Preliminary Concept Selection and Schedule

Team GM2

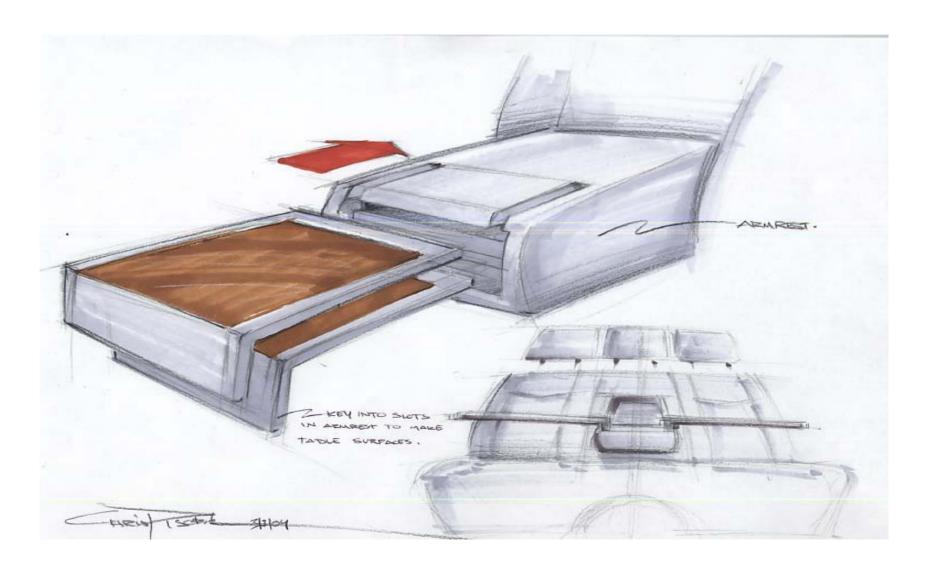
Lane Ballard Amber Mazooji

Tom Burns Minja Penttila

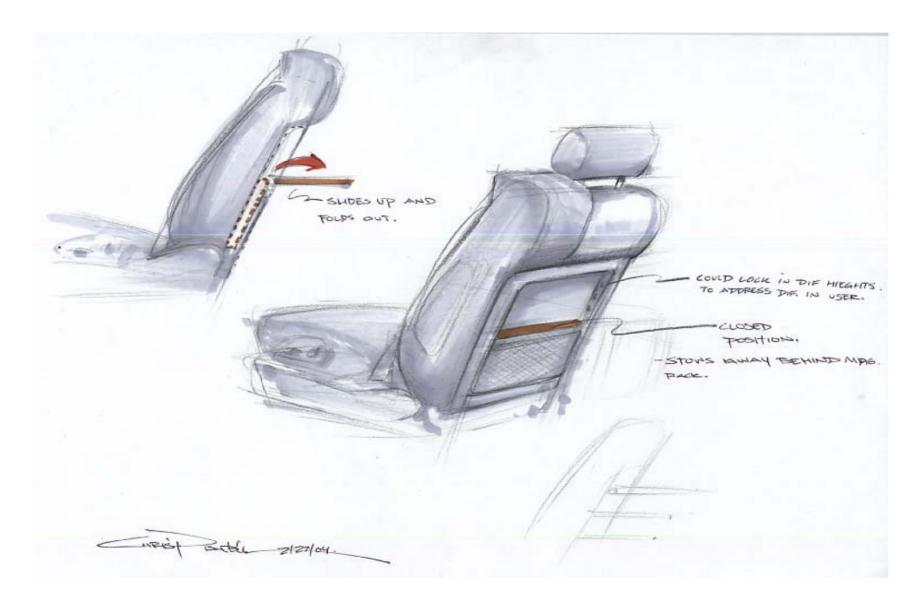
John Celmins Chris Piscitelli

Paul Glomski Tomer Posner

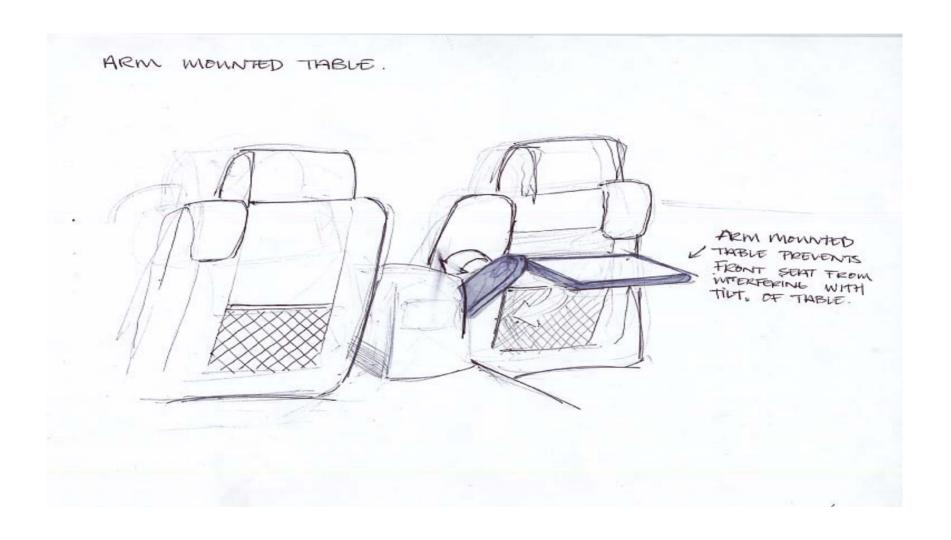
Most Preferred Concept - Center Console Back



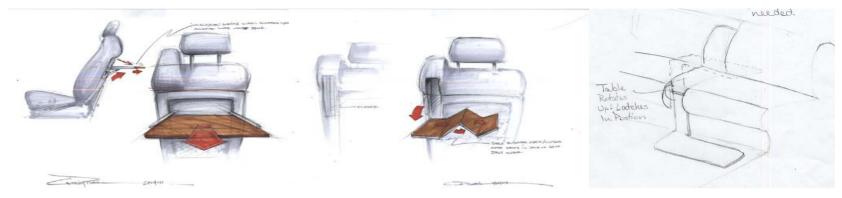
2nd Most Preferred Concept - Seat Back



3rd Most Preferred Concept – Center Console Front



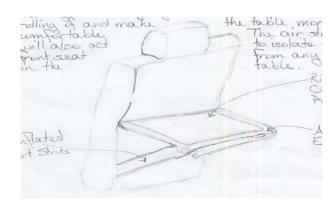
Other Concepts Considered



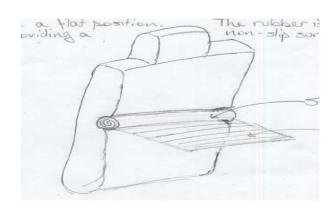
Airplane (Reference Concept)

Scissor Table

Foot Rest

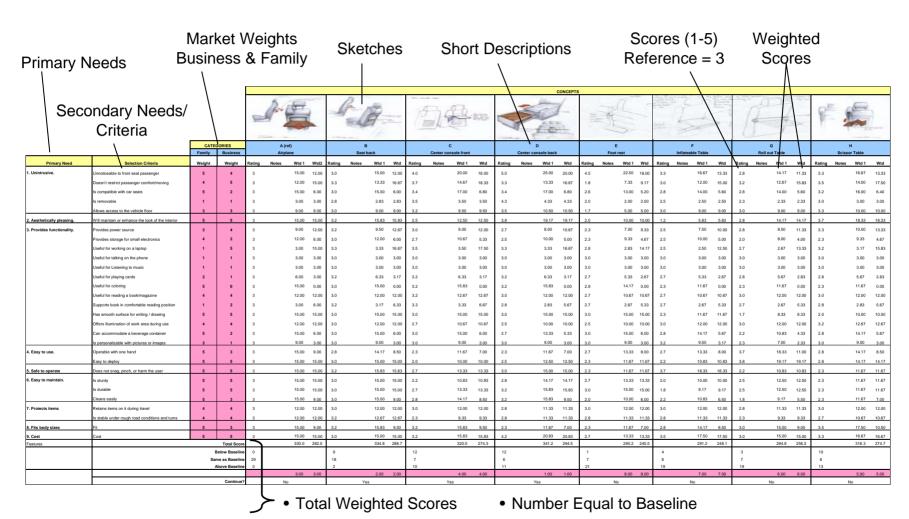


Inflatable Table



Roll-out Table

Concept Selection Matrix at a Glance



• Number Below Baseline

Overall Rank

Number Above Baseline

• In Top Three – Yes/No

Customer Features Prioritization

In order to better understand which features to include in our final concept, we are conducting customer surveys to identify which are most preferred.

Feature Survey Preliminary Results*

Feature	Importance Ranking (Rank from 1st to 9th)	from 1 least to 10 most valuable)	Comments
Light integral	2.0	8.5	
Slide out feature (airplane tray)	2.4	6.8	
Power outlet	4.4	4.5	
Storage space behind tables	5.2	6.3	
Cup Holder	5.4	4.5	
Expanding tables to center	5.6	5.7	
Electronics storage (cell/MP3)	6.0	5.7	
Storage space in tables	6.6	5.0	
Reading (tilt to help reading)	7.4	4.3	

Note: The vehicle already has two rear seat cup holders, and has a 12V outlet in the back of the center console Note: This data is preliminary due to insufficient sample size.

^{*}Results based on a limited number of completed surveys; finalized data will include a larger sample size

Key Uncertainties / Questions

Questions	Data Sources for Follow-up
How do we anchor the tray table into the frame of the vehicle?	1,5
Who exactly is our target audience?	2
Are the concepts realistic for car seat structure (i.e. is there room in the consoles and front seat)?	1,3,4
Do the concepts offer enough flexibility for table movement, i.e. to fit different body sizes?	1,3,4
Is the center consol-back idea dimensionally feasible, and if so is there a significant cost savings for a dealer to install a custom center consol vs. installing a seat-mounted tray?	1,5,6
Is the center consol-front concept dimensionally feasible, and if so will this concept provide a table to the front-seat passenger?	1,3
What weight will this table need to support during use with people leaning on it?	1,4,5
What are typical accelerations in the direction of travel, turning, and vertical?	1,5
What is a "comfortable" height or range of heights for the table?	3,4
Would the table be installed onto a seat before it is delivered to GM?	1,5
Would the table be installed onto a seat before it is delivered to the dealership?	5,6
How much will this cost GM or dealer and what are required margins?	1,2,4,6
What will the volumes be?	2,5,6

	Data Sources
1	CAD data and engineering drawings
2	GM marketing data
3	Human factors reference
4	Prototype models (testing with target customers)
5	Benchmarking from GM products
6	Dealer research

Draft Schedule

GM Lap Tray - Team #2

Page 1 of 1 3/9/04

Page 1 of 1	•													3/3	9/04	_
Duration	Start Date	End Date	TASK		_	Mar 13 20 2	27	3	A ₁		24	1	N 8	lay	22	
36d	3/4/04	4/8/0	Detail Design					_	7							
1d	3/29/04	3/29/	Select Concept	3/4 I			$\overline{}$	4/8	3							
1d	4/8/04	4/8/0	Assembly Drawings Complete			3/	29	4/8								
34d	3/13/04	4/15/	Materials and Component Selection							7						
1d	3/30/04	3/30/	Bill of Materials Complete		3/1	3 (\bigcirc		4/1	5						
1d	4/3/04	4/3/0	Vendor Selection			3/30)								
10d	4/6/04	4/15/	Procurement of Materials and			4,	,) 1/6	4/1	5						
38d	3/23/04	4/29/	Prototype & Testing								_	7				
1d	3/29/04	3/29/	Proof of Concept Prototype Complete			3/23					4/2	9				
26d	4/4/04	4/29/	Alpha prototype build			3/	/29 4/	,			4/2					
12d	4/16/04	4/27/	Construct Financial Model						4/	16	4/27	,				
1d	5/8/04	5/8/0	Final Presentation & Demonstration										^ /8 <u></u>			

Process Comments

Process Reflection

- We observed that many tray-table features (examples: cup-holders, surface material, talbe lighting, etc.) can be addressed
 independent of the general design concept. Therefore, our concept selection matrix only displays "high level" designs.
 Further customer research will determine which features are included.
- The concept selection matrix addresses how well the design answers each of the customer needs. However, in our case, the choice of design is highly constrained by the car interior. Although some dimensions are known, we will have to potentially reevaluate concept design when detailed dimensional data is available.

Group Meeting - 3/2/2004

- We discussed the next deliverables and distributed responsibilities among team members.
- We decided to follow the book's method regarding the concept selection matrix, even though we had some reservations regarding it. (see process reflection above)
- Each design was presented by its creator, and reviewed in higher detail by the team. Similar designs were consolidated, resulting in the categories at the top of the concept selection matrix.
- It was decided that the concept selection matrix will separately score each design by how it answers the needs of different populations the first being families with children, the second being business users.

Group Meeting - 3/4/2004

- The concept selection matrix was presented, and the weight of each need was discussed. As mentioned above, a different weight was assigned to the need importance for "Family" and "Business" users.
- A preliminary Gantt-chart was presented to the team and reviewed.
- Team members brought forth other lingering concerns that they thought the team should address. In addition, every team member was requested to think of the ensuing days.

GM Conference Call and Email Correspondence – 3/4/2004

- Discussed GM Visit and Project Status Review
 - Both GM teams will present to Gary Cowger on Monday March 29th from 1:00 1:30. Each team will have 15 minutes to do their presentation.
 - Required Follow-up Teams to forward the names of the presenters from each group once they are available
- Received faculty approval to sign GM confidentiality agreement
- Reviewed our market research findings that a higher weighting should be placed on the family purchaser with young children
- GM is working to provide seats, additional market data, and dimensional data. In the interim, we are taking measurements at Cadillac dealerships and conducting market research

Appendix

Concept Selection Matrix Data

		CATE	GORIES		A (re	ef)			В			С			
		Family	Business		Airpla	ane			Seat b	ack		Center console from			
Primary Need	Selection Criteria	Weight	Weight	Rating	Notes	Wtd 1	Wtd2	Rating	Notes	Wtd 1	Wtd	Rating	Notes	Wtd 1	Wtd
1. Unintrusive.	Unnoticeable to front seat passenger	5	4	3		15.00	12.00	3.0		15.00	12.00	4.0		20.00	16.00
	Doesn't restrict passanger comfort/moving	4	5	3		12.00	15.00	3.3		13.33	16.67	3.7		14.67	18.33
	Is compatible with car seats	5	2	3		15.00	6.00	3.0		15.00	6.00	3.4		17.00	6.80
	Is removable	1	1	3		3.00	3.00	2.8		2.83	2.83	3.5		3.50	3.50
	Allows access to the vehicle floor	3	3	3		9.00	9.00	3.0		9.00	9.00	3.2		9.50	9.50
2. Aesthetically pleasing.	Will maintain or enhance the look of the interior	5	5	3		15.00	15.00	3.2		15.83	15.83	2.5		12.50	12.50
3. Provides functionality.	Provides power source	3	4	3		9.00	12.00	3.2		9.50	12.67	3.0		9.00	12.00
	Provides storage for small electronics	4	2	3		12.00	6.00	3.0		12.00	6.00	2.7		10.67	5.33
	Useful for working on a laptop	1	5	3		3.00	15.00	3.3		3.33	16.67	3.5		3.50	17.50
	Useful for talking on the phone	1	1	3		3.00	3.00	3.0		3.00	3.00	3.0		3.00	3.00
	Useful for Listening to music	1	1	3		3.00	3.00	3.0		3.00	3.00	3.0		3.00	3.00
	Useful for playing cards	2	1	3		6.00	3.00	3.2		6.33	3.17	3.2		6.33	3.17
	Useful for coloring	5	0	3		15.00	0.00	3.0		15.00	0.00	3.2		15.83	0.00
	Useful for reading a book/magazine	4	4	3		12.00	12.00	3.0		12.00	12.00	3.2		12.67	12.67
	Supports book in comfortable reading position	1	2	3		3.00	6.00	3.2		3.17	6.33	3.3		3.33	6.67
	Has smooth surface for writing / drawing	5	5	3		15.00	15.00	3.0		15.00	15.00	3.0		15.00	15.00
	Offers illumination of work area during use	4	4	3		12.00	12.00	3.0		12.00	12.00	2.7		10.67	10.67
	Can accommodate a beverage container	5	2	3		15.00	6.00	3.0		15.00	6.00	3.0		15.00	6.00
	Is personalizable with pictures or images	3	1	3		9.00	3.00	3.0		9.00	3.00	3.0		9.00	3.00
4. Easy to use.	Operable with one hand	5	3	3		15.00	9.00	2.8		14.17	8.50	2.3		11.67	7.00
	Easy to deploy	5	5	3		15.00	15.00	3.0		15.00	15.00	2.0		10.00	10.00
5. Safe to operate	Does not snag, pinch, or harm the user	5	5	3		15.00	15.00	3.2		15.83	15.83	2.7		13.33	13.33
6. Easy to maintain.	Is sturdy	5	5	3		15.00	15.00	3.0		15.00	15.00	2.2		10.83	10.83
	Is durable	5	5	3		15.00	15.00	3.0		15.00	15.00	2.7		13.33	13.33
	Cleans easily	5	3	3		15.00	9.00	3.0		15.00	9.00	2.8		14.17	8.50
7. Protects items	Retains items on it during travel	4	4	3		12.00	12.00	3.0		12.00	12.00	3.0		12.00	12.00
	Is stable under rough road conditions and turns	4	4	3		12.00	12.00	3.2		12.67	12.67	2.3		9.33	9.33
8. Fits body sizes	Fit	5	3	3		15.00	9.00	3.2		15.83	9.50	3.2		15.83	9.50
9. Cost	Cost	5	5	3		15.00	15.00	3.0		15.00	15.00	3.2		15.83	15.83
Features	<u> </u>		Total Score			330.0	282.0			334.8	288.7			320.5	274.3
			Below Baseline me as Baseline	0 29				9 18				12 7			
			ne as Baseline Above Baseline	0				2				10			
						3.00	3.00			2.00	2.00			4.00	4.00
			Continue?		No)			Yes	8			Ye	es	

		CATE	GORIES		D				E			F			
		Family	Business		Center cons	ole back			Foot r	est		Inflateable Table			
Primary Need	Selection Criteria	Weight	Weight	Rating	Notes	Wtd 1	Wtd	Rating	Notes	Wtd 1	Wtd	Rating	Notes	Wtd 1	Wtd
1. Unintrusive.	Unnoticeable to front seat passenger	5	4	5.0		25.00	20.00	4.5		22.50	18.00	3.3		16.67	13.33
	Doesn't restrict passanger comfort/moving	4	5	3.3		13.33	16.67	1.8		7.33	9.17	3.0		12.00	15.00
	Is compatible with car seats	5	2	3.4		17.00	6.80	2.6		13.00	5.20	2.8		14.00	5.60
	Is removable	1	1	4.3		4.33	4.33	2.0		2.00	2.00	2.5		2.50	2.50
	Allows access to the vehicle floor	3	3	3.5		10.50	10.50	1.7		5.00	5.00	3.0		9.00	9.00
2. Aesthetically pleasing.	Will maintain or enhance the look of the interior	5	5	3.8		19.17	19.17	2.0		10.00	10.00	1.2		5.83	5.83
3. Provides functionality.	Provides power source	3	4	2.7		8.00	10.67	2.3		7.00	9.33	2.5		7.50	10.00
	Provides storage for small electronics	4	2	2.5		10.00	5.00	2.3		9.33	4.67	2.5		10.00	5.00
	Useful for working on a laptop	1	5	3.3		3.33	16.67	2.8		2.83	14.17	2.5		2.50	12.50
	Useful for talking on the phone	1	1	3.0		3.00	3.00	3.0		3.00	3.00	3.0		3.00	3.00
	Useful for Listening to music	1	1	3.0		3.00	3.00	3.0		3.00	3.00	3.0		3.00	3.00
	Useful for playing cards	2	1	3.2		6.33	3.17	2.7		5.33	2.67	2.7		5.33	2.67
	Useful for coloring	5	0	3.2		15.83	0.00	2.8		14.17	0.00	2.3		11.67	0.00
	Useful for reading a book/magazine	4	4	3.0		12.00	12.00	2.7		10.67	10.67	2.7		10.67	10.67
	Supports book in comfortable reading position	1	2	2.8		2.83	5.67	2.7		2.67	5.33	2.7		2.67	5.33
	Has smooth surface for writing / drawing	5	5	3.0		15.00	15.00	3.0		15.00	15.00	2.3		11.67	11.67
	Offers illumination of work area during use	4	4	2.5		10.00	10.00	2.5		10.00	10.00	3.0		12.00	12.00
	Can accommodate a beverage container	5	2	2.7		13.33	5.33	3.0		15.00	6.00	2.8		14.17	5.67
	Is personalizable with pictures or images	3	1	3.0		9.00	3.00	3.0		9.00	3.00	3.2		9.50	3.17
4. Easy to use.	Operable with one hand	5	3	2.3		11.67	7.00	2.7		13.33	8.00	2.7		13.33	8.00
	Easy to deploy	5	5	2.5		12.50	12.50	2.3		11.67	11.67	2.2		10.83	10.83
5. Safe to operate	Does not snag, pinch, or harm the user	5	5	3.0		15.00	15.00	2.3		11.67	11.67	3.7		18.33	18.33
6. Easy to maintain.	Is sturdy	5	5	2.8		14.17	14.17	2.7		13.33	13.33	2.0		10.00	10.00
	Is durable	5	5	3.2		15.83	15.83	3.0		15.00	15.00	1.8		9.17	9.17
	Cleans easily	5	3	3.2		15.83	9.50	2.0		10.00	6.00	2.2		10.83	6.50
7. Protects items	Retains items on it during travel	4	4	2.8		11.33	11.33	3.0		12.00	12.00	3.0		12.00	12.00
	Is stable under rough road conditions and turns	4	4	2.8		11.33	11.33	2.8		11.33	11.33	2.8		11.33	11.33
8. Fits body sizes	Fit	5	3	2.3		11.67	7.00	2.3		11.67	7.00	2.8		14.17	8.50
9. Cost	Cost	5	5	4.2		20.83	20.83	2.7		13.33	13.33	3.5		17.50	17.50
Features			Total Score			341.2	294.5			290.2	245.5			291.2	248.1
			Below Baseline					1				4			
			me as Baseline Above Baseline	6 11				7 21				6 19			
						1.00	1.00			8.00	8.00			7.00	7.00
			Continue?		Yes				No				N	0	

		CATE	GORIES		(G		н						
		Family	Business		Roll ou	ıt Table			Scisso	r Table				
Primary Need	Selection Criteria	Weight	Weight	Rating	Notes	Wtd 1	Wtd	Rating	Notes	Wtd 1	Wtd			
1. Unintrusive.	Unnoticeable to front seat passenger	5	4	2.8		14.17	11.33	3.3		16.67	13.33			
	Doesn't restrict passanger comfort/moving	4	5	3.2		12.67	15.83	3.5		14.00	17.50			
	Is compatible with car seats	5	2	2.8		14.00	5.60	3.2		16.00	6.40			
	Is removable	1	1	2.3		2.33	2.33	3.0		3.00	3.00			
	Allows access to the vehicle floor	3	3	3.0		9.00	9.00	3.3		10.00	10.00			
2. Aesthetically pleasing.	Will maintain or enhance the look of the interior	5	5	2.8		14.17	14.17	3.7		18.33	18.33			
3. Provides functionality.	Provides power source	3	4	2.8		8.50	11.33	3.3		10.00	13.33			
	Provides storage for small electronics	4	2	2.0		8.00	4.00	2.3		9.33	4.67			
	Useful for working on a laptop	1	5	2.7		2.67	13.33	3.2		3.17	15.83			
	Useful for talking on the phone	1	1	3.0		3.00	3.00	3.0		3.00	3.00			
	Useful for Listening to music	1	1	3.0		3.00	3.00	3.0		3.00	3.00			
	Useful for playing cards	2	1	2.8		5.67	2.83	2.8		5.67	2.83			
	Useful for coloring	5	0	2.3		11.67	0.00	2.3		11.67	0.00			
	Useful for reading a book/magazine	4	4	3.0		12.00	12.00	3.0		12.00	12.00			
	Supports book in comfortable reading position	1	2	2.7		2.67	5.33	2.8		2.83	5.67			
	Has smooth surface for writing / drawing	5	5	1.7		8.33	8.33	2.0		10.00	10.00			
	Offers illumination of work area during use	4	4	3.0		12.00	12.00	3.2		12.67	12.67			
	Can accommodate a beverage container	5	2	2.2		10.83	4.33	2.8		14.17	5.67			
	Is personalizable with pictures or images	3	1	2.3		7.00	2.33	3.0		9.00	3.00			
4. Easy to use.	Operable with one hand	5	3	3.7		18.33	11.00	2.8		14.17	8.50			
	Easy to deploy	5	5	3.8		19.17	19.17	2.8		14.17	14.17			
5. Safe to operate	Does not snag, pinch, or harm the user	5	5	2.2		10.83	10.83	2.3		11.67	11.67			
6. Easy to maintain.	Is sturdy	5	5	2.5		12.50	12.50	2.3		11.67	11.67			
	Is durable	5	5	2.5		12.50	12.50	2.3		11.67	11.67			
	Cleans easily	5	3	1.8		9.17	5.50	2.3		11.67	7.00			
7. Protects items	Retains items on it during travel	4	4	2.8		11.33	11.33	3.0		12.00	12.00			
	Is stable under rough road conditions and turns	4	4	2.3		9.33	9.33	2.7		10.67	10.67			
8. Fits body sizes	Fit	5	3	3.0		15.00	9.00	3.5		17.50	10.50			
9. Cost	Cost	5	5	3.0		15.00	15.00	3.3		16.67	16.67			
Features			Total Score	1		294.8	256.3			316.3	274.7			
			Below Baseline	3				10						
			me as Baseline Above Baseline	7 19				6 13						
	<u> </u>		ADOVE DASEIINE	13		6.00	6.00	10		5.00	5.00			
			Continue?		N	10			Ν	lo				