Lily Seat
PAEDIATRIC POSITIONING AID

John Murtagh

24/6/2015
Overview
Current Problem
Current Market Devices
Current Practice

Dublin Pathology 2015
Overview

- Requirement Gathering:
- Innovation: TRIZ
- Evaluation: Pugh Matrix
- Prototyping & Testing
1/4 Requirement Gathering

UCD Health Science

UCD Engineering

Our Lady's Children's Hospital Crumlin

Enable Ireland

DESIGN REQUIREMENTS

<table>
<thead>
<tr>
<th>Radiographic quality</th>
<th>Accommodate different sized children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection control</td>
<td>Robust</td>
</tr>
<tr>
<td>Ease of use</td>
<td>Child-friendly</td>
</tr>
</tbody>
</table>
TRIZ = Theory of Inventive Problem Solving

Based on analysis of past problems solved in the patent literature

40 Principles
TRIZ: How it works?

chocolate sweets with strawberry syrup?
TRIZ: How it works?

Identified Conflict!

Speed of pouring syrup vs. integrity of chocolate
TRIZ: How it works?

<table>
<thead>
<tr>
<th>Worsening Feature</th>
<th>Speed</th>
<th>Shape</th>
<th>Loss of Time</th>
<th>Reliability</th>
<th>Measurement Accuracy</th>
<th>Ease of Operation</th>
<th>Adaptability or Versatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving Feature</td>
<td>+</td>
<td>35, 15, 18, 34</td>
<td>11, 35, 27, 28</td>
<td>28, 32, 1, 24</td>
<td>32, 28, 13, 12</td>
<td>15, 10, 26</td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td>35, 15, 34, 18</td>
<td>+</td>
<td>14, 10, 34, 17</td>
<td>28, 32, 1</td>
<td>32, 15, 26</td>
<td>1, 15, 29</td>
<td></td>
</tr>
<tr>
<td>Shape</td>
<td>26, 32</td>
<td>24, 26, 28, 32</td>
<td>10, 28, 23</td>
<td>27, 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of Information</td>
<td>26, 32</td>
<td>4, 10, 34, 17</td>
<td>+</td>
<td>10, 30, 4</td>
<td>4, 28, 10, 34</td>
<td>35, 28</td>
<td></td>
</tr>
<tr>
<td>Loss of Time</td>
<td>28, 13, 34, 17</td>
<td>+</td>
<td>24, 34, 28, 32</td>
<td>+</td>
<td>1, 13, 17, 34</td>
<td>13, 35, 2</td>
<td></td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>28, 32</td>
<td>6, 28, 32</td>
<td>24, 34, 28, 32</td>
<td>+</td>
<td>1, 13, 17, 34</td>
<td>13, 35, 2</td>
<td></td>
</tr>
<tr>
<td>Ease of operation</td>
<td>18, 13, 34</td>
<td>15, 34, 29, 28</td>
<td>4, 28, 10, 34</td>
<td>17, 27, 8, 40</td>
<td>25, 13, 2, 34</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

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TRIZ: How it works?

Inventive Principle #13 – “the other way round”

- Invert the action(s) used to solve the problem
- Make movable parts (or the external environment) fixed, and fixed parts movable.
Inventive Principle #13 – “the other way round”
## 3/4 Evaluation: Pugh Matrix

<table>
<thead>
<tr>
<th>Feature</th>
<th>Concept 1</th>
<th>Concept 2</th>
<th>Weight</th>
<th>Total Score Concept 1</th>
<th>Total Score Concept 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection Control</td>
<td>3/5</td>
<td>4/5</td>
<td>3/5</td>
<td>3*3 = 9</td>
<td>3*4 = 12</td>
</tr>
<tr>
<td>Durability</td>
<td>4/5</td>
<td>2/5</td>
<td>2/5</td>
<td>4*2 = 8</td>
<td>2*5 = 10</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
<td>22</td>
</tr>
</tbody>
</table>

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4/4 Prototyping & Testing

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Next Steps

Currently final stages of an EI Grant application

What I have learned

• Problem solving in paediatrics to be strongly influenced by end user preferences and perceptions

• Interviews with end-users and subject matter experts were crucial in determining a solution that was “culturally acceptable”

• Significant interest from companies once clinical problem identified
Acknowledgments

• Dr. Michaela Davis, Ms. Jenny Grehan

• Dr Eoin O’Cearbhaill, Mr. Colin Keogh

• Ms. Liz Masterson, Mr. Eric Frazer

• Mr. John Tiernan

• Dr. Amanda McCann