Pay or Delay: The Role of Technology When Managing a Low Income

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ABSTRACT

This paper reports on a qualitative study of 38 low-income individuals living in the North East of England. The participants' experiences of money, banking and the role digital technology plays in their financial practices were identified through semi-structured interviews in people's homes and group workshops. A grounded theory analysis of these data characterises how technology both helped and hindered participants to keep close control of their finances. These findings suggest design opportunities for future digital banking technologies that extend the already sophisticated practices of individuals managing a low income, focusing on: delaying, prioritising, planning, watching, and hiding monetary transactions.

Author Keywords

Banking technologies; low income; financial inclusion; qualitative study.

ACM Classification Keywords

K.4.m [Computers and Society]: Miscellaneous;

INTRODUCTION

Digital technologies are playing an increased role in mediating interactions with money. For many people, using ATMs, online banking and applying for online credit have become indispensible tools for financial management. In regions where physical banking infrastructures did not exist until recently, electronic financial services via mobile phones have become highly popular [14, 17]. That digital technology is so crucial to our interactions with money has not gone unnoticed by the HCI community. In recent years there has been studies of alternative authentication systems to access our finances [23], the adoption of new banking systems in diverse cultural settings [20, 25] and work focusing on groups excluded from accessing new banking technologies and services [21, 27, 28]. However, thus far no work in HCI has examined the specific needs of people who live on incomes that are drastically lower than the majority of the population for whom banking services are generally designed for. The argument made in this paper is that while there might be much to gain from digital banking the specific needs of these individuals are not well catered for by currently available systems.

We undertook a qualitative study of low-income households across a number of economically disadvantaged neighbourhoods in the North East of England. The study was based on 15 semi-structured interviews in peoples' homes and 5 workshops with a further 23 participants. We gained insight into how participants exchanged money with other people, paid their bills, how budgets were managed, and what financial services they used and avoided. Building on the prior work on banking practices in HCI, we note that there are cultural and generational influences on how our participants manage their finances. While there is a popular rhetoric in the UK that people on a low income are unable to manage their finances [18], we highlight how our participants had sophisticated ways of detailing their transactions and prioritising what and who they paid. Digital technologies often came to the fore as both enablers and disablers in how our participants were able to manage their low incomes. While the focus of vendors and banks is to provide increasingly simple, easy to use, applications and devices, we noted that the financial practices of our participants appeared more complex than the capabilities of most of these digital technologies. Indeed, our participants desired tools that are more nuanced and sophisticated to support them to envision future financial scenarios.

The contribution of this work to HCI is twofold. First, we build on prior work on socially excluded groups [1, 11, 15] and the cultural and generational practices surrounding banking technology [12, 24, 26, 27] by providing a deepened understanding of the experiences and practices of low income bank account holders. Second, we provide a series of design challenges that arise from our participants' experiences and practices, focusing on developing tools that support planning, watching, hiding, delaying and prioritising monetary transactions.

BACKGROUND

While new technologies are improving access to banking services, for a large proportion of the World's population

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access is still far from ubiquitous. Figures in 2012 suggest that up to 50% of the global population do not have access to a transactional bank account [5]. Our research was performed in the UK, where issues of inclusivity with regard to banking facilities have recently come to the fore [22]. According to recent reports [5] 97% of people in the UK have access to a bank account. However, this figure disguises the fact that up to 23% of bank account holders are '*underbanked'*. These account holders are not able to use many of the facilities that most of us take for granted, such as automated bill payment and savings accounts that accrue interest. In the US, reports suggest that the numbers of people classed as underbanked has increased rapidly during the global recession, with as many as one third of people living in certain states being considered as such [3].

The payments industry is in a period of considerable change partly because of recent technical innovations in payment methods. Near Field Communication (NFC) technology is beginning to be integrated within bankcards and mobile phones allowing people to pay with the wave of their card or phone without constant authentication. Mobile financial services such as the O2 Wallet allows smartphone owners to consolidate accounts from multiple banks in one go and quickly send money to other peoples' phones. Indeed, SMS banking—which have been common in many regions across the global South [17]—are starting to become more common in Europe and North America as alternatives to traditional banking services.

Despite recent technical and commercial innovations and calls for greater attention to the poor financial service provision for low income families [18, 22], there has been very little research in this area. Ames et al. [1] and Yardi and Bruckman [29] have highlighted how socio-economic status can reflect and reinforce how technology is used in everyday life, while the work of LeDantec et al [15] and Grimes Parker et al [11] exemplify an increased attention to socially excluded groups in the field. In the context of banking technologies, prior work has highlighted how access to modern services does not always equate with the knowledge and competencies [20] or the level of trust and desire to use them [27, 28]. Our work is motivated by these concerns, and the awareness that structural differences in the daily lives of people with low incomes relates to differing values surrounding technology use [1].

It is a cruel irony that people on low incomes will generally expose themselves to additional charges from service providers as a result of their limited access to certain banking facilities. They are not able to benefit from the reductions in utility bills available to people who use automated payments (Direct Debits in the UK). They do not get interest on savings accounts, and because they often have very variable and unpredictable incomes they are more likely to go into debt in their bank account and thus pay penalty fees [18]. They may also have to rely on expensive transactions. For example, paying bills by cheque typically incurs higher rates or additional charges in the UK and US. This research was carried out as part of a project to devise a new transactional account that rectifies these shortcomings in current banking facilities. As such, our work aims to explore the design and delivery of affordable and convenient payment services appropriate for financially excluded households.

THE STUDY

The study took place over a three-month period in the North of England. A qualitative approach was chosen as we wished to develop a rich understanding of the challenges faced by low income individuals and households.

Participants

All participants had an income under the UK's Absolute Low Income Measure (£251.40 per week). We worked with representatives of two community outreach organisations, a local government supported housing provider, and two older persons advocacy services to refine our recruitment procedures. Following consultation, it was decided that as well as adopting the above official definition of low income, participants should live within neighbourhoods with populations of higher than national averages of unemployment and lower than national average incomes.

Having identified participant criteria, we worked with these organisations to recruit potential participants initially through community contacts. Taking a snowball approach to recruitment, we were introduced to further participants by those who had already taken part in the study. Either a member of the facilitating organisation or a researcher discussed the study with potential participants prior to its commencement. The formation of trust here was crucial as a number of participants were deeply sceptical of talking to strangers about their financial practices for fear of being 'ousted' to authorities for any unscrupulous activity.

In total, 38 participants were recruited to take part in the study. 18 (47%) of the participants were female, with a mean age of 60 years of age (our youngest participant was 21, our oldest 83). 92% of the participants were white British in their ethnicity. Although all of our participants shared the fact they lived on a low income, there was great diversity across the sample. This included: 5 unemployed young people whose main income was state benefit provided to unemployed people (£56 per week); 11 older people whose income is primarily a state pension (currently £124 per week average); 5 individuals with disabilities or impairments that significantly limited their access to banking facilities; 4 carers for people with disabilities who had given up their own jobs; and 17 individuals who are not computer literate. There was also quite some overlap between these 'groups'. For examples, 3 of the older adults taking part also had impairments that further restricted their access to banking services, and unemployed participants were highly diverse ranging from unemployed University graduates to middle-aged job seekers who had been out of work for several years.

Name of card	Image on card
Cash	*Bank notes and coins*
Cheque	*Filled in paper cheque*
Direct debit	*Direct debit logo*
Internet banking	*User interacting with a laptop*
Mobile payment	*Close-up of someone sending a payment with iPhone*
Passbook	*Handwritten list of transactions in and out of bank account*
Planning spending	*Calendar*
Prepaid card	*Prepaid MasterCard*
Receipts	*A pile of receipts*
Recording your spending	*Pie chart representing someone's spending over a month*
Savings jar	*A savings jar full of banknotes*
Statement	*Printed monthly bank statement detailing transactions*

Table 1. Topics for prompt cards. Each card had this title and a relevant picture.

Interviews and workshops

Prior work on banking in HCI has highlighted the potential difficulties researchers face discussing personal finances with participants [27]. Participants may feel uneasy in sharing details about their financial practices with the researcher in an interview. This unease can become all the more prevalent in group situations where participants may have different practices and place different value on money and how they manage their finances. We therefore developed interview and workshop protocols that built upon this prior work to make participants feel more comfortable in sharing potentially sensitive information with us.

17 of the participants took part in semi-structured interviews that were performed in their homes or at a location of their choice. Inspired by financial biographies [27], participants were initially asked to tell us about their 'typical week' and were informed that the interviewer will ask follow-up questions related to finances at key points. Following this, the interview would move on to a card-based activity. Card-based prompts have been noted to be a useful way for participants to start opening up to discussing their financial practices with others and relate concerns about digital technology [27].

13 cards (see Figure 1 and Table 1) were handed to participants. Each card represented: a payment method (e.g., 'cheques', 'cash'); a financial instrument ('statement', 'receipts') or a financial activity ('planning spending', 'record keeping'). Participants were asked to select one card that represented each of the following to talk about further: i) *Something you could not live without*; ii) *Something you would get rid of*; iii) *Something you would change for the better*; and iv) *Something you should use more or be better at doing*.

Participants were asked to go through the pack and respond to these four questions in their own time. Typically,

Figure 1. Prompt cards used in discussions with participants.

participants would lay the cards in front of them and survey them for appropriate responses. This activity quickly allowed participants to feel comfortable talking about issues to do with their finances to the researcher. The resulting discussions provided opportunities to explore how participants managed their finances now, the problems they have in doing so, and explore how they felt they could manage their finances better in the future. For those interviews undertaken in participants' homes, this often involved participants offering to show the researcher their financial records (as in Figure 2) as a way of explaining their existing routines and practices.

The remaining 21 participants took part in four separate workshops that were held on our facilitating organisations premises. These workshops began with participants introducing themselves followed by each performing the card activity and talking about their choices to the group. The use of the cards allowed most participants to quickly feel at ease talking about their personal and family finances in the group. While the workshops did not afford the level of depth individual interviews in peoples homes did, they provided opportunities for participants to question one-another on their practices and to identify shared problems.

All interviews, workshops and our analysis followed a constructivist approach to grounded theory [4]. As such, data collection and analysis were not completely separate processes. All interviews and workshops were audio recorded, transcribed and anonymised. During interviews the researcher would summarise informants views to check they have been understood correctly. Analysis began following the first 5 interviews when the lead author coded the transcribed data on a line-by-line basis. At this early stage several codes stood out related to the amount of time participants invested in their finances, concerns over control of physical money and detailed knowledge of account status. The discussion protocol was adjusted so these topics could be explored more deeply in the following interviews. Upon completion of all the interviews and workshops, the additional data was coded without any underlying theory by the lead author. 140 unique codes were developed at which point no new codes were generated. Frequently occurring codes were identified and used to form the higher-level

descriptions, a technique known as focused coding [4]. We then engaged in memo-writing [4], writing short analytical descriptions of codes and the continual comparison [10] of codes and their associated data with one-another. These memo comparisons led to the formation of 5 axial codes [26] that describe the central themes from the data and link the initial codes together. The second author independently coded sampled data to identify potential disagreements in interpretation, and we performed two workshops with stakeholders external to the work to cross-check categories and codes. Finally, selective coding was performed where quotes are chosen to form a narrative linking the 5 axials to illustrate the theory. Here theory is considered a description of the collected data and not a predictive model [4].

FINDINGS

Our analysis of the data revealed 5 axial codes: *lifestyle, routines and making adjustments*; *managing and negotiating priorities*; *categorising, designating and restricting expenses*; *record keeping to keep control and plan ahead*; and *threats and fears*. The overall theme of *confidence through awareness* links these together and will be discussed following a discussion of each code.

Lifestyle, routines and making adjustments

Money management was a fundamental part of most of the participants' daily lives. Almost all had a peripheral awareness of what their bank account balance should be at any time: *"I know within £3 exactly where I am with my finances, daily."* (P12). The vast majority had routines in place that would mean they check balances and recent transactions on a regular basis. For some this would mean checking at a specific time every day: "*I check every day what I've spent. I religiously check my balance every morning*" (P8). For others, it would mean ensuring that whenever any money is supposed to be coming into or out of their bank account they will check how much their balance is: *"I sit there and I literally, if I know I'm being paid tomorrow I will check my bank account at three minutes past midnight tonight."* (P10)

A number of the participants found themselves on a low-income after a sudden change of circumstances. Examples included the loss of their primary source of income (P22), a partner losing work or being made redundant (P14, P26), retirement (P35), the death of a partner or illness of a family member (P24), and splitting up with a long-term partner (P05). In such circumstances the financial implications of the new situation are a secondary consideration to the primary worry of finding a new job, finding a new home, and dealing with emotional or health factors. The financial implications of their situation often only became apparent some time after the change of circumstance. For example, participants who had previously enjoyed a regular income found it difficult to adapt their spending habits. Very quickly they would find themselves running out of any savings that they had accumulated while in work. Indeed, those who were in such situations reflected that if they had realised how much they were still spending sooner their current financial situation would be significantly improved:

> *"When I lost that job I kind of went on spending as though I had it. Now most, like about 90% of that money has gone. It's not because I was reckless with it or anything; it's just because I kind of assumed it was always there. Now I don't have such a float of emergency cash. I think being in this financial situation has forced me to learn how to plan more strictly, I couldn't go without planning my spending."* – P1

For others, the dramatic changes in their level of income lead to bankruptcy (P24, P22) repossession of family homes (P22), or having to move to smaller and cheaper rented properties (P26). As such in many cases one's financial circumstances were embedded in practices of communicating with public services, courts, new and old landlords, and utility providers. It was acknowledged by a number of participants that it was hard to manage finances in *"the chaos"* (P09) of change and as a result they would be *"always looking"* (P26) at bank statements. P22 explained how her checking routine was a result of continued pressure to reduce bills and restrict spending:

> *"There's not much room actually to play with.* […] *I'm having to be more careful with the food shopping, saying this is how much I want to spend this week and this has got to last this much, and we'll have these good meals and we'll have some rotten ones in between."* – P22

P22 would sit down several times a week at the kitchen table to look over her finances. P22's example is pertinent here as it illustrates how concerns over budgeting and saving money pervaded the lives of most of the participants. For others, low income impacted on urban mobility (being able to afford public transport or run a car) and meant planning travel very carefully (doing as much as possible in one visit to town). It also significantly reduced opportunities to socialise with friends and family, especially if those friends and family were earning a wage.

Managing and negotiating priorities

Managing a low-income meant many of the participants consciously prioritized certain bills over others. A number of participants explained how they had occasions where overspending on something they deemed non-essential—such as an item of clothing or spending more on unnecessary multi-buy offers at the supermarket—had meant they did not have enough money left for bills they considered critical such as rent, mortgage repayments or utilities. Many referred to occasions where spending beyond their means prior to a priority expense placed them into debt on current accounts. As most did not have overdraft facilities on their bank accounts this would lead to their account going into arrears and generating fines on a per-month or per-day basis. Therefore, almost all participants were aware of *"important dates"* (P23) that occurred each month or every quarter where certain bills had to be paid: *"I have to be mindful of that because if your accounts are empty then you run the risk of going into*

arrears, and then you get charged £6 a day." (P9). As well as keeping in mind these important dates, P9 was tactical in how he delayed the payment of certain bills in order to pay other more important ones:

> *"The phone bill is pretty flexible, I can pay that whenever, in fact you can get up to 2 months behind and they don't mind. If there's something good happening at the weekend, and I think my* [phone] *service is going to get cut off, I'll give them a ring and just say, "Can you push my bill back to next month and I'll pay two next month?" Just to free myself up at the weekend if there's anything that I want to do, I prioritise that over paying a phone bill on time."* – P9

Delaying the payment of particular bills was a frequent practice of several participants. P21 explained how he would prioritise payments that directly impact upon his living conditions (such as electricity which could be cut-off, or his rent which could lead to his contract not being renewed) over the water (which by law cannot be cut off) or Internet (where providers can be flexible with payments):

> *"I know that there are certain bills that you can get away with paying for late. You can't be cut off water and unless you refuse to pay the bill outright, they will be flexible if you're struggling a little bit for a week or so. So if something else comes up, I can push water back."* – P21

While some participants made value judgments about which bills they should prioritise, there were contrasting views. Some were vehemently opposed to spending money they knew they did not have. As noted elsewhere [27, 28], this was particularly true for older participants. Many of them had lived through great financial hardship during their lives and were brought up to not spend money on what they could not afford: *"If you haven't got the money you don't get it, and things we just did without."* (P32). As a result, while they would still prioritise certain expenditure over others, they would not commit to buying anything unless it *"was within my means"* (P35).

Categorising, designating and restricting expenses

Prior work has highlighted the importance of control and record keeping for the financial practices of the older old [27]. Keeping control was equally important across the participants in this study, regardless of whether they were young or old. Almost all participants referenced the need for them to be *"controlled"* with their spending or to *"know where they are"*, although some indicated that they were not very good at doing so.

One tactic to help keep control was dividing up income up into categories in order to plan their spending for the foreseeable future. P10 discussed the great lengths she would go to plan out how she would spend her money. First of all, she would prioritise particular bills over others by separating out a chunk of money and placing it into a separate bank account: *"so I need to pay May and June rent, so that will be £700 – so that £700 goes in that account, that's not to be touched, that's rent"*. She would

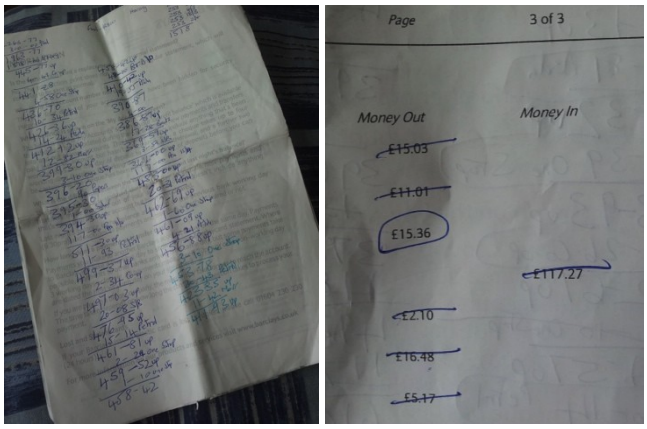

Figure 2. P20's handwritten record of transactions from a month period (left) and her annotations of a checked bank statement (right).

do this by logging onto her Internet banking as soon as she thought her incoming money would arrive in her account (typically just after midnight on a payday) and transfer it between accounts. P10 would then go through the remaining money and again designate it to particular types of expenditure for the following two-month period:

> *"Then from the money left over, that's what I'll divide up. So if I've gone in to my overdraft I'll have to take that much off to cover my overdraft. I then look at how many weeks I have until I next get paid, say I have to divide 10 weeks until I next get paid, I'd say, "I've got this much money, I've got to live 10 weeks." I just divide it, so it comes out as £40 or £50 a week."* - P10

Finally, if she feels if she has quite a lot to live off per week, she would add additional money to her savings account which is used as a *"safety net"*: *"If it's particularly high, if I'll have like £100 a week, I go, okay I can shave £10 off that and put that in my savings."* (P10). Separating out these 'chunks' into different accounts had the dual benefit for P10. First, when logging into Internet banking she could quickly ascertain how much money was in each chunk. Second, by separating out the money in this way she would be less tempted to spend it. She reflected: *"When I've got a bit more I'm less fussy about it, because I've got that comfort, safety blanket thing."* (P10).

Categorising and placing money into different chunks and piles for specific bills was also a practice undertaken by households that did not have multiple bank accounts. P26 explained how his wife and he would plan their spending each week when he received his wage:

> *"My wife and I would sit on a Thursday night and she would have little jars. So much for the mortgage and there would be so much for her housekeeping. Twice as much for my beer and then there might be £20 left."* – P26

Cash was deemed particularly useful here as it could be separated into piles, placed into see-through jars and you could literally "see" how much money you have left for specific types of bills over the coming period. These

qualities resulted in cash being seen as crucial to managing a tight budget. Previous work has noted how cash was valued in this way by older cohorts [27]. Indeed almost all older participants taking part in this study valued cash in this way. P24 explained how he uses cash as a way of monitoring how much money he has to spend each week, and how much "spare" cash he has to spend.

> *"What I've got in my pocket is what I've got. So, I know I can spend that. I'll go to the bank once a week, draw out what I think I need and then the rest is obviously there to pay the bills. I know if I've got like £10, that's all I can spend. If I go out and buy something for £9, I know I'm only going to have £1 left."* - P24

We also noted however that many of the younger participants valued cash for its restrictive qualities.

> *"I'm just very wary of paying on card or online and losing that sense of actually spending the money and sort of getting a bit carried away in that sense. If you go out with 20 quid and come back with 10, you know I've spent x amount rather than trying to count up receipts or run back about what you paid for on your card and stuff."* – P13

Cash was considered to be of particular use when going shopping for food, where people would only take out a specific amount of cash to ensure they stick within a predetermined budget. Similarly, if socialising or going out for an evening, people would only taking a small amount of cash and leaving debit and credit cards at home because *"it's very easy, especially when you're drunk to think, oh, it's a good idea to pay for six drinks on a card."* (P21). While such social events were rare for the vast majority of our participants, it appeared that the budgeting-supporting properties of cash enabled them to still enjoy the occasional evening with friends without the concern of over-spending.

Record keeping to keep control and plan ahead

A common approach participants used to keep on top of their finances was to keep intricate records of their expenses. These records would be kept in designated books, diaries or ledgers or in detailed spreadsheets on a computer. Those that kept such detailed records would also typically keep all of their receipts for a given period so that they could be checked off against bank statements. For example, P20 would write all of the payments and transactions she had performed for an entire month on scrap pieces of paper. She would update this list every one or two days, and keep a running total of what her account balance should be (Figure 2, left). She would collect a "mini statement" from an ATM once a week to verify that expected transactions have gone out. At the end of each month she receives an official statement from her bank, which she then cross checks with her own records. She rings any transactions that she does not recognise (Figure 2, right). She explained:

> *"I just like to know more or less on a daily, at least, well daily sometimes, perhaps two daily, exactly what my balance is, what money's there. Because it helps me towards planning things*." – P20

For P20 and others who undertook similar practices this level of record keeping was deemed beneficial on at least three levels. First, it enabled them to check that everything was *"just so"* and nothing had been withdrawn or paid out that was not correct. Second, keeping such records allowed them to see how much they were saving, and allowed them to put these savings aside to plan for bills that were known to be coming in the future. Third, by seeing what had gone out over a certain period of time they would be checking to see if specific outgoings have notably increased over time and whether they could save further money. P20, with a smile on her face, explained that: *"I'm not watching the TV anymore, so from yesterday I've cancelled the TV license. That has saved me £12 a month."*

As well as keeping tight control of one's own finances, detailed records also had great use for sharing finances with family members. P12 also kept a very detailed record of all transactions he and his wife made in his "ledger". He kept it meticulously up to date each week with an updated running total of how much was in the bank account. His wife delegated this routine completely to him: *"She leaves the financial control of where we live to me, because she's nervous of money"* (P12). But P12's wife found the ledger an important resource to refer to as and when she needed to withdraw money: *"She can look at that and she knows exactly how much money we've got at our fingertips. She knows she can go to the bank."* Although it was clear that P12 greatly enjoyed keeping this record, he found great comfort that his wife's worries about finances were often subdued by having access to the account status:

> *"As far as I'm concerned, at the moment, my wife could open my file. She can look and she'll know exactly how much money we've got. Not what I've got. It's what we've got. It calms her nerves enormously"* - P12.

While P20's and P12's record keeping was entirely paper-based and required significant effort on her behalf to keep up to date, others valued Internet banking as it provided immediate and up to date records of an account's status. A number of participants explained how they would log into their bank accounts every day to check that specific bills have been paid, that expected wages or credits have been paid in, or just to have a quick check of the remaining balance. This was deemed especially valuable when having to manage a tight budget with a busy home life. P26 is a housewife and also the main carer for her Mother, who is recovering from a stroke. She explained how she couldn't live without Internet banking because: *"I can do them* [her bills] *in the middle of the night, when I don't have kids screaming around me and I'm not pressured to make an appointment to try and sort it out at the bank"* (P26). Her busy lifestyle also leads her to forget to pay bills: *"I wake up in a panic at 11 o'clock at night and think I haven't paid something. So, I can do it straightaway"* (P26). Prior to using Internet banking however she used to keep a paper record in a diary. She reflected that Internet banking,

although providing much valued 24/7 access, is still "*not quite working*" for her:

> *"I don't feel I can see everything all at once.* […] *it could show me on graph how much my outgoings were, what my incomings were, what my expenditure was and I could cross referenced that every month."* – P26

While both record keeping and checking were considered of utmost importance across almost all participants, one or two admitted they found it challenging to keep track of their expenses. This was down to finding the task tedious (*"it's just not a great thing to do"* (P2)) or being unable to find time among other routines (*"it's hard to find the time to sit down and do it properly"* (P14)). While many participants didn't use automated payment methods such as Direct Debits due to their unpredictability, those who struggled to keep on top of their records talked about them being a *"god send"* (P34) as it ensured that bills that may go forgotten are paid each month.

Threats and fears

While some technologies, such as Internet and mobile banking, were seen as potential solutions to their problems with keeping track of finances, many raised concerns that such technology was *"insecure"* and *"untrustworthy"; "I don't believe in Internet banking, because I believe once things get into the electronic mode, they're susceptible to attack"* (P6). A number of participants explained how they had heard stories of people losing money doing their banking over the Internet, or read stories of computers being hacked into. Those older participants that used computers and the internet already had questions remaining over using it to access their bank account: *"I wouldn't mind having a go on the Internet banking, if I felt, and somebody convinced me, it was secure"* (P04). P22 had started to use Internet banking but only to *"look at the statements and look at what's come out* […] *I always think somebody's going to come and steal my numbers"* (P22). It was clear that there was much distrust of undertaking transactions on the Internet among many of the older participants.

While there was a fear of security of online banking in general, others took a more critical stance that banks and service providers are only providing such services to make money. P38 had a huge distrust of all manner of digital technology (he refused to have a mobile phone from his son) and exclaimed: *"The more doors you open, the more the wide boy can get in.* […] *This is supposed to be the day of technology and all it's done is create more problems, as far as I'm concerned. I'd get rid of it"* (P38). P38's distrust of sharing information online was replicated elsewhere: he would not give any information to staff from utility companies over the phone unless he knew them personally, he would shred any paperwork with any personal details on it and he would keep money in his home rather than place it in a bank account. His concerns were two-fold. At one level he was concerned about his personal identity being stolen. But a more pressing concern for him was that people could use this data to *"get to him"*—to try to sell him services he did not need or to realise he was potentially better off financially than initially thought. P21 shared similar concerns, and explained his reasons for not placing his small amount of savings into a bank account:

> *"when you're on benefits and things like that, they will be very specific and make sure that you don't have money.* […] *having bank accounts and savings accounts means you have money* [...] *the last thing you want to do is become unemployed, have those savings there and then for the Job Centre to go, - No, you can support yourself, you've got this much in a savings account."* - P21

Finally, there were also fears and threats related to those whom you shared your home with. P1 lived with his Mother, Step-Father and Sister, all of whom were unemployed. He explained how his Sister had serious money problems in the past and it was not unusual for *"money and cards to go missing"* or to catch her going through people's bank statements that had arrived in the post. As a result, P1 now no longer receives paper statements and performs the majority of his banking routines on his personal laptop in his room where he feels nobody else can see it. He also keeps a small amount of savings in a jar and hides it under his bed: "*I just don't want her* [his Sister] *to stumble across it. No-one knows where I keep my money."* Similar concerns were raised by other participants who didn't want family members to see their personal finances or were concerned about nosey flatmates: *"I just wouldn't necessarily want to share that information with them. I don't want them to know how much I'm earning and what I'm spending it on"* (P10).

CONFIDENCE THROUGH AWARENESS

Here, we summarise the overriding theme that links together the codes we have described: *confidence through awareness*. For most, there was an ambient awareness of financial strife and a need to save money—albeit some individuals were far better at taking action on this than others. We consider that this feeling of awareness was evidence of a lack of confidence in their financial situation. As a result, we saw how participants were consciously aware of upcoming bills and important transaction dates. In order to know whether there were enough funds in a specific account though participants also need to have an awareness of the account status. For some this awareness was fairly peripheral, whereas others used concrete representations of their account status (a statement, their own record, or access via the Internet) to frequently refer to. Those that had representations of their account present around their home—in glass jars, in notebooks or Excel spreadsheets, or just reminders on calendars—were better positioned to keep on top of their finances. The material presence of financial records afforded detailed examinations of finances and raised confidence, for some, in knowing their financial situation at any point in time.

Technology also played an important role in building or destroying confidence. Again this was tightly related to issues of awareness. But in these cases it would often be about 'who else was aware' rather than concerns about the status of your finances. Participants felt ill-at-ease and even paranoid about other people finding out about their account statuses. In some cases this was because they were concerned about fraud—however, in other cases it was a feeling that financial information could be held against them in the future. Ensuring a lack of awareness on others behalf helped people feel more confident that they could save towards gifts, treats or holidays. Once again, physicality was considered hugely important here—having something that was physically present in your home (i.e., your savings jar, paper statement of transactions) meant it could also be physically hidden (i.e., under your bed, shredded so it is unreadable).

DESIGN CHALLENGES AND OPPORTUNITIES

The banking industry in the UK was born out of a culture of exclusivity. Historically, the bank account was not a fundamental tool in society as it is today, and was a product targeted at those with a high socio-economic status [9]. Today there is pressure upon those providing transactional bank accounts to adopt the principal tenet of HCI to *understand the user* [22]. But on the whole, the design of current banking technologies reflects a trivial computerisation of common operations that a bank must perform. We saw how in a myriad of ways what was valued by the participants in our study were not the values inscribed into the technologies provided by the banking and payments industry. However, we propose there are still a number of opportunities to design systems to be more valued by, and useful to, the group to whom we spoke.

The findings from the analysis, and the principle of confidence through awareness, suggest specific needs to be supported in future digital technologies. Clearly, the participants in our study were all highly motivated to manage their finances and had very sophisticated practices. This was illustrated in the time and effort most put into making their account balance and stretching their finances as far as they could possibly go. In our design recommendations we do not wish to replace these complex practices with technologies nor prescribe interventions to alter their existing strategies [24]. Rather, we wish to explore the ways in which electronic and digital banking technologies might extend these practices and allow them to predict and explore future financial scenarios.

Delaying and prioritising

We noted how our participants had sophisticated ways of delaying one payment in order to prioritise another. Where income is limited or sporadic, these measures have to be taken to ensure the most important bills can be paid. Sometimes this is a unilateral decision on the part of the account holder. Sometimes there is a process of negotiation with the payee. Some service providers understand that it is better to receive a payment later rather than not at all, or after an expensive and protracted debt reclamation procedure. However, Internet banking systems frame digital payments as instant and irrevocable, arguably supporting behaviours that are desirable to banks themselves (e.g. easy setup of direct debits, instant payments, apply for credit). Such functionality implicitly seeks to influence people to place greater value in paying bills quickly and regularly, and remove responsibility to remember important payments. While these systems may be usable for those with regular and predictable incomes, this interferes with the fine-grained control of irregular, unpredictable incomes.

While it may be contentious to design technologies that help people to delay payments, it is worth noting that this is not necessarily a deviant practice and is common in commerce and everyday life. Simple functionality such as notifications in advance of future scheduled payments and the possibility to delay them could empower account holders to realistically manage finances, increasing the possibility for technology to provide situated support, and increase confidence in digital finances.

Planning and watching

Financial planning was something that was very important to all of our participants. A common practice amongst participants was separating cash into different physical or mental 'pots' enabling them to see how much money they have spare. There is no provision for this kind of predictive practice on current mainstream Internet banking systems—indeed, one participant had two completely different bank accounts so that one could just be for the rent money. Modern Internet banking facilities are beginning to provide functionality that enables people to reflect upon what has been spent in the past (e.g. using pie charts [16]). Enabling people to create figurative pots for future spending appears to be a simple thing to achieve technically and could make budget planning easier and more attractive.

One benefit of supporting awareness in this way is that it may promote reflection about how to manage spare money in the medium to long term. A number of our participants used savings to meet unexpected expenses, and some felt that savings accounts with that accumulate interest were aimed at those with more money than themselves. Access to the latter is one way to create a sense of financial stability, and foster the self-esteem to make medium to long-term financial decisions for personal benefit.

Another possibility is to automate the prediction of future spending. This is well within our reach technically, however, the trade-off between system flexibility and usability is an important consideration. While apps currently exist that support predictions of future spending (e.g. [2]) these typically require people to enter large amounts of information about expenditures and keep this information up to date. Instead, we might imagine apps or additional functionality on existing Internet banking systems providing predictions based upon regular expenses across different payment methods. For example, your

account may tell you how much might be saved by shopping at an alternative supermarket, or by moving to an alternative energy supplier. Furthermore, such tools and apps might also support the testing of ideas for future spending behaviour. This may provide feedback on what finances may look like in several months time if you delayed specific payments over others, or perhaps support you in saving small amounts towards a motivational goal.

Hiding

Across our participants we noted many privacy concerns that acted as a barrier to using digital technologies to manage finances. Where the financial circumstances of an individual were precarious, disclosing financial records to an organization, even a bank, represented a significant disclosure. At one level, there were concerns that offering this information would lead to offers of support that are unwanted, e.g. advertisements for loans, repeated offers of support. At another level, for those in receipt of some form of state benefit there was a concern that digital records of income and expenditure would become the target of surveillance or increased interest from those seeking to reduce the amount of any future benefit payments they received. Rules regarding eligibility for welfare payments can be confusing, and this behaviour is not necessarily dishonest. We also saw cases where hiding was important in ensuring family members and housemates did not access personal information. For this population, the inability to hide ones financial concerns from the state and collocated individuals could be a powerful disincentive to using a system that might otherwise have advantages for them.

The challenge here is subtler than keeping data and information safe through more secure and usable authentication mechanisms (as in [8, 21]). The issues here relate more to data sharing and access control in the home (e.g. [19]) and with service providers. What is required here, as Mazurek et al. [19] note, is greater transparency in how privacy and access policies are communicated to users, or to design systems that account for the lending or just the 'seeing' of others devices when private information is on display. In our participants cases, providing devices that stand alone from the account itself might be one way for an account holder to manage their finances. This may support the situated synchronisation of data between the two systems while emphasizing the disconnection between the account provider and financial planning tools. This is representative of the current practice some participants partake in with paper-based records. It could serve to communicate that one organisation or technology does not have possession of all the data, and minimizes the risk of it being surrendered to authorities on demand.

LIMITATIONS OF STUDY AND METHODS

As with any study, there are a number of strengths and limitations of the methodological approach of our study. While the sample of participants was large for the inductive and rich qualitative focus of this work [4], it is still small in comparison to the low income population of the UK. Also, although we recruited participants across three sites, these were within a specific region of the UK and predominantly white British population. Clearly more diverse sampling could lead to even greater pluralities of financial practices. Furthermore, banking and financial practices are highly culturally influenced, and studies in other cultural contexts would undoubtedly reveal very different issues. As with any grounded theory we therefore limit our findings to the sample of participants involved in this study.

The prompt cards used to elicit discussion also only represented a small number of possible payment methods that participants may rely on. However, they did elicit rich dialogues in interviews and promoted inter-participant discussions in workshops, often with participants using the prompts to refer to different but related payment methods.

CONCLUSION

In the domain of sustainability, DiSalvo et al. [6] and Dourish [7] have drawn attention to how the dominant focus in HCI is on changing individual behaviours without recognising the prevailing social, institutional and political structures that shape and inhibit the actions of individuals. There are similarities with what we have argued in this paper—that the technical infrastructure and services defined by the banking industry are inscribed with values of what banking should and should not be. These are values that break down in light of the values, practices and everyday concerns of people living on a low income. As such, one way forward is to work closely with banks and payments organisations to challenge these values. However, this would require significant changes to not only the capitalist orientations of the dominant banks, but also to the (antiquated) technical infrastructure that the British and US payments services and these values are channelled through.

A recent article by Rogers and Marsden [24] argues that HCI needs to move "beyond the rhetoric of compassion". That is, when designing for excluded groups one should empower them to follow their own agenda and that too much inclusive design is well meaning but has a shallow understanding of user needs. Their conclusion is that fundamental inclusive design can only be achieved by giving the excluded population tools to design their own systems. We have not gone that far in this research but we do believe that we are moving towards giving people more freedom to conduct financial transactions in ways that suit their own circumstances. In doing so, we begin to move away from the institutional structuring of what is right and wrong in how people manage their own money. Our exhortation to provide features for hiding and delaying monetary transactions might be viewed as subversive by a bank, for example, but these are practices that our participants depended upon. It is to be hoped that this paper, by presenting a view of current financial services through the eyes of people on low incomes, will encourage the development of electronic transactional accounts that don't cater solely for the convenience of banks.

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