Car Clock Design: The Effects of Usability Testing on Ease of Use

Wayword Motors

1 ISSUES

1. What fetures make car clocks easy to use?
2. Is legibility important in the designing of car clocks?
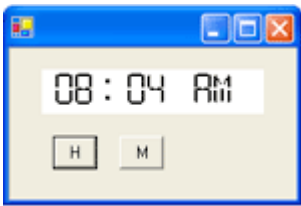3. How does iterative design improve usabity?

2 TESTING

Subjects (n=4)					
#	Age	Sex	Digital Clock?	PC Exp.?	Av. Annual Mileage?
1	20	M	YES	YES	8,000
2	25	F	YES	YES	15,000
3	21	M	YES	YES	12,000
4	19	M	YES	YES	12,000

Design Requirements:*
- Front Face 3in x 2in
- 7 segment LED Font
- Cannot hold two buttons at same time
- No switch constraints
- Easy to read/Easy to set

Iterative 1: Subjects 1 & 2

All images appear at 52% of actual size

V1:

08 : 04 AM

V2:

Car Clock
11:34 AM

VS.

Time Usage (s) [4 Trial Average]					
	Think	Hrs	Min	Other	Overall
V1	3.925	7.288	9.150	0.000	20.363
V2	5.125	6.043	10.093	0.765	22.025

Comments:
- Simple design
- Easy to understand
- No back button

Comments:
- Backwards feature helpfull
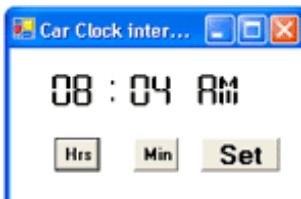- Difficult to locate AM and PM
- Too many buttons

- V1 1.663s faster than V2
- V1 has lower think time, indicating less complicated design

Design Improvements:
- Eliminate V2
- Add Set Button to V1 and redesign

Iterative 2: Subject 3

V3:

Car Clock inter...
08 : 04 AM

Comments:
- Simple design
- Flashing cue helpful
- No "back" button

Time Usage (s) [2 Trial Average]					
	Think	Hrs	Min	Other	Overall
V3	4.820	10.545	3.557	.460	19.390

- V3 0.073s faster than V1

Design Improvements:
- Add "back" button to the hours and minutes
- Change design to mimic realistic

V4:

Comments:
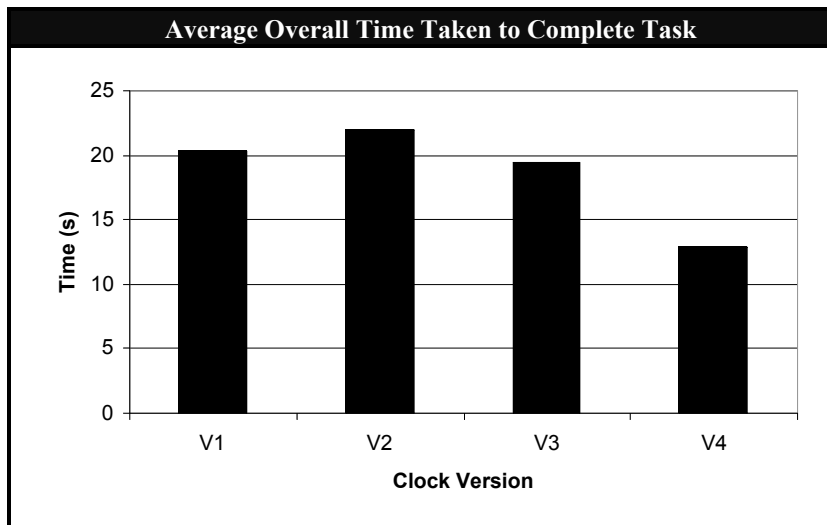- Liked "up" and "down" features
- High functionality
- Intuitive button configuration

Time Usage(s) [4 Trial Average]					
	Think	**Hrs**	**Min**	**Other**	**Overall**
V4	3.680	3.080	5.675	.490	12.925

- V4: Time decrease by 6.466s

3 RESULTS

Average Overall Time Taken to Complete Task

Final Design:
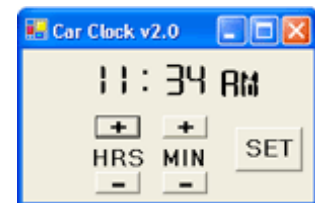
- + and – buttons
- Designed for usability
- Flashing Cues
- Set Button

Legibility (Bond Rule: H/D > .007)			
	Time Display	**Controls (Worst Case)**	**Acceptable?**
V1	0.0138	0.00694	NO
V2	0.00694	0.00521	NO
V3	0.01215	0.00300	NO
V4	**0.01215**	**0.00868**	**YES**

4 CONCLUSIONS

1. UP/DOWN buttons, flashing cues, and simplicity enhances usability
2. Legibility was unacceptable for all versions except V4, the final design.
3. V4 yielded task completion times 36.5% lower than V1, 41.3% lower than V2, and 33.3% lower than V3.
4. Iterative design provided enhanced usability through user feedback and resulted in design improvements.