

# An analysis of automatic teller machine usage by older adults: A structured interview approach



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It is often assumed that automatic teller machines (ATMs) are inherently easy to use and require no training. However, there is evidence to suggest that ATM users do experience difficulty when learning to use the system. The purpose of the present study was to conduct an in-depth analysis of ATM usage by older adults. Our approach consisted of telephone interviews followed by structured individual interviews. The goals were to understand the problems encountered by ATM users, to determine how ATMs might be better designed and to assess the training needs of older individuals. The phone interview data provide information about the relationships between age, sex and ATM usage within the adult sample, as well as information about why some people choose not to use ATMs. The structured interview data provide a more in-depth view of the concerns of both users and non-users, and information about training needs. The training and design implications of the results are discussed. © 1997 Elsevier Science Ltd

## Introduction

Automatic Teller Machines (ATMs) have been available in some form since the 1970s (Mauldin *et al.*, 1978). The purpose of the present study was to conduct an in-depth analysis of ATM usage by older adults. We interviewed users to determine their knowledge of ATMs, the problems they encounter in using ATMs and their suggestions for improvements. These data are relevant to both designers and trainers. We also interviewed non-users to determine their knowledge of ATMs, the reasons they choose not to use them and their potential interest in using them in the future. These data also have training and design implications; moreover, the comments of non-users may be useful to bank officers who wish to increase ATM usage.

We chose to interview older adults for several reasons. First, adults over age 60 represent a sample of users who can provide important information about how well ATMs function and the types of problems they encounter when using them. It is important to remember that 'older adults' are not a homogeneous population (Koch, 1992); instead there is a range of individual differences that might influence ATM usage. However, improvements due to design or training will

likely be beneficial to older adults in general, as well as to the user population as a whole.

Other reasons for interviewing older adults are the findings that: (a) fewer older adults use ATMs, relative to younger adults (Gilly and Zeithaml, 1985; Rogers *et al.*, 1996; Zeithaml and Gilly, 1987); and (b) older adults demonstrate more difficulties when using ATMs (Hatta and Iiyama, 1991). Consequently, the older adult population can provide a wealth of information that will be helpful for future ATM improvements, be they design changes or the development of training programs.

We will first review the literature on ATM use with respect to older adults. The review is brief because there is a dearth of information in this area. We will then provide an overview of the present study and the interview methodology that was used. The results and discussion will be focused on the information that is most beneficial to human factors concerns such as design improvements and training needs.

## *Empirical studies of ATM usage*

To our knowledge, there have been only two empirical studies of ATM usage that included older adults in their sample (Adams and Thieben, 1991; Hatta and

Iiyama, 1991). Hatta and Iiyama used an ATM model to assess performance of individuals aged 20–68. Their sample consisted of people who use ATMs once or twice a month as well as non-users; however, their data were not segregated according to usage experience so comparisons are not possible. They discovered that, on the first attempted use of an ATM model, 32% of the subjects failed when trying to make a deposit, 42% failed when trying to make a withdrawal and 47% failed when trying to complete a transfer. By their third try, all subjects could successfully make a deposit, but 8% still could not make a withdrawal or transfer funds. Moreover, the older subjects in their sample (aged 52–68) were slower and made more errors than the younger groups.

Adams and Thieben (1991) conducted a training study of subjects over age 50 who had never used an ATM. Their results showed that subjects who received any type of training performed better than subjects who received only a demonstration of how the ATM works (actually an ATM simulator). Interestingly, even after 20 min of training, only 40% of the subjects showed perfect performance. Thus, more in-depth training is likely necessary.

The data from the Adams and Thieben (1991) and Hatta and Iiyama (1991) studies combine to suggest that training individuals, especially older adults, may be critical for their success in using an ATM. One focus of the present study was to understand more about the training needs of older individuals. That is, to determine for which components of ATMs training is necessary and if older adults perceive the need for training to use ATMs.

### *Survey research of ATM usage*

There have been several recent reports of large-scale surveys conducted on ATM usage across the adult life span (Gilly and Zeithaml, 1985; Rogers *et al.*, 1996; Zeithaml and Gilly, 1987). Gilly and Zeithaml (1985) randomly sampled 5000 individuals (2500 each from Texas and California) and had a total response rate of 21.8% ( $N=1087$ ). Their results revealed that only 15% of adults over age 65 had ever used an ATM (compared with 43% of adults under aged 65) and only 4% of the older adults did more than half of their banking at an ATM (compared with 17% of the younger subjects).

More recently, Rogers *et al.* (1996) surveyed 9000 individuals (4500 each from Memphis and Atlanta) and had a total response rate of 17% ( $N=1562$ ). Rogers *et al.* reported that 33% of their respondents over age 65 used ATMs. Although this is an increase relative to the Gilly and Zeithaml (1985) results, there still remains a sizable portion of older adults who choose not to use ATMs.

The survey data point to another issue that was investigated in the present study. Namely, we interviewed older adults who do not use ATMs to better understand their rationale for not adopting this technology. Moreover, the survey results showed that a number of older adults do use ATMs. We were interested in understanding more about the concerns and problems encountered in using ATMs by this population. Our in-depth interview approach provided a useful tool for such an understanding.

### *Overview of the present study*

There were two main goals of this project: (1) to understand why some older adults choose not to use ATMs, their concerns about using ATMs and their interest in learning to use ATMs in the future. (2) To query older adult ATM users to determine some of the problems they have with ATMs and their concerns about using them. We were interested in those comments relevant to human factors' concerns such as design and training issues. We were not particularly interested in whether all the subjects reported the same types of problems. Instead, this was an exploratory approach to determine if some users reported problems that might be useful to ATM designers. Moreover, we have repeatedly been told by bank officers that training is not necessary for ATMs because they are inherently user friendly. However, the recent survey by Rogers *et al.* (1996) suggested that this may not be the case and we wanted to utilize the in-depth interview approach to learn more about the training needs of an older adult user population. Surveys are limited in the types of questions they can ask and the length of the answers that can be provided by the individuals surveyed.

We investigated the use of ATM technology by older adults in a two-phased approach. Phase one consisted of telephone interviews with 100 individuals. The purpose of the telephone interviews was multi-fold: (a) to query individuals about their ATM usage and their willingness to participate in a structured interview study, (b) to assess age and sex differences within an old adult sample, and (c) to collect data from non-users about their reasons for not using ATMs (to be used as prompts in the structured interviews).

Phase two consisted of detailed structured interviews with 24 individuals who were frequent, intermediate or non-users of ATMs. The structured interviews were designed to allow the older adults to tell us what they knew about ATMs, whether or not they felt comfortable using them, and, for non-users, why they did not use ATMs. The interviews were structured in the sense that we had a general script of questions that we asked. However, the subjects were allowed and even encouraged to provide as much information as they wanted that was related to their experiences with ATMs.

## **Phase 1 — Telephone interviews**

### *Method*

*Subjects.* One hundred older adults (50 residents of Memphis, TN and 50 of Atlanta, GA) participated in a telephone interview. There were 44 males and 56 females. The subjects ranged in age from 61 to 81 ( $M=71.80$  years,  $SD=5.35$ ), their education level ranged from 7 years to 20 years ( $M=14.38$  years,  $SD=2.67$ ) and their average self-rating of health was 2.95 ( $SD=0.62$ , on a scale of 1 to 4: 1 = poor, 2 = fair, 3 = good, 4 = excellent).

*Procedure.* The subjects were asked a series of demographic questions (e.g. age, sex, race, health, education), as well as the following questions related to ATM usage:

Do you do the majority of banking for your family?  
 Are you familiar with ATMs?  
 Do you have an ATM card?  
 If not, why not?  
 If yes,  
 Do you use your ATM card?  
 If not, why not?  
 If yes, how often?  
 What percentage of your banking is  
 done at an ATM?

### Results and discussion

In answer to the question 'Do you do the majority of banking for your family?' 81% of the subjects said yes. Thus the majority of the interviewees were speaking as the primary banker for their family. Moreover, the answer to this question was not significantly correlated with any of the demographic variables.

A total of 91% of the subjects were familiar with ATMs and 79% possessed an ATM card. Of those subjects who had cards, 50% actually used them. Spearman's non-parametric correlations were computed to estimate the relationships among the variables with a critical tail probability of  $p < 0$  throughout. Age was significantly correlated with ATM usage ( $-0.25$ ) and with how often users used their ATM card ( $-0.42$ ). Older individuals were less likely to use ATMs and older users used the ATM less frequently. Thus, even within this old adult sample (with a range of 20 years), older adults were less likely to use an ATM and older users used them less frequently.

Sex was correlated significantly ( $p < 0.05$ ) with a number of variables: knowledge of ATMs (0.21), owning an ATM card (0.21), using an ATM (0.29), frequency of ATM use (0.28) and the percentage of banking done at an ATM (0.29) (all correlations significant at  $p < 0.05$ ). The older males were more likely to be aware of and to use ATMs than the older females in the sample. Neither health rating nor education level was significantly correlated with any of the ATM variables.

There were 59 non-users in the sample. We specifically asked them why they did not use an ATM. Their answers are listed in *Table 1*. The most frequent reason provided was that they simply did not have a need for it. The second most frequent response was that subjects had safety concerns. These reasons are followed in frequency by the statements that they conducted their banking during the day or that it was simply more convenient to go the bank. Other fairly frequent responses were that they prefer people, they do not know how to use the system or they do not approve of ATMs. This pattern is similar to that reported for a much larger sample by Zeithaml and Gilly (1987); namely, the most frequent response by older adults for not using an ATM was that they did not need it (21.3%), followed by preferring the customary method (19.1%) and preferring personal interactions (18.5%). One notable difference was that none of their subjects mentioned safety as a reason for not using ATMs (unless these responses were collected under the 'other' category). On the contrary, nearly 34% of our subjects listed safety as an important reason for not using ATMs and 10% of the respondents listed safety as their *only* reason for not using ATMs.

**Table 1 Reasons for not using ATMs (from phone interviews)**

Reason	N	%
No need	23	40.0
Not safe	20	33.9
Bank during the day	15	25.4
More convenient to go in bank	8	13.6
Prefer people	7	11.9
Do not know how	5	8.5
Do not approve (or do not like machines)	5	8.5
Plan ahead	3	5.1
Charge for using	2	3.4
Do not know locations	2	3.4
Not available at bank	1	1.7
Do not like to feel rushed	1	1.7
Do not trust accuracy	1	1.7
Tried once — no success	1	1.7
Do not do the banking	1	1.7
People will get money when do not need	1	1.7
Not comfortable	1	1.7

Notes: Many people provided more than one answer; also, the answers listed are not mutually exclusive

The current non-user data are also consistent with the large sample described by Rogers *et al* (1996). For their older adult non-users, the highest ranked reasons for not using ATMs were: prefer people, not safe, concerned about keeping track of transactions, not private and do not need. Thus, in the more recent surveys (i.e. the current data and Rogers *et al*, 1996), safety has become a primary concern of non-users. There are several potential reasons for this phenomenon: ATMs have become more dangerous, people are more aware of the dangers of using ATMs, the media has given more attention to ATM-related crimes, or all of the above. In any event, the extant data suggest that if banks wish to increase ATM use they must improve their safety; this is especially an issue for older adults.

One issue of interest was whether older adults did not use ATMs because they did not have access to them. Several of the responses combined may suggest that this is the case (i.e. more convenient to go to the bank, do not know locations and not available at bank). Thus for 10 people (17%), inaccessibility of ATMs was an impediment to them being used. It is unknown whether these individuals would use the ATM if it were accessible. However, it is a sizable portion of the subjects and banks may wish to consider options to make ATMs more easily accessible (e.g. placing them in retirement communities).

In summary, the phone interview data provide information about the relationships between age, sex and ATM usage within an old adult sample (i.e. older males are more likely to use ATMs). In addition, the data for the non-users point to their reasons for not using ATMs and provide some insight for improving the system. For example, improving ATM safety, making the system more personal, more accessible and providing training might increase ATM usage by older adults. Also, the large number of individuals who claim not to need the system may be unaware of the functions that can be carried out on the ATM and could be educated. Interestingly, when asked if they would be willing to participate in a training program for ATMs, 62.5% of the non-users said yes. Thus, there is certainly an interest in learning more, even on

the part of individuals who do not currently use ATMs.

Another important outcome of the telephone interview results is the finding that the patterns of data are comparable to much larger surveys reported in the literature (Zeithaml and Gilly, 1987; Rogers *et al.*, 1996). Thus, we can have confidence in the representativeness of the individuals drawn from the sample for the in-depth structured interviews.

## Phase 2 — Structured individual interviews

### Method

**Subjects.** From the pool of telephone interviews, 24 subjects (13 residents of Memphis, TN and 11 residents of Atlanta, GA) participated in the structured interview. We had asked the telephone interviewees if they would be willing to come to the university to discuss ATMs. From those who said yes, and who reported doing the majority of the banking for their family, we recruited participants for the structured interview study. There were eight non-users, eight intermediate users and eight frequent users. Usage determinations were made on the basis of the telephone interview; frequent users used the ATM at least once a

week, intermediate users used the ATM at least once a month and non-users did not use the ATM at all. The subjects ranged in age from 62 to 80 (mean = 70.79 years), their education level ranged from some high school to doctoral degree (*ca* 10–20 years) and their average self-rating of health was 3.17 (on a scale of 1 to 4, with 4 excellent). The means for the demographic variables are presented in *Table 2*, separately for the three user groups. There were no significant differences between the groups for age, education or health rating.

**Procedure.** All of the subjects answered general questions about demographic variables (e.g. age, education) as well as about their experiences with technology in general. In addition, the subjects were asked a series of questions designed to elicit information about their familiarity with ATMs in general and their familiarity with specific procedures (some of the questions were adopted from Payne, 1991). ATM users were asked about the types of problems they have experienced in using ATMs and non-users were asked open-ended questions about why they did not use ATMs, their concerns about using ATMs and their interest in learning to use ATMs. Each interview was audiotaped and transcribed. (The questions used in the interviews are available from the first author.)

### Results and discussion

**Non-users.** We asked the eight non-users why they had never used an ATM and their responses are presented in *Table 3*. The pattern of responses is similar to that reported above from the telephone interview data (these subjects were drawn from that sample). We also asked them if they had any concerns about using ATMs (such as safety or trusting the ATM to work appropriately). Most of them mentioned safety as a primary concern; none of them expressed a distrust for

**Table 2 Means and standard deviations of demographic variables**

Demographics	Frequent users		Intermediate users		Non-users	
	M	SD	M	SD	M	SD
Sex (M/F)	5/3		4/4		4/4	
Age	71.13	6.58	70.75	5.55	70.50	5.07
Education*	14.63	3.16	15.63	3.29	14.00	1.07
Health†	3.00	1.15	3.50	0.53	3.00	0.76

\*Number of years of formal education (e.g. 12 = high school, 16 = college graduate)

†Self-rated health on a scale of 1 (poor) to 4 (excellent)

**Table 3 Questions asked of non-users**

#### Why have you never used an ATM?

- Well, if they'll put them in the church where I feel at ease now, I might go and use the teller. But I am not going to a teller after dark, after banking hours and be interested in being robbed or what, at all. It's not worth that to me I just write a check, I don't need to go there. I have no need for that.
- My husband always did it, I didn't need to.
- I never got to the emergency part of it where a particular time of night or anything. Not that I'm against it, if the time came where I was in that kind of predicament where I didn't have a friend or could reach something for cash or go into [grocery store] to cash a check...then I probably would use it. But I haven't come up against that. So therefore, I would say I haven't used it mainly because I have never needed it for any particular purpose where I find myself out of cash or whoever I was gonna give somebody a check for something that they won't accept it or a credit card.
- I just don't put in what I need and my husband gives me money, so I've never had to use it.
- Have time to go during banking hours, feel better dealing directly with a person.
- Never really found the need...plus I don't know how to run the machine to begin with.
- Occasion has never arisen when I would need it...go into bank or...use a credit card.
- Has never been necessary.

#### Do you have any concerns about using an ATM? (e.g. safety, trusting to work properly)

- Safety, that's right. They put them in my church I might use it on Sunday mornings if I need some money, but I wouldn't go out of my way for it because it doesn't mean that much to me.
- Well, yes, definitely because I know there have been problems. That's one reason we quit using them. I am concerned about safety, yes.
- No. Well, I wouldn't go into a poorly lit place or a place that was all, at a certain time of night all by myself, if it wasn't visible...
- Well, only those that you have and not know it. You know, that little apprehension. I am going to learn, from what you tell me and my son is going to take me there and show me exactly what you're saying and what I do, so that if I ever do need it...
- Only concern is that they charge me to take money out, might as well wait and go during banking hours.
- Only that someone may get the information of my pin number and go after me and do something, otherwise I've never found the need to have an emergency of that nature.
- Without trying it I couldn't say, no concerns.
- None whatsoever.

the ATM technology. In addition, when asked if they thought they might feel comfortable using an ATM six of the non-users said yes. Thus it does not appear to be the case that these individuals do not trust the technology.

We also asked the non-users whether they might be willing to use an ATM and four of the eight said yes, they might be interested in using one in the future. In addition, three of these subjects mentioned that if they were taught (either by us or a spouse or child) they would feel more comfortable using an ATM. Thus, these individuals recognized that at least part of their unwillingness to utilize ATM technology was due to their ignorance about how the system worked.

*Users.* Table 4 presents the types of transactions that the subjects conduct on the ATM. Clearly, the majority of the subjects use the ATM for making cash withdrawals. When asked if they ever used their cards for other transactions, two of the intermediate users claimed that they did not know how: 'No, I'm not sure I know how' and 'No...I'm not real comfortable and I don't want to stand there in front of people and try to figure it out'. Two of the eight intermediate users said they conducted other transactions and the remaining four subjects said they never did. Of the frequent users, three conducted other transactions and the remaining five subjects said they never did. These data combine to suggest that training may in fact be useful for ATMs. First, many current ATMs are equipped to perform a variety of functions. The present subjects are obviously not taking advantage of the breadth of the ATM. Moreover, two of the users explicitly stated that they did not do so because of their lack of knowledge about how to use the system.

We also asked the users (frequent and intermediate) to list all the possible transactions that can be conducted on an ATM. All of them listed withdrawals. However, only 75% listed deposits, 56% listed checking balance and 19% listed making transfers between accounts. Only 6% (i.e. a single subject) mentioned either paying a credit card bill,

**Table 4** What transactions do you use the ATM for? (listed by subject number)

Frequent users	
1	Withdrawals
2	Occasional withdrawals, deposit checks (never cash)
3	Withdrawals
4	Withdrawals
5	Withdrawals
6	Withdrawals, transfer funds, check balance, deposits
7	Withdrawals
8	Withdrawals, check balance
Intermediate users	
9	Withdrawals
10	Withdrawals
11	Withdrawals
12	Withdrawals
13	Make deposits, withdrawals
14	Deposits
15	Withdrawals
16	Withdrawals

Note: The subjects' responses are listed in the order that they listed them

paying a loan or checking recent transactions. These results suggest that even ATM users are not aware of the various functions that can be conducted at ATMs. A short training program would familiarize users with the different functions; moreover, designers might make the different functions more salient without requiring subjects to page through various hierarchies.

We were interested in whether subjects recalled having difficulties when they first began using the ATM. It is important to qualify these results with the knowledge that all the subjects had been using ATMs for at least three years, some as many as 15 years; consequently, memory may be an issue relevant to the following results. In addition, if a 60-year-old subject started using the ATM 15 years ago they were only 45-years-old. Seven of the frequent users and two of the intermediate users reported that they did not recall having any difficulties when they first started using the ATM. The difficulties reported by the other subjects are listed in Table 5. We also queried users as to how many times they had to use the ATM before they really felt comfortable and the mean response was 2.4 times (SD = 1.4). Rogers *et al* (1996) reported that 9% of the old adults in their survey responded that they never felt comfortable using the ATM. Thus even experienced ATM users do not necessarily feel at ease when using the ATM.

Even something as seemingly trivial as understanding how to insert the card can be problematic. It would be easy for users to learn how to do this; however, it can be disconcerting when one is first trying to use the machine and people are waiting in line. Training would certainly alleviate this problem. Similarly, it would be helpful to encourage users to develop a mnemonic for remembering their code. Finally, some subjects do report having difficulties and having anxieties when first using an ATM.

Although, as with most technologies, there is room for improvement, the older users we interviewed tended

**Table 5** Did you have any difficulties when you first started?

Frequent user	
•	Yes, [I] inserted the card the wrong way.
Intermediate users	
•	Yes...when I first started I couldn't make it work and I think that's the reason I don't go more often... Yeah, [I had trouble with] the secret code.
•	Well, as you can imagine, I was unfamiliar with it. I just had to, I had to take the time, you know, you kind of feel intimidated when other people are just standing there waiting for the machine, because they've been doing it and they know how to do it. And to take the time to read all those instructions, you know, it took a time or two to get familiar with it, but after that it wasn't any problem.
•	Well, not really. Keeping up with the amount of money that was coming out of it. I wanted a fairly good size amount of money and I'd try to use that thing and it would come out thirty dollars at a time or I'd hit something wrong and then I'd have to stop and count. And that's something that made me uncomfortable, I didn't like doing that in a glassed place.
•	Just getting used to it, yes.
•	I felt very uncomfortable the first time I used it. I remember I thought, oh, I'm gonna mess up here and hit the wrong numbers and stuff...I forgot my code.
•	Just getting the PIN [personal identification number] number that I wanted. I switched banks because my first bank wouldn't let me choose my own number.

to be generally satisfied with ATMs. We asked them to rate on a scale of 1 (not satisfied) to 10 (completely satisfied) their satisfaction with the convenience of ATMs ( $M=9.06$ ,  $SD=1.57$ , range 5–10), their satisfaction with the fact that there was no personal attention at ATMs ( $M=8.31$ ,  $SD=2.33$ , range 3–10), the speed of banking at ATMs ( $M=9.25$ ,  $SD=1.00$ , range 1–10), the accuracy of ATMs ( $M=9.56$ ,  $SD=0.73$ , range 8–10) and the safety of ATMs ( $M=6.63$ ,  $SD=2.84$ , range 2–10). There were no significant differences between the frequent and intermediate users. The satisfaction ratings were quite high except for safety (safety issues are discussed in more detail below). The most variable of the other responses was the personal attention: three of the subjects responded less than 5 on this question (i.e. they were not satisfied with this aspect). The lower satisfaction ratings for personal interactions may serve as a challenge for ATM designers to make the system more personalized and perhaps more interactive with the user.

*Problems with ATMs.* Subjects were asked to describe any of the problems they have had with using an ATM (see Table 6). It is important to keep in mind that even the intermediate users, although they do not use ATMs often, have been using them for a number of years. One subject mentioned a problem with seeing the keys and difficulties determining which keys line up with which button, and another reported having difficulties seeing the screen due to glare. Two subjects also mentioned the issue of the ATM not providing sufficient feedback. Another subject commented that

she was unable to respond quickly enough. All of these concerns could be addressed with design improvements.

*Safety issues.* Nearly all the subjects expressed concerns about their safety when using ATMs. Their responses to our query about their concerns about using ATMs are presented in Table 7. In addition, we asked them if they knew about any security measures that were provided for ATMs. Ten of the 16 ATM users responded that they were unaware of any security measures (see Table 8). ATM providers, designers and trainers thus have two concerns: (a) making the ATMs as safe as possible to use and (b) educating the users about the security measures being used to make them more confident about their safety. Doing only the latter would not be sufficient because you would not want the users to become too confident. It is evident, at least in this sample of older adults, that safety is an important issue for ATM users (see Rogers *et al.*, 1996, for similar results for adults of all ages).

*Ask the expert.* The last questions that subjects were asked were as follows: 'If you had an expert on ATMs sitting here in front of you, what would you ask him or her? Are there any other things about ATMs that you know or wonder about that we did not cover in our discussion?' Their answers to these questions are informative (see Table 9). Frequent users revealed their curiosity about how the system works and offered some suggestions for improvement. Half of the intermediate users would like to know more about the

**Table 6 Have you had any problems with using an ATM?**

**Frequent users**

- One time it...wouldn't give it [my card] back to me and they sent me another one.
- I put my card in and the money came out but the door wouldn't open...I called everybody...and they said they'd turn it in and I had to go off and leave a hundred dollars laying in their window where you could see it...they[the bank] retrieved the money and they credited my account.
- Ate up my card once, gave me \$20 short once, both problems of which we took care of, I always count my money right in front of the video camera, walked into the bank and said here's my problem.
- I think it's the [name of bank]...you do your thing then there's a "push if amount is correct"...the things are so situated that you can't tell which key to push. They don't line up properly and I have to get down and see which one they want...There's a yes [option] and a no [option] and three keys and I often push this key when I mean to push this one because I can't tell where it's focused and it doesn't do anything. It doesn't give you any feedback...That's the only pain that I've experienced in using one.
- Uh, I've [entered the wrong PIN], the [name of bank] ATM makes you go through the whole process, the withdrawing from checking and blah, blah, blah. You go through the whole process and then you get down and it sends the card back...I don't remember if it has a message...if it said...it's got some words...I don't know if it says "transaction rejected". I don't remember...Yeah, it makes you do everything...it says cancel or delete, I don't know if...it seems that after I've entered the money...I think maybe there's a chance to change your mind, but I'm not sure.
- One of the things I don't like about [it], I occasionally have problems with the ATM is the printing. Occasionally they'll run out of ink...and to me it indicates a lack of concentration on the part of the people that service those things...
- Well, if you consider this a problem I guess...one time I forgot my secret code...then I've stopped...two or three times and it has been out of order.

**Intermediate users**

- Once or twice it's been out of order.
- ... the only problem I've had is...there'd be a little sign there and it should have been bigger I reckon, that said "Temporarily Out of Order" and before I know it I've stuck my card in there and it's gone. But I just hit the clear and it'll come right back.
- Sometimes I punch something wrong and...it'll come out when I'm not through because I have been slow in giving it the next command...
- The only problem is when they are out of service, like last week I had to go to three, one in my neighborhood, stopped at another it was out of service too, finally ended up banking in the mountains.
- One time \$100 was lost, not machine's fault, not on bank statement, never said what had happened.
- Not really, sometimes card gets bent, have to get another card.
- Yeah, they change that thing up every once in a while and they don't tell people that have ATM cards what to do. And most of the time when they change it is to that they want you to go through two or more operations than what you are customarily used to...the glass screen picks up the afternoon sun and you absolutely cannot see the transactions you are going to make...its really hard because I wear bifocals...I think they could improve the glare problems that exist with them...[once] I didn't get any money out of it, and I put my secret code and everything, I had to do it twice...I went inside and I said, look I had to go through this transaction twice...but I only got the money out one time, is it gonna charge me for double transaction...They said don't worry...

**Table 7 Safety issues — Do you have any concerns about using the ATM? (users)**

**Frequent users**

- Safety...Personal safety, that kind of thing. The area I live in I don't really worry about it but I still have a concern and do not like to use it after...7 o'clock in the evening or after dark...I have a lot of qualms about using the [free standing ATMs].
- ...in other places they're all outside, and I don't feel secure with things like they are now
- Especially they caution the seniors about it [safety] at a lot of meetings that I go to...you know they're just easier prey than a young person...the locations of some [ATMs] are just terrible.
- ...hear about people in dark coming to take your money, I've never worried about it.
- I try to be prudent about it, I would not use an ATM in a remote location that is dark at night.

**Intermediate users**

- I make it my business to do it in the daytime if I can't at a time when there are other people around.
- Primarily safety. And next, I have a little bit of concern with the accuracy...if it's really being handled accurately. However, that has never happened. Nothing has ever happened wrong.
- Yes, I'm very concerned about safety because I read about it in the newspaper about these people that are robbed and in some cases killed.
- My major concerns about ATMs and this, I believe would hold for the majority of them, they're in terrible locations, they're isolated, away from the main street. Safety is my biggest concern. Convenience and safety. Safety and convenience, I go for safe convenience.
- My only concern is safety and I generally do that in the daytime, in fact I always do it in the daytime unless my husband is with me.

functions that ATMs can be used for and several of the subjects also offered suggestions for improvements. Half of the non-users would like to know how to use the system, whereas several of the non-users were really not interested in knowing any more about ATMs.

**Conclusions**

A cardinal rule in ergonomics is to 'know thy user'. In the current study we used an interview approach to try to understand one segment of the user

population of ATMs; namely, older adults. In addition, we interviewed non-users in the hope that this would also be informative for design and training improvements. The results of the telephone and structured interviews were very informative and provide information that is valuable to bank officers, ATM designers and trainers.

*Guidelines for design*

The potential design improvements have been alluded to throughout the results section. To reiterate, the subjects reported a number of problems that could be corrected with design improvements such as: better lighting, non-glare glass, improved mapping between the options and the keys, more information on the receipt, fewer options (or a less hierarchical design), improved feedback about errors and ways to correct errors, more time to respond, and so on. The present data provide a source of information regarding the problems that older adults have experienced plus their suggestions about potential improvements. Such improvements might be beneficial not only to older adults but to all ATM users.

A common concern of both non-users and users was safety. With good reason, individuals tend to be cautious about placing themselves in potentially dangerous situations. The issue of safety is critical for continued use of ATMs by adults of all ages. Although safety problems are not necessarily indicative of ATM design flaws, ATM designers could strive to add features to the system that might improve safety. For example, a 'panic button' could be designed as part of the system to allow ATM users to call for help or set off an alarm or cause a camera to take a picture at that moment.

*Guidelines for training*

Most system designers and bank officers assume that ATMs are inherently easy to use and require no training. In fact, we randomly queried 13 banks in the Memphis, TN metropolitan area and discovered that

**Table 8 Safety Issues — Are you aware of any security measures provided for ATMs?**

**Frequent users**

- Oh, they have a TV. You can see it...that's the only security that I know about.
- I have no idea.
- Well, I know I've read how they've talked about lately having telephones at the ATMs. I don't know that any of them have that yet or maybe some of them do, mine does not have...and I don't think that would be a big help. Because usually I don't think somebody's gonna come in the ATM and rob you I think it would be more like when going to your car and that's my fear.
- No, well other than the camera, they have cameras, but that's not gonna protect me. It'll give 'em a picture of 'whose doing the dirty work, but that's the only thing that I know of. Now I've never seen one with a security guard.
- No.
- I'm not aware of any.
- No, well I use it during the daytime.
- No.

**Intermediate users**

- Well, there may be a security person in the area but I don't know of any.
- No, not to my knowledge unless it'd be some kind of a hidden camera that I don't know anything about.
- No, but I would guess a camera maybe, but I have not noticed one.
- I don't know the security measures, I know that my machine has a camera and so they can record with the camera, I don't know how far it will go or anything like that, but I'm not aware of any other security measures other than that camera. But I think I will be going more to [grocery store], after what's gone on.
- None. Those that are out there are just sitting ducks. The only time I've felt that safe in using one is when the folks are there who put the new money in and there's usually a guard there while they're doing that.
- No, [I] usually go in the daytime.
- I'm sure they have the hidden cameras.
- I think there is a one way mirror on most of them with a camera behind it, I suspect that that is the case.

only two provided brochures that showed the user how to operate the ATM and those were cursory at best. However, empirical evidence suggests that users of all ages have difficulties using ATMs initially, when training is not provided (Hatta and Iiyama, 1991), and a training study of older adults revealed that performance is not perfect even after training (Adams and Thieben, 1991).

The current set of data suggests that a training program should be developed for ATMs. Although there was a variety of reasons offered by the non-users for not using an ATM, many simply did not see a need for the service. However, this may be due to their lack of knowledge about the functions that exist on current ATMs. Several individuals also stated that they did not use it because they did not know how. Many of the users used the ATM for only a limited purpose (generally to withdraw cash). Their comments suggest that this limited use is due, at least in part, to their lack of knowledge about how the system works and their discomfort in trying to learn while others are waiting. In addition, many subjects were not even aware of the different options available on many ATMs. We also discovered that many non-users (62.5% of those telephoned) would be willing to learn to use an ATM if they were provided with training.

The most appropriate type of training and the amount of training required remain empirical questions (but see Adams and Thieben, 1991, for some initial training-related research). Researchers should investigate the benefits of part-task training, tutorials and guides, memory aids and external cues for using the system. Additional issues to be considered in such training studies are the success of transfer across different ATM systems and the retention of information over periods of non-use. The present research clearly demonstrates that, within the older

adult population, both users and non-users perceive the need for training to be able to successfully use ATM technology.

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