Program of Industrial Design Posters

Industrial Design Program

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EZ-GO Stairs

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EZ-GO Stairs

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Jefferson Thomas Jefferson University — HOME OF SIDNEY KIMMEL MEDICAL COLLEGE
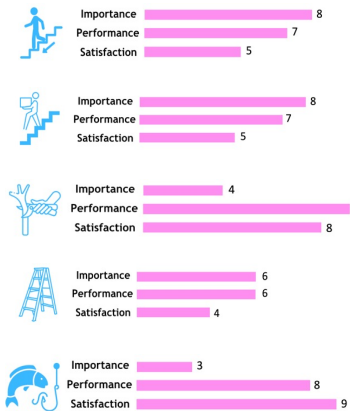
Objectives

- **Inter-professional collaboration**
  Collaborating between OT students and students in the Industrial Design program, students work together to design and build prototypes of assistive devices that facilitate clients' occupational performance.

- **Identify and analyze the occupational needs**
  Through interviews, observations, and activity analysis, OT and ID students can identify the occupational needs of clients and reflect them in assistive device design.

- **Design and create assistive device**
  Using the innovative and creative abilities of OT students and ID students to design and build assistive devices by adapting the client's environment and tasks.

Assessments for Occupational Needs

Our Client
J. is a 71-year-old man who manages most household tasks and chores independently. His primary concerns are loss of balance and fear of falling when descending the stairs. He cannot use the handrailing or navigate the stairs when using both hands to carry laundry and heavy items.

COPM Assessment

Importance	8
Performance	7
Satisfaction	5

Importance	8
Performance	7
Satisfaction	5

Importance	4
Performance	9
Satisfaction	8

Importance	6
Performance	6
Satisfaction	4

Importance	3
Performance	8
Satisfaction	9

Client Barriers

- Weak joints and muscles due to aging
- Balance impairments due to aging
- Large house with tall stairs.

Findings
Decreased balance in functional mobility when descending the stairs and carrying items

Needs
Balance → Hands-free

Goals
Client's primary goal is to prevent future falls and to be independent in his home

EZ-GO Stairs

Purpose of Our Device

A study investigated the occurrence of falls during activities of daily living. The results identified that more falls occurred without the use of an ambulatory assistive device (AAD). The use of AAD can reduce falls by widening the base of support, increasing body stability, reducing overload of the lower limbs (especially the knees), and providing safety. (Cruz et al., 2020) Therefore, it is crucial to use ambulatory assistive devices to reduce falls in frail elderly.

This device will provide J. support when walking up and down the stairs with a basket attached to carry the items hands-free, and adapted to client's staircase, height and ensured storability.

EZ-GO STAIRS

- Adjustable Support bar
- Bag Hooks
- Adjustable luggage bar
- Bag Latch
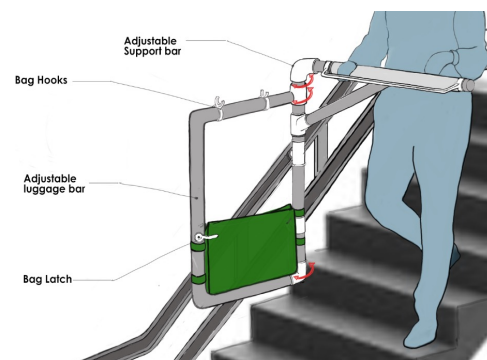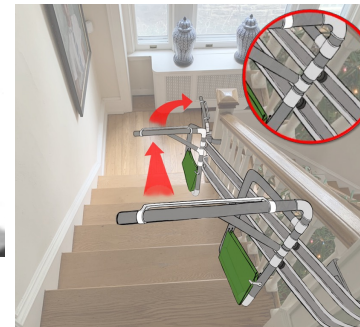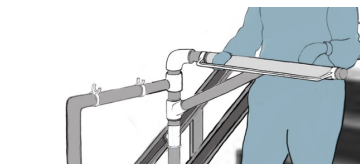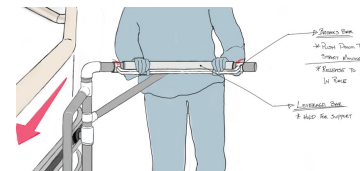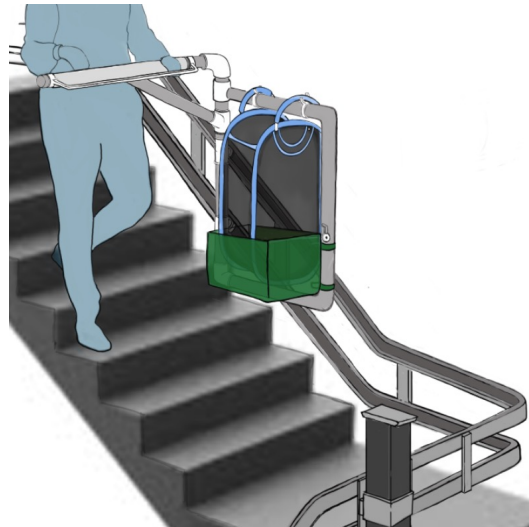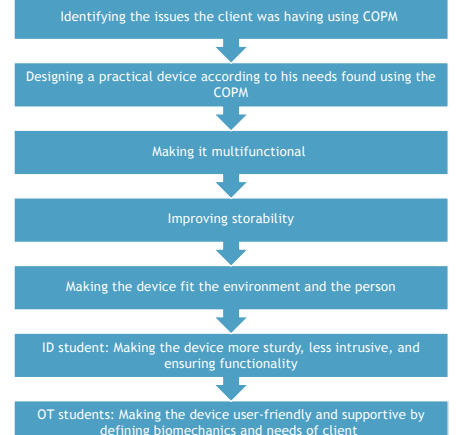
Client Feedback

Previous Design

- ✓ Adaptation was unique to his staircase
- ✓ Addressed storability
- ✓ Multifunctional components for carrying items up and down the stairs
- ✓ Found a solution to support his balance going down the stairs

"Very interesting design … works well with the issues that I have!" -J.

- ✗ Front glide ball would not be attached to the track when descending and ascending the steps
- ✗ Concerned if the device would be upright on the incline
- ✗ Weight limit and distribution

Defining Moments

- Identifying the issues the client was having using COPM
- Designing a practical device according to his needs found using the COPM
- Making it multifunctional
- Improving storability
- Making the device fit the environment and the person
- ID student: Making the device more sturdy, less intrusive, and ensuring functionality
- OT students: Making the device user-friendly and supportive by defining biomechanics and needs of client

References

Cruz, A. O., Santana, S. M. M., Costa, C. M., Gomes da Costa, L. V., & Ferraz, D. D. (2020). Prevalence of falls in frail elderly users of ambulatory assistive devices: A comparative study. *Disability and Rehabilitation: Assistive Technology, 15*(5), 510-514. https://doi.org/10.1080/17483107.2019.1587016

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