

The logo of Galgotias University is a stylized 'G' composed of three curved, overlapping bands in shades of yellow, blue, and red, set against a light pink circular background.

CONCEPT TESTING

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Concept Testing

The logo of Galgotias University is a stylized, circular emblem. It features a central blue swirl that curves upwards and to the right, set against a background of yellow and orange gradients. The entire emblem is enclosed within a light-colored circular border.

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Key Ideas Today

- Fastest route to failure
- Testing in staged, spiral, and SE-V PDPs
- Concept testing method
- Identifying uncertainties and risks
- Customer acceptance
- Technical validation



Fastest Route to Failure

- Testing is about avoiding failures by identifying the risks, finding the potential failure modes, and eliminating them.



- The FRF principle is about prioritizing the failure modes to spend your time working on the most important ones.

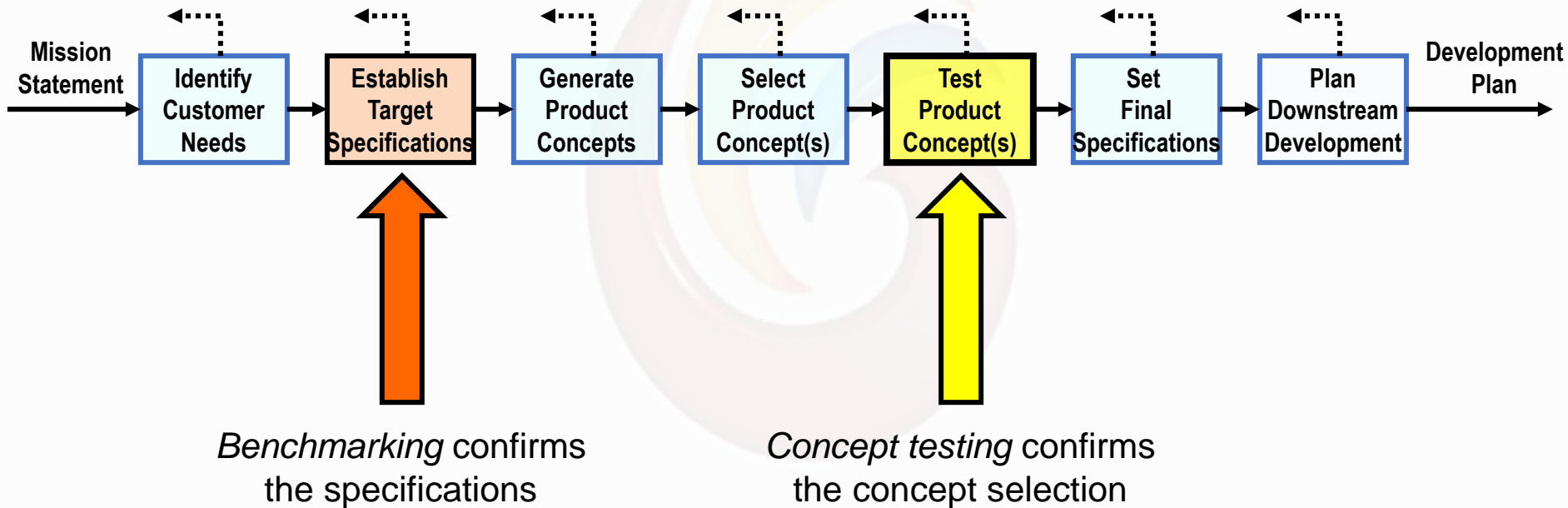
Failure is not the opposite of success; it is part of success.

Testing in the Product Development Process



- ◆ Go/No-Go Decision Gates
- Specification Testing (benchmarking)
- Prototype Testing (design iterations)
- Qualitative Concept Testing
- Performance and User Interface Testing (alpha)
- Quantitative Market Testing
- Validation/Acceptance Testing (beta)
- A/B Testing (release versioning)

Testing in the Concept Development Process



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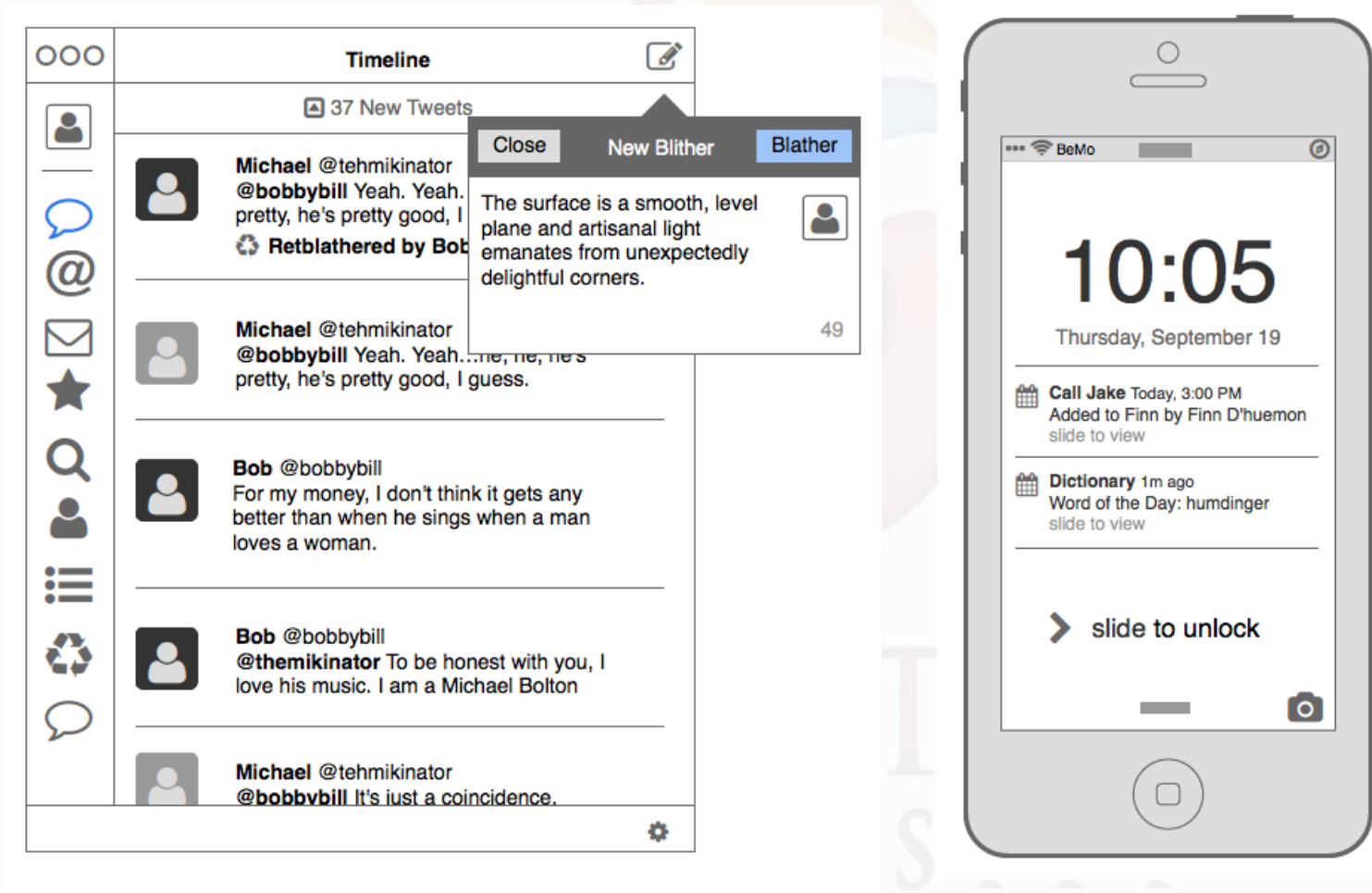
Concept Testing is Used for Several Purposes

- Go/no-go decisions
- What market to be in?
- Selecting among alternative concepts
- Confirming concept selection decision
- Benchmarking
- Soliciting improvement ideas
- Forecasting demand
- Ready to launch?

Concept Testing Process

1. Define the purpose of the test
2. Choose a survey population
3. Choose a survey format
4. Communicate the concept
5. Measure customer response
6. Interpret the results
7. Reflect on the results and the process

Wireframe Mockups



Ref: Balsamiq.com *Mockups* apps

Concept Testing Example: emPower Electric Scooter



Scooter Example

1. Purpose of concept test:
 - What market to be in?
2. Sample populations:
 - College students who live 1-3 miles from campus
 - Factory transportation
3. Survey format:
 - Face-to-face interviews

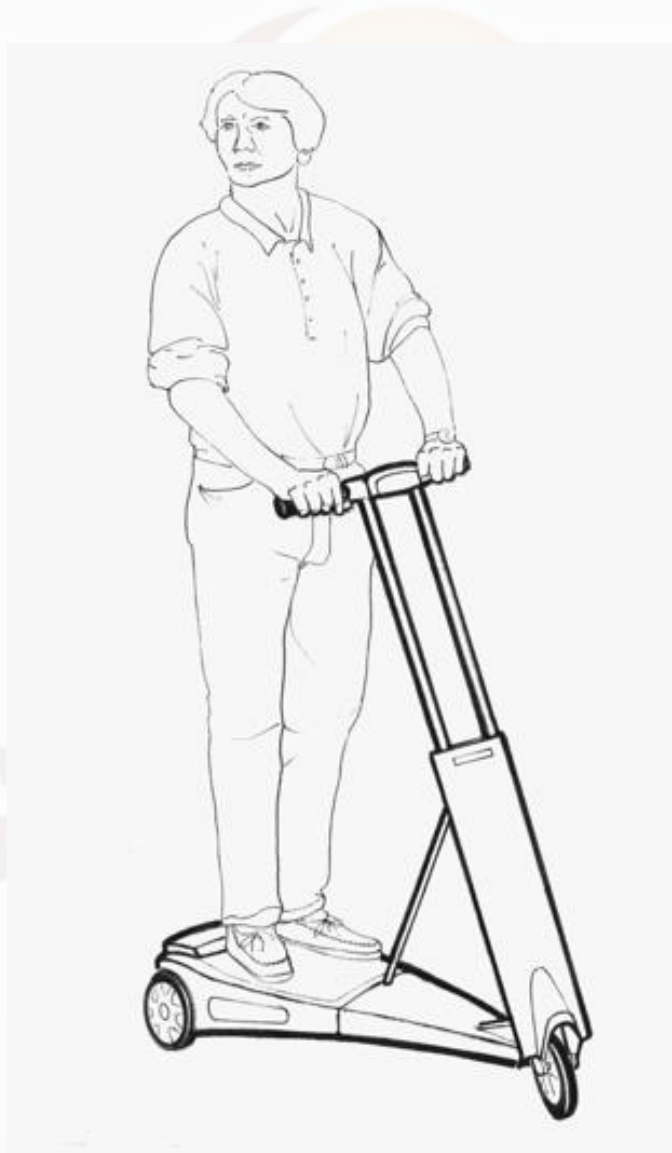
Communicating the Concept

- Verbal description
- Sketch
- Photograph or rendering
- Storyboard
- Video
- Simulation
- Interactive multimedia
- Physical appearance model
- Working prototype

Verbal Description

- The product is a lightweight electric scooter that can be easily folded and taken with you inside a building or on public transportation.
- The scooter weighs about 25 pounds. It travels at speeds of up to 15 miles per hour and can go about 12 miles on a single charge.
- The scooter can be recharged in about two hours from a standard electric outlet.
- The scooter is easy to ride and has simple controls — just an accelerator button and a brake.

Sketch



Rendering



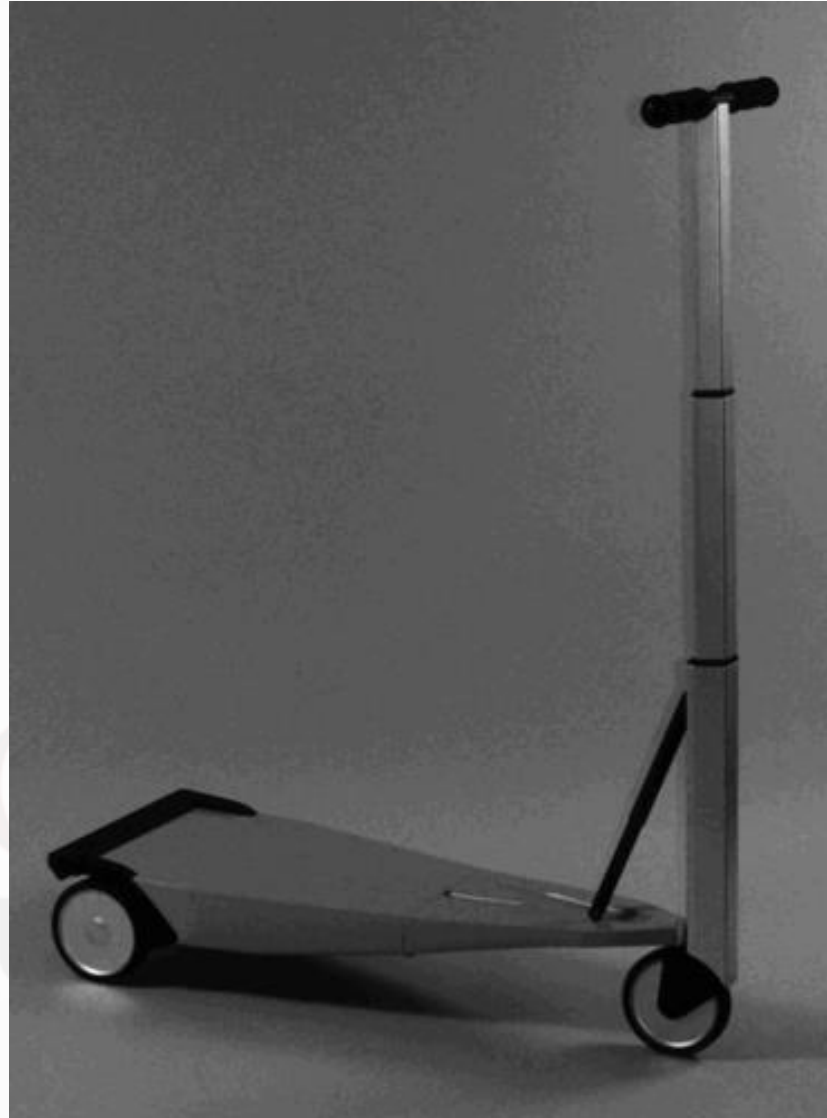
Storyboard



3D Solid CAD Model



Appearance Model



Working (Alpha) Prototype



Pre-Production (Beta) Prototype



Video,
Animation,
Interactive Multimedia,
or Live Demonstration



Survey Format

- **PART 1, Qualification**

- How far do you live from campus?
 - <If not 1-3 miles, thank the customer and end interview.>
- How do you currently get to campus from home?
- How do you currently get around campus?

- **PART 2, Product Description**

- <Present the concept description.>

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Survey Format

- **PART 3, Purchase Intent**

- If the product were priced according to your expectations, how likely would you be to purchase the scooter within the next year?

I would **definitely not purchase** the scooter.

I would **probably not purchase** the scooter.

I **might or might not purchase** the scooter.

I would **probably purchase** the scooter.

I would **definitely purchase** the scooter.

↑
“second box”

↑
“top box”

Survey Format

- **PART 4, Comments**

- What would you expect the price of the scooter to be?
- What concerns do you have about the product concept?
- Can you make any suggestions for improving the product concept?

- **Thank you.**

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Interpreting the Results: Forecasting Sales

$$Q = N \times A \times P$$

- Q = sales (annual)
- N = number of (annual) purchases
- A = awareness x availability (fractions)
- P = probability of purchase (surveyed)

$$= C_{\text{def}} \times F_{\text{def}} + C_{\text{prob}} \times F_{\text{prob}}$$

↑
“top box”

↑
“second box”

Forecasting Example: College Student Market

- $N =$ off-campus grad students (200,000)
- $A = 0.2$ (realistic) to 0.8 (every bike shop)
- $P = 0.4 \times \textit{top-box} + 0.2 \times \textit{second-box}$
- $Q =$
- Price point \$795

Forecasting Example: Factory Transport Market

- $N =$ current bicycle and scooter sales to factories (150,000)
- $A = 0.25$ (single distributor's share)
- $P = 0.4 \times \textit{top-box} + 0.2 \times \textit{second-box}$
- $Q = 150,000 \times 0.25 \times [0.4 \times 0.3 + 0.2 \times 0.2]$
= 6000 units/yr
- Price point \$1500

emPower's Market Decision: Factory Transportation



Production Product



emPower Purchased by ZAP

ZAPPY3 PRO

Speed:	Up to 13 MPH
Range:	Up to 17 miles
Motor:	350 Watt Brushless Hub Motor
Charging Time:	4 - 6 hours for pennies
Batteries:	36V 12 Ah, sealed lead acid
Tires:	Pneumatic
Color	Silver, Black Deck
Size:	30 x 19 x 26 in.
Weight:	100 lbs.
Max. Rider Weight	290 lbs.
Includes:	Basket, headlight, horn & removable seat



<http://www.zapworld.com/>

Sources of Forecast Error

- Word-of-Mouth Effects
- Quality of Concept Description
- Pricing
- Level of Promotion
- Competition

Discussion

- Why do respondents typically overestimate purchase intent?
 - Might they ever underestimate intent?
- How to use price in surveys?
- How much does the way the concept is communicated matter?
 - When shouldn't a prototype model be shown?
- How do you increase sales, Q?
- How does early (qualitative) concept testing differ from later (quantitative) testing?
- How can we use the Internet in the process?

YikeBike

- **Weight:** 10kg (22 lbs)
- **Frame:** Carbon fibre composite
- **Price:** £2,995 or €3,495 (~\$4,700)
- **Drive:** Electric brushless DC motor
- **Brakes:** Electric anti-skid, regenerative
- **Battery:** LiFePO₄, 40 min recharge
- **Speed:** 25 km/hr
- **Power:** 1 kW
- **Range:** 10 km (6.2 miles)
- **Fold size:** Compact 43 litres
- **Fold time:** Under 20 seconds
- **User height:** 163 cm - 193 cm
- **Weight limit:** 100 kg (220 lbs)
- **Wheels:** 20" front and 8" back
- **Lights:** High-visibility, built-in LEDs

<http://yikebike.com>



Nova Cruz Voloci Scooter

- Lightweight, high-performance, electric motorbike
 - 79 lbs (NiMH)
 - 30 mph top speed
 - 0-20 in 5 sec
 - 50 miles (max) range
- \$1995 (SLA), \$2495 (NiMH)
- <http://www.voloci.com>





References

1. Karl T. Ulrich and Steven D. Eppinger (2009), Product Design and Development, 4th Edition, Tata McGraw-Hill Publishing Company Limited, ISBN: 978-0-070-14679-2
2. Stephen C. Armstrong (2005), Engineering and Product development Management– The Holostic Approach, Cambridge University Press, ISBN: 978-0-521-01774-9.
3. IbrahimZeid (2006), Mastering CAD/CAM, 2nd Edition, Tata McGraw-Hill, ISBN: 978-0-070-63434-3.
4. [Anoop Desai](#), [Anil Mital](#) and [Anand Subramanian](#) (2007), Product Development: A Structured Approach to Consumer Product Development, Design, and Manufacture, 1st Edition, Butterworth-Heinemann, ISBN: 978-0-750-68309-8.

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The logo of Galgotias University is a circular emblem with a stylized 'G' shape. It features a gradient of colors: a light blue outer ring, a yellow inner ring, and a light blue center. The text 'Thank you' is superimposed over the logo.

Thank you

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