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BETWEEN DESIGN AND SITUATED PRACTICE: AN ETHNOMETHODOLOGICAL STUDY OF OLDER ADULTS' USE OF BANKING SELF-SERVICE MACHINES

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ABSTRACT

Self-service banking terminals embed assumptions about how users should understand and perform transactions. This study examines how problematic situations arise when users', especially older users', actual practices diverge from these assumptions. Based on a seven-year ethnographic field study in Austrian bank branches and semi-structured interviews, the analysis draws on ethnomethodology and Lucy Suchman's concept of situated action. The findings show that problems emerge from discrepancies between predefined system logic and situated user practices. Users interpret system responses and adapt their actions to the situation, while the systems often require knowledge of abstract structures, linear sequences and predefined interaction speeds. These discrepancies are frequently resolved through staff intervention and may otherwise be attributed to individual or age-related deficits. The study demonstrates how ethnomethodological analysis can reveal implicit design assumptions and inform more transparent, context-sensitive and supportive self-service systems.

KEYWORDS

User Experience Study, Situated Action, Ethnography, Older Adults

1. INTRODUCTION

The use of self-service terminals is regarded as a routine and largely taken-for-granted practice in everyday life. Supermarkets, transport operators and banks have digitized their customer processes on a large scale and are increasingly shifting services to self-service terminals. At the same time, this means that tasks previously carried out by staff are now being transferred to users (Eurostat). Nevertheless, closer observation reveals that not all users are equally able to navigate these technologies without difficulty (Rogers et al. 1996). Older people, in particular, frequently encounter difficulties that cannot be explained solely by a lack of technical

competence. Rather, the systems presuppose certain forms of perception, interpretation and action without making these prerequisites explicit. Instructions such as ‘insert card or hold it in front of the reader’ or ‘correct the amount’ rely on terms and calls to action whose meaning must first be deduced from the respective situational context. Users are thus required to make an interpretative effort that is taken for granted in the design itself.

Furthermore, certain procedural scripts are embedded in the devices, dictating the order in which individual steps are to be carried out.

This illustrates that self-service devices are not neutral tools. Their design incorporates assumptions about how a transaction should proceed, how displays and command prompts are to be understood, and what knowledge, skills and behaviour are expected of users (Dourish 2001). Difficulties in interaction therefore cannot be understood solely as a problem of individual competence, but also as a potential discrepancy between the assumptions embedded in the system regarding ‘appropriate’ use and the actions users actually take in a given situation.

How this discrepancy manifests itself in practice only becomes apparent during actual use. Users do not always act as intended by the design. Rather, the interaction between human and machine only emerges during the actual performance of an action and is co-created by the users in response to the situation. (Suchman 2006b). Users may abandon a task, adapt their approach in response to the situation, seek alternative courses of action, or interpret instructions differently from what was intended. It is precisely such deviations from the embedded scripts and usage scenarios that should not be understood merely as operational errors. Rather, they reveal the assumptions regarding knowledge, interpretation and appropriate behaviour that underpin the system’s design, and how users attempt to understand and cope with the situation in practice.

Against this background, the present study aims to close this research gap and to examine in greater detail the problems that arise in the tension between the design, the usage scripts embedded within it, and the users’ situated actions.

1.1 Research Question

This article is an extended version of Spevak et al. 2026. The focus of this study is to analyse actual usage practices and to examine how users construct meaning, overcome problems and organise sequences of actions in situ when interacting with the devices. The analysis is based on ethnomethodological considerations (Garfinkel 1986), supplemented by Lucy Suchman’s concept of ‘situated actions’(Suchman 1987; Suchman 2006b). From this perspective, technical artefacts are not merely neutral tools. They provide particular options for action and embed assumptions about how users are expected to proceed. However, users do not simply follow these predefined paths. They interpret the situation as it unfolds and adapt their actions to the specific circumstances they encounter.

The research questions arising from this constellation are as follows:

How do problematic situations emerge in interactions between older users and bank self-service terminals when situated actions diverge from assumptions about user behaviour embedded in the design?

What design assumptions become visible through these breakdowns and what does this imply for the design of self-service systems?

2. LITERATURE REVIEW

The interaction between older adults and cash machines has been the subject of a growing number of studies only since the late 1990s (A.S. Adams & K.A. Thieben 1991; Rogers & Gilbert, Kristen D. and Cabrera Fraser Elisabeth 1997; Rogers et al. 1996; Spevak et al. 2025). Although cash machines have been widely available since the 1079s, the specific challenges faced by older users only came to the attention of research relatively late. Reasons for non -use or limited use identified include perceived complexity, security concerns and a preference for face-to-face contact (Curran & King 2008; Feng, Rafih & Munteanu 2023; Harris et al. 2016; McPhail, Fogarty & Walker 2003; Zhang et al. 2012).

Research focused increasingly on specific problems encountered during use, including inefficient operating procedures, confusing interfaces, unexpected obstacles and the perceived complexity of the system. Consequently, the design of the machines also came increasingly into focus, with a more general user-centered design approaches being adopted (Aguirre, Benazar & Moquillaza 2020; Aguirre, Moquillaza & Paz 2019a; Aguirre, Moquillaza & Paz 2019b; Camilli et al. 2011; Cooharojananone, Taohai & Phimoltares 2010), whilst also placing particular emphasis on older users (Chan et al. 2009; Huang et al. 2019).

This was followed by studies on the usability and user experience of cash machines (Valenzuela, Moquillaza & Paz 2022; Sahua, Moquillaza & Paz 2021; Kamfiroozie & Ahmadzadeh 2011; Altin Gumussoy 2016), including innovative approach like biometric authentication (Muthu et al. 2023).

With the increasing prevalence of online and mobile banking research into older users has been extended to other digital banking services. A significant proportion of this research is based on technology acceptance models. Among the most commonly used approaches is the Technology Acceptance Model (TAM), which specifically considers perceived usefulness and perceived ease of use as factors influencing technology acceptance (Davis 1989; Nasri & Charfeddine 2012; Pikkarainen et al. 2004; Hanafizadeh et al. 2014). The Unified Theory of Acceptance and Use of Technology (UTAUT) expanded this approach to include factors such as performance expectations, effort expectations, social influence and supporting conditions (Viswanath Venkatesh et al. 2003).

Both models have been combined in further studies with additional concepts such as trust or perceived risk (Kim, Shin & Lee 2009; Alalwan, Dwivedi & Rana 2017; Malaquias & Hwang 2016; Gefen, Karahanna & Straub 2003; Spevak, Baranyi & Grechenig 2025).

These approaches make an important contribution to explaining technology acceptance, usage intentions and non-usage and identifying specific difficulties in interacting with banking technologies. But they do not necessarily address in detail how interaction is actually carried out in practice at any given moment and how problems arise in the course of situational actions. Here steps Ethnomethodology in and shifts the focus to the situational usage practices and how users practically organise their actions with technical systems (Sharrock & Button 2011; Suchman 2011). Button and Dourish further develop the link to system design through technomethodology by asking how ethnomethodological principles such as situatedness, practical action and accountability can be relevant to the understanding and design of interactive systems (Graham Button and Paul Dourish 1996; Dourish & Button 1998; Dourish 2007). Crabtree elaborates on this connection with the 'missing interactional what', thereby referring to those local and situational practices through which interaction with technical systems actually takes place, but which are easily lost in formalised descriptions and models (Crabtree 2004). Lynch situates this development within the fields of HCI and Workplace Studies, shifting the focus from acceptance and usability towards the actual, situational use of technical systems. This perspective also draws attention to the relationship between users' situational actions and

the sequences of actions anticipated by the system (Lynch 2015). Very few studies examine interaction with bank self-service machines as social interaction in the ethnomethodological sense (Angeli et al. 2004) , with the focus here tending to be on cultural specifics. The present study addresses this gap by applying an ethnomethodological perspective to examine how problematic situations emerge in actual use and how they relate to assumptions about user behaviour and action sequences embedded in the design.

3. RESEARCH CONTEXT

Spevak et.al investigated banking foyers in Austria (Spevak et al. 2025). Results showed that self-service machines are usually located in a foyer situated in front of the main branch area and can be separated from it by a glass partition after the branch has closed. There are also machines inside the branch, but these are no longer accessible after closing time. These self-service machines include: cash machines, deposit machines, statement printers and transfer terminals. Some lobbies also have coin roll dispensers, primarily for business customers. To save space, the machines are often positioned close together, separated only by a short opaque glass partition. Consequently, the privacy area is very limited and, during busy periods, customers may inadvertently be able to observe others' transactions, raising concerns regarding security and confidentiality, including the risk of PIN spying. At the same time, the environment offers minimal support for handling personal belongings, as only very limited storage space is available. This is generally restricted to small shelves, which are insufficient for personal items such as bags, wallets or other documents. Shelves attached to the machines are often too small to be of any practical use (Spevak et al. 2025).

4. METHODS

Besides providing more details this article extends the previous work by (Spevak et al. 2026) with three main aspects: First, the theoretical framework is expanded by situating ethnomethodology and Suchman's concept of situated action more explicitly within HCI and ethnomethodological research. Second, the analytical approach is further developed by applying the ethnomethodological concepts of accountability, indexicality and reflexivity more systematically to examine how problematic situations emerge and are made understandable in the course of interaction. Third, the empirical analysis is extended to examine the assumptions about user behaviour embedded in the design, how these assumptions relate to users´ situated actions and how resulting difficulties may be attributed to individual or age-related deficits.

4.1 Data Collection

Over a period of more than seven years (2018–2024) ethnographic observations were carried out in the branches of an Austrian bank. Field notes were taken, which were subsequently transcribed or observations were recorded. In addition, 18 semi-structured, guided interviews were conducted with key stakeholders: 10 older customers (aged 67- 83), 5 branch employees and 3 support staff from head office. Written consent was obtained for the semi-structured interviews, and all personal data was anonymised. The database served as a repository of

experience and as a source for other studies (Spevak, Baranyi & Grechenig 2025; Spevak et al. 2025).

Ethnographic observation provides insight into processes and behavioural patterns on site (Angrosino 2009). It is ideally suited for observation in social and public spaces to examine the methods by which people organise their actions. It helps to interpret local actions and interactions that users carry out within their own interpretative frameworks. Ethnographic methods enable the understanding of actions in relation to specific social situations (Morrison, Viller & Mitchell 2010).

They are particularly useful for an ethnomethodological approach because they provide insight to what users actually do, rather than merely recording what they report in interviews about their use of the system or what designers assume to be the intended sequence of events.

4.2 Data Analysis

Harold Garfinkel's ethnomethodology was chosen as the theoretical framework for data analysis (Garfinkel 2016). It is particularly well-suited to the analysis of ethnographic data, as it focuses on how social action is carried out through the visible activities of participants in situated contexts. It is a method, that does not only categorise problems or applies predefined theoretical categories but also reconstructs how they arise in the course of the interaction. It examines how people generate meaning and order through their observable actions. In addition, Lucy Suchman's approach of situated actions is drawn upon, according to which actions do not arise primarily from pre-determined plans, but within the context of the specific situation (Suchman 1987; Suchman 2006b).

Ethnomethodology assumes that social order cannot be taken for granted, but is constantly produced in people's everyday actions. It is not norms and structures that explain action, but the order-creating activities that individuals perform in specific situations of action (Abels 2009).

This ethnomethodological perspective can also be applied to technical artefacts by focusing on users' practical use and processes of meaning-making. Technical systems are not neutral tools, but components of social situations whose order is only established in and through use. Ethnomethodology examines how technology is produced, used and made comprehensible in everyday work processes, i.e. understanding how users actually interact with technology, interpret the seemingly objective instructions of the devices and handle them within social contexts (Sharrock, W. and Button, G., 2016).

Key concepts for understanding ethnomethodological analysis are accountability (or accounts), reflexivity and indexicality (Bergmann, Jörg & Meyer, Christian 2001; Dourish & Button 1998).

- **Accountability:** These are means of expression through which people, whilst carrying out their actions, make them understandable, meaningful, justifiable and socially comprehensible. This is a prerequisite for other participants to be able to cooperate. The intention and meaning of an action are already evident in the manner in which it is carried out. In this way, the participants create order through their actions. Intertwined with the principle of accountability is the concept of accounts. Just as accountability means that participants' actions must be performed in such a way that they are meaningful and perceptible to others, so an account is any way in which actors make their actions explainable to themselves and to others (Dourish & Button 1998; Patzelt 1987). Accounts provide contexts for interpreting meaning (Patzelt 1987).
- **Reflexivity:** The meaning of an action is generated by the action itself. Social actions are not rigid applications of rules or norms; the meaning of an action is constituted at the very

moment of its performance. Actions do not describe the situation, but actively create the situation at the moment of their performance.

- **Indexicality:** The meaning of every linguistic utterance is tied to the specific situational context. All participants must possess the necessary contextual knowledge to grasp the meaning. Similarly, the meaning of an object or technical artefact only emerges from the specific situational context.

As Trace emphasises (Trace 2016), ethnomethodology shifts the focus from questions of *why* to *how*, that means to how social reality is produced and maintained through every practices. This analytical approach makes it possible to examine the interaction as it unfolds and to reveal the extent to which users' actual actions correlate with the sequences of actions anticipated by the system design.

The second foundation of the analysis is Lucy Suchman's 'Situated Actions' approach. Drawing on her work on photocopiers (Suchman 1987), she critiques the notion that actions are planned and carried out rationally. Instead, she emphasises that actions arise within the context of the specific situation. She discovers that it is often not technical faults or errors that lead to problems in using technical systems, but rather a lack of familiarity with the usage assumptions embedded within the system. Linear, recursive instructions based on abstraction do not necessarily correspond to users' everyday knowledge. This internal plan of the machine is now imposed on the user as a plan for use, thereby scripting the user (Suchman 2006a; Suchman 2006b). It is precisely this that can lead to problems, as people do not necessarily act adhere to these prescribed procedures, but instead act situationally, improvise and interpret system prompts in the light of the immediate context. This perspective makes it possible to identify the discrepancies between the interaction logic embedded in the design and the users' situation specific actions. These discrepancies form the starting point for the analysis, which traces how interaction failure arise, which underlying design assumptions are revealed by the way users deal with these situations and what conclusions can be drawn from this for the design of self-service systems.

5. RESULTS

The field logs and interviews were divided into sequential sections and analysed. The analysis is based on the concepts of indexicality, accountability and reflexivity. In doing so, the study examined how users react to and interact with system states and responses, interpret them and then make decisions. As an example, sequences from field logs and interviews will be presented and analysed. The selection of sequences from the field notes was based on a corpus of data spanning several years. The selection criteria were as follows:

- recurring interaction patterns between customers, the self-service machines and staff, particularly where disruptions to the process occur;
- remedial actions involving explanation and intervention;
- requirements for linear processing.

The aim was not to select particularly striking individual cases, but to analyse those passages in which recurring and structural features of the observed interaction practices become apparent. The selected sequences serve as examples of comparable situations and patterns of behaviour that recur throughout the material. The interview passages selected were those in which recurring situations, behaviours and problems relating to the use of self-service machines, were discussed. The interviews were used as accounts that provide insight into how actions are explained, legitimised and placed within a situational context.

Table 1. Analysis of interaction sequences and underlying design assumptions

Scenario/Context	Sequence of Actions	Ethnomethodological Analysis	Design Assumption revealed
1 – Account selection Customer wants to print an account statement. Even if only one account is available, it must explicitly be selected.	**1.** Customer inserts the card.**2.** Selects "Account statement".**3.** Account line appears.**4.** Customer looks puzzled → **start of disruption**.**5.** Staff explains that the account must be selected so that a green tick appears.**6.** Customer taps twice; tick appears and immediately disappears.**7.** Staff explains again; customer presses slowly.**8.** Tick appears and printing starts.**9.** Customer talks about his personal and financial situation.**10.** Staff secures card and printout.	**Indexicality:** The tick has no self-evident meaning for the customer.**Accountability:** Staff makes the relationship between action and system response understandable.**Reflexivity:** Successful execution makes the functional logic visible retrospectively.	**Linearity and procedural understanding:** Users are expected to follow a predefined sequence and understand the significance of each required step, even when the step is not self-evident.
2 – Incomplete deposit Customer deposits €1,000, but only €800 is recorded; the card is retained.	**1.** Customer reports incorrect transaction.**2.** Reports €1,000 deposited / €800 recorded.**3.** Employee suggests printing statement.**4.** Customer reports retained card.**5.** Employee retrieves card.**6.** Customer repeatedly recounts events.**7.** States that he is knowledgeable about IT.**8.** Employee accompanies him to statement printer.**9.** Machine crashes during PIN entry.**10.** Customer repeats €1,000/€800 story.**11.** They move to another printer.**12.** Printing succeeds.**13.** Receipt: "€800, transaction not completed".**14.** Employee provides service ticket.	**Indexicality:** Individual system messages acquire meaning only in relation to the complete sequence.**Accounts:** Customer repeatedly reconstructs events and presents himself as a competent user.**Reflexivity:** His reconstruction constitutes the event as a claim of loss requiring investigation.	**Transparency of system state:** Users are expected to determine the status and outcome of a transaction from system information, even when technical problems occur.
3 – Payment-slip transfer Customer wants to make transfers using payment slips.	**1.** Inserts card and PIN.**2.** Selects "Execute transfer".**3.** Inserts payment slip.**4.** Split-screen appears.**5.** Customer looks puzzled.**6.** Staff asks whether transfer is from own account.**7.** Staff explains left/right options.**8.** Customer attempts wrong option; staff intervenes.**9.** Correct option selected; transfer completed.**10.** "New transfer" and "Eject card" appear.**11.** Customer attempts to select blue box; staff intervenes.**12.** Staff explains difference.**13.** Customer: "Oh, I see, you have to know that."	**Indexicality:** Meaning and consequences of options depend on the current process context.**Accountability:** Staff makes the system logic comprehensible.**Reflexivity:** The intended meaning becomes apparent through explanation and successful execution.	**Procedural knowledge and orientation:** Users are expected to know their position in the process, understand the consequences of options and translate their intentions into system categories.
4 – Withdrawal / mobile top-up Customer wants to withdraw cash but encounters an additional mobile-phone function.	**1.** Customer asks why she has to select a mobile tariff: "What have I done wrong?"**2.** Staff accompanies her to ATM.**3.** Card and PIN entered.**4.** "Withdraw" and "Top up pay-as-you-go mobile" appear.**5.** Staff explains difference.**6.** Customer states that one option is irrelevant to her.**7.** Appropriate selection is made and transaction completed.	**Indexicality:** The label is understandable, but its role as an alternative option is not.**Accountability:** Customer initially attributes the problem to herself; staff explains the selection structure.**Reflexivity:** The previous screen becomes understandable retrospectively.	**Understanding of menu structure:** Users are expected to recognise the underlying tree structure and distinguish between transaction steps and additional services.
5 – Timeout / inactivity Customer is orienting himself at a statement printer.	**1.** Customer searches the screen.**2.** Staff explains that PIN must be entered.**3.** Card is ejected due to "inactivity" before customer can act.**4.** Staff explains that process must be restarted.**5.** Waiting time because slot is locked.**6.** Card reinserted and process restarted.**7.** Adjacent machine briefly attracts staff member's attention.	**Indexicality:** "Inactivity" means something different to the system than to the customer.**Accountability:** The customer's visible orientation work cannot be recognised by the system; staff explains the invisible system logic.**Reflexivity:** The breakdown makes the temporal logic of the system visible.	**Temporal conformity:** Users are expected to read, interpret, decide and act within a predefined timeframe; absence of input is treated as inactivity.
6 – Menu hierarchy / multiple transactions Customer wants to make a transfer and subsequently print a statement.	**1.** Inserts card and PIN.**2.** "Does it tell you if that's right?"**3.** Selects transfer at staff prompt.**4.** Inserts payment slip.**5.** Delay occurs.**6.** "It's not taking it."**7.** Transaction completed.**8.** Customer wants statement.**9.** Presses "New Transfer".**10.** Staff explains return to main menu.**11.** Touchscreen does not respond.**12.** Employee presses firmly; device starts printing.	**Indexicality:** "New Transfer" is interpreted according to the immediate situation rather than the system hierarchy.**Accountability:** Customer verbalises uncertainty; employee makes the required actions understandable.**Reflexivity:** Hierarchy becomes apparent through successful and unsuccessful actions.	**Abstract structural knowledge and orientation:** Users are expected to understand menu hierarchy and nesting depth and maintain orientation across different levels although the overall structure is invisible.
7 – Technical malfunction Customer wants to make a transfer, but the machine does not respond.	**1.** Customer appears desperate.**2.** Staff offers help.**3.** Customer: "He doesn't want me."**4.** Staff suspects technical fault and moves to another machine.**5.** Customer completes transfer independently.	**Accountability:** Customer creates an explanation by personalising the malfunction.**Indexicality:** "He doesn't want me" is meaningful within the specific situation.**Reflexivity:** Successful use of another machine retrospectively establishes the first device as faulty and the customer as competent.	**Recognition and attribution of system failure:** Users are expected to distinguish technical malfunction from problems caused by their own actions, even when the system provides insufficient information about the cause.

5.1 Analysis of The Field Notes

The selected situations were analysed as sequences of actions, with individual actions not being considered in isolation but within the context of preceding and subsequent actions. Following Suchman's approach, the response of the technical system was also taken into account as an integral part of the particular situation.

5.2 Analysis of the Interviews

The accounts in the interviews confirm the findings from the field notes, or supplement them.

5.2.1 Accounts of Disruptions and Safety

It becomes clear in the interviews that disruptions are not the exception but recurring events:

- Machines are out of order: *"Almost every time I walk into the bank branch, one or two machines in the lobby aren't working at all" (Customer A),* "*...that one of them isn't working because of whatever"* (Customer J),
- system crashes occur during the transaction: *"Then it just cut out in the middle. They were all stuck somewhere!*" (Customer F)*,*
- There are some unusual, irregular ways in which the machine operates. *"Every cash machine I've used has worked the same way: the money comes out in front of you, right in front of your face. But in this branch, it came out right at the back on the right-hand side. I was fiddling around trying to figure out how to open it at the front. And suddenly, the €400 or €600 I'd wanted to withdraw had been swallowed up."* (Customer A). *"...it comes out at the bottom right and isn't seen because the customer is focused on the shutter that's supposed to open; it beeps, but they don't notice because they think it doesn't concern them anyway, and then it gets sucked back in"* (Bank employee B).
- This requires staff to constantly be putting things right
  - to resolve technical faults and correct operational errors: *"I know exactly which mistakes he's making, because… I see, OK, so he's entering the PIN, I see he's entering six digits. Me: 'That's too long.' So I see, I can already see, I know what the potential mistakes are, and it's just that people* struggle…" (Bank employee C)
  - Reassuring customers: *"who are quite capable of making transfers at the ATM but get really upset when it freezes during the transaction, so I have to calm them down a bit with a great deal of diplomacy*" (Bank employee B) and
  - Restoring processes: *"Because they don't know, because the machine crashed during a transaction. That often happens with account managers and the card suddenly wouldn't come out" (*Bank employee C)
  - To rectify user errors: *"Yes, they tap somewhere they didn't actually mean to tap; that just happens. Then they get stuck in a menu and can't proceed any further*" (Bank employee B).

The time spent using the self-service machine creates a feeling of vulnerability: "*The older generation feels watched at the machine*" (Bank employee D). "*Normally, I withdraw money inside the bank, not outside, if there's an ATM there, and if someone's watching me…*" (Customer F).

A defined end state is perceived as very important: *"I've gone in, the system has obviously finished, but I don't get a 'goodbye'"* (Customer F). The absence of the closing sequence – in

this case, the "Goodbye" on the machine's screen – constitutes a breach of accountability, insofar as the system's completion status is no longer made visible and interpretable to the customer in the usual way.

Checking is an important practice, and physical documents such as bank statements and invoices serve as a safeguard against uncertainty: *"Please print everything out for me, because if the whole thing collapses, then I'll have it in black and white*" (Customer F).

5.2.2 Accounts Based on Trust

The interviews reveal comments that indicate a preference for personal service over self-service machines: "*I don't want to be dealt with by a machine, especially when you don't even know if it's actually doing everything properly… I want to see people*" (Customer A). Customers specifically seek out certain individuals: "*Because I was in the branch yesterday and you weren't there, so I left again"* (Bank employee B).

Sharing the PIN code with staff is a sign of trust, as well as a necessity: "*They even tell me the ATM code in confidence, even though I'm not supposed to know it, because they can't enter it anymore*" (Bank employee G)

Negative experiences lead to a rejection of technology: "*They don't trust the machines because the machine has swallowed a banknote before or failed to dispense it, or the card was swallowed and not returned*" (Bank employee D).

Visiting only during branch opening hours reflects a fear of disruption and technical malfunction, as well as trust in and a preference for assistance from staff. *"I get help if something goes wrong during opening hours."* (Bank employee B).

5.2.3 Accounts of Age-Related Attributions and Physicality

Older customers are often perceived as requiring more intensive support: "*A very demanding, older clientele – these are precisely the customer groups who need a great deal of attention when using the machines, because they no longer see well, or because they are overwhelmed by various software changes or innovations*." (Bank employee B). *They are particularly nice to me because I am old, they help me, just as you should treat your grandmother'* (customer F). Certain functions do not seem to come naturally to older people: "*And why should very old people know that they just need to go back to the main menu*?" (Customer A)

Structural problems are described in terms of physical limitations: *"It's not that I can't do it, it's just that I can't see it"* (Customer F)

5.2.4 Accounts of Complexity and Abstraction

Staff articulate the issues: "*Some people can't even insert the card. They fail just at the stage of inserting the card, and so they do it with the chip facing backwards and so on. That's too many steps. I think that's too many steps. Just the card, okay, then the PIN, then comes the transfer, then the account statement – that's too much for them." I think that's simply too much, too much to choose from"* (Bank employee C). The machines are equipped with as much functionality and comprehensive information as possible: "*We just want to give the customer lots of information, all at once on one screen, with all accounts displayed, and then they can choose which account they want, but that's just not really practical for everyone* (Bank employee E). '*… the customer is simply overwhelmed by the range of options we offer, the things they can do on their own at the machine'* (Bank employee B). The lack of knowledge about internal bank processes and terminology is therefore a direct reference to the importance of indexicality: *"And*

what seems so logical to us, because we have been working with them for years, is apparently not so logical to the customer." So, the customer's view is different from that of a bank employee, who may still be able to assign certain technical terms or draw certain logical conclusions. Where could I find a card limit? Where could I find a PIN code? That is totally not, not linkable for the customer" (bank employee D).

6. DISCUSSION

This study focuses on the question of how problematic situations arise in the interaction between older users and self-service terminals in the banking sector, and what role the assumptions about user behaviour embedded in the design play in this context. The analysis is based on ethnographic observation logs and semi-structured interviews, which were evaluated using ethnomethodological concepts and the Suchman´s approach to situated action.

The concepts of accountability, indexicality and reflexivity proved particularly suitable for analysing the observed interactions. Accountability makes it possible to examine how users and staff make actions, problems and their causes explicable and comprehensible, indexicality highlights that the meaning of prompts, terms and options for action is not independent of the specific situation, but must be interpreted within the concrete of use. Reflexivity in turn, reveals how actions and interpretations simultaneously describe and produce the situation. In addition, the accounts revealed in the interviews – such as references to trust, age, security, control and complexity – enabled the identification of those interpretative patterns through which users and bank staff explain behaviour and make sense of it.

The analysis shows that problem situations should not be understood as isolated errors by individual users. Rather they arise from the discrepancy between the logic of action implemented in the system and the situated practice of use directly observed. Whilst the self-service terminals largely require a plan-based and rule-guided behaviour, the empirical findings reveal that customers carry out their actions at the terminal in a situational and context-dependent manner. The resulting problems should not be interpreted as a deviation from ‘correct’ usage, but rather as a consequence of differing operational logics.

A key finding of the analysis is the lack of accountability regarding the systems logic. For users, internal system states and the causes of certain reaction often remain invisible. The functional logic is often incomprehensible to the customer and is only made clear through the intervention of staff. To the customer, the systems appear as a black box whose internal processes they cannot understand and whose reactions remain incomprehensible. Events such as an automatic termination due to ‘inactivity’, the unexpected and unintended ejection of the card, or the general lack of a response remain inexplicable to the customer. Although the systems often provide feedback, this is frequently abstract or merely symbolic, meaning it cannot guide the customer towards a meaningful next step.

The translation – and thus the prerequisite for a successful completion of the transaction – is achieved through staff intervention. Staff explain system states, interpret displays, correct sequences of action and thereby restore the clarity which is necessary for a successful transaction. Observations and interviews point to the numerous disruptive situations in which there is a disconnect between the underlying logic and the customer’s behaviour, and staff must continuously perform remedial actions to restore stability in the interaction. Interaction with self-service terminals is significantly shaped by the indexicality of the interface elements.

Interface elements are meaningful only within the systems logic. This means that users must continually determine the systems current state and the significance of a displayed option in the current situation. Consequently, customers must constantly interpret the system's current state and determine the next steps to take. This is particularly evident in the sequence involving bank transfers and printing account statements. The hierarchical structure of the system is invisible to the customer; they see only individual options on the screen, but not the conceptual structure within they are organised. The 'New Transfer' button is defined by the system as a specific function, but the user interprets it as a continuation of the current context of action.

However, problems arise not only from a lack of user knowledge, but also from the design's lack of contextual sensitivity. This becomes clear in the sequence featuring the split screen. The design of the split screen ignores the user's practice of filling in payment slips with their own account details and offers two distinct options for action, which are, however, equivalent to the customer due to their understanding of the process. The design presupposes a distinction that is not necessarily relevant or recognisable with the specific context of actual use.

The analysis also illustrates how problem situations are only generated in the course of interaction with the self-service terminals. Reflexivity describes how users, through their actions and interpretations, determine what constitutes a problem. Statements such as "it won't accept it" or "he doesn't like me" not only describe a technical event, but also constitute an interpretation of what is happening in the situation.

Using self-service machines requires the ability to interpret the abstract steps of a standardised, pre-structured process. Customers must interpret the instructions displayed, deduce their meaning within the relevant context, and translate them into the appropriate inputs. However, this poses problems for inexperienced users, particularly older people, who have not yet incorporated these logics into their everyday knowledge. It becomes clear what competencies the system presupposes. The difficulties experienced by older people point to the great importance of contextual knowledge, interpretative skills and abstract thinking, which are taken for granted in the design of these systems. Age-related accounts in the interviews are cited as explanations for these difficulties, whether through self-attributions such as physical limitations or the perception that certain requirements are too difficult 'for older people' to manage. In this way, these accounts reframe the structural shortcomings in the design as a deficit attributed to the user. Responsibility for the successful use of the devices is attributed to the user, rather than being understood as an expression of the divergence between system logic and user behaviour.

An analysis of the interaction between older users and self-service banking terminals makes it clear that the problem situations observed and described are not primarily attributable to individual defects, but stem from the divergence between the assumptions embedded in the design and actual usage practices. A number of implications for the design of such systems can be derived from this.

- Transparency and accountability: System states and process progress must be visible; users should be able to recognise which step of the process they are at, what the system is currently doing and why something is happening. Long processing times require visible feedback. Silent system states without feedback should be avoided. No black box
- Structure and navigation: Processes should have a recognisable structure with a clear beginning, logical transitions and a definitive conclusion. Users should be guided step by step (no option overload), clear start and end, no abstract terms, transitions should be explicitly stated "Would you like to carry out another transaction or finish?"

- Unambiguity and comprehensibility: Ambiguous terms, symbols and action options should be avoided. Provide clear context-sensitive wording and consistent visual cues
- Context sensitivity: the system should take into account the history of transactions to date and adapt options and feedback to the current situation. Where possible, decisions should be formulated in terms of user actions rather than internal system logic. In ambiguous situations, the system should clarify the users intended action by asking context -sensitive questions, rather than assuming that users are familiar with the underlying process logic.
- Time and pace: Different interaction speeds must be taken into account. Longer or configurable time limits are recommended, as well as timely and noticeable warnings before termination; no abrupt interruptions without explanation
- Error prevention and recovery: Errors should not only be displayed, but also explained and solutions should be offered ("Try…"), attempts at clarification (not just "incorrect PIN", but "Are you sure this is the PIN for this card?"), simple correction options ("Back" button). Errors should be treated as an expected part of the interaction, rather than as an exception.
- Support and Recovery: The system should provide mechanisms for resuming a process that has been interrupted or has encountered an error. These include a clear display of the current system status, context-sensitive guidance, options for correction and backtracking, as well as specific suggestions for the next step. This enables the system itself to take over, in some cases, the support functions that are currently often provided by staff.
- Avoid complexity: Devices should not be overloaded with functions and options that are unnecessary or unexpected in the relevant context of use.
- Realistic assumptions about user behaviour: The design should not be based on idealised users who proceed in a methodological and structured manner. Users act situationally, not necessarily according to a plan, but draw on routines and experiential knowledge. Meaning is interpreted, not automatically understood. Successful self-service systems should not be based on the assumption of methodical, structure-savvy users, but rather on situational, context-dependent behaviour.

This study thus contributes to analysing problems with the devices not as a consequence of individual, age-specific deficits, but as the result of a structural discrepancy between system design and usage practice. The added value of the study lies not merely in identifying these difficulties, but in reconstructing their emergence within the specific course of interaction, thereby revealing the competences and behavioural assumptions implicitly presupposed in the design. At the same time, it becomes clear that difficulties arising from a mismatch between system logic and situated usage practices can be interpreted as individual or age-related deficits. Age thus emerges not only as a characteristic of users, but also as a potential and presumed explanatory category for problems in interaction. The study shifts the analytic focus from supposed individual or age-related deficits to the interaction between system design and situated usage practices and enables the deduction of empirically grounded requirements for more transparent, context- sensitive and supportive self - service systems.

7. LIMITATIONS AND OUTLOOK

The analysis is based on field observations conducted in a specific setting, a context that is particularly distinctive due to its financial significance and issues of trust and security. Nevertheless, the phenomena identified point to more general challenges associated with self-service systems without claiming statistically generalisability. Ethnomethodological analysis does not provide direct insight into users' motivations and attitudes; further analytical methods could yield additional insights here. Nor does it take into account factors such as efficiency, error rates or user satisfaction. Instead, it adopts an alternative perspective by examining how human-machine interaction arise in specific situations and how problems are overcome. Finally, the role of staff members as interpreters and mediators between the system and the user could also be analysed to gain a more precise understanding of the social organisation of 'self-service'.

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