

Tandem bike for autistic person (Team Tandem)

Team Members:

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Client:

Michael YuenHurwitz, Noah

Advisor:

Professor Beth Meyerand

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Presentation Overview

- Problem Statement
- Background
- Product Design Specifications
- Designs
- Design Matrix
- Future Work

Problem Statement

- Our client is a man with autism
- Want to develop a tandem ebike
- Operated by an assistant
- Allows for client to exercise

Background

- Autism
 - Developmental disorder
 - Difficulty with social interaction
 - Spectrum
- Three main components to this project
 - Frame
 - Resistance mechanism
 - User interface
- Focusing on frame



<https://www.prioritybicycles.com/products/embarc>

Product Design Specifications

- Bikers - Noah in the back and supporting staff in the front
 - Noah
 - 25 years old male, 230lbs, 6' 1"
 - Loves biking - help him lose weight while biking
 - Finds comfort in familiar staff
 - In constant anxiety and can aggress towards self and others
 - Staying busy brings him comfort

Product Design Specifications

- Safety
 - Make certain there is sufficient distance between Noah and staff
 - Noah should not have access to the braking system
 - No exposed chains
 - Noah should have an independently operating pedal
- Bike
 - Front staff bike should be an electric bike
 - Noah's portion should maximize stability and comfort

Product Components

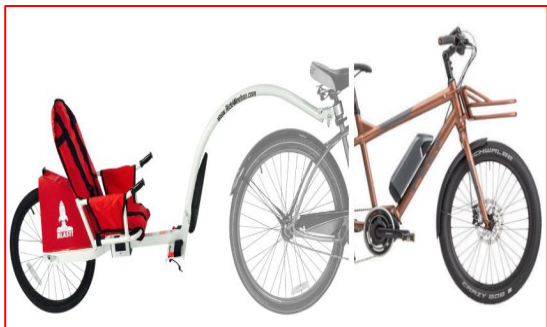
1. **Frame:** Trailer, ebike and connection
2. **Resistance Mechanism:** Noah's form of exercise
3. **User Interface:** Feedback and entertainment system

Designs for Frame:



Designs for Frame:

Standard Ebike + One Wheeled Trailer



Standard Ebike + Two Wheeled Trailer



Trike Ebike + Two Wheeled Trailer



Standard Ebike and One Wheeled Trailer

Design:

- Standard Two Wheel Ebike
- One Wheeled Trailer
- Seat Post Attachment

Features:

- Lighter weight
- standard ebike is less costly



Standard Ebike and Two Wheeled Trailer

Design:

- Standard Two Wheel Ebike
- Two wheeled trailer
- Bottom Bracket(BB) attachment

Features:

- Standard Ebike cost
- BB attachment and two wheel trailer more stable



Trike Ebike and Two Wheeled Trailer

Design:

- “Trike” three wheel Ebike
- Two wheeled Trailer
- Axle attachment

Features:

- Stable ebike and trailer
- Trike Ebike more costly



Design Matrix

3 Wheel



4 Wheel



5 Wheel



Criteria (weight)

Safety(24)	2.5 /5	12	4.75 /5	22.8	5 /5	24
Resistance(20)	3 /5	12	4.25 /5	17	4.375 /5	17.5
Stability(17)	2 /5	6.8	4.125 /5	14	4.875 /5	16.58
Ease of Use (15)	1.75 /5	5.25	5 /5	15	4.33 /5	13
Comfort(11)	3.25 /5	7.15	5 /5	11	4.5 /5	9.9
Ease of Fabrication(8)	4 /5	6.4	3.25 /5	5.2	2.625 /5	4.2
Cost (5)	5 /5	5	3.5 /5	3.5	1.25 /5	1.25
Total (100)		54.6		88.5		86.43



Future Work

- Research connecting piece
- Discuss final idea with TREK
- Determine testing procedures
- Begin prototype fabrication



TREK

Acknowledgements

- Clients: Michael YuenHurwitz, Noah
- Advisors: Professor Beth Meyerand, Dr. Christopher C. Luzzio

References

- “PRIORITY EMBARK E-BIKE.” *Priority Bicycles*, <https://www.prioritybicycles.com/products/embark>.
- “What Is Autism?” *Autism Speaks*, <https://www.autismspeaks.org/what-autism>.