Warranty on all NAO robots is only valid within the country of purchase.

Delivery is approximately 1-8 weeks from receipt of your official order and payment in full.