

ANALYSIS OF DIFFERENT ATM INTERFACES IN PAKISTAN TO MINIMIZE COGNITIVE BURDEN FOR INTERACTION

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ABSTRACT: Now a day every bank in Pakistan has facility of Automated Teller Machine (ATM) throughout country. But many people, especially layman are still reluctant to use it, because of its complex layout. ATM of every bank has its own layouts which also confuse users. In this paper, we'll try to find problems and flaws in current layouts of ATMs (Automated Teller Machines) by comparing current layouts with HCI rules for Pakistani ATMs. Our conclusion will not base on our assumptions only, but we'll also conduct surveys to get opinion of people (users). This paper elaborates the need of better solution in ATM structure and also enlightens the nature of people using the ATM machines.

Keywords: Automated Teller Machine, ATM, ATM Layout, Human computer interaction, HCI.

INTRODUCTION

In Pakistan the majority of bank customers in big cities now regularly use Automatic Teller Machines (ATMs). Today's young generation may have not known banking without its use. ATM made the life of a simple user easier as no long waiting queues for just small amount of money. For these customers, ATM is some sort of a tool providing a common functionality of receiving cash in less time. It also provides some of fundamental financial information like mini receipt; funds transfer. (De Angeli et al., 2002). ATM can be considered as interactive computer machine. This study can be carried out using human computer interaction (HCI) rules.

HCI Introduction: HCI is the study of interaction which describes that how the people interact with computers and this also includes the branch of study that what computers are achieved or developed to interact with human beings (www.cs.bham.ac.uk). In general the Interaction between humans and computer occurs at an interface. This interface can be a combination of hardware and software together. Major goal of HCI is to make effective interaction between humans and computers. This will lead to the production of human friendly interfaces for all type of users. HCI addresses important issues of developing markets such as absence of literacy and weak or limited Infrastructures environment. The culture is also a very important factor in HCI. (DeAngeli et al., 2003), (Pepermans et al., 1996)

HCI contains three major parts;

1. Human (user)
2. Computer
3. Interaction

- Human:** Human we mean a user or there may be a group of users who are working together or performing same task. Every human (user) have its own mental approach. He may think different from other humans (users).
- Computer:** Computer does not mean a PC or laptop only but ATM machines, VCR, Mobile phones even calculator are also included in Computer.
- Interaction:** Interaction means "communication between two entities". In human computer interaction both entities are quite different from each other but we have to make sure that both are working synchronize. In this research paper we'll identify that current layouts of ATMs (Automated Teller Machines) in Pakistan are very complex and not per according to rules of HCI. These ATMs interfaces not fulfilling the major goal of HCI (i.e. to make interaction between humans and computers effective and easy). And also not following Ben Shneiderman's Eight Golden Rules of HCI (Shneiderman, 1996)

Table-1 Use of Different ATM interfaces

	Frequency	Percent	Valid Percent	Cumulative Percent
One	15	15.0	15.0	15.0
Two	19	19.0	19.0	34.0
Three	48	48.0	48.0	82.0
More than 3	18	18.0	18.0	100.0
Total	100	100.0	100.0	

ATM Introduction: Automated Teller Machine or ATM is a two way computerized and communication device that provides automated financial services. ATM require magnetic strip card (credit or debit card) and PIN (Personal Identification Number) to perform required activity (Shneiderman, 1996). From an ATM, user can securely withdraw cash, deposit money, transfer money to another account, check balance, and pay utility bills etc. The user inserts his/her ATM card (debit card/credit card), enter his/her pin code and after authentication user can perform these operations. The main idea behind ATM was to replace traditional human tellers with an automated machine. The usability factor plays very curial role for adoption of ATM interfaces for the customers. (Stevens et al., 1986)

Current Flow of ATMs: The current process can be listed as follows (www.radiohead.blogspot.com):

- User Inserts card.
- User Selects language (English/Urdu).
- User enters his/her pin code.
- User Choose transaction option (Fast Cash/Cash Withdraw etc).
- User (Enter or Select) Amount (depending on previous option).
- System asks for Receipt option? (Yes / No).
- System Withdraw Cash.
- In some machines System asks for another transaction? (Yes / No)
- User Collects receipt.
- User Collects card

MATERIALS AND METHODS

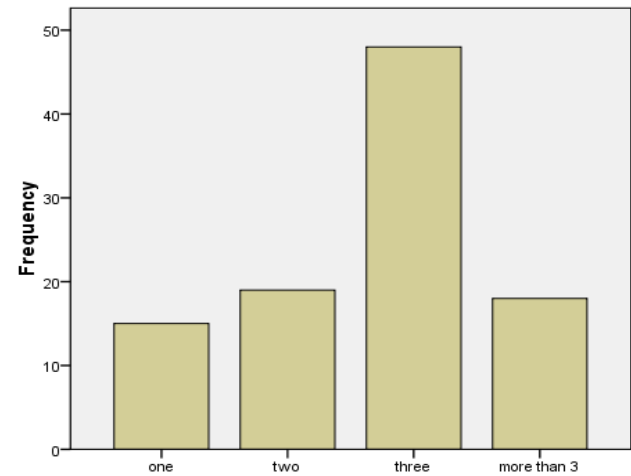
As mentioned above that our research paper will based on survey results. We've conducted a survey Pakistan base ATMs and here are its results:

A. **Use of different ATM interfaces:** Question1 results show the percentage of persons who use different ATM interfaces. Most of the users use more than two ATM interfaces. Only 15% use one ATM interface, whereas remaining users use more than one ATM interface. 66% users use three or more than three ATM interfaces. Table-1corresponds to the results of question 1 and bar chart is shown here:

B. **Difference in ATM interfaces:** Our next step is to find out that how many users find the difference between those ATM interfaces which they use. Question 2 results shows us that how many users found difference in ATM interfaces. It is shown in Fig. 2 and table-2.

C. **People having difficulty using different interfaces:** In the next step we have to find those users who feel difficulties using these interfaces. Question 3 result shows that how many users feel difficulty using

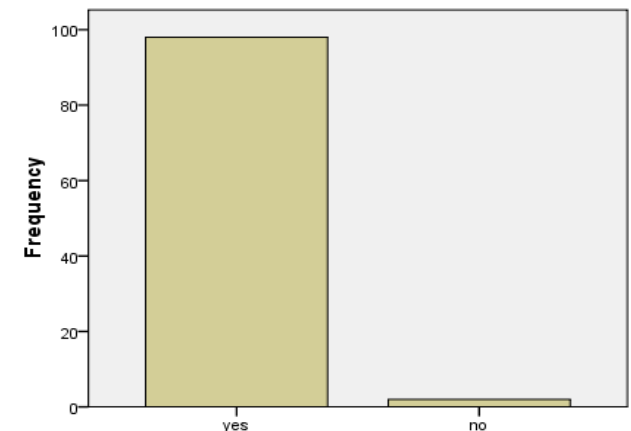
different ATM interfaces. Our 71% users found difficulty using different ATM interfaces. The ratio of finding the difficulty is quite high. The frequency table for result of question 3 and respective bar diagram is shown below:



Bar Diagram-1: Use of Different ATM Interfaces

Table-2: Difference in ATM interfaces

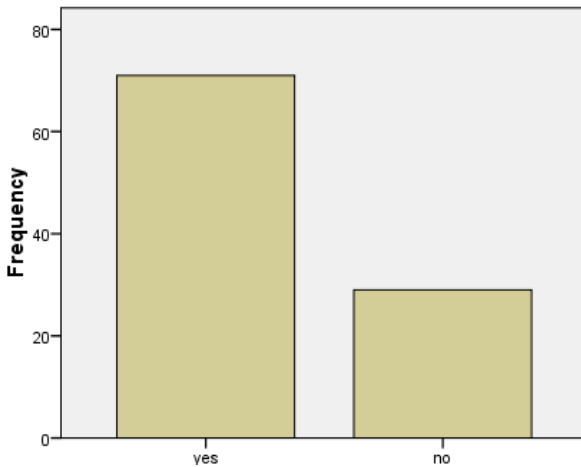
	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	98	98.0	98.0	98.0
No	2	2.0	2.0	100.0
Total	100	100.0	100.0	



Bar Diagram-2: Difference in ATM Interfaces

Table-3: People Having Difficulty Using Different Interfaces

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	71	71.0	71.0	71.0
No	29	29.0	29.0	100.0
Total	100	100.0	100.0	



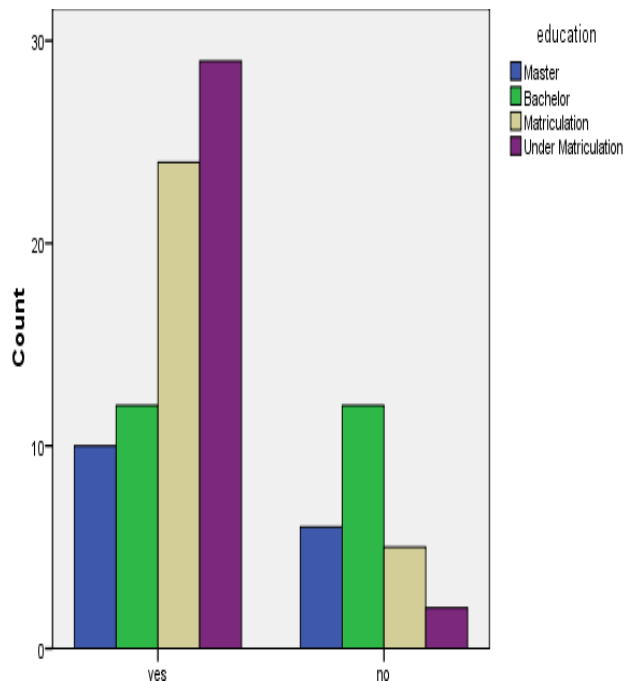
Bar Diagram-3: People facing difficulty using different interfaces

D. Literate people having difficulty using different interfaces: The literacy rate of our country is not up to the mark. This certainly affects the ATM users as well. The next calculations show the crosstab evaluation of users having difficulties in use of different ATM interfaces according to their education. The user who has higher education has low ratio of facing difficulties as compared to the people having less education.

Almost 30 out of 31 users who are under matriculation find difficulties using different interfaces. Almost 28 out of 29 users whose education is matriculation find difficulties using different interfaces. The ratio of facing difficulty by Bachelor or Master degree holder is much lesser comparatively. The frequency table of crosstab evaluation and respective bar diagram is shown below:

Table-4: People facing difficulty using different interfaces with varying literacy levels

People having difficulty using different interfaces			Education				Total
			Master	Bachelor	Matric	Under Matric	
	yes	Count	10	12	24	29	75
		% of Total	10.0%	12.0%	24.0%	29.0%	75.0%
	no	Count	6	12	5	2	25
		% of Total	6.0%	12.0%	5.0%	2.0%	25.0%
Total	Count		16	24	29	31	100
	% of Total		16.0%	24.0%	29.0%	31.0%	100.0%



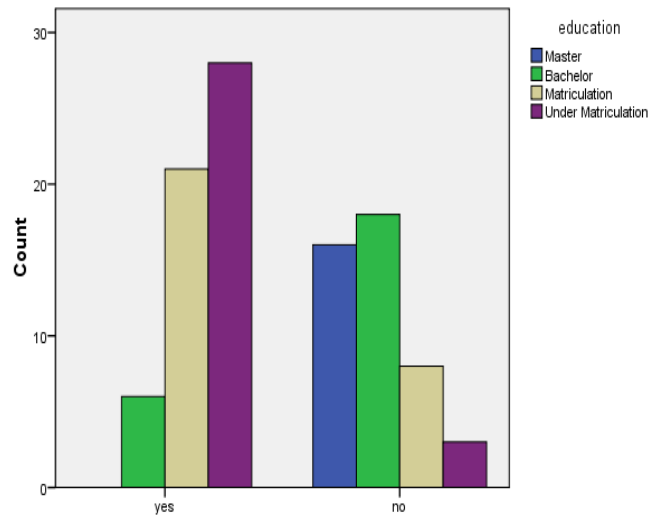
Bar Diagram-4: People facing difficulty using different interfaces with various literacy levels

E. People using one interface due to having difficulty using different interfaces: In the next step we find ratio of those users who use only one ATM interface due to difference in the ATM interfaces. Our next question's result shows us that how many users use only one interface. The ratio of using one ATM interface is high among low educated users whereas the difference in ATM interfaces does not affect those users who are highly educated. People who use only one interface x education Cross tabulation

Related Work: In context of ATM layout, Mr. Kevin Curran & Mr. David King from University of Ulster Northern Ireland, UK (Curran, 2008) have done similar work in their paper title as "Investigating the Human Computer Interaction Problems with Automated Teller Machine (ATM) Navigation Menus" for their country on U.K. base ATMs. Their work was to reduce transaction time of ATMs by making its navigation menu simpler. Our work is to elaborate the fact that in our country, Pakistan, the ATM layout should be made simpler so it becomes more useful even for layman and illiterate people. This will lead to the extra income to the banks in Pakistan.

Table-5: People who use only one interface with varying literacy levels

		Education					Total
people who use only one interface	yes	Master	Bachelor	Matric	Under Matric		
		Count	0	6	21	28	55
	% of Total	.0%	6.0%	21.0%	28.0%	55.0%	
	no	Count	16	18	8	3	45
		% of Total	16.0%	18.0%	8.0%	3.0%	45.0%
	Total	Count	16	24	29	31	100
% of Total		16.0%	24.0%	29.0%	31.0%	100.0%	



Bar Diagram-5: People who use only one interface with varying literacy levels

RESULTS AND DISCUSSION

We conclude that more than 85% people have more than 1 ATM card. It is also shown that 98% people among them find that every ATM layout is different from each other. And 71% people feel difficulty to use different type of ATMs interfaces, because different type of layouts increase cognitive burden. So from survey it is very clear that people are facing difficulty by using different type of ATMs. We can increase number of ATM users by providing simple, synchronized and user friendly interface. It will also create ease and reduce ATM usage time. This research shows that there is a need of better interface in the ATM infrastructure used in our country. This layout and modified layout is under consideration of our research group. The objective is to find the solution of a better ATM layout which will be

easy to use and will also reduce the usage time as problem is defined and elaborated here. This research is continued in the direction to provide the solution for easy and standard ATM interface.

REFERENCES

- De Angeli, A. Lynch, P. Johnson, G. In. Green, W.S. Jordan, P.W. Eds., *Pleasure vs. efficiency in user interfaces: towards an involvement framework*, *Pleasure with Products: Beyond Usability*, Pp97–111, 1st ed. Taylor and Francis, London, (2002).
- De Angeli, A. Coventry, L. Johnson, G.I. In. Gunter, K. Smith, A. French, T. Eds., *ATM's adoption in developing countries: De'ja`vu or not?*, *Proceedings of the Second BCS HCI and Culture Workshop*, 1:15–20 (2003).
- K. Curran, D. Kin, *Investigating the Human Computer Interaction Problems with Automated Teller Machine (ATM) Navigation Menus*, *Computer and Information Science*, 1-2:34-51(2008).
- Pepermans, R., Verleye, G., Van Cappellen, S. *Wallbanking, innovativeness and computer attitudes: 25– 40-year-old ATM-users on the spot*. *Journal of Economic Psychology* 17: 731–748(1996).
- Shneiderman, B., *Eight Golden Rules: Universal Usability*, *Communication of the ACM*, 43-5: 84–91(1996).
- Stevens R.E., Martin R.T., Carter P.S., Cogshell D., *A Comparative Analysis of Users and Non-Users of Automatic Teller Machines*, *Journal of Retail Banking VII* 1–2: 71–78(1986).