

Numeracy practices and vulnerability under conditions of limited financial means: "Without money, you can't survive or do anything or develop yourself"

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Abstract (Using ALM Heading 1)

This paper discusses adults who are dealing with limited financial means under the premises of disability and over-indebtedness. To this end, the authors examined the concepts of vulnerability, financial literacy and the numerate environment for systematising and presenting findings from a qualitative secondary analysis of qualitative data sets derived from two research projects, having explored the numeracy practices of adults with learning difficulties and of adults facing over-indebtedness. By this, the learner's micro level of acting out numeracy is brought to the fore, revealing the multidimensional features of a numerate environment and of adults' numeracy strategies in order to handle financial matters in daily life. The analysis identified the common ground of the most significant competency domains of financial literacy according to both data sets (revenues, expenses and consumption, and budget management) and identified the numeracy strategies developed and used. In conclusion, the authors suggest further discussion of vulnerability as a relative and relational category that supports a pedagogical understanding of adult basic education and adult numeracy with a resource-oriented perspective..

6 Key words

Numeracy; disability; debts; money; vulnerability; financial numeracy

Introduction

Analysing the topic of dealing with limited financial means as part of adult numeracy is of particular interest, considering the pivotal role that money plays in the scope and quality of not only participating in society, but also in pursuing individual and collective interests, learning endeavours, and leading a 'good' life with sufficient means. Its significance was summarised by an interviewee in one of the studies to be presented in this paper, an adult with learning difficulties (also termed intellectual disabilities [ID]):

I mean, it enables everything you have got: a flat, food, clothing, spare time. It is in our times...
Without money, you can't survive or do anything or develop yourself. (DIS_I_1_#01:00:19-1#)

This sequence points to what we have described in earlier papers as the *nexus between participation and adult basic education* in the sense of an interdependency: basic education is both the prerequisite of participating in society and its continuous work mode (Curdt & Schreiber-Barsch, 2021; Schreiber-Barsch & Curdt, 2021; Schreiber-Barsch, Curdt & Gundlach, 2020). Having recognised this interdependency, it becomes clear why adult basic education has evolved from being treated as an individual's responsibility to one that is borne by the public and educational sector, as enabling and ensuring the participation of individuals and groups in society complies with the socio-political and educational standards and demands of a modern democracy. Thus, the concept of participation links individual action (learning) to its embedding societal architecture (entitlement for and provision of learning) (Beck, 2013). Adult basic education enables and strengthens this nexus by assisting adults as they adapt to the knowledge and employability demands of modern societies and labour markets, empowering individuals and groups to navigate through these societies and critically reflect these demands, as well as reducing the social expenses and negative impacts of a population with only low numeracy and literacy skills (Craig, 2018, pp. 61 – 65; Grotlüschen & Buddeberg, 2020; Organisation for Economic Cooperation and Development (OECD), 2019a).

A social practice approach to adult literacy and numeracy pays particular attention to the different layers of this nexus and helps to uncover its power relations and individual perceptions. Such an approach ensures that adult literacy, numeracy, and language skills are not viewed as only an individual performance; rather, they are seen as “communal resources” (Hamilton, Hillier & Tett, 2006, p. 12) and “fundamental aspects of communication” (p. 11) that allow individuals to develop their biographies, “mediate individuals' dealings with one another, and regulate interaction with social agencies” (p. 11). Adult basic education, then, extends the pedagogical idea of transferring functional knowledge of reading, writing and mathematics techniques towards recognising this embeddedness of literacy and numeracy (Tett, Hamilton & Hillier, 2006). This view is seen to support adults in leading a meaningful life as independently and self-determined as possible and developing a literate and “numerate adult citizenship” (Faragher, 2019, p. 206), which allows adults to be recognised as “productive and accepted members of particular communities of practice” (Yasukawa, Jackson, Kane & Coben, 2018a, p. 14).

Following this perspective and shifting the focus to numeracy, the paper aligns with scholarly works that interpret numeracy as accounting for both the mastery of school mathematics *and* everyday numeracy (Geiger, Goose & Forgasz, 2015, p. 531; Lüssenhop & Kaiser, 2021, p. 47), giving credit to a life-world orientation (Grunwald & Thiersch, 2018) and aiming to uncover the situative and context-contingent nature of acting out numeracy (Yasukawa, Rogers, Jackson, & Street, 2018b). Such socio-cultural approaches seek to gather insights into how numeracy is perceived and experienced subjectively by adults, focusing “on what people *do* with numeracy through social interactions in particular contexts, rather than on people's performance of mathematical skills in isolation of context” (Yasukawa et al. 2018a, p. 13; emphasis in original). To this end, the paper further draws upon the concepts of the numerate environment (Evans, Yasukawa, Mallows & Creese, 2017; Evans, Yasukawa, Mallows & Kubascikova, 2021) and financial literacy (Lusardi, Hasler & Yakoboski, 2021; Mania & Tröster, 2015, 2018). It aims to show how their systematic application on findings from two qualitative-oriented research projects, having explored the issues of numeracy practices of adults with learning difficulties (Schreiber-Barsch et al., 2020) and of adults in situations of over-indebtedness (Angermeier & Ansen, 2019), was useful in investigating the financial numeracy practices of two groups of adults in vulnerable living situations and in uncovering important implications for adult basic education pedagogy and research approaches.

Literature review: Numeracy practices of adults living in financial fragility

Over-indebtedness and disability: Fuelling risks of vulnerability

Several studies have consistently referred to income and educational background as significant objective resources that affect participation in learning (in general) and adult basic education (in particular) (OECD, 2019b, pp. 23, 26-27; Lusardi et al., 2021, p. 184). Hence, living with over-indebtedness or with learning difficulties strongly suggests a higher risk of financial vulnerability, again emphasising the need for financial literacy due to situations of “financial fragility” (Lusardi et al., 2021, p. 181).

Over-indebtedness has a strong impact on a diverse range of everyday contexts, such as consumption, living, social networks and healthcare provision (Ansen et al., 2017). The term “over-indebtedness” covers households that are not able to cover their daily expenses and fulfil their contracted payment obligations for a longer, persistent period, even if they minimise their living expenses (EU Commission, 2008, p. 37). Data from credit agencies and debt-counselling services report that in 2021, around 9% of the German population (around 6 million persons) is said to be over-indebted (Creditreform, 2021, p. 45). Quantitative data on persons using debt-counselling services confirm the relation between over-indebtedness with unemployment and low income; furthermore, the high percentage of persons with a low (ca. 45%) or missing (ca. 19%) school-leaving qualification has become apparent (Peters & Größl, 2021, p. 43). However, the reasons for the prevalence of over-indebtedness involve a complex interplay between external factors such as unemployment (22.7%) or illness (11.2%) and individual behaviour concerning, for example, consumption (8.6%) or insufficient financial literacy (3.6%) (p. 47). Beyond the economic and legal status of insolvency, the situation of limited financial means needs to be seen as a lengthy, non-linear and socially embedded process with a deep impact on social participation and personal well-being (Ansen et al., 2017). Each daily activity must be costed while considering its financial constraints.

What is considered a disability or impairment differs worldwide (World Health Organization [WHO], 2007, pp. 17–24), yet, their mutual interference with participation manifests in the International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001) as well as in the United Nations’ definition: “Persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others” (UN, 2006, Art. 1). In Germany in 2019, 7.9 million persons were officially recognised as having a severe disability (DESTATIS, 2021, p. 327). Data from 2013 identify a total of 299,000 persons as having an intellectual disability (ID) (assigned to persons with an IQ score of 55 and below) or a learning disability (with no distinction in the statistics; BMAS—Bundesministerium für Arbeit und Soziales, 2016, p. 46). However, the relation of disability, particularly intellectual (termed in this paper *learning difficulties*; see below), with low income and educational background is evident, for example, in low levels of school-leaving qualifications (KMK, 2020, pp. XXI-XXII) or, as adults, a predominance of working in sheltered workshops (BMAS—Bundesministerium für Arbeit und Soziales 2016, pp. 119–124, 222, 196). Seventy-five percent of their employees are persons labelled with an ID (Bundesarbeitsgemeinschaft Werkstätten für behinderte Menschen (BAG WfbM), 2020a, p. 37). Sheltered workshops allow for participation in work and have also the task to integrate persons into the primary labour market; however, it is for them to decide who is perceived as able enough for supporting transition to vocational training or (sheltered) jobs in the primary labour market. Moreover, working in a sheltered workshop is not considered regular employment. Hence, these employments are decoupled from legal protections, such as minimum wage or pension funds (pp. 163–164). On average, the standard wage of people working there was 206,95 Euros per month in 2019 (BAG WfbM, 2020b), posing high poverty risks. However, the situation of persons with disabilities is much more cushioned by social state benefits (due to an ID diagnosis) in comparison with the situation of other persons such as those in over-indebtedness.

There are many reasons to suggest that adults in situations of over-indebtedness or disability are confronted with a much higher risk of vulnerability and, vice versa, with a more distinct need for adult basic education. However, we argue for a multidimensional and

pedagogical understanding of vulnerability according to which vulnerability remains a potential, and not a given, fact prior to its occurrence. Every human being is vulnerable and thus exposed to diverse *vulnerabilities* in his/her personal and social entities (Burghardt et al., 2017). Vulnerability, moreover, depends on the interplay between internal and external factors (Mackenzie, Rogers & Dodds, 2014, p. 4). Thus, there are two sides: “an external side of risks, shocks and stress to which an individual or household is subject: and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss” (Chambers, 1989, p. 1). Such loss “can take many forms—becoming or being physically weaker, economically impoverished, socially dependent, humiliated or psychologically harmed” (p. 1). In this sense, the *potential* of becoming or being vulnerable transforms over the lifespan in its degrees and risks of becoming existent (Brown, Ecclestone & Emmel, 2017). Vulnerability, thus, is embedded in human corporeality, subjective perceptions and in social and cultural fabrics of norms and values, which also implies a reservoir of personal and social resources for coping with and resisting to risks of vulnerability (Castro Varela & Dhawan, 2004) – rendering, considering the scope of this paper, persons and households “more financially resilient” (Lusardi et al., 2021, p. 182).

The numerate environment and financial literacy as analytical frameworks

The body of knowledge on numeracy as part of adult basic education has unfolded over the last few years (Gal, Grotlüschen, Tout & Kaiser, 2020). In our research, we used the theoretical resources of socio-cultural research and studies of numeracy as social practice, with their conceptual categories of numeracy events (“occasions in which a numeracy activity is integral to the nature of the participants’ interactions and their interpretative processes”) and numeracy practices (“the broader cultural conceptions that give meaning to the event”) (Baker, Street & Tomlin, 2003, p. 12). Through numeracy practices, the contexts of acting out numeracy are brought to the fore, examining whether and the way in which these contexts enable and/or hinder the development and use or non-use of numeracy as part of the adults’ “social lives and social interactions” (Evans et al., 2021, p. 6).

Numeracy involves, on the one hand, standardised mathematical content (space and shape; numbers and calculating; size and measurements; patterns and structures; probabilities, frequencies, and chances; Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK), 2004, p. 8; OECD, 2019a), and, on the other hand, transfer- and process-oriented mathematical skills (problem solving; communicating; reasoning; modelling; presenting; KMK, 2004, p. 7; Schäfer, 2020, pp. 71–75). We complemented these two categories (content, skills) with those of *direct interaction* and *artefacts* to understand the usage of artefacts as visual aids (e.g., timetables) and of devices/ technologies/ objects or support persons (such as professionals, assistants), which are employed by subjects as part of their numerate environment (Curdt & Schreiber-Barsch, 2021, p. 208). Focussing on dealing with limited financial means, due to its high significance in both data samples (see below), put, moreover, the numerical size ‘money’ in the foreground and those numeracy practices in which the mentioned categories interrelate: content-wise, it concerns, for example, distinguishing bank notes from coins and counting them. In transferring this into acting out numeracy, the individual meaning and interpretation of the social phenomenon of money (Abbott & Marriott, 2012; Geiger et al., 2015) and its significance in unfolding numeracy abilities and skills (with, e.g., artefacts such as a calculator) as a means to participate in society becomes apparent.

Under the context of enabling and ensuring participation, the concepts of financial numeracy and financial literacy are introduced (Gal et al., 2020, p. 380, 388; Mania & Tröster, 2015, 2018; Skagerlund, Lind, Strömbäck, Tinghög & Västfjäll, 2018). Both concepts refer to adults’ abilities to lead one’s life according to their financial affairs; yet financial numeracy also emphasises the development of a critical view on handling financial affairs, recognising adults’ situated learning and dealing with financial means. In order to differentiate these numeracy-related activities in the data sets, we used the systematisation developed by Mania and Tröster (2015), which features six competency domains of financial literacy situated in daily life:

revenues; money and payment transactions; expenses and consumption; budget management; loans and debts; and provision and insurances (pp. 23–28; comparable to, for example, the areas of the US-American Personal Finance Index; Lusardi et al., 2021).

However, as these domains of financial literacy capture only the demand side of financial affairs, we complemented the analysis with the broader concept of the numerate environment conceptualised by Evans et al. (2017, 2021), which distinguishes four dimensions and three levels: The dimensions are termed *affordances* (demands, opportunities, supports, barriers), functioning on the micro-level “(the individual in small face-to-face groups), the *mid-level* (groups and institutions in civil society), and the *macro* (societal) levels” (2021, p. 5; emphasis in original). Using the term ‘affordance’, Evans et al. followed Gibson’s (1979) work on the ecological approach to visual perception. By emphasising, in the psychological debate, the relation between perception and action by introducing the term affordances, Gibson highly contributed to overcoming the subject/object dualism. Affordances are understood as relationships between objective settings in the environment (that may be stable or not, perceived or not) and their perception, depending on a respective animal’s (Gibson) or human being’s viewpoint (Chong & Proctor, 2020). We agree with the term’s significance yet such socioecological concepts are mostly based in sociological and psychological studies, whereas we intend to put forward a pedagogical perspective on acquiring and developing numeracy as an adult’s learning endeavour that highly depends on the subject’s reasons for (not) entering a learning process and for deciding (more or less intentionally) to (not) develop numeracy strategies under the premises of their respective life world and numerate environment. In this sense, we emphasise even more strongly that acting out numeracy not only responds to external affordances, but also highly depends on subjectively perceived and experienced meanings and interests, that is, whether an action or learning process is seen as appropriate and desirable or not.

Research designs

This paper draws upon the findings of two qualitative-oriented research projects on adult numeracy practices (see endnote). Considering the limited extant knowledge regarding the numeracy practices of adults with learning difficulties and adults experiencing over-indebtedness, both projects opted to apply a bottom-up approach (Evans et al., 2017, p. 18) and snowball sampling. The approaches correspond to prioritising the learner’s perspective and voices on acting out numeracy (Yasukawa et al., 2018a, p. 14) and in contrasting in-situ observations and thick descriptions provided by adults themselves with meanings and experiences expressed by professionals working at key positions in the numerate environment, such as in debt-counselling services, assisted living facilities or at vocational schools for students with special needs (Angermeier & Ansen, 2019; Schreiber-Barsch et al., 2020).

This study of over-indebtedness was guided by the goal of uncovering meanings of everyday mathematical practices in processes of over-indebtedness (Angermeier & Ansen, 2019). The research design involved, in the first step, 11 focus groups with professionals working in debt-counselling services based in Hamburg and Munich. The second step consisted of 30 semi-structured interviews with clients of these services. To analyse the data, a qualitative content analysis, developed by Kuckartz (2018), was used.

The study of adults with learning difficulties aimed to explore the ways in which they engage in numeracy practices in their everyday contexts, the extent to which their numeracy-related abilities are mirrored in these practices and the meanings they ascribe to their practices (Schreiber-Barsch et al., 2020). To this end, principles of participatory research (Unger, 2014; Walmsley & Johnson, 2016) were combined with grounded theory methodology (Strauss & Corbin, 1990) (Curdt & Schreiber-Barsch, 2020). The shadowing method (Bøe, Hognestad & Waniganayake, 2017) was used for 11 in situ explorations with adults with learning difficulties (housing situations, education, employment, free time). Then, 13 semi-structured interviews were conducted with adults with learning difficulties (Witzel, 2000; Porter & Lacey, 2005, pp. 92–95). Finally, a focus group methodology (Barbour, 2007) with social support system professionals was used. Aligning

with works of disability studies (Goodley, 2017) and the cultural model of disability, we have adopted the use of the term ‘learning difficulties’ to refer to those abilities that others describe as intellectual disabilities, as suggested by major self-advocacy groups such as People First.

Findings

We introduce findings from a qualitative secondary analysis of both data samples, focusing on how individuals dealt with limited financial means. We asked for the ways in which these individuals acted out financial numeracy and the meanings they ascribed to dealing with limited financial means. By this, we intended to derive insights into those features of the numerate environment that initiate or foster numeracy activities (and eventually learning), thus increasing or decreasing the risk of financial vulnerability. This gives attention to the learner’s view and activity; however, these remain to be deeply affected by the professionals’ work and the societal structures regarding income, education, and social state support.

For presenting the comparative findings, we have selected the competency domains of the financial literacy concept developed by Mania and Tröster (2018) that correspond in both data materials as adhering to the most significant numerate events in acting out numeracy in relation to dealing with limited financial means: *revenues; expenses and consumption; and budget management*. Whereas we have illustrated the significance of domain money and payment transactions in the context of disability in an earlier paper (Curdt & Schreiber-Barsch, 2021), we put forward in this paper those domains with the largest common ground of significance in both data sets, which guide the findings’ presentation.

All the participants’ names were anonymised. Capital letters highlight an emphasis made by the respondent. All sequences were translated from German by the authors. Abbreviations: DEBT = dataset on over-indebtedness; DIS = dataset on disability; I = interview; SH = shadowing; FG = focus group.

The numerate environment under the premise of over-indebtedness

By analysing the data material from the interviews with clients of debt-counselling services, the significance of the domain *revenues* in individual ways of acting out financial numeracy became apparent. In the numerate environments, the demand side is derived from the need to calculate the available financial means (such as wages, social benefits and/or pension funds). At the same time, these means, as well as the payment receipts of bank accounts, provide opportunities for using or developing numeracy. Whereas the regularity of revenues is experienced as helpful (support) in the daily calculations for keeping a financial overview, its amount, the often-low income, increases uncertainty due to often having to serve high debt payments. The data reflect that such a situation, then, might be perceived as a barrier to building up financial reserves for unexpected expenses, as these sequences illustrate:

It is not possible to build reserves for nothing. So, there should be better, nothing happens in between, so to say. (DEBT_I_16, para. 97)

Just unexpected expenses; you cannot calculate them, right? (DEBT_I_1, para. 92)

Closely related to revenues are demands stemming from domain *expenses and consumption*. Livelihood, daily consumption and leisure activities must always be rated in terms of affordability. Sales slips are experienced as supportive of controlling expenses: “If I pick up the sales slip, then I of course count” (DEBT_I_11, para. 24). Free advertisements sent by mail provide an opportunity for using or unfolding financial numeracy by better planning one’s shopping: “I know free advertisements that clunk through the letter box and that I never previously used, I browse through them. I write down: “Where do I buy, and where do I buy what?” (DEBT_I_8, para. 56). The interviews reflect that this contributes (support) to buying items early

and, thus, cheaper, successfully managing higher expected expenses. The regular use of the same shops also helps keep a constant level of expenses, whereas price fluctuations or sporadic debiting in uneven intervals impede (barriers) the reliable calculation of expenses:

And I know, on the third, they will debit my account with this, on the fifth with that, and on the fifteenth, oh, again, and on the twenty-fifth, or the twenty-eighth—such nonsense. They debit the expenses from my mobile for the next time, even though my account is already empty. (DEBT_I_2, para. 70)

Accordingly, the data report many demands in the domain of *budget management* to cover daily needs while having limited financial means. A high share of the interviewees, depending on personal preferences, made daily, weekly or monthly overviews (support) of their receipts and expenditures (such as rent or energy costs). In particular, the beginning of the month is felt to be a vital date for necessary budget considerations (demand), because this is when most of the debiting occurs. Additionally, all interviews reflect the continuous demand for situated prioritising and decision-making on which expenses are necessary (such as food, rent and diapers) or only preferable (new clothes, Christmas presents and movies). Especially in families, diverse needs must be evaluated against each other in terms of affordability:

(...) When I want to take the bus, or when I want to go somewhere with my son, or just do something, especially then, it is very difficult for me to manage financially. I really would like to do a lot more with him, but bus rides cost a lot of money. You always have to calculate that. Then there is the entrance fee, and you might want to eat or drink something inside. You don't want to say always no. (DEBT_I_3, para. 4)

Some interviewees labelled their own numeracy abilities (support) as beneficial, considering the wide range of daily demands in their numerate environment; these abilities were acquired at and required to be used in school and at work. Thus, the demand to calculate might contribute to being motivated to develop numeracy abilities, experiencing the successful use of estimations and calculations:

You need to calculate now. (...) However, you manage to get along with your money in the month. All in all, what remains—call it 20 Euros? You are happy. You are pleased. It just makes you happy. (DEBT_I_13, para. 192)

Furthermore, social networks are described as a crucial source of support. The interviewees reported on given material resources (money, food, clothing, etc.) for bridging financial gaps, but also on immaterial resources, such as information on social support, cost savings, or checks on their budget management. The social security administration also sometimes offers supportive measures insofar as financial responsibility (and, thus, financial demand) is relieved by, for example, taking over rent. Social support systems, such as debt-counselling services, are knowledge sources for financial information. Additionally, they provide ideas for new budget management strategies:

Yes, with the debt-counselling service, it is a refinement. The structure that is implemented and yet I do not have myself. As I said, it would be better if I had more structure by myself; however, with the help of the debt-counselling service, I can get this structure. It is all nicely listed. You just see at first glance what is going on. (DEBT_I_27, para. 66)

However, sporadic costs (for example, broken household appliances and school trips) have become a barrier in budget management. This might lead to frustration, since no improvement in the situation is felt despite constant calculation:

I knew the figures, but did not really want to pay attention to them because it made me sick. (DEBT_I_02, para. 106)

Sometimes, the sheer number of overdue notices and invoices that need to be sorted and calculated generates a feeling of overload. Some interviewees referred to their lack of role models in how to successfully manage the demands of limited financial means. In the end, being forced to constantly calculate all activities decreases the available time resources in highly stressful daily lives.

The numerate environment under the premise of disability

The data mirrors the relevance of the *revenues* domain and indicates the impact of the numerate environment due to the common lack of regular employment subject to social security with very low incomes. Interestingly, most of the research participants accept this, and only a few criticize this system. In the following sequence, an interviewee criticises these employment structures (and the apparent lack of willingness to change his situation) as a barrier to reasonable income. In his view, he fulfils the requirements of the work demands, and due to his knowledge and sense of injustice, he considers the interview an opportunity to raise his voice and call for support:

[...] As an employee of a sheltered workplace, I could work in this profession. Then, after some time, I realised that I really got exploited. I worked 40 hours and was paid 220 euros. [...] Why can't you change it to an extended job, which is protected, but where also I can earn MONEY, such as in the context of a fostered employment... (DIS_I_3_#01:06:26-7#)

Considering domain *expenses and consumption*, the data set sheds light on the demands of ensuring the financing of basic supplies, including monthly invoices. Most understand that their monthly income is paid into the account at the beginning of the month; some ration their income, while others spend it at once. However, income provides a vital opportunity to develop financial numeracy, as reported in this sequence. This interviewee already plans, at the beginning of each month, what needs to be paid during the month. Her budget book gives her the necessary support in over-viewing her expenses by collecting and fixing the payment slips and, furthermore, enabling savings:

[...] Invoice needs to be ... PAID, you have to look every month: What needs to be paid as...invoices? [...] Because you need to know what you have spent in a month and what you still HAVE at the end of the month, right? [...] So that you can ration your money and so that you do not build up new debts, right? [...] I take the payment slip. I always pick it up. And then I have such a book at home—a budget book. Then I fix the payment slip there, and then I write down the sum of the payment slip—what I have spent. And then I deduct it from my money—what I have spent. [...] Once a week, all payment slips are thrown together, and then I put them in the budget book. Everything is listed one below the other, and then it is calculated. Then, you know around the amount you have spent in that week. And then you KNOW: Okay, in that week, I could possibly spend one or two Euros MORE or so. Or spend one or two Euros less [...] and how much budget is left for the whole month. (DIS_I_2_00:35:21-2-00:37:41-2)

Shopping events open up a wide range of opportunities for using numeracy. In most cases, purchases are planned, sometimes a shopping list is made, and often the same shops are used to facilitate buying the cheapest products. Only a few of the participants reported comparing prices in free advertisements sent by mail and then going purposefully to the shops with the cheapest products.

Apart from daily consumption, financial means are needed for free time. During shadowing, Greta decided to buy something to eat on her way to the swim training while disembarking from the tube:

Greta, disembarking: Is it okay to eat something? I am hungry. [...] I can invite you today. Are you hungry? I'll invite you.

Researcher: Thank you.

On the platform, we go to a sales booth. Greta tells the seller, 'One pretzel with butter'.

The researcher also orders a pretzel, and Greta pays. She hands over a five-Euro bill. She takes the change and pockets it. We proceed on the track towards the stairs.

Researcher: Do you know how much change you get back?

Greta: I cannot do that yet. (DIS_SH_4_protocol (7) pp. 19-21)

Considering this shopping event, knowledge of the exchange value of money is sufficient; calculating the exact amount is not necessary. Greta showed her knowledge of distinguishing monetary values (i.e. coins and bills) and her skills in estimating the amount of money present. These abilities (support) helped her cope with this numeracy event. It was not before the researcher asked for the amount of change that a possible barrier with regard to numeracy demand and Greta's abilities becomes evident. Yet, during the event, this did not seem to matter to Greta, who still lives with her parents. This might explain why her knowledge of the exact amount of change was not ascribed as relevant. Having the opportunity to buy something (and, by this, proceed in numeracy learning) is highly cherished by Greta, but it is something that arises 'today', not regularly. As the shadowing later uncovered, the opportunity to do this depends on her mother and her willingness to give Greta money for her disposal (support).

Concerning domain *budget management*, in the context of living and housing, the research participants are usually closely looked after by professionals who provide support in daily matters. The following focus group sequence with professionals illustrates how pedagogical measures turn out to become either barriers or opportunities for the respective individuals, depending on certain demands on the adult person to independently manage the budgets at their disposal:

There is also a security measure that we terminated around about nine months ago. So we had, for a LONG time, over several years, offered to deposit money at the office. ... We have not done this anymore for around nine months, or only in limited exceptional cases where it is hardly possible to handle it in a different way. This resulted in a much higher level of autonomy and self-determination. But, on the other hand, also in those issues that we have outlined here before [in irritation and uncertainty in daily life; the authors]. But despite of all this, it is also autonomy. I do not have to wait anymore until somebody who is allowed to open the cash is in the office. I can just go to the cash machine and get my money there, as everybody else does at any time. (DIS_FG_2_B6_#00:43:55-2#)

Depositing money allows the professionals a certain degree of control and it supports a feeling of security and routine for the residents; but it could also be described as a barrier to financial numeracy, because irritation and uncertainty (among the residents caused by the demand to handle their money) could serve as a reason for learning. The data set suggests that such a reason could evolve if the opportunity is given to do budget management on one's own (as a new demand) without (pedagogical) support. However, an earlier analysis across the data set of the professionals' viewpoints on numeracy learning as part of their professional tasks and duties indicated that it is seen by the professionals less as a core task but rather as a side effect (Schreiber-Barsch & Curdt, 2021).

Regarding budget management, professionals working at a vocational school emphasised the necessity of pedagogical support that is embedded in daily life situations:

Dealing with MONEY, we also practice, I guess, always quite often, ... They do not have any idea of the exchange value of money. We go shopping together during some lessons. Also, for the lesson on housekeeping, we always need washing powder and GARBAGE bags and all that STUFF. And then we try sometimes in the shop so they then practically ESTIMATE: How much money could that be ... Or do we indeed have ENOUGH money that we took with us or got from the office? That is quite CHALLENGING. Well, to look, are 50 euros enough, or do I need more? (DIS_FG_1_B2_#00:12:53-3#)

The professionals support acquiring and learning numeracy by using events in daily life, which suggests, in our view, learning based on daily routines and experiences. Across the data set, the analysis emphasises that regarding dealing with money under the premise of disability, the

appropriate usage highly depends on the availability of cash and the rationing of this visible and tangible material (money as artefact and support).

Discussion

The comparative analysis identified the significance of three financial literacy competency domains on the demand side of dealing with limited financial means in situations of financial fragility due to disability or over-indebtedness. Domains that require a more advanced financial understanding (and sufficient financial means), such as payment transactions, investments, tax, hire purchases or asset accumulation were less significant. The value of using the broader concepts of financial numeracy and the numerate environment's affordances unfolded in the analysis by demonstrating the situative, context-contingent and subjectively interpreted nature of financial numeracy practices and by emphasising the significance of the individual's perception of these affordances, revealing who actively used or did not use the resources and affordances in their numerate environment and who actively decided to proceed with learning or not.

Hence, the data underlines the understanding of an actively performing subject in situations of financial fragility, acquiring and developing certain numeracy strategies that are used and/or developed not merely due to external requests but are aligned with meanings, situational decisions, and/or the prioritisation of individual needs. A continuum between two poles could be identified in acting out numeracy in dealing with limited financial means, which suggests a differentiation into the following strategies, mirroring the overall high appreciation given to regularity and routine:

Revenues: Strategies vary between

- *Routinised action:* handling financial affairs according to the available revenues;
- *Critical-reflexive action:* questioning one's own position and ability to act out numeracy in the context of a consumer society (lack of price transparency, normative value of money, power of the commercial industry, and the power imbalance between public authorities, creditors and companies) and the social state architecture (very low income and limited job possibilities due to disability diagnosis).

Expenses and consumption: Strategies vary between

- *Routinised action:* employing similar procedures (e.g. same shops), habits and patterns (always buying the same/cheapest products);
- *Comparative, balanced action according to an individual prioritisation and decision-making:* comparing prices, qualities, quantities and providers; evaluating and prioritising between necessary expenses that might require avoiding situations (activities in free time) or cutting back and flexible decision-making to allow for the satisfaction of non-necessary consumption and wishes.

Budget management: Strategies vary between

- *Planned, controlled action:* routinised calculations and documentation of temporal budget overviews (weekly, monthly, etc.), payment slips, and bank statements; planned shopping (fixed shopping amount, ration money); saving; delegation of financial responsibility if necessary;
- *Spontaneous, situated action* (situated according to, for example, experiences or situational demands): spending money spontaneously according to individual needs or situational demands (e.g. broken household appliances) and based on prior experiences in financial matters.

Strengthening the learner's view on numeracy strategies, however, does not call for shifting the gaze from the numerate environment back to the individual (Evans et al., 2017); on the contrary, it emphasises the significance of the nexus between adult basic education and participation. Interestingly, in both data sets, very few adults openly criticised the meta level of consumer

society or social state architecture with its ambivalent social safety net features (such as the sequence on criticising the employment structures for persons with disabilities exemplified). Claims for social change and transformation were rarely expressed. under the leitmotif of participation were rarely expressed. Likewise, the relationship between their situation (limited financial means) and the suggested low level of numeracy abilities, which is crucial for the rationale of the need for adult basic education, is only very rarely mentioned by themselves. Nevertheless, it is this numerate environment that constitutes the crucial difference in the degree of financial fragility between both data sets: Whereas persons experiencing over-indebtedness are held fully responsible for their financial matters, adults with learning difficulties remain in a protected space due to their ID diagnosis. This space limits the latter's opportunities upwards (e.g., "earn a living"; Evans et al., 2021) but protects them downwards, thus, from falling into over-indebtedness.

Conclusions

In this paper, we explored the micro level of financial numeracy practices by adults under the premise of limited financial means due to disability and over-indebtedness. The risks exposed by this financial fragility also became evident in our data sets; however, the utilisation of the concepts of financial numeracy and the numerate environment allowed an identification of potential vulnerabilities according to the specific demand that is under scrutiny *and* demonstrating a respective numeracy strategy in response. In the case of over-indebtedness, vulnerability may be relative with regard to lifespan due to its temporal duration. In the situation of disability, it might be a relational feature that depends on social norms and expectancies, and, thus, making visible a suspected or proven "clash" (Weisser, 2018) between a person's (perceived) abilities and the context-contingent expectations of certain degrees of functioning that are considered to be basic within that environment. One example of this is the case of Greta and the non-relevance attributed by her to her abilities in calculating change.

We suggest that this understanding of vulnerability or fragility should play a vital role in a pedagogical understanding of adult basic education and adult numeracy, shifting the focus from a deficit to a resource-oriented perspective on numeracy learning (Schreiber-Barsch & Curdt, 2021; Schreiber-Barsch et al., 2020). Following a resource-oriented perspective invites us to recognise and value adults' appropriate numeracy strategies, even if they do not reflect curriculum standards: These strategies might provide fertile ground for further numeracy learning and for improved financial resilience. It contributes, moreover, to the discussion about why most over-indebted adults currently decide not to use debt-counselling services and why so few adults participate in course offerings in adult basic education—because a reason for learning and/or participating is not perceived. This also provides an answer to the criticism by Willis (2008) on the unquestioned belief in the efficacy of financial-literacy education (p. 202): To be effective for all sides involved, teaching *and* learning need to be a "reflective and questioning activity" (Hamilton et al., 2006, p. 9), "looking not only at what we do in educating the public but where this fits in the larger social structure and ask who is not there" (English, 2014, p. 54) if the goal of fostering literate and numerate adult citizenship is to be pursued.

Finally, the field of adult education is called upon to question its research approaches and whether these contribute to a resource-oriented perspective, allowing us to identify not only frequencies of behaviour, but also niche strategies, and show sensitivity to issues of vulnerability in recognising adults facing over-indebtedness and disability as "mathematics doers and thinkers" (Tan, Lambert, Padilla & Wieman, 2019, p. 1). Research would, then, require "learning from and with those who are vulnerable [...] and to do this not once, not in one locality, and not for one group only, but again and again, in each place, and for each sort of person," as Chambers (1989, p. 7) advocates. This would allow a better understanding and "action that will better fit and serve the diversity of conditions and people and their changing priorities and needs" (p. 7).

Endnote

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References

- Abbott, D., & Marriott, A. (2012). Money, finance and the personalisation agenda for people with learning disabilities in the UK: some emerging issues. *British Journal of Learning Disabilities*, 41, 106-113.
- Angermeier, K., & Ansen, H. (2019). Value and understanding of numeracy practices in German debt counselling from the perspective of professionals. *ZDM Mathematics Education* 52(3), 461-472. DOI: 10.1007/s11858-019-01109-w.
- Ansen, H., Langer, A., Molle, J., Peters, S., Schwarting, F., & Vaudt, S. (2017). *Herausforderungen moderner Schuldnerberatung*. Kiel, Hamburg: Deutsches Institut für Sozialwirtschaft e.V. Retrieved from https://www.bag-sb.de/fileadmin/user_upload/1_BAG-SB/4_Forschung/Forschungsbericht_DISW_2017.pdf. Accessed 02 Dec 2021.
- BAG WfbM – Bundesarbeitsgemeinschaft Werkstätten für behinderte Menschen e.V. (2020a). *Neue Herausforderungen. Neue Perspektiven. Neue Wege. Jahresbericht 2020*. Retrieved from <https://www.bagwfbm.de/file/1437/>. Accessed 29 Dec 2021.
- BAG WfbM – Bundesarbeitsgemeinschaft Werkstätten für behinderte Menschen e.V. (2020b). *Durchschnittliche monatliche Arbeitsentgelte 2017-2019*. Retrieved from <https://www.bagwfbm.de/file/1356>. Accessed 29 Dec 2021.
- Baker, D., Street, B., & Tomlin, A. (2003). Mathematics as social: Understanding relationships between home and school numeracy practices. *For the Learning of Mathematics*, 23(3), 11-15.
- Barbour, R. (2007). *Doing focus groups*. Los Angeles: SAGE.
- Beck, I. (2013). Partizipation-Aspekte der Begründung und Umsetzung im Feld von Behinderung. *Teilhabe*, 52(1), 4 – 11.
- BMAS – Bundesministerium für Arbeit und Soziales (2016). *Zweiter Teilhabebericht der Bundesregierung über die Lebenslagen von Menschen mit Beeinträchtigungen*. Bonn: BMAS.
- Bøe, M., Hognestad, K., & Waniganayake, M. (2017). Qualitative shadowing as a research methodology for exploring early childhood leadership in practice. *Educational Management Administration & Leadership*, 45(4), 605 – 620.
- Brown, K., Ecclestone, K., & Emmel, N. (2017). The many faces of Vulnerability. *Social Policy & Society* 16(3), 497-510. doi:10.1017/S1474746416000610
- Burghardt, D., Dederich, M., Dziabel, N., Höhne, T., Lohwasser, D., Stöhr, R., & Zirfas, J. (2017). *Vulnerabilität. Pädagogische Herausforderungen*. Stuttgart: Kohlhammer.
- Castro Varela, M. do M., & Dhawan, N. (2004). Horizonte der Repräsentationspolitik — Taktiken der Intervention. In B. Roß (Ed.), *Migration, Geschlecht und Staatsbürgerschaft. Perspektiven für eine anti-rassistische und feministische Politik und Politikwissenschaft* (pp. 205-226) Wiesbaden: VS Verlag.
- Chambers, R. W. (1989). Editorial Introduction. Vulnerability, Coping and Policy. *IDS Bulletin*, 20(2), 1-7.
- Chong, I. & Proctor, R.W. (2020). On the evolution of a radical concept: affordances according to Gibson and their subsequent use and development. *Perspectives on Psychological Science*, 15(1), 117-132.
- Craig, J. (2018). The promises of numeracy. *Educational Studies in Mathematics*, 99(1), 57–71. <https://doi.org/10.1007/s10649-018-9824-5>.
- Creditreform (2021). *SchuldnerAtlas Deutschland 2021. Überschuldung von Verbrauchern*. Retrieved from https://www.creditreform.de/fileadmin/user_upload/central_files/News/News_Wirtschaftsforschung/2021/SchuldnerAtlas_Deutschland/2021-11-10_AY_OE_Analyse_SchuldnerAtlas_2021.pdf. Accessed 02 Dec 2021.
- Curdt, W., & Schreiber-Barsch, S. (2020). Abilities in the blind spot of testing regimes: Eliciting the benefits and limitations of participatory research approaches on numeracy in adult basic education. *International Review of Education*, 66(2-3), 387-413.

- Curdt, W., & Schreiber-Barsch, S. (2021). „Ohne Geld kann man ja nicht überleben oder nichts machen oder sich entfalten.“ Numerale Fähigkeiten von Erwachsenen mit Lernschwierigkeiten im Spannungsfeld der Grundbildung. *Lernen und Lernstörungen* 10(4), 203-215.
- DESTATIS – Statistisches Bundesamt (2021). *Datenreport 2021 – Kapitel 9: Gesundheit*. Retrieved from https://www.destatis.de/DE/Service/Statistik-Campus/Datenreport/Downloads/datenreport-2021-kap-9.pdf?__blob=publicationFile. Accessed 03 Dec 2021.
- English, L.M. (2014). Financial Literacy: A Critical Adult Education Appraisal. *New Directions for Adult and Continuing Education*, 2014(141), 47–55. <https://doi.org/10.1002/ace.20084>
- EU Commission (2008). *Towards a common operational European definition of over-indebtedness*. Brussels: European Commission.
- Evans, J., Yasukawa, K., Mallows, D., & Creese, B. (2017). Numeracy skills and the numerate environment: Affordances, opportunities, supports and demands. *Adults Learning Mathematics*, 12(1), 17–26.
- Evans, J., Yasukawa, K., Mallows, D., & Kubascikova, J. (2021). Shifting the Gaze: From numerate Individual to their numerate environment. *Adult Literacy Education: The International Journal of Literacy, Language, and Numeracy*, 3(3), 4-18.
- Faragher, R. (2019). The new ‘functional mathematics’ for learners with down syndrome: Numeracy for a digital world. *International Journal of Disability, Development and Education*, 66(2), 206–217. <https://doi.org/10.1080/1034912X.2019.1571172>.
- Gal, I., Grotlüschen, A., Tout, D., & Kaiser, G. (2020). Numeracy, adult education, and vulnerable adults: a critical view of a neglected field. *ZDM Mathematics Education* 52, 377–394. <https://doi.org/10.1007/s11858-020-01155-9>
- Geiger, V., Goose, M., & Forgasz, H. (2015). A rich interpretation of numeracy for the 21st century: A survey of the state of the field. *ZDM Mathematics Education*, 47(4), 531–548. <https://doi.org/10.1007/s11858-015-0708-1>.
- Gibson, J.J. (1979). *The ecological approach to visual perception*. Boston, MA: Houghton Mifflin.
- Goodley, D. (2017). *Disability studies: An interdisciplinary introduction* (2nd Ed.). Los Angeles, CA: SAGE.
- Grotlüschen, A., & Buddeberg, K. (2020). *LEO 2018 – Leben mit geringer Literalität*. Bielefeld: WBV Media.
- Grunwald, K., & Thiersch, H. (2018). Lebensweltorientierung. In G. Graßhoff, A. Renker & W. Schröder (Eds.), *Soziale Arbeit* (pp. 303-315). Wiesbaden: Springer.
- Hamilton, M., Hillier, Y., & Tett, L. (2006). Introduction: Social Practice of Adult Literacy, Numeracy and Language. In L. Tett, M. Hamilton & Y. Hillier (Eds.), *Adult Literacy, Numeracy and Language* (pp. 1-18). Maidenhead, NY: Open University Press.
- KMK – Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (Ed.) (2004). *Bildungsstandards im Fach Mathematik für den Primarbereich. Beschluss vom 15.10.2004*. Luchterhand. Retrieved from 2004_10_15-Bildungsstandards-Mathe-Primar.pdf Accessed 28 Dec 2021.
- KMK – Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (Ed.). (2020). *Sonderpädagogische Förderung in Schulen 2009-2018. Statistische Veröffentlichungen der Kultusministerkonferenz. Dokumentation Nr. 223*. Retrieved from https://www.kmk.org/fileadmin/Dateien/pdf/Statistik/Dokumentationen/Dok223_SoPae_2018.pdf. Accessed 03 Dec 2021.
- Kuckartz, U. (2018). *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung*. Weinheim, Basel: Beltz Juventa.
- Lusardi, A., Hasler, A., & Yakoboski, P.J. (2021). Building up financial literacy and financial resilience. *Mind & Society*, 20, 181-187.
- Lüssenhop, M., & Kaiser, G. (2021). Numeralität im Wandel der Zeit – Analyse zentraler Konzeptionen zu Numeralität und Implikationen für die Numeralitätsdiskussion in der Erwachsenenbildung. *Zeitschrift für Pädagogik*, 67. Beiheft. *Alphabetisierung und Grundbildung*, 36-52.
- Mackenzie, C., Rogers, W., & Dodds, S. (2014). Introduction: What is Vulnerability and why does it matter from oral theory? In C. Mackenzie, W. Rogers & S. Dodds (Eds.), *Vulnerability. New Essays in ethics and feminist philosophy* (pp. 1-29). Oxford: University Press.
- Mania, E., & Tröster, M. (2015). *Finanzielle Grundbildung. Programme und Angebote planen*. Bielefeld: wbv.
- Mania, E. & Tröster, M. (2018). Inhaltsbereiche der Grundbildung. Stand und Herausforderungen. In Agentur für Erwachsenen- und Weiterbildung (Ed.), *Grundbildung lebensnah gestalten. Fallbeispiele aus den Regionalen Grundbildungszentren in Niedersachsen* (pp. 11–21). Bielefeld: wbv.

- OECD – Organisation for Economic cooperation and Development (2019a). *The Survey of Adult Skills: Reader's companion* (3rd Ed.). Paris: OECD Publishing. <https://doi.org/10.1787/f70238c7-en>
- OECD – Organisation for Economic cooperation and Development (2019b). *Skills matter: additional results from the survey of adult skills*. Paris: OECD Publishing. <https://doi.org/10.1787/1f029d8f-en>
- Peters, S., & Gröbl, I. (2021). *iff-Überschuldungsreport 2020. Überschuldung in Deutschland. Institut für Finanzdienstleistungen (iff)*. Hamburg. Retrieved from <https://www.iff-hamburg.de/wp-content/uploads/2021/06/iff-ueberschuldungsreport-2021.pdf>. Accessed 02 Dec 2021.
- Porter, J., & Lacey, P. (2005). *Researching learning difficulties. A guide for practitioners*. London: Paul Chapman Publishing.
- Schäfer, H. (2020). *Mathematik und geistige Behinderung. Grundlagen für Schule und Unterricht*. Stuttgart: Kohlhammer.
- Schreiber-Barsch, S., & Curdt, W. (2021). Grundbildung und Behinderung. Zum Verhältnis von pädagogischem Auftrag, subjektgelagerten Fähigkeiten und professionellem Vermittlungshandeln am Beispiel von Numeralität. *Zeitschrift für Pädagogik*, 67. Beiheft. *Alphabetisierung und Grundbildung*, 200-224.
- Schreiber-Barsch, S., Curdt, W., & Gundlach, H. (2020). Whose voices matter? Adults with learning difficulties and the emancipatory potential of numeracy practices. *ZDM Mathematics Education, Special Issue "Numeracy and vulnerability in (early) adult life"*, 52(3), 581 – 592.
- Skagerlund, K., Lind, T., Strömbäck, C., Tinghög, G., & Västfjäll, D. (2018). Financial literacy and the role of numeracy – How individuals' attitude and affinity with numbers influence financial literacy. *Journal of Behavioral and Experimental Economics* 74, 18-25.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research. Grounded theory procedures and techniques*. California: SAGE.
- Street, B., Baker, D., & Tomlin, A. (2008). *Navigating numeracies. Home/school numeracy practices*. Dordrecht: Springer.
- Street, B. (1984). *Literacy in theory and practice*. Cambridge: Cambridge University Press.
- Tan, P., Lambert, R., Padilla, A., & Wieman, R. (2019). A disability studies in mathematics education review of intellectual disabilities: Directions for future inquiry and practice. *Journal of Mathematical Behavior*. <https://doi.org/10.1016/j.jmath.b.2018.09.001>.
- Tett, L., Hamilton, M., & Hillier, Y. (2006). *Adult Literacy, Numeracy and Language*. Maidenhead, NY: Open University Press.
- Unger, H. von (2014). *Partizipative Forschung. Einführung in die Forschungspraxis*. Wiesbaden: Springer.
- UN – United Nations (2006). *Convention on the rights of persons with disabilities*. Retrieved from http://www.un.org/disabilities/documents/convention/convention_accessible_pdf.pdf. Accessed 02 Dec 2021.
- Walmsley, J. & Johnson, K. (2016). Vorwort. In T. Buchner, O. Koenig & S. Schuppener (Eds.), *Inklusive Forschung. Gemeinsam mit Menschen mit Lernschwierigkeiten forschen* (pp. 9-12). Bad Heilbrunn: Julius Klinkhardt.
- WHO – World Health Organization (2001). *International Classification of functioning, disability and health*. Geneva: WHO.
- WHO – World Health Organization (2007). *Atlas. Global resources for persons with intellectual disabilities*. Geneva: WHO.
- Weisser, J. (2018). Inklusion, Fähigkeiten und disability studies. In T. Sturm & M. Wagner-Willi (Eds.), *Handbuch schulische Inklusion* (pp. 93–106). Opladen, Toronto: Barbara Budrich.
- Willis, L. (2008). *Against Financial-Literacy Education*. 94 Iowa L. Rev. 2008-2009. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1105384
- Witzel, A. (2000). Das problemzentrierte Interview. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 1(1), Art.22. <https://doi.org/10.17169/fqs-1.1.1132>. <http://www.qualitative-research.net/index.php/fqs/article/view/1132/2520>. Accessed 22 Dec 2021.
- Yasukawa, K., Jackson, K., Kane, P., & Coben, D. (2018a). Mapping the terrain of social practice perspectives of numeracy. In K. Yasukawa, A. Rogers, K. Jackson & B. Street (Eds.), *Numeracy as social practice: Global and local perspectives* (pp. 3–17). London, New York: Routledge.
- Yasukawa, K., Rogers, A., Jackson, K., & Street, B. V. (Eds.). (2018b). *Numeracy as social practice*. Global.