Singapore Healthcare Management 2017

Music Therapy Cart

Melanie Kwan, MT-BC, KKH
Arun Kumar, Ph.D, Singapore Polytechnic

KK Women's and Children's Hospital
SingHealth

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Background

- Music therapists face high transportation needs for their tools of trade, which vary in size and weight.
- Existing options, including medical trolleys, were generally inadequate, unsuitable, and resulted in multiple trips for group set-ups.
- Power outlets may not be accessible due to medical equipment
- Students from the School of Electrical and Electronic Engineering at Singapore Polytechnic were tasked to design a cart to address these issues.

Methodology

Empathy Study

From observations and interviews with music therapists at the hospital, the students observed these problems:

sides were exposed

items were not secured

large items could not fit

instruments would go missing

Analysis of Needs

- flexibility for smaller or larger configuration depending on number of instruments to be loaded
- Cart material needed to be able to withstand the sanitizer used in the hospital.
- Availability to power up the keyboard piano or similar electronic instruments.

- Transportation
- Adjustable
- Secure
- Infection Control
- Power source

Design and Field-testing (Year 1)

- An adjustable body that could be expanded and collapsed using mild steel material for sanitization purpose was designed.
- Electronic instruments could easily be placed on the top.
- After the first year, cart was presented to the therapists for their user inputs.

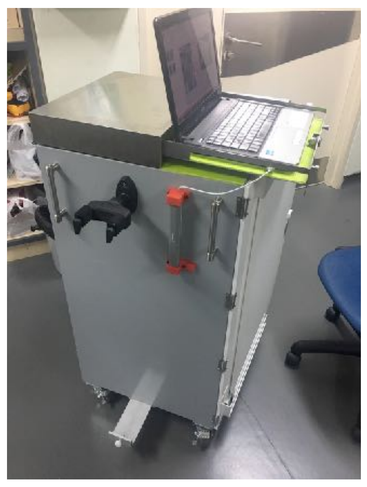
Evolution, Redesign, and Final Touches (Year 2)

- the door was redesigned to make it sturdier
- a lockable laptop storage was added on the top
- electrical connections for powering up the musical instruments
- latchable guitar holder was installed on one side
- During on-site testing, the wheels were found to jam in elevator gaps and were changed to a larger size.

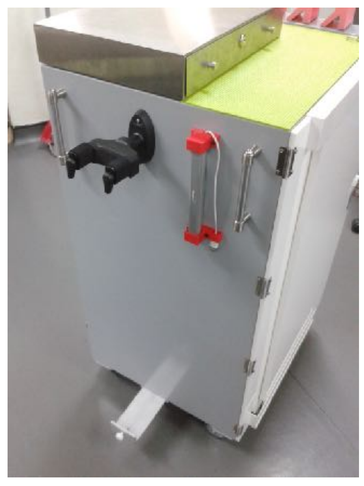
Electrical Components

The electrical setup was designed so that it does not result in any cables hanging outside the cart when the power source is not being used. A single plug point provided outside the cart was used for both charging the battery as well as to power up the electronic instruments. A safety precaution required that the battery could not be used at the same time as it was being charged. Two parallel power points meant that two electronic instruments could be powered up at the same time.

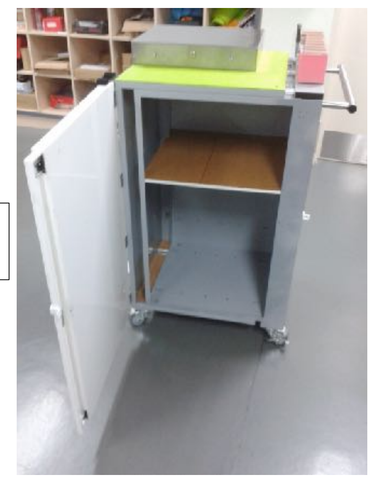
Pull Handlebars (to navigate the cart)



Laptop storage (Can be locked with a key)



Speaker (for laptop use)



Results

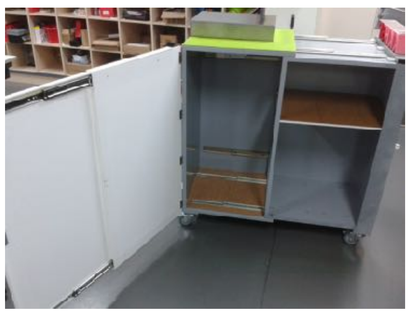
The expandable music therapy cart prototype included

- handles on either side that facilitated pulling or pushing the 360° wheels with ease.
- A side clamp held the guitar in place, and shelving led to items being readily identified and retrieved.
- the first of its kind in-built battery hook-up enhanced access to electronic instruments, as existing sockets might be unavailable due to utilization by medical equipment.
- The computer and laptop were secured in a retractable tray, which eased recording of live music during sessions.

When the cart was site-tested at KKH from Jan to March 2017, it reduced the number of wasted trips from 4 to 12 a week to nearly zero, resulting in time savings.

Conclusion

The music therapy cart was able to functionally meet transportation needs. In addition, its independent source of power enhanced access to a wider range of music by patients who were supported by medical equipment. The cart also optimized time savings as trips to retrieve instruments were reduced from 7.5/week on average to 0.



The authors acknowledge the efforts of SP students toward the successful completion of the Music Therapy Cart Project:
2016-17 FYP Project Team: Koh Yu Xuan, Ryan Lee Jiachen and R Kumaresh
2015-16 FYP Project Team: Soon Kian Seong, Chan Kok Wooi and Cheryl Ong