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Research Article

The Relationship of Social Vulnerability to Health-Related Digital Practices: A Quantitative Analysis Based on the German LEO Literacy Assessment

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Abstract

A link between literacy and health has already been demonstrated in various national and international surveys. Previous research has shown that adults with low literacy are very frequent users of social media. Increasingly, people are gaining their health-related knowledge and skills by being in digital spaces and consuming health-related content across platforms. In this article, we explored the relationship between digital health practices and the health of people with low literacy skills using data from the German-based LEO assessment. We found that low literacy skills do not have a strong direct effect on health status, but social vulnerability, such as low social participation and low social recognition, has a strong effect on a person's subjectively perceived health status.

Keywords: literacy; vulnerability; health literacy; digital literacy

International studies such as the Programme for the International Assessment of Adult Competencies (PIAAC) or the International Adult Literacy Survey (IALS) (Organization for Economic Co-operation and Development [OECD], 2019; OECD & Statistics Canada, 2011) have shown that health knowledge is linked to literacy in the sense of reading literacy (health-related literacy). This link is particularly evident in the question of how knowledge and information are generated. During the COVID-19 pandemic, health information and medical treatment have increasingly moved into the digital space, for example in the form of video medical consultations. At the same time, health-related news and so-called fake news were disseminated through digital media, requiring skills to distinguish between real and fake information and legitimate knowledge providers. This example showed that low literacy and critical thinking skills can lead to exclusion from social participation and vulnerability in health issues (Heilmann & Grotlüschen, 2020). At the same time, the digitalization of the (German) health care system is advancing, and dealing with it requires digital literacy (Bundesministerium für Gesundheit, 2023). These examples show the relevance of questions of social participation/vulnerability when it comes to the intersection of literacy, health, and digitalization, as well as a current interest in further research in this area (for a brief introduction to the relationship between basic education and vulnerability see Gal et al., 2020). Empirical results from an assessment of reading and writing skills in Germany (LEO 2018 – Living with Low Literacy; in the following: LEO 2018) have shown that adults with very limited reading and writing skills use social media more frequently than average. Moreover, social media is seen critically when it comes to the discourse about health and

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knowledge gain. Often, they are regarded negatively (e.g., fake news, COVID-19 infodemic).

Following on from this, we want to explore which digital platforms and formats (low literate) adults use when seeking information about health issues (or if they do not use them at all). We want to take a closer look at the specific educational needs of adults with low reading and writing skills regarding health-related digital information and their social vulnerability (as shown by Heilmann & Grotlüschen, 2020).

The paper is based on a review of the research literature, as well as empirical data from LEO 2018. We link the concepts of literacy, social media, and health to highlight the intersection between digital literacy and health education and their role in the analysis of vulnerability and health practices. In the empirical part, the analysis of data from LEO 2018 will show that the use of social media in everyday life as well as general literacy seem to be marginally but positively correlated with subjectively perceived health status. However, this suggests that low literacy skills are not associated with poorer health per se, but rather place people in vulnerable social and employment positions.

Literature Review

Our literature review consists of three sections. First, we present references to research on literacy and basic competences from a perspective of vulnerability, followed by findings on digitalization research, before concluding with a description of the link between digitalization and health.

Literacy and Adult Basic Proficiencies

Assessments are usually built on a notion of literacy (in this article, literacy in the core refers to reading and writing skills) as a measurable skill which Brian Street critically refers to as an autonomous model of literacy (Street, 2013). This applies, for example, to reading literacy and everyday mathematic skills, as measured by the PIAAC study. Governments and institutions which are running educational programs are using results from large-scale surveys. Evidence-based policy particularly asks for these kinds of results (OECD, 2007; Pellegrini & Vivanet, 2021). The data on which this article is based comes from the 2018 German survey on adult literacy LEO 2018 (Buddeberg et al., 2020; Grotlüschen et al., 2019; Grotlüschen et al., 2020). As a national large scale assessment survey it represents a currently important strand of literacy research, as do international large scale assessments like IALS (OECD, 2000), Adult Literacy and Lifeskills Survey (ALL) (OECD & Statistics Canada, 2011) or PIAAC (OECD, 2013).

Contributions to literacy research are based on both qualitative and quantitative data. Currently, large-scale quantitative surveys represent a dominant branch of research. Criticisms of this dominance and of the transformation of social practices into quantities (Hamilton et al., 2015) are mainly formulated by protagonists of qualitative approaches. There are critical positions towards the basic theoretical assumptions and the global political implications (Addey, 2021; Evans, 2019; Grek, 2020). Critical approaches present findings on societal subgroups that face significant disadvantages, e.g. in the context of the pandemic (Tett, 2023) or in the context of incarceration (Patterson, 2022).

Important international assessment surveys are the studies IALS, ALL and PIAAC mentioned above. In some countries PIAAC was performed with additional modules like a special sample of adults aged 65 to 80 years in Germany (Friebe et al., 2014) or PIAAC Health in the United States. PIAAC Health revealed a correlation between formal education and information-seeking behaviour. Furthermore, the use of the internet for searching health-related information strongly correlates with health status (Feinberg et al., 2016). Regarding the reading skills (literacy) and everyday mathematics skills (numeracy) PIAAC reports larger – though different – proportions of low-performing adults in all participating countries. PIAAC differentiates five levels of skills with the level one and below representing very limited skills (OECD, 2019). Low skills in literacy and numeracy are reported especially for countries entering the survey in the second or third round, many of them from the so-called Global South (Grotlüschen & Buddeberg, 2020). National basic skills surveys have been performed in England (Department for Business, Innovation and Skills, 2012), France (Jeantheau, 2013), or Germany (Buddeberg et al., 2020). Compared to international surveys these national surveys offer the opportunity to design survey instruments and background questionnaires that take account of the respective national contexts. The German survey LEO 2018 which offers the

data for this contribution, besides assessing the reading and writing skills of adults gathered information about reading and writing practices in different fields of life (family, work, digitalization, politics, finance, health) and self-reported basic proficiencies in these domains. The survey thus expands the single story of literacy (Addey, 2021) from the narrow perspective of the autonomous model to a wider notion of literacy which at least partially implies a perspective of literacy as a social practice (Barton & Hamilton, 2000). While the discussion on literacy as social practice already has a longer tradition, numeracy as social practice refers to a more recent discourse (Gal et al., 2020; Street, 2005; Yasukawa et al., 2018).

In addition to literacy and numeracy, there is a broad range of further basic skills (e.g., European Commission, 2007; European Commission et al., 2019). By examining different domains, LEO 2018 adopted a part of these key proficiencies which also correspond to the National Decade for Alphabetization and Basic Skills (2016-2026), which is the current policy framework in Germany regarding basic skills (BMBF & Kultusministerkonferenz, 2016). Unlike PIAAC which mainly follows a perspective of employability in the framework of a human capital approach (Evans, 2015) LEO 2018 followed a perspective on social inclusion or on social vulnerability. The survey determined a higher risk of unemployment and employment in low-wage sectors (Stammer, 2020). Also, low literacy does correlate with feelings of social exclusion and vulnerability (Heilmann & Grotlüschen, 2020).

Digitalization

As such, digital transformation touches all areas of life and affects people at many different levels (Dander et al., 2020). Almost 20 years ago Selwyn et al. (2005) state, that with the ongoing digital knowledge transfer, the "internet has transformed the personal computer into a powerful connected resource – bringing hitherto unimaginable networked computing power to homes, schools and workplaces" (Selwyn et al., 2005, p. 6). The authors describe that the internet is "popularly celebrated to be transforming all sectors of everyday life" (Selwyn et al., 2005, p. 6) as well as bringing all kinds of technical change through capable platforms (Selwyn et al., 2005).

While on the one hand the internet is seen as a cultural revolution, on the other hand there are critical voices that warn against the technological and cultural changes (artificial intelligence/AI, increased social inequality through algorithms, technologization, etc.) that accompany the internet, or at least examine them by weighing up its advantages and disadvantages (e.g., O'Neil, 2017). Critics, however, see these as deterministic tendencies that do not consider digitalization in its full scope and underestimate the ambivalent structures of digitalization in education (e.g., digital divide) (Reich, 2020). In the education sector, it is a matter of taking advantage of the resources of digital media (e.g., democratization of knowledge) while at the same time considering the associated relativization of secure knowledge resources through the internet. The problem of finding trustworthy sources on theinternet comes to a head especially in social media. Research on the phenomenon of the internet combines different perspectives. The variety shows that there is a "wide range of views on digitalization" (Kühn & Robak, 2021), such as technological perspectives, cultural studies perspectives, sociological perspectives as well as socio-technical perspectives. Perspectives that describe the socio-cultural aspects of digitalization and the medialization of society through the internet also call this the emergence of a culture of digitality (Stalder, 2021). In this sense, the internet is seen as a "range of practices, software and hardware technologies, modes of representation and interaction that may or may not be interrelated by participants, machines or programs"' (Miller & Slater 2000, p. 14 in Selwyn et al., 2005, p. 7). Thus, it is repeatedly pointed out that despite the continuing euphoria about digital media, critical and mature assessments of their use should be reflected and this especially in education (Selwyn, 2022).

Looking at the educational sector in general, the field of education seems to be called upon to adapt to developments and technical progress and to face up to the accompanying tasks of digitalization in a pedagogically informed manner. At the same time, it shows that the use of previously unused (digital) opportunities, such as social media, can reach disadvantaged groups in a different way than traditional educational media (print newspaper, etc.) can.

Link Between Digitalization and Health

Health-related literacies and skills and their relation to digitalization are among the most relevant challenges in this field. While health-related information becomes

available more easily through digital channels, it becomes more and more difficult to distinguish relevant and empirically verified information from commercially exploitative claims and simple fake news or even conspiracy theories. The European Health Literacy Survey finds a generally low health literacy in several European countries. The survey was able to show that adults generally struggle to find and judge health-related information (Sørensen et al., 2015). A Swedish study among teenagers and young adults was able to demonstrate the immense difficulties they had in distinguishing advertisement from relevant information and news (Nygren & Guath, 2019) and it stands to reason that health-related information is no exception. Instead, health seems to be a topic of great misinformation, manipulation and exploitation. As social media has become a platform for the exchange of health-related information, the impact of this trend (Wiedicke et al., 2022) and the skills necessary to deal with the flow of information, need to be subject of research.

Earlier evaluations of the LEO 2018 data showed that the ability to judge digital information critically, like distinguishing between real information and advertising, has a positive impact on critical health literacy (Heilmann & Skowranek, 2023).

Especially during the COVID-19 pandemic the significance of health-related information on the internet increased. The World Health Organization (WHO, 2020) used the term "infodemic" in the context of the COVID-19 pandemic because of mixing truthful information and fake news about the virus on the internet and on social media platforms. In this context internet users and especially those who search for health information on the internet need special skills in terms of ehealth literacy (Norman & Skinner, 2006). These skills are "defined as the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (Norman & Skinner, 2006, p. 2). According to specific surveys 80% of the US citizens and 72% of the German population are searching for health information on the internet (Link et al., 2021).

Zschorlich et al. (2015) highlight that persons who mainly use health information on the internet on average tend to be female, younger to middle aged, and have higher educational qualifications and higher income. They also search specifically for particular topics either for themselves or for others.

The KomPaS Study (Horch, 2021) examined communication and the information in the health system from the point of view of the adult population (age 18 and older, n=5,053). They found out that 69% of the German population are searching for health information on the internet. Women in the age of 30 till 44 years are searching more often for health information then men in the same age group. People with a low socio-economic status are searching less often, but in the group of people with low economic status the men are searching more often for health information on the internet then women (Horch, 2021).

During the first lockdown of the COVID-19 pandemic in Germany Dadaczynski et al. (2020) analyzed the digital health literacy of students (n=14,895). More than 80% of the participants used search engines, news websites or websites of official authorities. 40% of the participants also used social media and YouTube. Within the group of the students, women showed lower digital health literacy, especially in the areas "Search and Find" and "Assess the Quality of the information." In addition to these results, they also found out that students with a higher digital health literacy had a higher psychological health (Dadaczynski et al., 2020).

Feinberg et al. (2019) describe that in the United States people with low health literacy and low ehealth literacy are also affected by a low health insurance literacy, because in the United States more than 63% of the population under the age of 65 have employer-sponsored health insurance plans, for which terms are only accessible through internet documents written in formal language. Due to this people need special skills to access and understand these digital insurance documents. This makes it difficult for them to understand what insurance benefits they are entitled to, which in turn prevents them from claiming the benefits they deserve (Feinberg et al., 2019).

Regardless of the search behavior, studies in Germany found out that 52.4% of the participants (*n*=8,500, aged 18-75 years) (Kolpatzik et al., 2020) or rather 75.8% of the population(*n*=2,151) (Schaeffer et al., 2021) only have low digital health literacy. The search for information and the evaluation of the relevance and quality of the information was found to be difficult (Kolpatzik et al., 2020). Nevertheless, women and people with higher incomes have

higher digital health literacy levels (Kolpatzik et al., 2020). Groups of people who are particularly affected by low digital health literacy are people above the age of 65, people with low education, people with low literacy, people with low financial resources, and people with multiple chronic illnesses (Schaeffer et al., 2021). Nevertheless, digitalization offers an opportunity to monitor and control one's own health behavior using apps and smart watches. In addition, the internet offers research opportunities on health topics anywhere and anytime and enables the exchange of experiences on health topics on social media platforms (Schaeffer et al., 2021, p. 2). In Germany, 20% to 30% of the population use health related apps, but currently there are only a few study results on digital health literacy, so that sufficient knowledge about the extent of digital health literacy and the need for support is missing (Schaeffer & Gille, 2022). In addition, there is no consensus if social media influences health in a positive or negative way, even though about ¾ of the population of the United States uses social media and about half of them report about an influence of health information on their health-related behavior. In China, about 70% of the WeChat user use the app as primary source for health information (Schillinger et al., 2020).

Social media news feeds are generated through algorithms which use Big Data for showing user specific content. For showing personalized content to the users their search and consumption behavior on the internet is evaluated through the algorithms and the feed will be created from the results and contains information and advertising which could be interesting for a user (cf. Gillespie, 2014). Through this automated showing of user-related content it could be possible to consume health related information involuntary through social media news feeds.

Research Question

Based on the state of research we want to answer the research question: Are functional-pragmatic digital proficiencies related to social media positively associated with increased health literacy?

We want to use the results as a basis for making deductions for educational practice especially to demonstrate specific educational needs for adults with low literacy regarding health-related digital information and their social vulnerability.

Data and Method

To answer the research question, we compiled several linear multiple regression analyses in which we included low reading and writing skills as a potentially moderating effect on digital practices. These were based on the LEO 2018 survey. It is a German nation-wide and representative survey on reading and writing skills and literacy-related competencies and practices with a sample size of 7,192 cases. In this survey, adults between the ages of 18 and 64 were included; adults living outside of private households (e.g., in any kind of state institution or unhoused adults) as well as parts of the German population that did struggle with the German language were excluded from the survey. More detailed information on LEO 2018 can be found in Grotlüschen et al. (2019). The survey combined a reading and writing assessment with a detailed background questionnaire with sociodemographic and socioeconomic variables as well as variables about practices related to reading and writing (e.g., information search on the internet) and self-reported basic skills in the domains of health, digitalization, finance, and politics.

Variables

Central variable to this secondary analysis of the LEO 2018 data is the state of health which was operationalised by LEO as subjectively perceived health status (see Monden, 2014). The subjectively perceived health status was used as dependent variable for all regression analyses. In the survey the corresponding question was "How would you rate your state of health in general?" with responses on a five-step Likert scale (very good, good, partly good/ partly poor, poor, very poor). In addition, three groups of independent variables were used: (a) variables on digital practices, (b) socio-economic background variables and (c) variables of societal vulnerability.

The main interest of this paper is the relationship between digital practices and the subjectively perceived state of health, and how this relationship is influenced and moderated by reading and writing skills. The two main variables used here were the frequency of reading and consuming social media posts from friends or acquaintances and the frequency of watching online tutorials or instructional videos, as these have been shown to have significant correlations with the subjectively perceived state of health. For answering the questions

about these two practices interviewees used the response categories: daily, at least once a week but not daily, less than once a week, less than once a month, never. For both variables, proficiency values on reading and writing skills were added as a potential moderator.

These relations were controlled for socio-economic factors like age cohort, gender, and formal educational attainment (low, middle, high). In addition, the later, more complex models also include the interest in health-related topics ("In general, how interested are you in the subject of health?" - strong, rather strong, rather little, little, not at all) and frequency of internet usage (daily, at least once a week but not daily, less than once a week, less than once a month, never). Educational attainment (and the correlated social standing and capital) is known to show a positive relation to health outcomes; the higher the education, the higher are a person's chances of good health (Kakarmath et al., 2018). Same goes for higher age cohorts. With inclining age cohorts, not only do people show more health problems, also the relation factors set earlier in life increases (Conti et al., 2010). The relationship between gender and health has been widely discussed and researched. Health disparities between genders (with most research focussing on men and women) have been shown in multiple studies and are theorized to be a result of structural sexism in society and in the health sector (Homan, 2019). The variables on health-related interest and frequency of overall internet usage were added to the regression models because we presumed that either one might be inherently connected to health-related practices in digital spaces.

To approximate the social vulnerability of adults, two further variables were included in the analyses. LEO 2018 includes questions both on the sense of belonging to the main society ("Social life: To what extent do you feel more like part of it or rather excluded?") and on the feeling of general contentment in life ("How satisfied are you at present, all in all, with your life?") both of them with a response scale from 0 to 10. These were used as indicators of inclusion and vulnerability.

Questions and Models

The analysis was conducted in seven steps, in which different layers were added to the regression model. First, only the two digital practices were correlated separately with the health outcome. Subsequently, literacy as a moderator was added. And finally, regressions with the control variables were added.

Findings

Social Media Use and Online Tutorials

Our findings show that social media use correlates positively with subjectively perceived state of health by a factor of 0.05 (model 1 in Table 1). This is a marginal but nevertheless highly significant effect. When literacy and a moderator between literacy and social media use are added to the equation, the statistical impact of social media use more than doubles to 0.11 points (model 2). Both coefficients are statistically significant on a 0.001-level. Using social media in everyday life as well as general literacy skills seem to correlate marginally but positively with health outcomes. However, the correlation between reading and writing skills and subjectively perceived state of health is higher than the impact of social media use. The moderator between high reading and writing skills and frequent social media use is not significant and therefore not shown in the table but indicated toward a negative moderator.

TABLE 1

Linear regression models for subjective health status in dependency of social media use, literacy and the moderator between literacy and social media use.

	Model 1	Model 2
social media use	0.05	0.11
reading and writing skills		0.26
moderator literacy/social media use		(n.s.)

Note: Source LEO 2018 – Living with Low Literacy; N = 6739, n.s. = not significant on 0.05-level.

Like the use of social media, watching online tutorials correlates with a coefficient of 0.07 with health outcomes (model 3 in Table 2). However, when literacy and the moderator variable are added to the regression model, none of the coefficients are statistically significant.

TABLE 2

Linear regression models for subjectively perceived health status in dependency of the frequency of online tutorial consumption.

	Model 3	Model 4
online tutorial	0.07	(n.s.)
reading and writing skills		(n.s.)
moderator literacy/online tutorials		(n.s.)

Note: Source LEO 2018 – Living with Low Literacy; N = 6739, n.s. = not significant on 0.05-level.

Education, Age, and Vulnerability

Both variables lose their statistical significance when they are controlled for background variables. Among these, the strongest and highest positive predictor for health is the educational background. A high educational attainment has a significant factor equivalent to 0.3 (model 5 in Table 3). A medium education attainment corresponds with a 0.15 coefficient. The educational background was used here as a proxy for general wealth and social class.

Another proxy we used for social inclusion and well-being is adults' overall sense of satisfaction and their overall sense of being included in society. Being in the 20 per cent with the lowest sense of overall satisfaction is the strongest negative predictor of subjective health. With a coefficient of -0.48 (model 5 in Table 3), health is correlated with being in the least satisfied quintile of adults. Similarly, but to a lesser extent, being in the lowest quintile of feeling included in society has a significantly negative relationship with the subjectively perceived health status, with a coefficient of -0.26 (model 5 in Table 3).

As discussed in earlier research, age's relation to health was shown in the present regression outcomes. The age group of 50 to 64-year-olds has a coefficient of -0.43 (model 5 in table 3) in comparison to adults ages 18 to 29.

TABLE 3

Linear regression models for subjectively perceived health status in dependency of the frequency of social media use and online tutorial consumption, and control variables

	Model 5
social media use	(n.s.)
Online Tutorials	(n.s.)
reading and writing skills	(n.s.)
educational attainment (medium)	0.15
educational attainment (high)	0.30
female gender	(n.s.)
Age group (in relation to 18–29-year-olds)	
Ages 30-39	(n.s.)
Ages 40-49	-0.23
Ages 50-64	-0.43
Low feelings of general contentment	-0.48
Low feelings of belonging to society	-0.26

Note: Source LEO 2018 – Living with Low Literacy; N(Model 5) = 6994, n.s. = not significant on 0.05-level.

Discussion

In contrast to earlier findings which indicated a relation between literacy and health-related outcomes (Heilmann & Grotlüschen, 2020), we now rather propose that low literacy and low digital literacy or ehealth literacy are major determinants in the processes in which adults' general vulnerability is increased.

We approximated the question of societal vulnerability with the two variables on satisfaction and feelings of societal inclusion, assuming that being in the bottom 20 percent of these two scales might indicate some kind of exclusion and vulnerability. Both were found to be significant negative predictors of subjectively perceived health status. However, we expect that at least part of the statistical effect of satisfaction is due to a reciprocal interaction between low subjective health status and overall satisfaction, where health-related struggles might affect one's satisfaction as well as overall dissatisfaction and vulnerability might be related to lower subjective health status. However, the relatively strong relationship between these two variables suggests that both are related to vulnerability.

The fact that literacy does not have a strong direct effect on the subjectively perceived health status is consistent with the findings of MacDonald et al. (2022), who report this relationship only for certain age cohorts. While literacy skills might not directly be relevant to care for one's own health, it seems that by lessening chances of social inclusion, e.g. in the field of employment (especially of well-paid employment) and by increasing adult's feeling of not belonging, low literacy very well can be a factor in a low subjectively perceived health status.

Our results show that being part of the 20% of society that feel least included has a significant relation to health. This might have multiple reasons. Not being able to participate in the labor market due to health problems can lead to feelings of exclusion, as the labor market is one of the most relevant spaces of social inclusion in our societies (Gebel et al., 2021). The access to health services is also often moderated by other forms of social participation like income.

We propose some explanations for the use of social media. It is possible that social media use per se has little or no relevance for health outcomes. Although health-related misinformation often circulates on social media, we cannot say a lot about how people evaluate it. Adults with low literacy skills attribute low skills to themselves in assessing the credibility of information on the internet (Buddeberg & Grotlüschen, 2020). Regarding artificial intelligence, less experienced users regardless of their reading and writing skills are less confident that they will not fall for fake news (Grotlüschen et al., 2024). There may be adverse effects that cannot be shown in our generalized models. Beneficial and detrimental effects of digital health information might cancel each other out either at the individual level or at the societal level. Further analysis is needed to distinguish these effects.

Limitations

As mentioned before, our possibilities to differentiate between different social media forms and different types of consumption are very limited. Therefore, no specific statements regarding the direct effect of social media and online tutorials can be made. Instead, we can show that there is no relation between both practices and health outcomes that can be generalized.

The data set of LEO 2018 considers adults aged 18 to 64 years, who live in private households and speak sufficient German to follow a personal interview in the German language. Non-German speakers, prisoners, people in home accommodation and adults aged 65 and older are not included in the data set (Grotlüschen et al., 2020, p. 55).

The LEO 2018 data was surveyed in 2018 and therefore excludes post-pandemic learning and potential changes in society. It tested and surveyed different skills and practices. The variables used here refer exclusively to the description of practices, so that considerable differences in proficiency are to be assumed. Our research shows, however, that literacy itself seems to play a minor role here.

Unlike the findings of Feinberg et al. (2016), that the internet itself is a valuable source of health-related information, based on our findings this does not seem to hold true for social media only.

Conclusion and Outlook

We propose to interpret the presented results as follows: First, we note that the statistical association between literacy and health does not hold when other control variables are added -particularly variables regarding social and financial vulnerability. This indicates that literacy is not associated with poorer health per se, but rather pushes people into vulnerable positions in society and employment. These, in turn, are often associated with higher health risks and poorer health outcomes. Thus, our first concluding thesis is that de-stigmatization, better

and more socially equal health care, and better working conditions increase the health of a variety of vulnerable people, including the health of people with low literacy.

In addition, social media and online tutorials are presented here for the first time as neutral sites of learning that are not automatically associated with poor health (for example, through misinformation). Instead, the issue of empowered and critical digital literacy seems to be a crucial factor here. Accordingly, it may be of great benefit to consider issues of critical literacy not as an afterthought to basic literacy skills such as reading and writing, but as necessary learning goals. People with low literacy skills would benefit from learning opportunities that support the competent use of digital media and health-related information in digital spaces, in a low-threshold approach and without high access requirements. Such opportunities might be courses in e.g. Adult Education Centers (German: Volkshochschulen), providers of parental and family education or community centers.

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