

## Problems (n = 20) Revealed through Heuristic Evaluation

Problem Type	Problem	Violated Heuristics	Average Severity Rating		Vending Machine
Interface Accessibility	There is no way to interact with the vending machine using voice commands.	H7, H8	3.68	3.32	V1,V2,V3
	There is no touchscreen for product selection and other functionalities.	H3, H4, H5, H7, H8, H9, H10	3.92		V3
	The money insertion option is in a high position.	H2, H4, H7, H8	3.61		V3
	There is no place for inserting the coin to purchase the product.	H7	3.63		V3
	The number pad for selecting products is not visible in the absence of light.	H4, H8	1.78		V3
Transactional Design	After inserting the money for a product, there is no way to retrieve that money if we don't want the product anymore.	H3, H4, H7	3.88	3.58	V1, V2, V3
	There is no place from where returned coins can be collected.	H4, H8	3.72		V3
	The cash button on the interface is absent.	H4	3.42		V1
	No option is available for online payment.	H7	3.6		V3
	There is no appropriate instruction about the accepted type of banknote.	H9	3.32		V1, V3
Instructional Layout	There is no alert message while discarding the item from the cart.	H4, H5	3.23	2.90	V2
	After selecting the product, there is no instruction for inserting the money.	H1	2.45		V1, V3
	No notification is given while releasing the product.	H1, H9	2.20		V2, V3
	The instructions for using this machine are very small.	H2, H4, H7, H8	3.02		V3
	No option is available to discard any item.	H3	3.48		V3
	No option for selecting multiple items at once.	H3	2.48		V2, V3
	Ambiguity exists in the guidance of product purchasing.	H10	3.45		V1,V2,V3
Visibility and Clarity	The coin collection is a little below. So sometimes it is not noticeable, and no message is provided on the screen while returning the coin.	H1, H4, H8	3.18	2.91	V1, V2
	No instructions are given on which way to swipe or even need to swipe, and the arrow of the push sign is not appropriate.	H4	2.32		V1, V2
	The display size is small and blurry.	H2, H8	3.23		V3

## Problems (n = 14) Revealed through Cognitive Walkthrough

Steps/ Questions	Vending Machine	Findings		Usability Problem Type
		Yes/No	Usability Problems (Why responded as No?)	
Step #1: Select the desired item from the touchscreen interface. (Applicable for both Task-1 and Task-2)				
Q1: Will the user select the desired item from the touchscreen interface?	V1 & V2	Yes(67%) No(33%)	1) Products are not categorized. 2) Voice command is not available.	Interface Accessibility & Instructional Layout
	V3	Yes(0%) No(100%)	1) The touchscreen interface and voice commands are not available.	Interface Accessibility
Q2: Are the items on the touchscreen visible?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) Absence of a touchscreen interface.	Interface Accessibility
Q3: Will the user understand that the item needs to be selected from the touchscreen interface?	V1	Yes(67%) No(33%)	1) Absence of appropriate instruction for product selection.	Instructional Layout
	V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) No interface to select items in a categorized way.	Interface Accessibility
Q4: Will the user understand that the item has been selected?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) No way to notify about product selection due to the absence of a touchscreen interface.	Instructional Layout
Step #2: Choose the online payment method (Applicable for Task 1)				
Q1: Will the user choose the online payment method?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) Not mentioned whether online payment can be accomplished or not.	Transactional Design
Q2: Is the online payment method available?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) No clear icon is provided for online payment.	Transactional Design
Q3: Will the user recognize that products can be purchased by online payment?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) The vending machine does not offer an online payment method.	Transactional Design
Q4: Will the user understand that the online payment has been successful?	V1,V2 & V3	Yes(33%) No(67%)	1) No notification about payment confirmation.	Transactional Design
			1) Due to the absence of online payment methods, no notification is provided.	Transactional Design
Step #2: Choose the cash payment method (Applicable for Task 2)				
Q1: Will the user choose the cash payment method?	V1, V2 & V3	Yes(100%) No(0%)		
Q2: Is the cash payment method available?	V1, V2 & V3	Yes(100%) No(0%)		
Q3: Will the user recognize that products can be purchased by cash payment?	V1 & V3	Yes(33%) No(67%)	1) No notification about inserting the bank notes.	Transactional Design

	V2	Yes(100%) No(0%)		
Q4: Will the user understand that the cash payment has been successful?	V1 & V2	Yes(100%) No(0%)		
	V3	Yes(0%) No(100%)	1) No way to understand the payment confirmation until the product is released.	Transactional Design