Repercussions of Extended Use of Digital Media Devices ("Screens")

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Date: 12 August 2019
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Summary

This document studies the repercussions of the extended use of digital media devices—particularly smartphones—on certain aspects of our lives. It reviews studies that examine the influence of these digital media devices (hereinafter: "screens") while focusing on these main areas: psychological wellbeing, cognition and learning, interpersonal interaction, and physiological effects.

Internet use has many benefits, including access to information and remote services; distance education; maintaining contact and ties with family, friends, or people with similar interests; self-expression and access to different audiences; and the ability to partake in social and political discourse. Nevertheless, a lively debate has unfolded in recent years over the repercussions of smartphone use. It is argued, among other things, that smartphone use affects social interactions, impairs attention, causes depression and anxiety, and even leads to "phone addiction." Despite the lively public and scientific discourse on the matter, most of the research currently being conducted suffers from several shortcomings, including measurement issues, a lack of transparency, and the over interpretation of data with low significance.

On the whole, the document suggests that there is currently no academic consensus regarding the repercussions of the extensive use of screens. Whereas some studies claim that the use of screens leads to clear damage, other studies have not found a correlation or a causal connection. Some studies have even found the use of screens to have measurable benefits.

Screens and Psychological Wellbeing

Alongside one study that claims screen time exceeding one hour a day had a negative correlation with psychological wellbeing, another study maintains that the extensive use of digital media has an insignificant effect on psychological wellbeing.

A study performed in the United States found that the daily use of screens was higher among boys, members of ethnic minorities, lower-income households, and homes with poorly educated parents; hence, certain demographic variables had a significant effect on the extent of screen use. The authors of the study note that they found a very weak correlation between screen time and psychological wellbeing.

Screens, Learning and Cognition

There is substantial research evidence indicating that smartphone use has a negative impact on additional cognitive tasks performed at the same time. However, research on the long-term effects on attention is inconclusive. The studies obtained contradictory findings regarding the link between multitasking on digital media, on the one hand, and the level of success in performing tasks that require attention, on the other.

In a 2016 study, researchers found a correlation between extensive smartphone use and a preference for immediate rewards over a larger reward at a later time. Various studies claim that a correlation exists
between the extensive use of social media, instant messaging, and smartphones and low academic achievement. Other studies claim that it is the cognitive skills themselves that predict that ability to deal with distractions.

**Screens and Interpersonal Interaction**

Some claim that the common pattern of conversations in the presence of a phone leads to partial attention and lower commitment to interactions, reduced eye contact, and less of a sense that the other person is available—which results in a less meaningful, less creative, and less personal conversation. Various experimental studies demonstrate that the mere presence of a nearby mobile phone affects the quality of the relationship or interaction.

A 2015 study claims that ignoring or disregarding a partner or significant other due to smartphone use increases conflicts between partners and thereby affects relationship satisfaction.

**Screens and Physiological Effects**

There is a clear link between digital media use before bed and sleep disorders, i.e., delayed bedtime and impaired sleep quality.

There is evidence that more television time is linked to obesity, but there is insufficient evidence regarding overall screen time or "non-television screen time." There is no strong evidence to support recommendations on viewing limitations.

According to an OECD report, most musculoskeletal risks due to screen use are not unique to these technologies, and are characteristic of other prolonged static activities, such as sitting in class, as well. However, it is important to physically tailor the spaces in which these technologies are used in order to minimize potential damage.

A January 2019 report by the Science and Technology Committee of the British House of Commons notes that current studies on these issues are insufficient, tend to examine correlation rather than causality, and are generally lacking. A January 2019 OECD report on the matter raises similar claims regarding the quality of research and notes that higher quality research and distinct budgeting for research in these fields are required in order to provide comprehensive and evidence-based guidelines or recommendations.

Notwithstanding the lively debate among researchers and the uncertainty regarding the validity of recommendations on restricting screen time for small children, various agencies and countries have—for several years now—provided age-dependent recommendations to eliminate or restrict screen time, with an emphasis on small children, as specified below. By contrast, the basic recommendation of the British Royal College of Paediatrics and Child Health is that families should negotiate screen time with children based on the specific needs of each child, the manners in which children use the
screens, and the extent to which screen activity replaces or disrupts other activities—physical, social, and sleep.

According to the response from the Ministry of Health, an initial review shows that the findings are inconclusive and the research not sufficiently evidence-based regarding questions of the physiological, psychological, and cognitive effects of the use of computers and smartphones (with the exception of sleep and non-ionizing radiation). Upon completion of a review, the TNUDA Information Center, which coordinates treatment of this issue, will draw up and submit its recommendations—in accordance with the findings—to the Ministry of Health. The Ministry’s response further indicated that as a general rule, health policy is determined by the strength of the evidence of harm, among other things. When it comes to a matter in which the health repercussions are the subject of debate, it is not possible to conclusively set forth risk prevention guidelines (emphasis added).
1. Background

This document examines the repercussions of the extended use of digital media devices—particularly smartphones—on certain aspects of our lives. The document reviews studies that examine the influence of digital media devices (hereinafter: "screens") on several main areas: psychological wellbeing, cognition and learning, interpersonal interactions, and physiology.

It should be noted that there is currently no academic consensus regarding the repercussions of the extensive use of digital media, in general, and of smartphones, in particular. Alongside the voices in the media, research, and policy that maintain that screen use causes clear damage, other studies have not found a correlation or causal connection. Some studies have even found the use of screens to have measurable benefits.

Due to the broad scope of the subject at hand, this document does not present all the knowledge in this field. Nevertheless, the distinctions between the aspects and various repercussions of screen use, which are presented in this document, and the examination of the research validity of the claims on these subjects can help in developing an understanding of the issue and in addressing the question of whether it is necessary to develop government policy or raise public awareness on the matter. These subjects will be discussed briefly at the end of the document.

1.1 Selected Data

Smartphones have become an integral part of our everyday lives. According to data from the Pew Research Center, 98% of Israeli adults had a mobile phone in 2018, 88% had smartphones, and nine out of ten people on average used the Internet.

According to a 2017 Bezeq report, the average age for receiving a smartphone in Israel was 10.

According to a 2018 Bezeq report, 27% of parents reported that their children first used digital media at the age of 1–2, and another 27% reported their children first used digital media before their first birthday. Forty-three percent of parents do not restrict their

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Some studies maintain that screen use causes clear damage, but others have not found a correlation or causal connection. Some have even found measurable benefits.

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1 Note that this document does not examine aspects of Internet abuse such as online bullying, exposure to inappropriate content, invasion of privacy, etc. These issues have been discussed on several previous occasions by other documents by the Knesset Research and Information Center.


children's digital media consumption; among parents who do, 36% restricted consumption to less than two hours and 8% limited it to 3-5 hours.  

Data from a 2015 PISA study published by the Ministry of Education in 2018 points at the following findings:

- **Israeli children are exposed to computers and the Internet at a very early age.** Thirty-four percent of students reported that they first used the Internet when they were six years old or younger—the highest rate among all OECD countries. Fifty-two percent of students in Israel reported using a computer at age six or earlier.

- Ninety-five percent of students reported having Internet access at home compared to 92% of students who reported so in 2012—figures similar to the OECD average. Eighty-seven percent of students reported that a mobile phone with Internet access is available at home for their use.

- Twenty-eight percent of students reported not using the Internet at school, and 31% reported less than 30 minutes a day of Internet use at school.

- Some 40% of students reported using the Internet outside of school between one and four hours a day. Thirty-one percent of students use the Internet outside of school for more than four hours a week (similar to the OECD average of 32%).

- Eighteen percent of students reported using the Internet outside of school for more than six hours on a school day (as compared to the OECD average of 26%). This datum represents a significant increase over the 2012 PISA report, when the rate in Israel stood at 8.9%, as compared to an OECD average of 7.2%. In Israel, a higher rate of girls than boys use the Internet for over six hours a day (23% and 13%, respectively). Thirty-nine percent of students use the Internet for more than four hours a day on the weekend (lower than the OECD average of 47%).

- Israeli students reported average Internet use of 135 minutes on weekdays outside of school, as compared to the current OECD average of 145 minutes and as compared to 106 minutes in Israel according to 2012 PISA data.

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A higher rate of girls than boys report high internet use (i.e., 4 hours or more a day) on the weekend (44% compared to 33%).

A survey conducted in 2017 for the Israel Internet Association among the Jewish population presented the following findings:

- Fifty percent of adults reported using the Internet for more than four hours a day (of whom 26% reported more than six hours of daily Internet use). At the same time, 58% of adolescents reported using the Internet for more than four hours a day (of whom 26% reported more than six hours of daily Internet use—a figure that is higher than the rate for adolescents, but similar to the OECD average, as reported in the aforementioned PISA survey).

- Thirty-four percent of adults reported using the Internet for two to four hours a day (compared to only 29% of adolescents), and 16% of adults reported having used the Internet for less than two hours a day (as compared to 12% of adolescents).

As noted, these figures are not unique to Israeli adolescents. According to a 2018 Pew survey, 54% of US adolescents maintained they use mobile phones too much; likewise, 54% stated that they try to restrict their mobile phone use of their own accord.

2. Screens and Digital Media—Advantages and Disadvantages

Internet use has many benefits. Besides allowing access to information and a variety of remote digital services, the Internet—and particularly social networks—help people keep in touch with family and friends, learn, and get to know to people with shared interests. Online services allow people to express themselves, create content and reach different audiences, and take part in the social and political discourse.

The dominance of the Internet and social networks is amplified by smartphones, which connect users and the media to the point that some users perceive the media as an "extension of the self."

The dominance of the Internet and of smartphones has sparked a lively public debate on the question of the repercussions of the introduction of smartphones into our lives. These are questions regarding the effects on the type and quality of the interpersonal and social interactions we create, questions about the impact on our

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attention—or whether it is difficult to maintain continuous attention, claims of an impact on depression and anxiety, and even a discourse on "phone addiction."

Although these phenomena are discussed in relation to both adults and children, people tend to attach greater significance to the impact on children, who are in the critical years of their physical, social, cognitive, and psychological development. The debate does not stop with social discourse; it has also led to recommendations on restricting the consumption of digital media, for instance among babies under two years of age. The parliamentary discourse in other countries has also addressed this issue. For example, in January 2019, the British House of Commons published a summary report of the work of the Science and Technology Committee entitled, "Impact of Social Media and Screen-use on Young People’s Health Inquiry."

In order to contend with the scientific uncertainty, the multitude of publications on the issues at hand, and the sheer scope of the issue, this document is based largely on studies published in academic journals, while attempting to focus on relatively central articles and major researchers. In addition, we also used literature reviews, which provide a wider perspective, as well as reports by parliamentary or international organizations that cover the subject matter as a whole.

### 2.1 Extensive Screen Use and Psychological Wellbeing

Various studies have examined whether screen use has a negative impact on users' psychological wellbeing.

A study published in 2018 examined the correlation between the use of digital media and the rising rates of depression and suicidal tendencies in the United States between 2010

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11 Israeli Medical Association, Israel Pediatric Association, *Preventing Exposure to Media among Babies under Age Two*, position paper, November 2014 [Hebrew].


13 For example, Prof. Andrew Przybylski, whose studies are cited rather extensively below, is mentioned by name in the House of Commons report as a renowned expert in the field (p. 14). Dr. J.M. Twenge is one of the most notable researchers and speakers in the field (albeit one of the most controversial). Taken together, the two researchers present very different perspectives on the subject.


15 Note that the academic literature contains references to the benefits of using screens and their contribution to psychological wellbeing as they allow people to make social connections, meet people with shared interests, and more.
According to the study, which was based on data from US population surveys of about half a million adolescents, the adolescents who spend more time using screens were significantly more likely to show symptoms of depression or exhibit suicidal tendencies. On the other hand, those who partook in screenless activities (such as physical exercise or sports, consuming print media, or participating in religious ceremonies) were less likely to suffer from depression or exhibit suicidal tendencies. The study further stated that adolescents who consumed digital media for three or more hours a day were 34% more likely to exhibit at least one symptom of suicidal tendencies.

Another study led by the same researcher (Twenge) with a representative sample of over 40,000 children and adolescents was based on parents' reports on one of their children. The study stated that "screen time" in excess of one hour a day had a negative correlation with their psychological wellbeing. Those who watched screens for seven hours or more doubled their risk for low psychological wellbeing as compared to those who watched up to one hour a day. In addition, the rate of 14–17-year-olds diagnosed with anxiety or depression was double among those who watched digital media for seven or more hours a day as compared to those who watched an hour a day.

By contrast, a 2019 study based on over 17,000 adolescents in the US, England, and Ireland found only a small negative correlation between adolescents' screen time and their psychological wellbeing. According to the researchers, the impact of the extensive use of screens on psychological wellbeing is negligible and insignificant in an adolescent's life compared to other activities.

One study stated that more than one hour a day of "screen time" was negatively correlated with psychological wellbeing, but another study claimed that extensive screen use has a negligible effect on psychological wellbeing.

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17 Referred to in the study as a "suicide related outcome."
18 This study has received widespread criticism due to its research method and findings. See, e.g., Y. Ophir, Y. Lipshits, & H. Rosenberg, "New Media Screen Time is Not (Necessarily) Linked to Depression: Comments on Twenge, Joiner, Rogers, and Martin (2018)," Clinical Psychological Science, 2019.
21 They demonstrate their claim by noting that in order for an adolescent’s reported level of psychological wellbeing to drop by half a standard deviation, they must report screen time of 63.5 hours a day.
Methodological Issues and Problems

Despite the heated public and scientific debate on the matter, the currently available research suffers from numerous problems, including issues of measurement, a lack of transparency, and overinterpretation of data with low significance.

Various studies and reports emphasize that there is a fundamental difference between the identification of a correlation between phenomena and the existence of a causal link. Moreover, even in cases where the argument can be made that a causal link exists, the directionality—i.e., the response to the question "what caused what"—is unclear. For example, even if we point to a correlation between "problems with psychological self-regulation" and "extended screen time"—and even if we argue that a causal link exists between the two—the question remains whether the child’s parents permitted extended screen time because of the behavioral difficulty or whether the extended screen time caused the behavioral difficulty.

Another criticism of screen time studies is that "screen time" is a very partial indicator that is not sufficiently sensitive to the specific context—the type of content consumed, the nature of consumption, the time of consumption, and even specific usage patterns for that medium. As such, screen time cannot be used as an effective index for examining the impact and repercussions of screen use. For example, one user’s screen time may be comprised of continuously reading an article, while another’s screen time may comprise mostly interactive video games. Even two users who use the same type of medium, such as a social network, may use it differently, with one creating content and sharing it with friends and the other passively consuming content and not sharing with others at all.

In another study led by the same researcher (Andrew K. Przybylski), which was published in 2017, the researchers found a statistically significant correlation between the duration of "screen time," covering various types of consumption, and a decline in psychological wellbeing. The research showed a positive correlation or no correlation between screen time and wellbeing (viewing was analogous to an increase in psychological wellbeing) up to a certain level of consumption; beyond this point, the correlation was negative (high viewing correlated with low psychological wellbeing). For example, up to

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100 minutes of video games a day, up to 117 minutes of smartphone use, up to 221 minutes of watching videos, and up to 257 minutes of computer use for leisure were not found to correlate with a decline in psychological wellbeing. However, a statistically significant correlation with declining psychological wellbeing was found for higher usage.

Although the researchers found a statistically significant correlation between screen time and psychological wellbeing, they note that the "screen time" variable had a low level of impact on subjects' psychological wellbeing. They note that the potential negative effect of extensive screen time on psychological wellbeing was a third the size of the positive correlation between eating regular breakfasts and psychological wellbeing.

In another study of children ages 2–5, which was conducted by the same team and published in 2019, the researchers tried to examine whether abiding by the recommendations to restrict screen time for small children was linked to their psychological wellbeing. The study, which was conducted among some 20,000 children, found that daily screen use increases as the child gets older. In addition, screen use is higher among boys, ethnic minorities, lower-income households, and households with poorly educated parents. The authors found no empirical scientific grounds for the recommendations by the American Academy of Pediatrics to restrict young children's screen time.

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24 All data refer to weekday viewing; on weekends, the amount of screen time before a negative correlation with psychological wellbeing was reported was greater.

25 A.K. Przybylski and N. Weinstein, "Digital Screen Time Limits."

26 For recommendations on viewing restrictions issued in the US and other countries, see Section 3.1.
The term "moral panic," which was coined by sociologist Stanley Cohen, describes a widespread feeling of social anxiety that is sparked by a social phenomenon which is perceived as something that could harm society's collective values and morality. Usually, the panic results from a combination of intensive coverage of the "danger" and intervention by interest groups, the authorities, and public opinion, which converge on a loaded issue (such as pedophilia, teen violence, or a disease outbreak), and intensify fear of it.

In certain cases, the media doesn't just spread the panic but also causes it; the technological medium is the source of panic that leads to the negative public reaction—what is also known as "media panic." Media panics have accompanied the appearance of several traditional media technologies, such as radio and television. The Internet, social networks, and mobile phones each in turn sparked media panic that focused on the potential destructive effects each could have on society. Media researcher Gerard Goggin proposed the term "mobile panic" to describe the phenomenon of moral panic surrounding the rapid diffusion of mobile media. Within mobile panic Goggin included a wide range of anxieties regarding the negative impact of intensive cellular use—an increased sense of loneliness, decreased literacy, deteriorating health among users, harm to cultural values, harm to the victims of the distribution of damaging photos, etc.

Therefore, in contrast to the common approach found in the studies reviewed throughout this document, the "moral panic" approach criticizes the public discourse and media coverage for emphasizing fear of the technologies in question and views them as an expression of the fear of social change.

### 2.2 Screens and Interpersonal Interaction

Various studies have attempted to examine whether the availability of digital media—and particularly smartphones—affects interpersonal interaction. For instance, does the availability of contact with other people (via the Internet) while in the presence of a certain person affect the nature or kind of our relationship with the person who shares our physical space.

Technology researcher Sherry Turkle claims that the constant presence of smartphones and our attachment to them harm our ability to be empathetic to other people, our ability to be with ourselves (alone, without outside stimuli), and our ability to have meaningful conversations with others. According to Turkle, the widespread pattern of conversation in the presence of a phone leads to partial attention and a reduced

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27 Hananel Rosenberg and Menahem Blondheim, "'Disconnected': What Happens when a Hundred Teenagers Wake up in the Morning without their Smartphones," not yet published. [Hebrew]
commitment to interactions, diminishes eye contact, and lowers the sense that people are available for us; such conversations are thus less meaningful, less creative, and less personal.\textsuperscript{28} Her claims, which are based on qualitative studies, have also been confirmed to a certain extent by empirical studies.

In an experimental study published in 2017, the researchers organized meetings at a café for 3–5 friends or family members.\textsuperscript{29} The researchers divided the 300 subjects into two groups: one group was told to leave their phones on the table on vibrate, while the other group was told to put the phone on silent and place it in a closed box on the table.

Participants whose phone was on the table reported lower levels of interest and enjoyment from the meeting than did those whose phones were in the box. Participants with phones reported feeling distracted more than did participants without phones. However, the researchers noted that the observed effects were statistically weak, so they decided to conduct another study that consisted of multiple self-reports using questionnaires that participants answered five times every day for a week.

Participants in the additional study reported that when they used their phones during face-to-face interactions, they felt more distracted; they felt less interest and pleasure, less "socially connected", more bored, and like "time moved slower." The researchers found the "distraction" variable to be a mediating variable that predicts the other variables; they therefore maintain that the mobile phone led participants to be distracted, and this distraction led to decreased enjoyment and sense of connection, more boredom, and a sense that time is moving slower.

The study’s authors note again in their concluding remarks that though the observed effect of phones on the measurements was small, it is important due to the consistency of the findings. According to the researchers, the studies show that phone use during interpersonal interactions prevents people from being fully present in the here-and-now, and they therefore propose changing the social norms regarding the use of phones during social interactions.

Another experimental study published in 2012 sought to examine whether a social interaction is affected by the presence of a nearby mobile phone.\textsuperscript{30} The researchers

\textsuperscript{28} Sherry Turkle, "Always-on/always-on-you"; idem, Reclaiming Conversation: The Power of Talk in a Digital Age (New York: Penguin, 2015).


therefore divided subjects into pairs of strangers who would hold a conversation on a topic that was handed to them as a short written instruction. For one group of participants, a book was placed on a table next to the chairs with a mobile phone on it; for the other group, the mobile phone was replaced with a pocket notebook.

**Participants in the situation where a mobile phone was present reported a lower "quality of interaction" and feeling less close to the other participant after the interaction, as compared to the group without a mobile phone present.**

In a follow-up experiment, the experimental environment was the same as before, with the addition of two types of instructions: one group was asked to discuss an everyday matter and the other group was asked to discuss an important matter (the most meaningful event that had occurred that year). In this experiment, **the researchers found that when it came to an everyday conversation, the presence of a phone had no impact on the perception of the quality of the interaction, trust, or empathy. By contrast, for the important conversation, the quality of interaction, trust, and empathy were perceived to be lower when the phone was nearby.**

Another study published in 2015 claims that ignoring or disregarding a spouse or significant other due to mobile phone use increases conflicts between spouses and thereby affects their satisfaction from the relationship.

### 2.3 Screens and Cognition

Smartphones include many applications that assist or replace users' cognitive actions. A modern-day phone is usually also a phone book, daily planner, navigation tool and map viewer, information search tool, camera, and more. In addition to the questions of addiction or dependency that have been raised in public discourse and in research, it has even been argued that the multiplicity of uses and users' attachment to the phones have had a negative impact on our cognitive functions, including memory, attention and concentration, reward seeking, and the ability to delay gratification.

The following section presents the main aspects of the research on this matter, which is based on a literature review published in 2017. Some of the aspects will also include examples from other studies.

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31 This behavior of snubbing someone in favor of a mobile phone even led to a new term in English—"phubbing."


2.3.1 Attention

There is substantial evidence that points to the negative impact of smartphone use on other cognitive tasks performed simultaneously. However, empirical research regarding the long-term effects of smartphones on our attention span is still limited and inconclusive.

A study examining cognitive performance (executive functioning and attention) among two groups—one in which the tester "forgot" a mobile phone in the area, and the other where he "forgot" a notebook—found that subjects who were in the presence of a phone scored lower than subjects who were in the presence of a notebook. The score was significantly low for difficult tasks but was not significantly affected when it came to easy tasks.35

In another study published in 2017, the researchers performed an experiment with three different scenarios: phone in bag or pocket, phone on desk, and phone in other room (subjects were told to keep the phone on silent in all three scenarios).36 The researchers found that the cognitive performance of subjects whose phones were in the other room was higher than those in the other two groups. However, there was no significant variation between the "bag or pocket" condition and the "desk" condition. In another experiment, which was performed as part of the same study, the instructions were changed for some of the subjects, and they were told to turn off their phone. The researchers found no difference between the achievements of subjects who turned off their phones and those who left it on silent, but they found that the aforementioned findings regarding the variation between subjects whose phones were near them and those who left them in another room held consistent.

The researchers state that the study indicates that the mere presence of a phone could negatively affect cognitive performance, even when the user does not pay conscious attention to it.

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34 Executive functioning is a collective term for the mental processes required for concentration and focusing attention; these allow for "playing with ideas"; thinking before acting; addressing new, unexpected challenges; and resisting distracting temptations. See: A. Diamond, "Executive Functions," Annual Review of Psychology 64 (2013): 135–168.


37 The researchers examined two different metrics of cognition—working memory capacity and fluid intelligence.
Other studies have examined the repercussions of digital media multitasking on cognition and performance. One study found that subjects who reported a tendency to multitask struggled more than others to filter out distractions from their surroundings (and from their main task). Furthermore, people who reported they tend to multitask on digital media actually took more time to perform tasks due to switching from task to task (switch cost). Another study pointed to a correlation between frequent multitasking on media devices and lower attention control. However, not all studies produced such results and some even pointed to an opposite trend, i.e., a positive correlation between frequent multitasking and the performance of tasks that require attention.38

2.3.2 Memory

Various studies have tried to determine whether the extensive use of smartphones or specific applications such as navigation tools, cameras, or search engines affect memory patterns or the ability to remember.

For example, a study on the use of GPS for navigation showed that users who used voice navigation were not as familiar with the route and significant landmarks. In addition, their spatial memory of the area where they had navigated was more limited than those who were given a map and limited time to study the route and who then navigated independently.

In another study, researchers found a correlation between frequent multitasking on media devices and a lower level of “working memory”39 and reduced long-term memory performance. Subjects who tended to multitask on media devices presented less accurate representations of information compared to those who did not do so as often.

These studies indicate that smartphones may have a negative impact on memory patterns and levels. One possible explanation for these effects is that the brain operates in such a way that it allocates fewer resources when there is supposedly no need to store information. For example, one study showed that people who assumed that information would be available to them remembered it less well than people who assumed they would have no further access to the information. Another study showed that there is a switch from remembering the actual items of information to remembering where they are stored or can be found. However, many of these are correlation studies in which causality cannot be determined, so the level of the

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38 Authors of the literature review on the subject note that action games help improve multitasking abilities.
39 “Working memory” is a cognitive mechanism of preserving a relatively small amount of available information to perform a certain task; it enables planning, understanding, reasoning and problem solving. N. Cowan “Working Memory Underpins Cognitive Development, Learning, and Education,” Educational Psychology Review 26, no. 2 (June 2014): 197–223.
certainty of claims regarding the impact of smartphones on memory is not very high.

### 2.3.3 Delayed Gratification and Rewards

Some claim that the use of smartphones "rewires" our brains and causes an addiction to instant rewards or gratification, hence the difficulty in delaying gratification. However, research in this field is still in its preliminary stages and does not contain sufficient empirical evidence to support these claims.

In a study published in 2016, researchers found a correlation between extensive smartphone use and a preference for instant rewards over a big payoff at a later stage. "Heavy" (i.e., very extensive) smartphone users were more prone to getting small, immediate rewards offered to them instead of waiting more time for a more significant reward. However, similarly to what was stated above, correlation does not indicate causality, and therefore a possible explanation for this finding is that "impulsive" people tend to use smartphones more—not that the phones cause such behavior.

However, an experimental study published in 2015 found some evidence to support the claims that smartphone use reinforces a tendency to prefer instant gratification. The study consisted of three groups—heavy users, non-users, and non-users given a smartphone for the first time. The tests performed over the course of the experiment indicated that heavy users were more "impulsive" and more "hyperactive" based on the study's metrics and questionnaires; after three months, the new users proved to be more impulsive compared to the beginning of the experiment, whereas the control group of non-users did not present any change in the impulsiveness metric.

**In conclusion, these studies provide some indications to support the claim that extensive use of smartphones has a negative impact on users' ability to delay gratification, but there is no conclusive scientific evidence to support this claim.**

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Various researchers have claimed that the characteristics of intensive mobile phone use among adolescents resemble those of an actual addiction. According to Rosenberg and Blondheim, despite multiple discussions on the exact definition of "addiction," it is generally agreed that it includes symptoms such as spending long periods of time using the addictive substance, using it more often than initially intended, a continued desire to reduce usage, unsuccessful attempts at quitting, negative effects on everyday life including damage to friendships and familial relationships, and symptoms of withdrawal when use is stopped. In the context of mobile phones, it is important to note the distinction between the classic definition of addiction as a physiological and psychological dependence on substances such as drugs and alcohol and a behavioral addiction such as addiction to gambling, video games, online pornography, etc.

The claim that symptoms of behavioral addiction can be clearly identified in the patterns of smartphone usage among many adolescents comes from a variety of studies conducted among adolescents. According to researchers, the negative repercussions of smartphone addiction include a sense of stress and distress; an inability to function; fatigue; a lack of concentration; and physical, psychological, and social damage. At the same time, there are quite a few researchers who claim that mobile phone use—even if unusual and excessive in extent—cannot be defined as an actual addiction. Some researchers call for the inclusion of cases of extreme phone dependence in the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM does not currently define addiction to the Internet or to screens in general as a mental disorder; however, DSM-5 includes Internet Gaming Disorder on the list of conditions for further research. The World Health Organization defined Gaming Disorder—which includes, but is not limited to, online video games—in ICD-11.

According to the response by the Ministry of Health to our query, the literature review on the subject being prepared for the ministry suggests that there are findings that point to overuse or excessive use of digital media, but one cannot point to a causal link between said use and addiction. Moreover, there is a problem with defining digital addiction, which is not related solely to the type of device and usage patterns but also to the user's motivation, personality structure, and his or her social or emotional gains from the use. Due to the great variation in the research methodology in the field and the aforementioned difficulties in defining addiction, different studies suggest rather different prevalence rates, both among different populations and within the same population.

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41 Hananel Rosenberg and Menahem Blondheim, "'Disconnected.'"
42 Ibid. Researchers are divided on whether this is a dependency or a compulsive behavior.
43 Miri Cohen, Senior Head of Emergency Services and First Aid, Ministry of Health, response to Knesset Research and Information Center Query, email, 30 July 2019 [Hebrew].
2.3.4 Learning Ability and Academic Achievements

Further to the line of inquiry behind many of the aforementioned studies on attention, memory, and delayed gratification—skills which are all connected to learning ability and academic achievements—various studies have examined the link between habits of digital media use and academic achievements.

Various studies have claimed that a correlation exists between multitasking on media devices and the extensive use of social media, instant messaging, and smartphones, on the one hand, and low academic performance, on the other.

At the same time, other studies suggest that it is the cognitive abilities themselves that predict a person’s ability to cope with distractions (including those from media) and that the variance in the extent of his or her "working memory" predicts the ability to deal with distractions.

As previously mentioned, a number of studies have claimed that phone use while learning has a negative impact on achievements.

A 2012 study based on questionnaires and grade point average (GPA) data from 1,839 US college students found a significant negative correlation between students' reported daily Facebook use and their college GPA.44 Whereas the average user in the study spent 106 minutes per day on Facebook, the study suggested that another 279 minutes per day could lower GPA by 0.37 (the average GPA in the study was 2.95). In other words, in order for Facebook use to have a significant negative impact on GPA, average usage would have to increase dramatically.

The study did not find a significant link between the extent of daily Facebook use and the time dedicated to academic studies, which rebukes the hypothesis that all of the time dedicated to Facebook "came at the expense of" study time. In addition, while the frequency of Facebook status updates was negatively linked to GPA, the frequency of "checking to see what friends are up to" and "sharing links" were positively linked to GPA. In other words, while there is a correlation between certain usage patterns and a low GPA, other usage patterns were found to be correlated with higher grades.45

In an experimental study conducted at the US Military Academy at West Point and published in 2016, the researchers examined the impact of laptop use on students'
Students were divided into three groups: students without computers; students with laptops or tablets; and students with tablets, which had to remain flat on the desk (so that the lecturer could see and better control student behavior). The researchers found that the use of computers or tablets in class had a negative impact on students' grades, both within the group that only used tablets and among those who used tablets or laptops more freely. The use of computers, according to the study's authors, lowered the grade by 1.7–2.6 points on a 100-point scale; they further suggest that the negative impact of computer use might be higher in a less competitive environment with fewer disciplinary restrictions.

The researchers suggest several explanations for the lower grades, including that computers distract from learning and therefore students have a reduced understanding of the study material, that using the computer to take notes is less efficient than writing them out by hand, and that lecturers might change the way they teach the entire class or students who use a computer.

In another study, researchers found a correlation between self-reported extensive smartphone use and lower cognitive abilities, i.e., participants demonstrated lower analytical abilities and received lower scores on their knowledge metrics. Students who reported extensively using of search engines received lower scores on the observed metrics compared to those who reported more limited use.

### 2.4 Physiological Impact of Screens

Several studies have sought to examine the links between the use of screens and various physical activities such as eating, sleeping, and exercising. In addition, some of the studies examine the effects of the use of technology on aspects of human physiology such as posture, wrist function, vision, etc.

#### 2.4.1 Screens and Sleep

Different studies have indicated that using screens in the evening, before bed, prolongs the process of falling asleep, affects the biological clock and postpones and reduces the production of sleep-inducing hormone melatonin.

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An experimental study published in 2015 compared sleep and bedtime patterns between two groups: one group used a light-emitting electronic book (LE-ebook) before bed, while the other group read a printed book under a lamp. The study was conducted in a sleep lab where the lighting, duration of reading, and other parameters were controlled. The study found that participants who read ebooks took longer to fall asleep; were less sleepy during the evening; had lower melatonin levels, shorter REM cycles, and a delayed beginning of their dream sleep stage; and were less alert in the morning. The study's authors note that the use of light-emitting mobile devices before bedtime has biological effects that can perpetuate sleep deprivation and interrupt circadian rhythms that affect sleep/wake cycles—aspects that can have a negative impact on a person’s health, safety and performance.

Another experimental study published that year was conducted in a home environment, without being linked to any specific screen technology (i.e., participants were told in general to use screens but were not instructed to use any particular kind). It found that an hour of exposure to light-emitting devices such as computers, tablets, etc., before bedtime reduced melatonin production by 23%; a two-hour exposure reduced melatonin production by 38%. The study was conducted among 15–17-year-olds and its authors maintain that the findings suggest that adolescents may be more sensitive than other population groups to the effects of light.

A January 2019 OECD report that examined the impact of screen use on children’s health and wellbeing noted that the studies on the effects of screens on sleep consistently point to a negative impact on sleep quality and duration. The report’s authors note that restricting the use of screens in the hours before bedtime or using blue-light blocking glasses could assist in preventing sleep impairment.

According to the Health Ministry’s response to our query, a literature review performed by the TNUDA Information Center on the use of digital media and sleep deprivation in children, there is a clear link between the use of digital media devices around bedtime and at night and sleep disorders. Nighttime use of devices mainly delays bedtime, but it also leads to poor sleep quality and tiredness during the day.

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49 “Circadian rhythms are physical, mental, and behavioral changes that follow a daily cycle. They respond primarily to light and darkness in an organism’s environment. Sleeping at night and being awake during the day is an example of a light-related circadian rhythm. Circadian rhythms are found in most living things, including animals, plants, and many tiny microbes.” National Institute of General Medical Science, “Circadian Rhythms,” retrieved 17 July 2019.
50 Ministry of Health, response to Knesset Research and Information Center Query, email, 30 July 2019.
The review’s authors present a list of recommendations on the matter, including:

- Avoiding nighttime use of mobile phones and similar devices that could have a negative impact on sleep;
- Instituting "no-screens time" during the hour before bedtime;
- Removing digital devices—particularly mobile phones and computers—from children's rooms, due to concerns regarding non-ionizing radiation, the effects of blue light, and the likely effects of device availability on the extent of use in general and particularly before bedtime;
- Encouraging educational institutions to examine the introduction of technologies for pedagogical needs and their usage patterns in an intelligent manner. The report further suggests raising parental awareness as to the health implications of using digital technologies at night.

2.4.2 Physiological Impact on the Body (Skeleton and Muscles)

Several studies have indicated the effects of using desktops and laptops on pain or discomfort in various organs, particularly the back, shoulders, neck, and palms. Laboratory studies have pointed at a link between using computers and long periods of time without changing posture, an “awkward” anatomical position, and a change in muscle activity—all of which can help explain the musculoskeletal effects of computer use.

In a review study that examined 45 different studies on the physiological repercussions of using mobile devices—including touch screens (such as tablets and smartphones)—the authors note that research in this field is methodologically insufficient and generally of low quality. However, the researchers note that:

- Using touchscreen mobile devices—and particularly aspects such as the duration of use, an awkward position, a big screen, and playing video games—could be related to physical symptoms, most commonly related to the area around the back and shoulders;
- There is concern that extended use of mobile touch screens will lead to injury, similar to the concern of injury—such as carpal tunnel syndrome—and repetitive strain.

Most of the musculoskeletal risks due to screen use are also characteristic of other prolonged static activities. However, there is value in physically tailoring spaces to minimize potential damage.

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52 The carpal tunnel is located near the wrist. It serves as a passageway for nerves and tendons, including the median nerve, which is responsible for palm sensation and movement. This nerve passes through the arm and reaches the palm through the carpal tunnel. Carpal tunnel syndrome is caused by pressure on the median nerve. The phenomenon is more common among people who are engaged in strenuous manual labor or those whose work entails recurrent wrist movements. This is why people who work with computers—which includes typists, hi-tech workers, content editors, and graphic artists—compose one of the risk groups for carpal tunnel syndrome. See: Ruth Gophen and Benny Bernfeld, “Carpal Tunnel Syndrome,” Clalit Health Services website, 16 March 2014, accessed 30 July 2019 [Hebrew].
injuries—due to extensive computer use. However, empirical scientific evidence is still limited.

- There is some evidence from laboratory studies of the link between the use of mobile touch screens and effects on the head, neck, and shoulders (as compared with non-use). In addition, there is evidence that the tablet use has more negative effects than computer use due to the different viewing angle and the fact that the device is handheld rather than the screen being stationary. Moreover, there is evidence to support the claim that using mobile touch screens for active tasks (such as gaming or writing) may be more harmful than using them for passive tasks (such as viewing).

As stated in an OECD report on the subject, it is important to remember that most of the musculoskeletal risks due to screen use are not unique to these technologies and are, in fact, also characteristic of other prolonged static activities, such as sitting in class. However, there is value in physically tailoring the spaces where these technologies are used to minimize potential damage and in developing an awareness of proper posture and of positions that have the potential to cause greater damage.

### 2.4.3 Overeating, Reduced Motion and Exercise and Overweight

According to an OECD report, various studies have shown a link between obesity and overeating and screen time among children. Watching television while eating is linked to increased energy intake (more calories or more food). The mechanisms that explain this phenomenon include being distracted by the screen and a decreased ability to identify satiety signals.

Other studies focus on examining the "displacement effect," according to which watching or consuming media come at the expense of other activities such as reading, exercise, etc. However, according to authors of the OECD report, scientific evidence for the claim of a displacement effect is relatively weak.

In a review of reviews on the subject, the researchers conclude that there is moderately strong scientific evidence that more television time is linked to greater obesity; however, there is insufficient evidence regarding "total screen time" or screens other than television. There is moderate evidence of the link between the duration of viewing and the implications (a dose-response relationship) regarding screens and television screens. There is insufficient evidence for viewing time thresholds (recommendations for viewing limitations).  

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3. Is There a Need for Government Policy?

Generally speaking, many social changes are also expressed in the attitudes of legislators and the government. For example, the Ministry of Health may express an opinion on the health risks of screen use and ways to moderate them; the Ministry of Education may enact policies on how media should be used on its premises and on educating children and adolescents on the wise or balanced use of media; and, in principle, the Ministry of Communications may also address these aspects, as part of its responsibility for and authority over Internet service and web services providers. In addition, the Ministry of Science and Technology may also be relevant in various areas, as it finances studies in various fields, particularly those related to science and technology.

Based on the information presented in the document, there appear to be varying levels of scientific certainty regarding the various effects of screen use. While there is a great deal of academic literature on the negative effects of screens on sleep, the impact of extensive screen use on psychological wellbeing, for instance, is a matter of heated academic debate. As mentioned above, several studies claim that screens have a negative impact on interpersonal interactions—but this is a realm on which government ministries usually avoid taking a stance.

Although most of the articles reviewed above clearly address research questions on the subject, some of the researchers do directly address the issue of the relevance and justification for providing recommendations and suggestions for restricting the extent of digital media use—particularly among children and adolescents. For example, while Twenge and Campbell support treating this as a public health issue, Przybylski and Weinstein note that they have not found any evidence to support the viewing restrictions recommended by the American Academy of Pediatrics.

In the January 2019 report by the Science and Technology Committee of the British House of Commons, Impact of Social Media and Screen-use on Young People's Health, the authors note that research on the subject is not yet well established, and that the studies that do exist tend to examine correlation rather than causation and are generally lacking. The report's authors note that the government must act to advance research, both by budgeting and issuing calls for applications for research and through legislation or regulations that would require social media companies to provide researchers with data and anonymous information for use in developing a fact-based study. The January 2019 OECD report entitled Impacts of Technology Use on Children: Exploring Literature on the Brain, Cognition and Well-being raises similar claims regarding the quality of research. Among other things, it notes regarding policy that...
more high-quality research will be needed in order to develop healthy attitudes regarding children and technology as well as comprehensive and well-informed guidelines or recommendations. Drafting a national policy could help close the gaps through selective budgeting for research in these fields.

It should be noted that the query by the Knesset Research and Information Center to the Office of the Chief Scientist at the Ministry of Science and Technology on whether the ministry is funding such studies remained unanswered when the writing of this document was concluded.

Below is a short comparison of the recommendations on screen viewing issued in various countries, which is followed by the responses by the Ministry of Health and the Ministry of Education to the query by the Knesset Research and Information Center.

### 3.1 Recommendations for Screen Viewing Restrictions among Children and Adolescents

<table>
<thead>
<tr>
<th>Country/Organization</th>
<th>Babies</th>
<th>Preschoolers</th>
<th>School-age children and adolescents</th>
<th>Additional recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Organization (WHO) 2019</td>
<td>Up to age 2—no viewing Above age 2—up to an hour a day</td>
<td>3–4 years old: up to an hour a day</td>
<td>The report only discusses children up to age 5.</td>
<td>The report refers to viewing screens as a “sedentary behavior” and also includes recommended exercise and sleep durations for children up to age 5.</td>
</tr>
<tr>
<td>US, American Academy of Pediatrics, 2016</td>
<td>Up to 18 months: no viewing (except for video chats); 18–24 months: only high-quality programs</td>
<td>An hour a day with co-viewing</td>
<td>Consistent restrictions on duration and type of use</td>
<td>Turn off screens not in use; make sure screen time doesn’t come at the expense of other activities that are vital to healthy development</td>
</tr>
<tr>
<td>Canada—CSEP CPS 2017</td>
<td>No viewing</td>
<td>Up to an hour (CSEP)</td>
<td>Up to 2 hours (CSEP)</td>
<td>Restrict sitting for long periods of time (CSEP); parental model of balanced viewing (CPS)</td>
</tr>
</tbody>
</table>

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56 CSEP—Canadian Society for Exercise Physiology; CPS—Canadian Pediatric Society.
<table>
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<tbody>
<tr>
<td></td>
<td>No viewing up to age 1; up to one hour between ages 1–2.</td>
<td>Up to one hour</td>
<td>Up to two hours (entertainment)</td>
<td>No viewing</td>
<td>Avoid exposure (up to age 2)</td>
</tr>
<tr>
<td></td>
<td>No viewing</td>
<td>Up to an hour</td>
<td>Up to two hours (recreation)</td>
<td>30 min</td>
<td>Up to an hour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>An hour in elementary school; two hours for adolescents</td>
<td>Up to two hours for school-age children (likely referring to elementary school)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Avoid as much as possible; avoid entirely until age 2—including TV &quot;running in the background&quot; mode.</td>
<td>Distinguish between passive and active viewing, between leisure or learning and enrichment; turn off screens not in use; choose age-appropriate content; install filtering software; co-viewing; parent by example; media is no substitute for interactions, games, or exercise.</td>
</tr>
</tbody>
</table>

Alongside the recommendations presented in the table, we note that the Royal College of Paediatrics and Child Health published a guide for physicians and parents in January 2019 which, unlike the documents reviewed above, does not include recommendations for viewing limits based on either extent or age. Because members noted that scientific evidence for setting viewing time restrictions is weak, the primary recommendation of the RCPCH is that families discuss screen time with children based on each child's specific needs, the way screens are used, and the extent to which screen activity replaces or impinges on exercise, social activities, and sleep.

The British guide presents four questions that can spark discussion and examination of the issue:

1. Is screen time in your household controlled?

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57 Israel Pediatric Association, Recommendations for Screen Time among Kindergarteners and School-Age Children, Israel Ambulatory Pediatric Association website, November 2015, accessed 7 July 2019 [Hebrew].

2. Does screen use interfere with what your family wants to do?
3. Does screen use interfere with sleep?
4. Are you able to control snacking during screen time?

The document then recommends that families that wish to reduce screen time abide by several principles:
- Have a plan and stick to it;
- Be aware, but not intrusive or judgmental;
- Think about parents’ own media use;
- Prioritize face-to-face interactions;
- Be snack aware;
- Protect sleep.

### 3.2 Response by the Ministry of Education

The Knesset Research and Information Center requested information from the Ministry of Education on its policy regarding screen use (for purposes other than learning) and on educational programs related to the balanced use of screens and information technologies.

**On procedures for phone use in schools:**

The Director General’s Circular entitled “The Optimal Educational Environment and How Educational Institutions can Address Violent Events and Risks” addresses the use of technology during activities both within and outside the school as well as harm caused by technology.

According to the circular, the school administration may ban mobile phones from school premises or restrict their use as per the faculty’s discretion. School policy should comply with the instructions of this circular. According to the circular, bringing mobile phones to school should be avoided. In addition, the circular includes guidelines for proper behavior while using personal technology devices during activities within and outside school:

- Personal technology devices in general (mobile phones, cameras, tablets, etc.) and mobile phones in particular may not be used during class or exams, except when the educational staff requires it for a defined educational activity.

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59 Einav Locke, Director of the Psychological Counseling Service, and Dr. Ofer Rimon, Deputy Director General for Communications, Technology and Information Systems, Ministry of Education, response to Knesset Research and Information Center query, emails of 2 July 2019 and 24 July 2019 [Hebrew].
As a rule, students must keep mobile devices turned off in their bag—and not on their desk—except when the educational staff requires it for a defined educational activity. During out-of-school activities, mobile devices are to be used according to the staff’s instructions.

The use of mobile phones to take photographs or record during class is strictly prohibited. No one may be photographed without his or her knowledge or consent.

Photography during an educational activity (inside or out of the classroom) is to be carried out according to instructions from the educational staff, provided the dignity or privacy of the person being photographed are not harmed.

On educational programs that address the use of phones and screens:

According to the response by the Ministry of Education, the "Life Online" prevention program, which is tailored to students' age and demographics, is taught in educational institutions within the context of the life skills class. In elementary and middle schools, one hour a week is supposed to be dedicated to life skills. Meanwhile, high schools teach "Identity in Adolescence," which consists of 15 lessons a year. According to survey data from the Ministry of Education, during the 2018/19 academic year, life skills and "Identity in Adolescence” classes met regularly in some 77% of elementary schools, some 62% of middle schools, and only 50% of high schools.

The "Life Online" program is meant to develop emotional wellbeing in the digital age among children and adolescents, which includes training them for optimal behavior online. According to the ministry, the emphasis is placed on the balanced use of screens and on setting personal boundaries while using them.60

Besides the activity conducted in life skills classes throughout the year, targeted activities are held on three occasions: at the beginning of the year, in order to set out the acceptable behavioral norms under school policy; during the National Week for

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60 The life skills class is a mandatory subject of instruction for all students from grades 1–12, which is intended to prepare students to address present and future life challenges, including those arising from both ordinary and stressful or dangerous situations. See, "What is the Life Skills Program?" Ministry of Education website [Hebrew]. Life skills lesson plans for elementary school students include "Summer Time": a lesson in life skills class on the intelligent use of summer vacation time, with an emphasis on the balanced use of screens (intended for grades 1–3); "All Right! I Got My First Mobile Phone!": a life skills lesson focused on developing personal and social responsibility when using the mobile phone and an introduction to boundaries on the Internet (intended for grades 3–4); "The Boundary Guard in Me": a life skills lesson on establishing personal boundaries online (intended for grades 5–6); "It’s Screen Time": a life skills lesson on exposure to screens (intended for grades 5–8). The lesson plans for middle school include: "Exposure to Screens and how to Use Them: Where am I and What is my Limit?": a life skills lesson focusing on introspection and increasing awareness of screen use and its implications (intended for grades 7–8). "Land of Screens": a life skills lesson on critical thinking about exposure to screens (intended for grades 8–9); and "Who Knows Why? Who Knows How Much?": a life skills lesson on screen overuse (intended for grades 7–9). Lesson plans for high school students include "My Screen and I" and "The Screens and Me": life skills lessons on habits for personal screen use and screen overuse (intended for grades 10–12), "Exposure to Screens and how to Use Them: Where am I and What is my Limit?": a life skills lesson focusing on introspection and increasing awareness of screen use and its implications (intended for grades 9–10). Ibid.
Internet Browsing Safety; and in advance of summer vacation, when children and adolescents spend many hours on the Internet and on social networks.

According to the Ministry of Education's response to our query, data from the recent survey conducted in 2017/18 among school counselors in institutions where the life skills program is taught indicate that optimal behavior online and preventing harm (which, according to the Ministry, also includes balanced use of screens) was emphasized by 79% of elementary school counselors in their work with students. Middle school counselors reported that 88% emphasized this issue and high school counselors reported that 74% addressed the issue. We note that according to the ministry's response, most of the activity was conducted in February 2018 during the National Week for Internet Browsing Safety.61

According to the Ministry of Education, alongside the work of educational staffs in schools, another notable activity was the “Friends and Influencers” program, which trains adolescent “friends” for safe internet browsing to deliver messages to their peer group and younger students and to act as gatekeepers on social networks. The friends provide information, set a personal example, serve as gatekeepers, and serve as a source of assistance. During the 2018/19 school year, some 3,200 “friends” were involved in this program across some 210 schools.

3.3 Response by the Ministry of Health62

The Knesset Research and Information Center approached the Ministry of Health with questions regarding the subjects in this document; the main points of the ministry's response follow below. Matters related to addiction to digital media and the effects of screen on sleep were mentioned in the above sections on these subjects.

The media reported in February 2018 that the Ministry of Health was forming a professional committee led by Prof. Gil Zaltzman to examine the repercussions of the increasing exposure of children and adolescents to social networks. The ministry’s response indicates that this committee was not established. According to the Ministry's representative, these issues are handled by the TNUDA Information Center, which provides the Ministry of Health with a professional response on non-ionizing radiation and its repercussions on public health and even provides the public and policymakers

61 Some 92% of school counselors in elementary schools, 96% of middle school counselors, and 87% of high school counselors reported conducting activities on the subject during the National Week for Internet Browsing Safety at the school where they work. Overall, 92% of counselors in educational institutions discussed the issue during the national week.

62 Miri Cohen, Head of Emergency Services and First Aid, Ministry of Health, response to Knesset Research and Information Center Query, email, 30 July 2019 [Hebrew].
with access to relevant information. In light of the expanded use of communications technologies, TNUDA had also begun examining other health-related effects of communications technologies, even those—such as sleep disorders, addictions and driving distractions—that are not caused by radiation.63

The Ministry of Health's response also noted that an inter-ministerial steering committee was founded in 2016 with members representing the Ministry of Health, Ministry of Social Affairs and Social Services, professionals, and academic experts on matters of addiction. The committee decided to focus on gambling addiction (online and general), sex addiction and hypersexuality, and addiction to technology. The Ministry of Health's Department for the Treatment of Addictions intends to hold a seminar for its staff on "behavioral addictions and treatment approaches" in 2020, which would also address addiction to technology.

Regarding the physical (other than aspects of sleep and non-ionizing radiation), psychological, and cognitive effects of computer and smartphone use, the Ministry of Health's response noted that a preliminary review suggests that these are fields in which the findings are inconclusive findings and the research insufficient. When the review is completed and depending on its findings, TNUDA will draw up its recommendations and submit them to the Ministry of Health.

The Ministry's response also stated that generally, healthcare policy is determined—among other things—by the strength of the proof of harm. When it comes to an issue where the health repercussions are a matter of debate, guidelines for preventing risk cannot be conclusively determined (emphasis added).

63 The TNUDA National Information Center was established in January 2013 following a Government resolution on investigating non-ionizing radiation and its impact on public health. The center is led by Prof. Siegal Sadezki, Director of the Cancer and Radiation Epidemiology Unit at the Gertner Institute, and was established with funding from the Ministry of Science and Technology and the Ministry of Environmental Protection. TNUDA Website, updated 2 November 2016, accessed 31 July 2019 [Hebrew].