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IT and communication technologies dominate adolescent downtime

By Sandra Bohmann and Jürgen Schupp

Today’s teenagers spend their free time very differently than they did 15 years ago: engagement with IT and communications technologies is now their most significant leisure activity. Representative statistics based on data from the Socio-Economic Panel (SOEP) longitudinal study indicate that Internet and computer-based recreation plays a major role for more than 95 percent of all 17-year-olds in Germany, regardless of gender. Even though access to the Internet and computer-based technologies is now widespread across all social classes, usage patterns differ according to certain socio-demographic characteristics. While lower household income is associated with higher Internet activity, it is not a factor in social networking or gaming. The latter remains a male domain, but boys’ and girls’ Internet usage and social network engagement do not differ: here the type of high school plays a determining role. Students in academically oriented German high schools (Gymnasien) are more likely to be active on social media on a daily basis than are students in secondary schools (Realschulen and Hauptschulen), which are less academically oriented. Education policymakers have started acknowledging the pivotal role that technology plays in young people’s lives and have announced a campaign targeted to adolescents of all social segments and at all types of high schools. It aims to strengthen students’ command of technology while discussing the risks of digital communication, and investigate how education can leverage more of the new opportunities in digital media.

The importance of computer-based and Internet activities is growing

It is hard to miss the extent to which digitalization and technology in general permeate teenagers’ lives in public spaces, schools, and the family. No other way of spending leisure time has experienced such a rapid dynamic development as electronic entertainment media – the Internet above all, followed by Internet-based chats, gaming, and engagement with social networks. Based on the SOEP data on teenagers for the period 2000–2014, the report at hand demonstrates the extent to which technological progress has changed everyday life for teenagers. It also looks at how structural differences in the use of modern information and communication technologies have emerged and the way their use has changed over time.

Computer-based and Internet leisure activities are at the top with teenagers

Almost all of the 17-year-olds who were surveyed between 2012 and 2014 stated that they engaged in at least one IT-related leisure activity on a daily or weekly basis (Figure 1). At the beginning of the 2000s, slightly more than half of the 17-year-olds gave this answer. A close-up view of the IT-related activities with which teens spend their leisure time shows that the explosive increase in this leisure area is based on the increased use of the Internet for surfing and chatting, and engagement with social networks. On the other hand, the proportion of those who play computer games at least once a week has remained relatively steady at approximately 50 percent of teenagers since the early 2000s. It has even dropped slightly of late.

The trend presented above is primarily driven by the fact that more and more young people spend time with IT and communication-based leisure activities on a daily basis. This underlines the predominately high everyday relevance of computer and Internet technology. Fifteen years ago, less than 30 percent of young people spent time with computers on a daily basis. Of the respondents who were surveyed between 2012 and 2014, 85 per-
The average time spent with these technologies has increased by approximately 30 minutes since the last survey in 2001/2002 and now stands at around four hours for boys and three hours for girls. The time-use survey also confirms that other media, such as television, are used less often than they used to be.

Classic leisure activities down for the first time

Since the first survey of teenagers in the SOEP in 2000, their participation in athletic, musical, and cultural activities has risen continuously. The most recent cohort, whose data were captured 2012–2014, shows a slight drop in the participation in classic leisure activities, but the level is still much higher than what was observed at.

Box 1

Baseline data

The baseline data are provided by the Socio-Economic Panel (SOEP) and its survey of young people in particular. For the longitudinal study, DIW has commissioned KANTAR Public (formerly TNS Infratest Sozialforschung) to survey an annual representative sample of households in Germany. Currently, over 20,000 persons in over 11,000 households are participating in the survey.

Data on 17-year-olds

Since 2000, 17-year-olds have received annual questionnaires requesting information on their leisure activities and use of information and communication technologies. Overall, 6,081 of the 17-year-olds born in the period 1984–2014 completed the in the year when they turned 17. Around 5,930 of them provided information on how they spend their downtime. This report uses all the available years in order to map trends over time. For this purpose, several birth years have been combined into cohorts (Table 1). Extrapolation factors make it possible to weight the data to make them representative, which allows for generalizing upon the information the young people from each birth year give to the interviewers.

The data captured in the SOEP only provide information on the portion of daily use, but the most recent German Federal Statistical Office time use survey, which was conducted in 2012 and 2013, provides more precise data on the amount of time spent with IT-related activities per day. A comparison with data from the previous time use survey from 2001/2002 (Table 1) shows that not only the portion of children and teenagers who spend their free time with IT and communication technologies has increased, but the length of time they spend with the technologies every day has also risen.

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2 However, when comparing this to the information in the SOEP, always consider that the age group in the time use study inherently has a greater age variation among ten- to 17-years-olds.

Of course the analyses presented here do not permit any inferences as to whether this trend is related to the increase in Internet-based leisure activities. However, since the portion of young people who said the time they spend “just hanging out” every day has also gone up in tandem with musical and athletic activities, further analyses are needed to determine exactly which changes underlie the phenomenon of “teenage overload.”

Fewer and fewer teenagers read in their downtime

The SOEP data also indicate that fewer and fewer teenagers read when they have free time. Reading on both a daily and weekly basis decreased during the survey period. Fifty-three percent of the 17-year-olds in the oldest cohort, born between 1984 and 1986, read at least once a week. In the 1995–97 birth cohort the percentage dropped to 43 percent. It is entirely possible that today’s teenagers read more online, but the simultaneous growth in the portion of those who said they never read indicates that overall, fewer young people are reading. The data in the time use survey, which also covers reading on electronic media, confirm the decline in the rate of reading. They also show that the young people who did read in 2012 and 2013 spent on average one hour a day reading – the same amount of time reported ten years ago.

Personal social contact in leisure time trending downward

Since the beginning of the survey, the portion of teenagers who meet friends (or their best friend) on a daily, or at least weekly, basis has slightly fallen. From 2001–2003, this was still a daily leisure activity for 27 percent (39 percent) of 17-year-olds. In the period 2012–2014, it was still the case for only 22 percent (26 percent).

However, one cannot conclude that the increasing digitalization of leisure time goes hand in hand with social isolation. After all, three-quarters of the latest cohort said they chatted, surfed the Internet, and engaged in social networks every day. This suggests that young people now interact with each other more via the Internet. It remains unclear however whether the social networks are really used for interaction or solely for the purpose of user-oriented self-presentation. Even if teenagers are in contact with each other more frequently via the Internet, the nature and quality of these screen-mediated relationships might differ rather dramatically from the kind of relationships that develop in personal interac-


10- to 17-year-olds spend more and more time with PCs and smartphones while the use of other media declines.

The digital divide in use persists

Until 15 years ago the digital divide, in the sense of “inequality in access to private computers and the Internet,” was the focus of the debate on structural differences in the use of modern information and communication technologies. At the beginning of the 2000s, adults and teenagers with lower household income and a low level of education owned their own computers and Internet access less frequently than others. But the digital divide...
As a gap in access, – at least as far as teenagers are concerned– has been largely closed in the past two decades and is no longer relevant.

Statistically significant differences by household income, parental educational level, and immigrant background that could still be observed in the second cohort are barely perceptible in the latest cohort (Figure 2). Almost all teenagers today have domestic Internet access. However, in the latest cohort of 17-year-olds, surveyed from 2012 to 2014, a slightly greater number of young people from lower-income households lacked access to the Internet than those from the three upper income quartiles. Young people whose mothers graduated from high school or university have a particularly high rate of access. The 2015 *Shell Jugendstudie*, a longitudinal survey of German teenagers initiated in 1953, showed that social background remains statistically significant when not only access to the Internet but also the number of means to access the Internet are observed. The more affluent children and teenagers are, the more means to access the Internet are available to them. Even if a divide in access continues to exist on a very high level, the digital divide in form of an access divide is in general considered to be overcome.

In recent years, the debate focused on “digital inequality instead.” Digital inequality describes the phenomenon in which the frequency and purpose of digital media use, as well as the type of skills users acquire in the process, vary systematically across demographic groups. As early as ten years ago, the SOEP data for adults showed that computer and Internet use varied strongly with the level of education.

Taking the portion of teenagers who engage daily in at least one IT-related leisure activity differentiated according to socio-demographic characteristics, and comparing them across cohorts shows that structural differences in use have changed significantly in the past two decades (Table 2).

Gender makes no difference when it comes to using the Internet

While boys still spend a much larger portion of their leisure time on IT-related activities in the oldest and second-oldest cohorts studied here, the gender difference in daily use of information and communication technologies is no longer statistically significant in the latest cohort. This is primarily because girls and boys surf the Internet, chat, and engage in social networks with equal frequency. As for computer games, the boys have the lead (see Box 2). This finding is particularly relevant...
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Top income quartile in the latest cohort said they spent their downtime with new media every day in comparison to the teenagers in the lower three quartiles. At the beginning of the 2000s, the lower level of participation of the teenagers in lower-income households was probably primarily due to financial constraints: in general, lower-income households were slower to adopt modern technologies.

14 John P. Haisken-DeNew et al., DIW Wochenbericht 67 (2000), Ibid. It should also be kept in mind that many computer games went hand in hand with relatively rigorous hardware and software requirements at the beginning of the 2000s. Gaming as a hobby could quickly become rather expensive. Whereas many of the computer (or smartphone) activities surveyed in the more recent cohorts, such as chatting and engaging in social networks, can be pursued with almost any end device.
Adolescents and IT

Box 2

Excessive computer and online use as a means of stress reduction

Command of modern information and communication media is an essential prerequisite for social participation and professional success today. Various studies have confirmed the multiple positive consequences of reasonable use. Excessive use of these technologies may nevertheless affect people’s lives negatively. In addition to the sheer physical symptoms that result from long periods of screen-time, scientific studies have found correlations between excessive computer/Internet use and poor concentration, lower school-related motivation, poor grades, higher levels of aggression, and riskier behavior in general. Potential negative consequences of the dominance of digital media in the everyday life of children and teenagers are also a topic of public discussion. Warnings about the effects of excessive use of computers, the Internet, and smartphones on the brain, physical and mental health, and social relationships are myriad.4 How to define appropriate, excessive, and problematic use is, however, still part of the academic debate.5 The absolute duration of use does not determine whether a case of use behavior is problematic or not. Instead, criteria borrowed from the definitions of pathological gambling or substance dependence are used, for example: whether the use behavior can still be controlled, the existence of withdrawal symptoms, and the extent to which the use behavior has a negative impact on other areas of life.6 Varying definitions and instruments of measuring problematic usage pattern often yield very different results.

In an international study conducted in 2014, for example, 0.9 percent of German teenagers exhibited explicit addiction of today, teenagers’ lower level of participation is more likely due to the fact that they have especially high rates of participation in more structured and education-oriented leisure activities. They simply have less time to surf, chat, and engage every day.15 In a slightly different form, the results of the latest Shell Jugendstudie confirm this assertion. While 26 percent of young people in the two lower income quartiles indicated that they do not have time for other things due to their Internet activities, only ten percent of the young people in the upper two income quartiles agreed with the statement.

Another indication for the hypothesis that parents in households with a higher socio-economic status make sure that young people do not spend too much time with new media, or that the young people themselves have internalized such thinking, is that young people whose parents graduated from high school or university also have lower daily participation levels in Internet surfing and computer games. Yet looking at the young people’s own education, it appears that the ones who attend academically oriented high schools have the highest participation levels. As expected, fewer young people already taking part in vocational training programs (and therefore with less free time) are online on a daily basis than those with less formal education, it appears that the ones who attend academically oriented high schools have the highest participation levels. As expected, fewer young people already taking part in vocational training programs (and therefore with less free time) are online on a daily basis than those with less formal education.

References


5 To date, Internet/computer addiction has not been included in the latest version of the American Psychiatric Society’s Diagnostic and Statistical Manual of Mental Disorders (DSM-5). However, the “Internet gaming disorder (IGD)” has been accepted into the “Emerging Measures and Models” section in which disorder symptoms that have not been adequately researched are listed until they can be officially accepted as part of the manual. See Mark D.Griffiths, Daniel Luke King and Zsolt Demetrovics, “DSM-5 Internet gaming disorder needs a unified approach to assessment,” Neuropsychiatry 4th year, 1 (2014): 1-4.

6 Currently, there are at least 18 different measurement methods for and definitions of pathological Internet and gaming behavior. Some scientists have used the criteria for pathological gambling while other authors use the criteria that the DSM defines for addiction to psychotropic substances. For a brief overview and detailed information on the relevant literature, see Sabine Meixner, “Exzessive Internetnutzung im Jugendalter,” Kinder und Jugendpsychiatrie und praktische Neurologie u. Psychiatrie, 55th year, 1 (2010): 3-7.

Adrian Hille et al., (2013). Ibid. Another study in England was unable to find a causal relationship between access to the Internet and communication technologies at home and school performance, see Benjamin Faber, Rosa Sanchez-Guerrer and Felix Weinhardt, “ICT and Education: Evidence from Student Home Addresses,” NBER Working Paper 21306 (2015).
Teenagers from affluent households invest less leisure time in IT-based activities

The multivariate analyses confirmed the negative relationship between household income and engaging in IT-based leisure activities. Teenagers in households in the upper income segment have a probability of engaging in any IT-based leisure activity on a daily basis that is nine percent lower than that of teenagers from middle-income families. Their likelihood of being active in social networks on a daily basis is even 15 percent lower. With regard to surfing and chatting, the children of high earners are not different from those in the middle-income segment. However, young people in the lowest income quartile have a 15 percent lower probability of surfing and chatting on the Internet than the reference group from middle-income households.

Who engages in which IT-related leisure activities depends on a variety of socio-demographic traits

Alongside the temporal changes in the use structure of digital media over time, the SOEP data allow for a glimpse at the structural differences in use content (Table 3). Since the relationship to some of the demographic characteristics has markedly changed over time, the multivariate analysis was restricted to the most recent cohorts of 17-year-olds born from 1994–1997. We examined the probability of engaging in a specific IT-related leisure activity on a daily basis, depending on membership in certain socio-demographic groups.

used as an instrument for measuring socioemotional stress.\textsuperscript{11} We further controlled for level of satisfaction with grades and frequency of fighting with parents in order to directly test two possible causes of psychosocial stress.

The SOEP data confirm that teenagers who responded that they are often or very often sad, worried, or angry have a 20 percent higher likelihood of surfing and chatting on the Internet every day than those who are less often angry, worried, and sad. The likelihood of them pursuing any IT-related leisure activity is 12.5 percent higher. Contrary to expectations, the likelihood of playing computer games every day is not linked to emotional stress factors.

Young people who often or very often fight with at least one parent exhibit an eight percent higher probability of pursuing an IT-related leisure activity every day. Low satisfaction with grades is also linked to a significantly higher probability of engaging with social networks on a daily basis.

Overall, the SOEP data confirm that there is a positive relationship between psycho-emotional stress factors and the probability of pursuing IT-related leisure activities on a daily basis. What the data do not explain is why certain forms of digital media use are linked to certain stress factors but not others. These questions are left open for in-depth qualitative and quantitative studies in the future.


\textsuperscript{11} See footnote to Table 3.
Teenagers who read regularly spend less time online; social contacts do not influence online activity

Whether or not young people meet friends at least once a week has no influence on their daily activities in social networks or surfing and chatting online. However, young people who reported reading on a weekly or daily basis had a ten percent lower likelihood of surfing and chatting online on a daily basis. Equally the likelihood of pursuing an IT-related activity during their daily downtime was lower for young people who read regularly.

Teenagers with an immigrant background do not differ from those without an immigration background concerning their Internet activities and engaging in social networks, but they show a lower probability of gaming on a daily basis.

Young people aiming at a high school degree or those who are not satisfied with their school grades have a higher probability to be active on social networks.

### Table 3

Relevance of different socio-demographic characteristics for the probability to practice specific IT activities on a daily basis

<table>
<thead>
<tr>
<th>Probability of daily practice of</th>
<th>At least one of the following IT-activities</th>
<th>Playing computer games</th>
<th>Surfing on the internet</th>
<th>Being active on social networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.024</td>
<td>0.257***</td>
<td>−0.013</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>(0.509)</td>
<td>(0.000)</td>
<td>(0.781)</td>
<td>(0.607)</td>
</tr>
<tr>
<td>Lowest income quartile (reference category: central 50 percent)</td>
<td>−0.034</td>
<td>0.086</td>
<td>−0.146*</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(0.464)</td>
<td>(0.277)</td>
<td>(0.066)</td>
<td>(0.801)</td>
</tr>
<tr>
<td>Highest income quartile (reference category: central 50 percent)</td>
<td>−0.089*</td>
<td>0.012</td>
<td>−0.071</td>
<td>−0.147*</td>
</tr>
<tr>
<td></td>
<td>(0.083)</td>
<td>(0.818)</td>
<td>(0.230)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Mother’s education in years</td>
<td>−0.005</td>
<td>0.015</td>
<td>−0.002</td>
<td>−0.007</td>
</tr>
<tr>
<td></td>
<td>(0.579)</td>
<td>(0.176)</td>
<td>(0.885)</td>
<td>(0.624)</td>
</tr>
<tr>
<td>Migration background (dummy)</td>
<td>−0.002</td>
<td>−0.090*</td>
<td>−0.015</td>
<td>−0.097</td>
</tr>
<tr>
<td></td>
<td>(0.964)</td>
<td>(0.093)</td>
<td>(0.773)</td>
<td>(0.202)</td>
</tr>
<tr>
<td>Vocational training (reference category: Real- or Hauptschule)</td>
<td>−0.096</td>
<td>−0.037</td>
<td>−0.091</td>
<td>−0.099</td>
</tr>
<tr>
<td></td>
<td>(0.275)</td>
<td>(0.606)</td>
<td>(0.266)</td>
<td>(0.340)</td>
</tr>
<tr>
<td>Gymnasium (reference category: Real- or Hauptschule)</td>
<td>0.091*</td>
<td>−0.086</td>
<td>0.036</td>
<td>0.235***</td>
</tr>
<tr>
<td></td>
<td>(0.082)</td>
<td>(0.129)</td>
<td>(0.550)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>Reading (at least weekly)</td>
<td>−0.077**</td>
<td>0.002</td>
<td>−0.098**</td>
<td>−0.063</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td>(0.968)</td>
<td>(0.036)</td>
<td>(0.367)</td>
</tr>
<tr>
<td>Meeting friends (at least weekly)</td>
<td>−0.037</td>
<td>−0.057</td>
<td>−0.012</td>
<td>−0.130</td>
</tr>
<tr>
<td></td>
<td>(0.454)</td>
<td>(0.441)</td>
<td>(0.856)</td>
<td>(0.200)</td>
</tr>
<tr>
<td>Emotional and psychological strain***</td>
<td>0.125*</td>
<td>0.086</td>
<td>0.203***</td>
<td>0.228*</td>
</tr>
<tr>
<td></td>
<td>(0.062)</td>
<td>(0.415)</td>
<td>(0.010)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>Fighting with mother and father (frequently and very frequently)</td>
<td>0.083*</td>
<td>0.023</td>
<td>0.069</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>(0.057)</td>
<td>(0.653)</td>
<td>(0.196)</td>
<td>(0.586)</td>
</tr>
<tr>
<td>Low satisfaction with school grades (3 and less on a scale from 0–10)</td>
<td>−0.029</td>
<td>−0.010</td>
<td>0.044</td>
<td>0.234*</td>
</tr>
<tr>
<td></td>
<td>(0.738)</td>
<td>(0.912)</td>
<td>(0.724)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Observations</td>
<td>803</td>
<td>801</td>
<td>802</td>
<td>541</td>
</tr>
</tbody>
</table>

The coefficients of the logistic regression analysis above show changes in the probability of conducting the respective IT-related activities given a change in the respective predictor variable if all other predictor variables are held constant at their mean.

1 A person is assumed to experience emotional and psychological strain if at least two out of the three following criteria apply: often or very often felt a) sad, b) worried or c) angry in the four weeks before the survey.

significance: * p<0.10; ** p<0.05; *** p<0.01 (p-values in brackets)

Source: SOEP v.31, 17-year-olds, weighted, calculations by DIW Berlin.

Young people aiming at a high school degree or those who are not satisfied with their school grades have a higher probability to be active on social networks.
Conclusion and outlook

In the past two decades, the digital divide manifested as a social Internet access gap and has almost completely closed – at least for teenagers. Digital media’s increasing availability, portability, and interconnection have established these technologies as young people’s most frequently used leisure activity. Although the majority of socio-demographic differences in the use of total IT-related leisure activity have disappeared, there is a new digital divide along socio-demographic traits concerning the specific purpose for which the new media is used. For example, young people from the lower income quartile surf and chat online less frequently than those from households in the middle-income segment. Teenagers who attend secondary schools engage in social networks much less frequently than those who attend academically oriented high schools.

Participation in social discourse not only requires access to Internet-based medial content, but also the ability to encounter it critically.

Educational policy and policymakers in general are reacting slowly to many of these trends. On the one hand, there is a large gap between young people’s media presence in their leisure time – and the IT skills they acquire in the process of using it – and the use of digital media in schools. On the other hand, schools should function as the place where young people discuss and learn to use new media responsibly. Training teenagers on how to use the new media— which now dominate their downtime activities – in a responsible and powerful way, and formulating educational goals has become a key pedagogical task for educators. Educational policymakers have finally recognized that they must react to the ongoing technological and media-related changes in the living environment of our youth. A recently announced government program aims to strengthen young people’s command of technology and the risks associated with digital communication and learning with the new opportunities digital media offer. The German government plans to make €5 billion available for digital tools in schools in the next five years. Merely expanding digital technology in schools will probably not be enough. As the government is well aware, the key is teaching young people how to use digital media as a new primary cultural technology.

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