User Observation Study: Equipment Logging Systems

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Motivation

- Maintaining a reliable log of equipment in and out of a University Housing Service desk
- Necessary information: Date and time of rental, resident name, resident ID number, name of equipment, equipment version code (if there are multiple of one item)
- Desired Outcome: Reliably tracking equipment rentals so as residents do not get charged incorrect late fees and so equipment does not go missing

Conclusion:

When comparing two equipment logging systems, it was concluded that the system that features a GUI and database is faster and easier to use than a system that uses a spreadsheet.

Operations Tested in this study

- Can the participant accurately check out an item to a “resident”
- Can the participant accurately check in an item from a “resident”
- Can the participant accurately discern if the item is late or not based on a list of loan times for the variety of equipment available to rent?
- Can the resident accurately discern from the system if there are any items available to loan out?

System 1: Spreadsheet System

- Two different Microsoft Excel spreadsheets
- User fills out columns for an equipment check out
- User cuts and pastes the row into a different spreadsheet for check in
- Reflects the current system in use at University of Oregon Housing

Example of Spreadsheet System

	A	B	C	D	E	F	G	H	I	J
1	Last	First	95#	Time out	date out	item	item code	Time in	date in	late notice emailed
2	Young	Judith	951023421	3:00 PM	11/22/19	Ping pong paddle	1			23-Nov
3	laei	alonzo	951215912	7:00 PM	11/24/19	HDMI	3			
4	Grant	Harmony	951020941	7:02 PM	11/24/19	Screwdriver	1			
5	Lewis	Mary	951395184	7:30 PM	11/24/19	Dirty Dancing	1			
6	Artzo	Ashley	963284923	1:00 PM	11/24/19	Ping pong paddle	2			
7	Garbonzo	Abby	951632185	8:00 PM	11/24/19	HDMI	2			
8										
9										
10										

System 1: GUI System

- C++, SQLite Database, QT GUI
- Database keeps track of which item is out, who checked it out, and for how long it has been lent out
- Displays late items on main window
- Won’t let the user check out an unavailable item
- Displays message if the item is late

Example of GUI System

	fname	lname	id	equip_name	equip_vers	dt_out	type
1	Claire	Kolln	951541443	Zindan	1	11-20-2019 07:53 AM	movie
2	Jane	Doe	951234678	Hammer	2	11-24-2019 06:16 PM	tool
3	Jill	Jackson	123456789	Monopoly	1	11-24-2019 06:16 PM	game
4	John	Doe	123456788	Hammer	1	11-24-2019 06:17 PM	tool
5	Allen	Price	951335205	Lucky in Love	1	11-24-2019 06:48 PM	movie

Check In

Check Out

Load/ReLoad

Late Items:
Zindan - 1

Equipment Database Connected

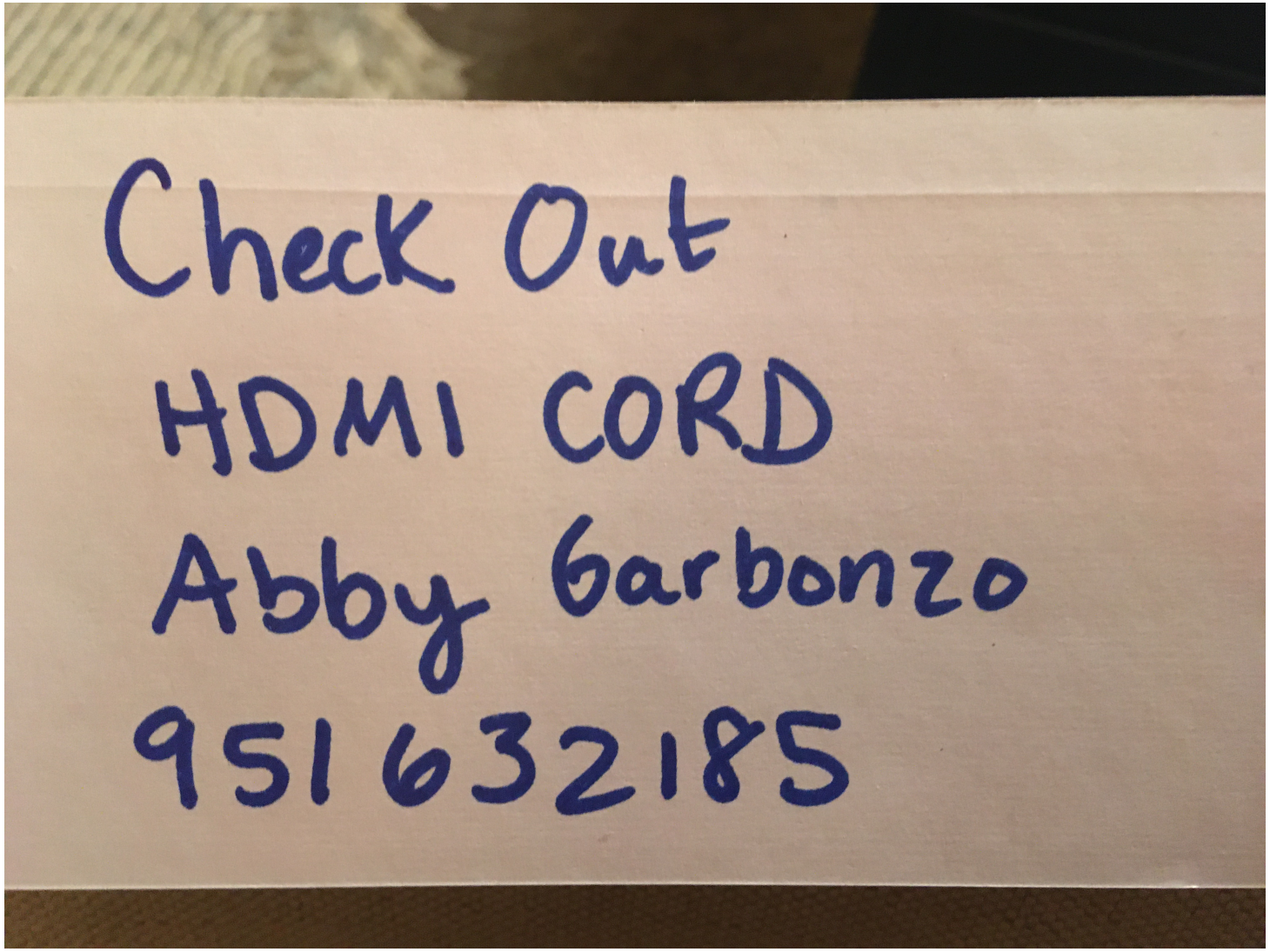
Experimental Design

- 5 participants: Students under the age of 23 pursuing varying degrees
- All have little to no experience working with equipment logs
- All have at least a base knowledge of Microsoft Excel
- Materials: MacBook Pro, 2 sets of transaction cards, reference cards containing the loan times for different equipment types
- Transaction cards: 10 per system, tested the operations listed in slide four
  - At least one asked the user to check out an unavailable item
  - At least one asked the user to check in an item that was late

Data Collection

- Taped each block of trials using a Sony Alpha a72 camera and a tripod
- Had an index card for each participant to keep collected data and notes on for each transaction card

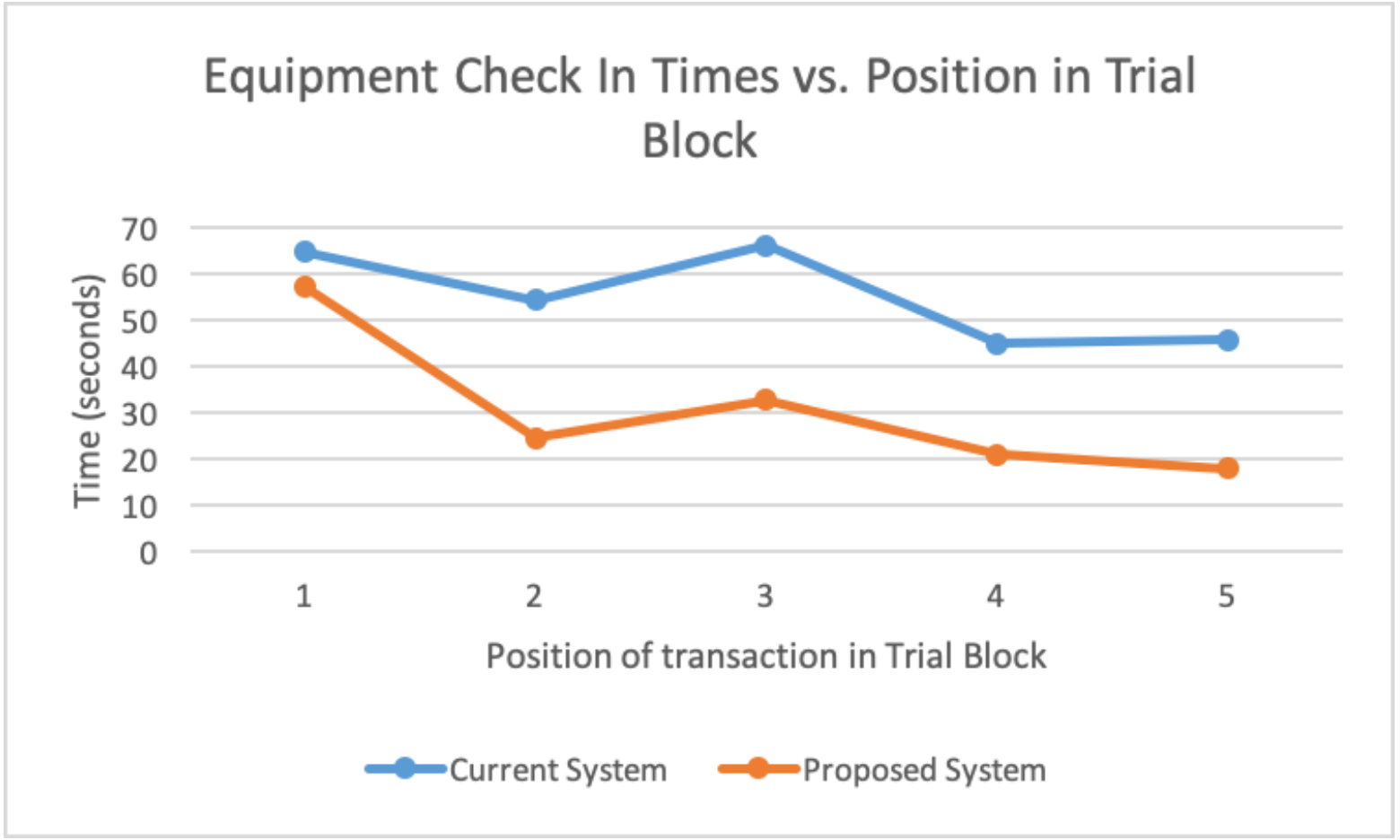
Example of a transaction card



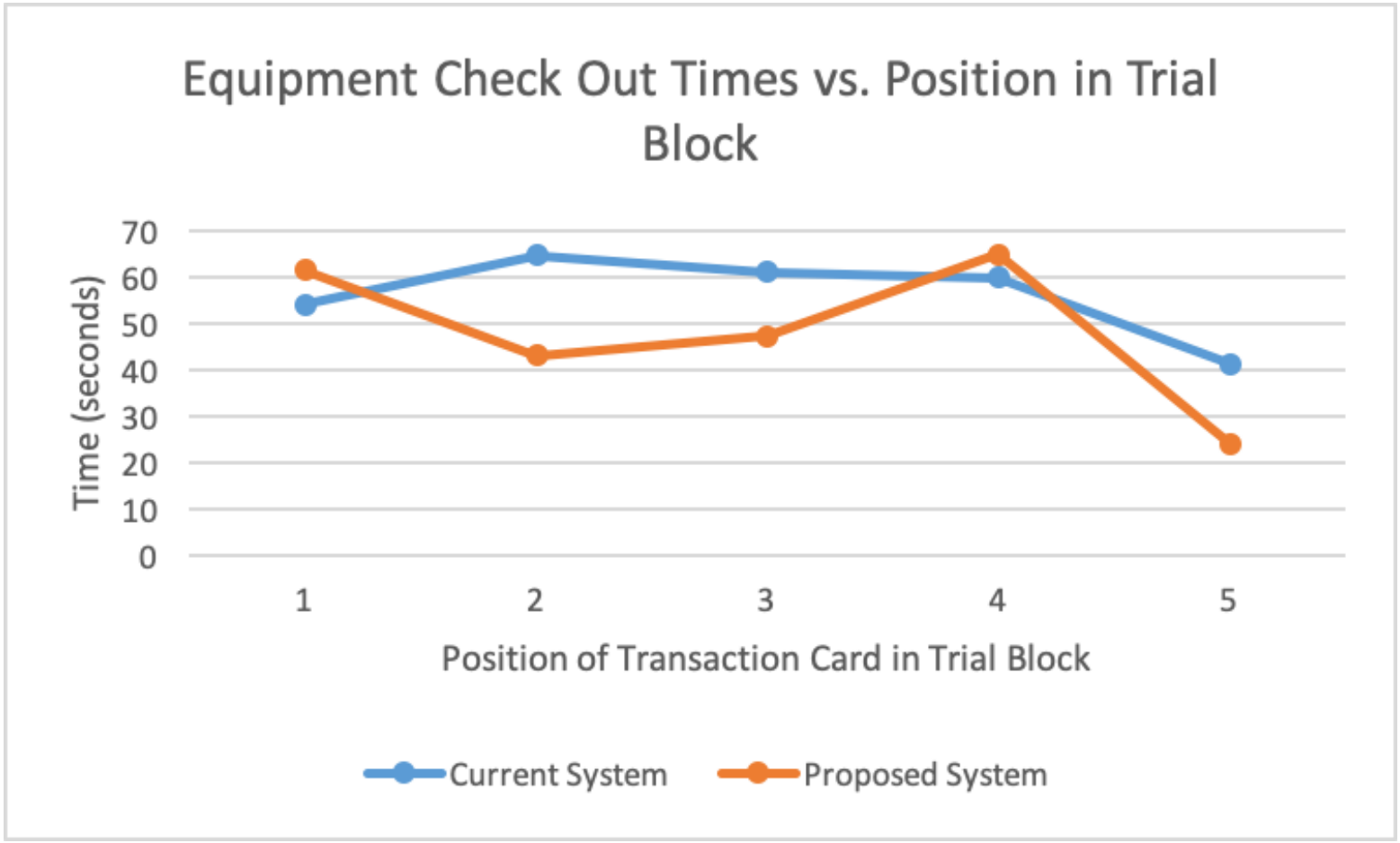
Experimental Design (cont)

- Each participant was told they were taking on the role of a Housing Service Desk worker and was told their goal was to finish each transaction as quickly as possible while maintaining a high level of accuracy
- Were instructed to read each card out loud before carrying out the task, and to vocalize their actions as they performed them especially if they believe that there are no more actions to be taken for a particular card. Were timed from when they finished reading the transaction card to when they picked up the next card.
- Were told that they can not check out an item which is checked out to another student
- Were told that they must vocally acknowledge that an item is late

Results


Equipment Check In Times vs. Position in Trial Block
Time (seconds)
70
60
50
40
30
20
10
0
1
2
3
4
5
Position of transaction in Trial Block
Current System
Proposed System

Results


Equipment Check Out Times vs. Position in Trial Block
Time (seconds)
70
60
50
40
30
20
10
0
1
2
3
4
5
Position of Transaction Card in Trial Block
Current System
Proposed System

Results

- More difficult for the user to make mistakes on the GUI system
- Faster for the user to type in a movie name than pick it out from a large drop down menu
- Check in on the GUI system was faster than on the spreadsheet partially because it required significantly less keyboard/track pad interactions (4 vs 11)
- Systems were about equal in terms of users recognizing that an item was late (2/4 vs. 3/5)
- 5/5 participants noticed they were asked to check out an unavailable item in the GUI system and only 3/5 noticed on the spreadsheet system
- A user who reported her knowledge of Microsoft Excel was an 8 out of 10 was only moderately faster at checking in data than a user who reported a knowledge of 4 out of 10 – still had faster operations on the GUI system for the most part

Summary

- The GUI system was overall faster and easier to use
- Study highlighted some changes that should be made to the GUI system:
  - Alphabetizing drop down lists of items – especially for movies because there are 200+ items to choose from
  - Making late message more emphasized by making it red and bigger on check in screen