PHENOMENON MAP

THE IMPACTS OF DIGITAL MEDIA ON CHILDREN, YOUNG PEOPLE AND SENIOR CITIZENS

THE IMPACTS OF DIGITAL MEDIA ON CHILDREN, YOUNG PEOPLE AND SENIOR CITIZENS

SOFI SCIENCE ADVICE INITIATIVE OF FINLAND

CONTENTS

IT SHOWS WHAT IS KNOWN ABOUT A PHENOMENON BASED ON THE MOST RECENT RESEARCH

RESEARCH EVIDENCE is published in huge amounts. This makes it practically impossible for parties such as the authorities and decision-makers to stay on track of the most recent research related to their work. Public discussion has a tendency to offer overly simplistic solutions to complex issues, forget about the scale of things, and repeat misleading myths. Therefore these days, more and more emphasis is put on curating and compiling research evidence, or having someone pick the studies of the highest quality from the mass and draw conclusions on what can be reliably said based on them.

However, there are at least two challenges related to the utilisation of evidence syntheses, i.e. research summaries, in the provision of science advice and decision-making. First, producing a synthesis is a lengthy and demanding process, easily spanning up to three years in international projects. A previously posed question may become outdated or the Government that posed the question may change before the completion of the synthesis. Second, the utilisation of evidence syntheses, no matter how good their quality, is often limited. In decision-making, the synthesis must reach the right people at the exact right time, answer the exact right questions, and be sufficiently concise to ensure that it will be read and make an impact.

Sofi aims to rise up to these challenges with its phenomenon map. It is an operating model that involves producing summaries of reliable scientific knowledge from relevant perspectives to support decision-making, societal discussion and understanding complex phenomena. This process is carried out in close inter-action with professionals working on the topics as we believe that this provides the best means to identify the needs for information and harmful myths that must be busted as well as to ensure that the phenomenon map will reach at least the key individuals whose work revolves around the topic. We have been experimenting with and developing tools and methods that have been previously barely used in Finland but which could be beneficial in compiling scientific evidence: **criteria for assessing the level of evidence** and **an evidence gap map**. The phenomenon map process also includes the practical application of the results of the syntheses: a group of experts has prepared **suggestions for practical measures** based on the evidence.

The impacts of digital media on children and young people and older people emerged as the topic of the first phenomenon map. All of the parts included in the phenomenon map have been compiled between these two covers: descriptions of the used method and process, six evidence syntheses, an evidence gap map concerning Finnish children and young people, suggested measures, and a list of references.

ACKNOWLEDGEMENTS

WHAT DO YOU THINK?

We hope that you will find the content of this report beneficial—whether your interest lies in the impacts of digital media, media education, media use among children and young people, or evidence syntheses and the methods used in producing them.

We would love to hear what you think about this phenomenon map. Is this publication useful for you for some purpose? Was there anything missing? Are you thinking about a topic on which you feel we should compile another phenomenon map? Contact us by email at sofi@acadsci.fi or on Twitter at @SofiFinland!

Nanna Särkkä and Jaakko Kuosmanen, Sofi

TOWARDS CONSTRUCTIVE DISCUSSION ON THE ACTUAL IMPACTS OF DIGITAL MEDIA

OUR LIVES have become rapidly digitalised in just a couple of decades. Working, studying, engaging in social interactions, acquiring information, following news, consuming entertainment, and engaging in recreational activities are more and more likely to occur through screens, and the coronavirus crisis further accelerated this development. It comes naturally for such a change to stir up debate and thoughts. However, the discussion on digital media use has some problematic features.

FIRST, the discussion is largely focused on concerns. There is nothing new to this. New technologies have always caused fears and moral panics. Landline telephones were once feared to make us lazy and asocial. Meanwhile, television was believed to wreck literacy, interpersonal interactions and family life. It is no wonder, then, that some feel concerned about digital technology in all its diversity and pervasiveness. This concern is, nevertheless, often unfounded. For example, older people may perceive young people glued to their mobile phones as asocial and passive media consumers, but they may actually have a highly active role in the digital world. An excessive focus on concerns in the discussion will divert attention to the wrong aspects. Some may also feel disproportionately worried about their own or their family member's media use, and this may be only worsened if public discussion emphasises concerns.

Instead of stirring up worries, we should pay attention to the positive effects of digital media use so we can act to strengthen these. The benefits of digital technology are not insignificant: The technology enables quick information searches and remote working and studying.

Social media has a positive impact on interactions, a sense of community, building an identity, and learning. The digital world trains young people to flexibly adopt new approaches. This requirement for shifting the focus from harms to the benefits and opportunities brought by digital media can also be extended to research. Research has been focused on the negative impacts of digital media, which was also revealed by our evidence gap map (p. 66).

SECOND, the discussion and particularly the rhetoric around worries and concerns related to the topic is often reductive. Various user groups, such as "young people" and "old people" are perceived as homogenic groups with uniform needs, skills and problems. Nevertheless, media is used in considerably different ways and based on each users' individual premises, resulting in variation in the impacts of use and their intensity. The myths that are rehashed in everyday speech and on the media contribute to the reductive perceptions of the topic. The idea of digital natives, that is a generation with uniform and superior digital skills, is one of these persistent myths. This topic is discussed in further detail in the myth-busting review on pages 24–28.

This simplification is also apparent in obscuring causal relations. For instance, there is a rather common belief that the digital media use of young people is causing various symptoms of mental anguish. As the reviews included in this phenomenon map indicate, abundant digital media use is rather a consequence of other problems than their cause. The ambiguity of the causal relationships is exacerbated by problems in research quality. Media use and wellbeing have been nearly exclusively studied based on the respondents' personal assessment.

The availability of actual observational data on media use or its consequences is very poor. Moreover, most of the research on the topic is cross-sectional, that is to say, the data have been compiled or measured during a single point in time. This makes it impossible to determine causal relationships. Indeed, there is a need for more high-quality longitudinal studies, which involve following the same, sufficiently large research population over a sufficiently long period to identify the actual impacts of media use and their relations to social and mental health issues.

A phenomenon will also be overly simplified when it is examined based on limited information, such as the result of a single study. Media outlets are eager to bring attention to research findings likely to catch people's attention, as news on topics such as the adverse effects of excessive social media use or violence in video games are likely to make readers click on an article. While it is important to discuss the harm caused by digital devices and social media, news articles written on a single research finding will usually create an overly simplistic idea of a complex phenomenon. Instead of individual studies, attention should be paid to what a wider group of studies and the consensus of the research community say about the topic. This is precisely what the present phenomenon map does: it summarises high-quality research findings.

IN PARTICULAR, decision-making and recommendations by the authorities should be based on high-quality, reliable and structured research evidence. In medicine, meta-reviews and the Current Care Guidelines drawn up based on them are a common practice. So far, meta-reviews serving societal decision-making have been more uncommon, but they are nonetheless just as necessary.

Steering group for the phenomenon map:
Kimmo Alho, professor in psychology, Janne Matikainen, university lecturer in media and communications studies, Mika Pantzar, professor at the Consumer Society Research Center, and Katariina Salmela-Aro, professor in educational psychology (all of the University of Helsinki)
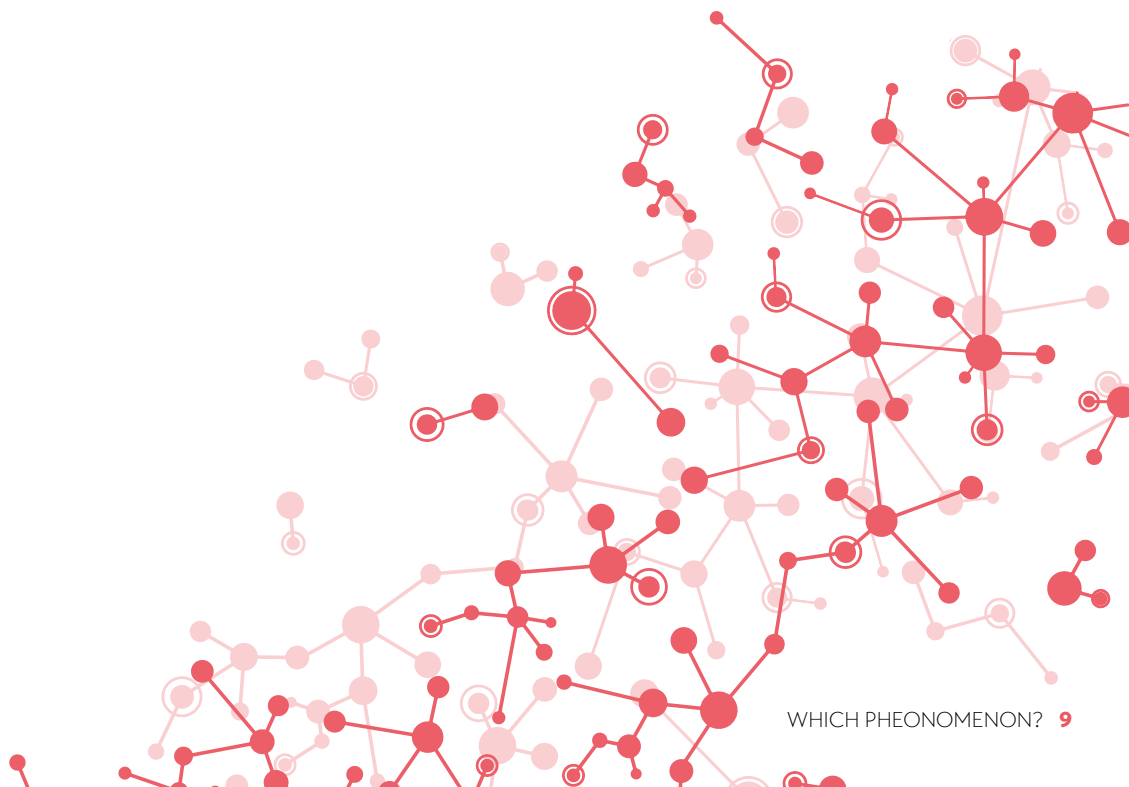
TOOLS USED IN MAPPING THE PHENOMENON

LAURI HIETAJÄRVI

The way in which we compile research evidence is not insignificant. An evidence synthesis can only be as reliable as the studies on which it is based. Different types of syntheses can also be produced for various purposes. How did we define the examined phenomenon and perspective? How did we ensure the reliability of the syntheses?

1. A DIALOGICAL PROCESS

CARRYING OUT an extensive and systematic data collection process is laborious and pinpointing the correct search terms is demanding. The purpose of the provision of science advice is to produce evidence syntheses on topics for which there is demand. Ensuring that the output is as appropriate as possible requires determining the topic together with experts and other professionals in the field using a dialogical approach. Indeed, these discussions with stakeholders provided a versatile view into what the examined phenomenon looks like from various perspectives, which needs for knowledge are related to it, and what kinds of projects are already underway.

The preparation of the phenomenon map proceeded as follows:

1. We wanted this publication to concern a topical, complex and widely interesting topic, which would not yet be entirely politicised and on which standpoints would not yet be fully entrenched.

The addiction caused by smartphones particularly in children and young people was selected as the starting point.

2. Subsequently, we identified key experts and operators around the topic, including both researchers as well as administrative and third-sector representatives. They were invited to discuss the phenomenon in a joint roundtable. Among other things, it emerged at this point that, as a theoretical concept, *addiction* is tricky and that the perspective should be extended beyond individual devices, to digital media as a whole.

3. To further limit the topic, discussions were held with various agents on issues such as: What makes this topic interesting or important? What is not known about the topic? Which perspective has been ignored? Which misconceptions or myths are cultivated? Which studies are ongoing?

4. The discussions helped improving the accuracy of the selected perspective and limiting the topic:

the effects of digital media on children and young people, also paying attention to older people. The following search criteria were determined: keywords and parallel concepts, geographical and temporal limitations and search topics and research types (only systematic reviews and meta-analyses, also original studies from Finland). The search terms are listed on page 21.

5. An information specialist carried out a systematic information search on the research conducted on the topic in recent years. The resulting thematically categorised list of references and the results of complementary searches carried out as the work progressed are provided on pages 75–96.

The resulting list of references is highly versatile: It can be used as the first phase of argument reviews, systematic reviews and meta-analyses[1]. It can also be

PHASES OF MAPPING THE PHENOMENON

1. SELECTING A THEME
A topical, complex, widely interesting, non- politicised

2. CHARTING KEY INDIVIDUALS
Whose work revolves around this topic?

3. ROUNDTABLE ON THE PHENOMENON
What is already known, what is not?

4. LIMITING THE TOPIC: CONSULTING STAKEHOLDERS

5. DETERMINING LIMITATIONS
On which issue is there enough research, but the topic is not too extensive?

6. DETERMINING KEYWORDS

7. DATA SEARCH

8. CLASSIFICATION OF RESULTS

9. ASSESSMENT OF THE LEVEL OF EVIDENCE

10. WRITING SYNTHESES
a) Myth-busting review
b) Argument review
c) Evidence summary

11. EDITING THE SYNTHESES

12. FORMULATING PROPOSED MEASURES FOR DECISION-MAKERS

13. POPULARISATION, FORMULATING MESSAGES

14. COMMUNICATION AND INTERACTION

15. FINAL ASSESSMENT

1 Grant & Booth, 2009

used as the basis of an evidence gap map review and for determining which research is still missing. An assessment of the level of evidence in the obtained research can also be attached to the list by making use of criteria that fit the target data set. More on this in the following section.

2. ASSESSING THE LEVEL OF EVIDENCE AS PART OF SCIENCE ADVICE

RESEARCH EVIDENCE is disseminated and used in various situations in society, including academic debate, science communication, lobbying and science advice. In academic debate occurring between researchers, the responsibility on the assessment of reliability of information and level of evidence is an established part of the process of forming research evidence.

Disseminating research evidence outside the academic world involves presenting the evidence in various ways. Science communication usually aims to simplify—or clarify—messages, and the reliability and significance of research evidence is, at times, also exaggerated (researchers may seek attention and resort to click-baiting). However, we should hope that the recipients of science communication would have sufficient media literacy and be critical of exaggerated news reporting. While the information used in lobbying, including evidence syntheses produced by think tanks and other institutions representing certain interest groups, has been intentionally selected, the recipients of this information, i.e. decision-makers, can be presumed to acknowledge this. Meanwhile, science advice services should be independent and always base their work on the most reliable information, and the recipients of this information must be able to rely on this. What is the best way to ensure the reliability and optimal quality of the evidence used in providing science advice?

Medicine is often concerned with questions of life and death, and the field has long tradition in producing evidence-based care guidelines. Societal decisions also often have major impacts. Although political decisions cannot be directly derived from scientific knowledge (the so-called Hume's guillotine: values or moral rules cannot be derived from facts[2]), the knowledge base for political decisions should be as solid as possible. An example of this is the so-called replication crisis[3] subject to much discussion in psychology: the results of studies cannot be replicated, and the generalisations made based on the results are not accurate. We also lack a system that could be used for assessing the level of evidence and determining at which point there is sufficient knowledge about a topic to utilise the knowledge in practice without worry[4]. This undoubtedly applies to all social sciences, and unreliability of information also affects medicine and natural sciences. Even though forming evidence is rather different in social sciences compared to medicine or natural sciences, social sciences may have something to learn from the latter if the aim is that research knowledge will support making significant decisions and predicting their impacts.

Exaggerated example: In assessing the maturity of technologies, NASA uses Technology Readiness Level, a nine-level scale. On level one, the basic principles related to the workability of technology have been reliably observed and reported. On level six, the technology is tested in an operational environment. On the final level, the technology has repeatedly been used intensely in the actual operational environment. While evidence from social sciences rarely even reaches the first level of this scale, it is nonetheless relied upon in making decisions that affect human lives[5]. Indeed, the provision of science advice should always include the assessment

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2 Hume, 1739
3 https://en.wikipedia.org/wiki/Replication_crisis
4 Ijzerman et al., 2020
5 Ijzerman et al., 2020

of the level of evidence in the used research knowledge. Moreover, when political decisions are made based on research knowledge, it is always critically important to know how reliable this information is, i.e. acknowledge the uncertainty of the information.

There are various tools and frames designed for assessing the level of evidence, but using these in assessing research knowledge is not sufficiently prevalent. Examples from medicine include the Grading of Recommendations Assessment, Development and Evaluation (GRADE) model and the Weight of Evidence frame of reference of the Evidence Informed Policy and Practice Center, which emphasises social science aspects[6].

High-quality review summaries that synthesise the results of several systematic reviews or meta-analyses and whose level of evidence has been systematically assessed are best suited for the purposes of science advice. The quality of the produced summaries is always directly dependent on the quality of the reviews included in them[7]. However, science advice often has to also resort to individual systematic reviews and meta-analyses or syntheses formed based on individual studies. Science advice based on a single or a few individual studies should be avoided.

SYSTEMATIC REVIEWS

If no evidence summaries are available, individual reviews are a good alternative for science advice. However, in this context, it is key to determine the level of research the reviews are based on and how this has been taken into consideration in drawing up the reviews[8].

THIS IS HOW THE SYSTEMATIC REVIEWS WERE ASSESSED:

Items A–I were assessed for each review and they were all graded as no, yes or partly. Partly referred to a situation in which reporting was lacking or the implementation seemed incomplete. The reviews and meta-analyses were classified as follows:
If the review had not clearly reported on the items A, C, D, E or F, it was classified into the significant risk category. If only B or G was missing, the review was classified in the moderate risk category. The meta-analyses were classified into the significant risk category, if H or I was missing. If the review had been published in a journal classified in the category 0 based on the Publication Forum criteria, it was classified into the significant risk category. This classification structure did not include calculating total scores. Most of the evidence syntheses included in the phenomenon map only used low-risk category reviews. Other publications, such as theoretical reviews, could also be included for separate reasons.

ASSESSMENT TOOL FOR THE SYSTEMATIC REVIEWS AND META-ANALYSES INCLUDED IN THE PHENOMENON MAP

A Clear determination of research question and search criteria

B Protocol determined in advance (review strategy)

C Extensive (covering more than two databases) and systematic search practice

D Systematic approach for the approval process for included studies and related description

E Reporting the excluded studies and the exclusion criteria

F Clear description of the included studies

G Assessment of evidence provided by the included studies

H Clear examination and reporting of publication bias

I Clear examination and reporting of the heterogeneity of research findings i.e. differences between original results (only applied to meta-analyses)

6 Gough, 2007
7 Thomson et al., 2010; Tricco, Tetzlaff & Moher, 2011
8 Tricco, Tetzlaff & Moher, 2011

In compiling the evidence syntheses included in the phenomenon map, a model developed for this purpose based on the Amstar-2[9] and NHLBI Study Quality Assessment Tools[10] assessment frames was used to evaluate systematic reviews and meta-analyses. The assessment involved examining the risk for systematic errors in the research findings to the extent possible based on the reporting in the review. Most of systematic reviews follow the frame of the Preferred Registered Items for Systematic Reviews and Meta-analyses (PRISMA Statement)[11], which produces a specific, but not yet sufficient, level of quality.

Particular challenges of research concerning the impacts of media include the shock value of the study (possibly resulting in publishing results with lesser significance or quality); conflicts between researchers (making contrary interpretations of the same data set); and the poor quality of original studies (often using self-rated survey data collected from a small sample of students). In fact, the key elements of a reliable review or meta-analysis include a review protocol registered in advance (i.e. the principles on which a review is conducted have been previously determined and published) (B) and assessment of the level of evidence of the included studies (G). Moreover, particularly for meta-analyses, it is essential to assess and pay attention to publication bias (a tendency to opt for publishing positive or expected research findings rather than negative or unexpected results) (H) and the heterogeneity of research findings, i.e. variation between them (I).

ORIGINAL STUDIES

If no high-quality reviews are available, it may be necessary to examine original studies in science advice work. The assessment of the quality of these studies is easier than that of reviews. Assessing original studies involves evaluating the level of evidence rather than the quality of the actual research work. Key methodological limitations may result in a low level of evidence even in an otherwise thoroughly conducted research: obtaining accurate or sufficiently extensive data on specific topics such as complex societal phenomena is difficult, and using an empirical test design is out of the question in many topics due to ethical concerns (e.g. the intentional exposure of young people to harmful online content in a test setting is unacceptable). As a result, a study may represent the top of its field while only providing weak evidence.

Not unlike any other research literature, the research on media impacts includes studies with a various level of evidence. In compiling the evidence synthesis for the phenomenon map, the quality appraisal of original studies was based on an assessment structure[12] modified based on the STROBE checklist[13] and the WoE framework[14]. The methodological reliability and level of evidence in the study was scored simultaneously.

HOW ORIGINAL STUDIES WERE ASSESSED:
Domains 1–10 were scored on a scale of 1 to 3, in which 1 corresponds to a basic level without any significant deficits, 2 points refers to a good level and 3 points to the best level. The best level required, e.g. the pre-registration of the study design and adherence to a plan, the openness of data and analyses, or other exceptional empirical accuracy. If the study failed to take some domain into consideration, this was scored 0, but if this was not relevant, the item was left blank, in which case the score did not affect the overall average score. An acceptable methodological level required for each of the domains (purpose, data, methods, reporting) to be overall at least at the basic level.

9   Kwan et al., 2020; Orben, 2020
10 https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools
11 http://www.prisma-statement.org/
12 Examples of the assessment structures: Alimoradi et al., (2019) (modified based on STROBE14); Kwan et al., (2020), Orben (2020) (modified based on the AMSTAR-2 criteria) and Haddon et al., 2020
13 Alimoradi et al., 2019; see also STROBE Statement: Available checklists
14 Gough, 2007

THE ASSESSMENT STRUCTURE FOR THE LEVEL OF EVIDENCE FOR ORIGINAL STUDIES IN THE PHENOMENON MAP	
1. Purpose of study	**A clear research question (and hypotheses):** Does the research question include hypotheses based on, e.g. previous research, targeted at the research population, anticipated effect sizes extracted from previous research, or otherwise particularly well-grounded research questions? Level 3 requires the pre-registration of hypotheses.
Data	
2. Study design	**Description of study design:** Has the study design been clearly described at the very beginning of the article (e.g. a longitudinal design, experimental design or other design temporarily fitting the research system instead of a cross-sectional design) and does this choice fit the research question?
3. Participants and sample	**The size, representativity and quality of sample:** Is the sample sufficiently extensive and representative of the research population with regard to the research question? Was sampling executed well?
4. Variables and measurements	**Quality of variables and measurement:** Were data collected using methods other than self-reporting? Were objective data used? Was the measurement approach or other data collection method reliable and sufficiently accurate in view of the research questions?
5. Missing data	**Reporting and processing missing data:** Was the amount and causes of missing data reported? Are missing data randomly distributed in the data set or are data missing systematically? Has the withdrawal from a longitudinal study and the reasons for this been analysed? For example, has a particular group of respondents dropped out or systematically left the same questions unanswered or can the obtained data be used to anticipate the missing data? Has the study taken the missing data and its nature into account?
Methods	
6. Processing	**Processing and reporting data or variables:** Does the use of data in analyses comply with hypotheses (scales, distributions) and transparency (open justifications for variable transformations or modification of data)? Was possible pre-registration carefully followed? Has all information necessary for the repeatability of the results been openly provided?
7. Sources of error	**Taking bias or errors into consideration:** Have any sources of errors that could affect the results been taken into account, including the sample, data structure, missing data and measurement?
8. Models	**Selecting and reporting on tests or models:** Has the selection of statistical tests and models been optimal from the perspective of research questions and the special characteristics of the data? Have the models been described in detail, openly and with justifications? Are alternative models discussed? Was possible a pre-registration process carefully followed? Has all information necessary for the repeatability of the results been openly provided?
9. Sensitivity analyses	**Reporting sensitivity analyses:** Is the sensitivity of results assessed in relation to changes in the model? Was the impact of external variables potentially affecting the results taken into consideration? How well was uncertainty in the results presented? Was possible pre-registration carefully followed? Has all information necessary for the repeatability of the results been openly provided?
10. Reporting	**Appropriate reporting of results:** Have conclusions and interpretations been made honestly with regard to the empirical results? Are interpretations presented in relation to the expected effect size and the achieved level of evidence (cf. only positive or negative outcome and its statistical significance is described at the basic level)? Have the results been presented in concrete terms using real-life scales or practical implications?

OTHER ASSESSMENT TOOLS

The above assessment methods are not universal; instead, they must be applied based on the criteria of the evidence synthesis under way and the field of research. Similar assessment structures are available in different fields and by various agents. For instance, there is a long tradition in this area in medicine, but the assessment of the level of evidence as part of evidence-based decision-making is also essential in fields such as social sciences.

3. EVIDENCE SYNTHESES

HOW CAN WE PACKAGE research evidence into summaries containing all key aspects to benefit various users? Presenting research evidence in a concise form is an essential part of both forming scientific knowledge[15] as well as providing science advice. There are various methods for conducting a synthesis of research[16] and variation in the degree to which these are systematic. Roughly speaking, reviews can be divided into systematic and non-systematic[17], but both can include a variety of approaches different in terms of their extent and accuracy, which makes them suitable for different purposes[18]. In this project, we produced publications using three different types of synthesis. Fundamentally, all of them are so-called meta-reviews or umbrella reviews[19], i.e. their source literature included review articles supplemented with original studies or studies conducted in Finland. In addition we produced an evidence gap map.

Syntheses in the phenomenon map	Synthesis type	Terms in English
There are no digital natives (p. 24–28) *Older people need media education that transcends mere digital support (p. 30–33)*	MYTH-BUSTING REVIEW non-systematic, narrative meta-review	• state-of-the-art review • quick scoping review
Why we should stop talking about screen time (p. 36–41) *Social media is an environment that supports interaction (p. 42–46)*	ARGUMENT REVIEW systematic, narrative meta-review	• narrative review • scoping review • evidence brief • critical interpretive synthesis
Digital media, addiction and wellbeing (p. 50–58) *Perils of the Internet (p. 60–65)*	EVIDENCE SUMMARY systematic meta-review, as a rule peer-assessed	• rapid evidence assessment • rapid review • evidence statement • evidence check • realist review/synthesis • meta-narrative review
EVIDENCE GAP MAP (p. 66–71) overall picture of research conducted on a specific topic: what exists and what is missing?		• evidence gap map • scoping review

15 Tricco, Tetzlaff, & Moher, 2011
16 see e.g. Gough, Thomas, & Oliver, 2012; Grant & Booth, 2009; Munn, Stern, Aromataris, Lockwood, & Jordan, 2018
17 Gough, Thomas & Oliver, 2012
18 Gough, 2007; Gough, Thomas & Oliver, 2012; Grant & Booth, 2009
19 Grant & Booth, 2009

MYTH-BUSTING REVIEW

A myth-busting review tackles some recurrent and harmful misconception and aims to dismantle this by using research-based argumentations on why this myth does not hold true. Myth-busting involves tackling false or one-sided conceptions and can be considered as the first step of the provision of science advice. A myth-busting review provides a credible argument to the political or societal discussion.

This review is a non-systematic meta-review. It can be perceived as a *state-of-the-art review*[20] or a *quick scoping review*[21]. It is a narrative, research-based initiative for discussion or a more reflective publication selectively based on high-quality research. Its tone may be slightly provocative. However, it must always indicate which of its findings are based on research evidence and which of them are conclusions made by an expert.

Process

> Identifying a harmful myth in cooperation with key experts in the field.

> Formulating an argument – for example ″the conception of digital natives is harmful and should be abandoned″.

> After a data search, selecting studies related to the myth for examination. Unlike in the case of the other types of syntheses, the literature is not examined in an objectively systematic manner, but from the perspective of myth-busting. (This may also be implemented as a separate data collection if no extensive data search is carried out.)

> Writing an involved myth-busting review whose arguments originate from reliable research.

ARGUMENT REVIEW

An argument review is a narrative and scoping meta-review based on systematic criteria and the level of evidence in research, but also a narrative meta-review building an argument. It aims to make an impact, which means that it is not objective, but its methods are more systematic than those of a myth-busting review. In terms of a systematic and comprehensive approach, an argument review therefore falls between a myth-busting review and an evidence summary. These types of reviews can be classified as *theme or argument reviews*[22], and we can generally refer to as a *meta-narrative review* or a *critical review*[23]. An argument review can also issue recommendations for measures. Even though the result may involve taking a stand, the argumentation is always based on reliable research evidence[24]. The text must also always indicate which of its findings are based on research evidence and which are conclusions made by an expert.

The goal of the paper is to provide an argument based on broad research evidence and formed using transparent criteria for political or societal discussion.

Process

> Selecting a topic arising from societal debate and discussions among stakeholders which has been discussed in a manner that emphasises emotional or anecdotal arguments or presumptions.

> Performing a systematic research review search to the extent required by the topic.

> Assessing the obtained reviews based on previously agreed criteria. Key aspects of assessment include compatibility with the question posed in the argument review and the level of evidence in the reviews (*risk-of-bias*).

> Analysing the reviews and forming an argument based on the strongest support provided by research; there is also good reason to pay attention to perspectives not widely supported by research.

> Formulating an argument in a format appropriate to the target audience.

EVIDENCE SUMMARY

An evidence summary is a systematic review on the latest, strong evidence related to a specific question and belongs in the domain of systematic reviews[25]. An evidence summary does not involve forming arguments or speculation; instead, its aim is to explain as objectively

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20 Gough 2007
21 Grant & Booth, 2009
22 Gough, 2007
23 Grant & Booth, 2009
24 Gough, 2007
25 Gough, 2007; Grant & Booth, 2009

as possible what the most reliable evidence says about the topic at hand. To ensure conciseness and objectivity, strict and open criteria must be set for the included studies (only the latest and most high-quality research), and it is vital to assess the evidential value of the research knowledge. This method resembles that used in *rapid evidence assessment*[26] or a *rapid review*[27].

An evidence summary must pass an assessment process. The process is carried out as a so-called traditional double-blind assessment, which means that the author of the synthesis and those reviewing it do not know each other's identity, or at least as an open peer-assessment, in which the synthesis is assessed by experts who did not contribute to drawing it up. The names of the reviewers should be disclosed in connection with publishing the synthesis.

An evidence summary compiles the results of reliable studies and highlights so-called research community consensus, knowledge supported by the strongest level of evidence.

Process

> Performing a systematic search of research reviews to the extent required by the topic.

> Assessing the obtained reviews based on previously agreed criteria. Key issues to assess include compatibility with the question posed in the evidence summary and the level of evidence in the reviews (*risk-of-bias*).

> For the results, summarising the level of evidence provided by the field of research as a whole as well as by the studies and reviews providing the best evidence.

EVIDENCE GAP MAP

Evidence gap map provides an overall picture of a study conducted on a specific topic, using certain criteria: what kind of research has been completed and what is still missing? This involves systematic examination of a topic and is considered a type of *systematic review*[28]. The term *scoping review* can be used to refer to this type of a review.

At best, an evidence gap map is a visual presentation of the overall research situation. A critical analysis of the situation can be provided alongside the map that depicts it. The map can also be utilised in purposes such as determining the priority areas for research funding.

Process

> Performing a systematic search.

> Carrying out a detailed content analysis and classification of previously completed research based on criteria such as: target groups in studies, used variables, quality/evidential value in studies.

> The results of the content analysis should be preferably illustrated visually to promote detecting the emphases and gaps in the available research.

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26 Gough, 2007
27 Grant & Booth, 2009
28 Gough, 2007; Grant & Booth, 2009

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CARRYING OUT THE LITERATURE SEARCH

MARIA HAKALAHTI

Research on the impacts of digital media on young people was charted in spring 2020 and the search was further supplemented in the following autumn. The results of the database search are provided on pages 75–96.

THE LITERATURE SEARCH CONCERNED data on digital media and young people[1]. The following inclusion criteria were used:

1. article concerns some area of digital media, such as the internet, social media or digital gaming, excluding gambling
2. research sample comprised of children or young people aged under 25
3. published in 2015 or later
4. article type is review, meta-analysis or a study concerning Finns
5. topic covering the excessive use of digital media, harms such as cyberbullying and sexual harassment, media use or its other impacts.

The databases utilised in the search included the Web of Science, Scopus, EBSCO, ScienceDirect, ProQuest, Wiley Online Library and Taylor & Francis Online. In addition to these international databases, a search concerning studies conducted among the Finnish population was also carried out in the Finna search engine and the Journal service. A keyword matric served as the basis of the database searches. The matrix was further supplemented with the synonyms of the included terms and other vocabulary related to the topic. The selected search terms were varyingly targeted at the keywords, abstracts and titles in the data etc. Other search terms were also formed as the literature search progressed.

The literature search utilised various combinations of search terms to ensure that the resulting materials would be as comprehensive as possible. The search terms used related to young people included *adolescents, children, cyp, students, young people* and their Finnish equivalents *nuoret, lapset, opiskelijat* and *nuoriso*. In addition to the expressions included in the keyword matrix, articles concerning digital media were searched using terms such as *Instagram, Snapchat, Youtube, screentime, mobile phone, computer, esports, apps, chatroom* and *discussion forum*.

Database searches were carried out based on topics related to the 1) excessive use, 2) disadvantages, 3) use and 4) other impacts of digital media. Excessive use was particularly examined from the perspectives of prevalence, treatment and prevention. The disadvantages of digital media were focused on topics such as bullying, grooming and sexual harassment. Media use was particularly concerned with young people's media literacy and behaviour online.

For example, a search statement could be as follows:

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1 Researchers from the IkäihMe project by the University of Lapland were responsible for the chapter on older people.

(adolescents OR children OR students OR young people OR nuoret OR lapset OR opiskelijat OR nuoriso) AND (internet OR social media OR smartphone OR facebook OR digital games OR digitaaliset pelit OR sosiaalinen media OR verkko OR cyber) AND (finland OR finnish OR suomi OR suomalainen) AND ((excessive OR addiction OR pathological OR compulsive OR problematic OR riippuvuus OR ongelma OR ongelmakäyttö OR liikakäyttö OR patologinen) AND (prevalence OR comorbidity OR attachment OR treatment OR prevention OR esiintyvyys OR hoito OR ehkäisy OR intervention OR intervention))

The literature search process also involved assessing the suitability of the obtained materials as source data. The assessment was based on the reliability of data and the exclusion criteria set for the search regarding the topic, sample, time of publication and type of the data. If an article was not available openly and free of charge, its suitability was typically assessed based on its abstract or other available description. Peer reviewed articles were emphasised for reviews and meta-analyses.

At the end of the literature search process, supplementary searches were carried out on the topics on which the database search had yielded the least results. The references included in the materials fulfilling the inclusion criteria were compiled on a Word file and any duplicate copies were removed. ■

SEARCH TERMS DETERMINED FOR THE DATABASE SEARCH

Subject
- *cyber*
- *digital*
- *digital games*
- *facebook*
- *gaming*
- *ICT*
- *internet*
- *media*
- *online*
- *screen time*
- *social media*
- *smartphone*

- digitaalinen media
- digitaalinen pelaaminen
- digitaaliset pelit
- mediakulttuuri
- pelaaminen
- ruutuaika
- sosiaalinen media
- TVT
- verkko
- älylaite
- älypuhelin

Time
- 2015–

Excessive use
- *addiction*
- *attachment*
- *comorbidity*
- *compulsive*
- *concentration*
- *excessive*
- *intervention*
- *multi-tasking*
- *multitasking*
- *pathological*
- *prevalence*
- *prevention*
- *problematic*
- *treatment*

- ehkäisy
- esiintyvyys
- hoito
- interventio
- keskittymiskyky
- liikakäyttö
- ongelma
- ongelmakäyttö
- patologinen
- riippuvuus

Region
- *Finland*
- *Finnish*

- suomalainen
- Suomi

Disadvantages
- *body image*
- *bullying*
- *eating disorder*
- *grooming*
- *intervention*
- *perpetration*
- *perpetrator*
- *prevention*
- *sexual harassment*
- *victim*
- *victimization*

- ehkäisy
- interventio
- kehonkuva
- kiusaaminen
- riski-käyttäytyminen
- seksuaalinen häirintä
- syömishäiriö

Type
- *meta*
- *meta-analysis*
- *review*

- katsaus
- meta-analyysi

Participation
- *competence*
- *competencies*
- *content*
- *content generation*
- *differences*
- *distribution*
- *influence*
- *literacy*
- *participation*
- *patterns*
- *profiles*
- *sharing*
- *skills*
- *use*

- erot
- jakaminen
- käyttö
- medialukutaito
- osaaminen
- osallistuminen
- profiili
- ryhmä
- sisällöntuotanto
- sisällön tuottaminen
- sisältö
- taidot
- uudet lukutaidot
- vaikuttaminen

Media literacy
- *algorithm*
- *bubble*
- *disinformation*
- *effect*
- *fake news*
- *identity*
- *manipulation*
- *misinformation*
- *post-truth*
- *self-presentation*

- algoritmi
- disinformaatio
- identiteetti
- kupla
- manipulaatio
- misinformaatio
- vaikutus

Sample
- *adolescents*
- *children*
- *cyp*
- *students*
- *young people*

- lapset
- nuoret
- nuoriso
- opiskelijat

MYTH-BUSTING REVIEW

A myth-busting review aims to correct a common misconception with arguments based on research evidence. It is a non-systematic meta-review in that it is based on high-quality research but does this selectively.

THERE ARE NO DIGITAL NATIVES

LAURI HIETAJÄRVI

Summary

➤ There is no generation with uniform digital and media literacy skills. Young people are divided into different groups based on the people close to them, personal interests and the support they receive.

In which area is there still a lack of knowledge?

➤ The long-term impacts of media use on the brain or information processing are still unknown.

Recommendation

➤ Young people's critical media literacy and ability to assess the reliability of information must be improved.

IN 2001, Marc Prensky, an American writer and researcher in education, coined the term digital natives to refer to young people born after 1980, as this generation had grown up and matured in a world in which digital technology had always been present. According to Prensky, this had come to significantly shape this group as people as well as influencing the way they behaved and learned. Using digital technology comes naturally to digital natives, and they have excellent digital skills. Meanwhile, Prensky referred to older generations as digital immigrants. Prensky raised concern that the outdated education system and teachers representing a different generation would fail to respond to the needs of digital natives as learners.

Many empirical studies were quick to debunk the myth of digital natives[1]. As media users, young people do not constitute a homogenous group. Generally speaking, people's media use is diverse[2]. Young people have different motives for using media. While their media use is most commonly motivated by entertainment and maintaining social relationships, information retrieval, creative engagement and gaming are also common[3]. The majority of young people fall into a category of so-called ordinary media users, whose behaviour is not particularly characterised by any single aspect. In addition, distinguishable groups include at least 1) users consuming all media particularly actively (majority of them boys) and 2)

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1   e.g. Bennett & Maton, 2010
2   e.g. Ertiö et al., 2020; Kaarakainen & Kaarakainen, 2018; Li et al., 2017
3   Hietajärvi et al., 2016; 2019

particularly socially active users (majority of them girls)[4]. Even a rough division can, then, distinguish clearly different types of media use and user groups.

In response to the criticism against the concepts of digital natives and digital immigrants, Marc Prensky later changed the definitions, but the myth of different generations characterised by a determined set of skills lives on.

THE MYTH OF THE DIGITAL NATIVE AND THE HUMAN BRAIN

One of the basic assumptions of the myth of the digital native is that growing up in a given media landscape is prone to modify the brain of children and young people. This would result in the children and young people developing an ability to execute a variety of tasks simultaneously and process a deluge of information coming at them from multiple directions. It is true that media use can shape a person's brain. However, it remains unclear how exactly media affects the brain and information processing of young people and how permanent the possible impacts are, and this may remain unexplored due to the sheer diversity of the media. Nevertheless, we can make some conclusions about the relationship between brain development, information processing and the media.

Depending on the stage of brain development, children and young people may be particularly vulnerable to the abundant stimuli from digital media[5] or the constant interruptions that disturb information processing and concentration[6]. The young people most likely to be distracted by various kinds of interruptions are the ones whose media use is characterised by media multi-tasking[7]. Moreover, in line with their stage of development, teenagers are both emotionally particularly susceptible to feelings stirred by acceptance or rejection as well as rather immature when it comes to self-regulation,

which may render them particularly vulnerable to the effects caused by the media[8]. By contrast, compared to the above examples, the myth of the digital native gains more support from the research findings regarding the positive impacts of gaming on the brain and information processing[9]. Active gamers have been found to have a better working memory performance compared to their peers less active in gaming[10].

Media use may affect the brain development and information processing of children and young people. Nevertheless, there is no clear evidence of causal links and little can be said about this issue, at least at the level of an entire generation.

THE MYTH OF THE DIGITAL NATIVE AND DIGITAL SKILLS

The myth of the digital native assumes that young people have exquisite digital skills compared to their parents or are at least inherently better equipped to learning and adopting skills related to digital media. This is primarily true, as, depending on their developmental stage, young people are able to acquire new skills more quickly than adults. However, learning is significantly affected by a person's previous knowledge and skills, which often puts older people in an advantage.

The key idea of the myth is that young people fluent in using digital technology would get bored in a traditional school setting that does not allow them to use technology. This has been referred to as the gap hypothesis: there is a digital gap between the school and the rest of the world[11]. The hypothesis is supported by a couple of studies conducted in Finland. According to the first, the young people who found the least meaning in school attendance would have liked to use more digital technology at school[12]. According to the second, longitudinal, study, enthusiasm to study using technology predicted a higher learning motivation if

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4   Li et al., 2017; Kaarakainen & Kaarakainen, 2018
5   Christakis et al., 2018
6   Firth et al., 2019
7   Moisala et al., 2016
8   Crone & Konjin, 2018
9   Palaus et al., 2017
10 Moisala et al., 2017
11 Hietajärvi et al., 2020
12 Salmela-Aro et al., 2016

the school provided sufficient opportunities for making use of digital devices[13].

Finnish young people rank at the top of the world in multiliteracy, or the ability to identify, modify and produce meaning using a variety of tools[14]. Nonetheless, young people are not on the same footing when it comes to media literacy or digital skills acquired during leisure time, which means that it is also impossible to identify a distinct generation of digital natives in this context. By contrast, it appears that there are various kinds of gaps between young people. Although digital technology has become available to virtually everyone, a gap seems to have formed between those young people who know how to utilise this and those who do not[15]. While digital skills have been presumed to even out the impact of one's socioeconomic background, the gap in digital skills appears to somewhat follow the socioeconomic divides[16]. Those young people who receive support for using digital media from people close to them seem to gain most benefits from digital media. Versatile technology use supports the development of media literacy[17].

While a gap of some degree would seem to emerge between different generations, the findings are not fully conclusive in this area. According to one meta-analysis, on average, media literacy was better among girls than boys[18], whereas an extensive study carried out in Finland demonstrated that Finnish boys fare better in digital skill tests compared to girls[19]. However, girls seem to perform better in linguistic tasks, multiliteracy and computational thinking, which refers to analysing data, recognising and forming patterns in activities, and the automation of functions[20].

Digital natives are presumed to find all the information they need from the internet. However, in principle, young people seem to have rather poor information retrieval skills[21], which has also been observed in Finland[22]. An examination of young people's skills in assessing the reliability of information has revealed that while young people seem to acknowledge that the quality of information found online on topics such as health varies, their ability and means to make a distinction between reliable and unreliable information differ considerably[23]. Most young people lack the capabilities to critically assess the information they encounter online and its reliability[24]. Boys appear to do better than girls at finding information, and girls better at assessing the search results[25]. It seems that moderate media use is linked to better media literacy[26].

In summary: there is no generation with uniform digital and media literacy; instead, young people are divided into various groups based on the support they receive, the people close to them, and their personal interests. There seems to be room for improvement in young people's critical media literacy and abilities to assess the reliability of information. ◼

13 Hietajärvi et al., 2020
14 Leino et al., 2019a
15 Dolan, 2016
16 Siddiq & Scherer, 2019b, Leino et al., 2019a
17 Kaarakainen & Saikkonen, 2015; 2018
18 Siddiq and Scherer 2019a
19 Kaarakainen, Kivinen & Vainio, 2018
20 Kauppinen & Marjanen, 2020; Leino et al., 2019a
21 Zhou & Lam, 2019
22 Kaarakainen & Saikkonen, 2015; Saikkonen, 2018
23 Freeman et al., 2018
24 Kiili et al., 2018
25 Kaarakainen, Kivinen & Vainio, 2018
26 Leino et al. 2019b

This myth-busting review aims to correct a common misconception with arguments based on research knowledge. This is a non-systematic meta-review in that it is based on high-quality research but does this selectively.

This evidence synthesis is based on a list of international systematic reviews compiled by an information specialist based on a systematic information search and Finnish case studies on the effects of digital media on young people (more detailed description of the information search on p. 20–21). Reviews and studies concerning themes related to the myth of the digital native, i.e. particularly young people as media users, adolescent brain development, and young people's media competence, were selected from the list based on their title and abstract. The methods of producing the various papers are described in further detail on pages 17–18.

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OLDER PEOPLE NEED MEDIA EDUCATION THAT TRANSCENDS MERE DIGITAL SUPPORT

SUSANNA RIVINEN, PÄIVI RASI, HANNA VUOJÄRVI
& SIRPA PURTILO-NIEMINEN

Summary

> Older people are a heterogenous group of people with diverse media literacy needs. These needs must be supported extensively in all areas (using, understanding and creating media content)

> Media literacy training must be based on the needs and interests of older people.

In which area is there still a lack of knowledge?

> Less practical work and research is carried out related to the media literacies of older people compared to those of children and young people.

> Particular attention should be paid to the ability of older people to understand and critically analyze media content as well as to produce these.

Recommendation

> Media literacy must be supported in all stages of life.

> Positive representation of older people must be increased.

MEDIA EDUCATION consists of education, guidance and support activities with the main goal of developing the *media literacy* of people of all ages. Generally speaking, media literacy refers to an ability to access different information resources and using, understanding, critically assessing and creating various kinds of media content, including text, image, sound and combinations of these. This means that media literacy involves much more extensive competence than a mere ability to use digital devices. In an increasingly digitalised and media-focused society, media literacy and all its areas are perceived as a civic skill whose development is a life-long process. A lack of media literacy could pose a challenge in coping with day-to-day life or exceptional periods such as the coronavirus outbreak in spring 2020.

Digital technology and media use play a key role in learning, wellbeing, daily life and participation in society. Media literacy is necessary in contexts such as ensuring smoothly running day-to-day life, following and understanding the news, making transactions using e-services (such as the MyKanta health care pages or online banking services), and communicating with family members and friends.

MEDIA LITERACY OF OLDER PEOPLE

So far, the media education and media literacy of *older people*, i.e. those aged 65 and above, has been promoted and studied less compared to children and young people. Nevertheless, increasing interest in the topic can be observed in both Finland and internationally.

In the media, the media literacy of older people has been primarily described from a negative, narrow and homogenized perspective[1]. Older people are represented in a certain way, i.e. primarily described as a group of people that are struggling with digital devices, media and services and are at a risk of social exclusion. These representations fail to denote that older people are a heterogenous group with marked differences in the various areas of media literacy[2]. Negative representations may also contribute to enforcing the stereotypical perceptions of older people. Overall, referring to everyone over 65 years of age as "older people" in the context of media literacy is overly homogenizing, as people's skills also vary based on the age group they belong to: youngest-old (65–74-year-olds), middle-old (75–84-year-olds) or oldest-old people (over 85-year-olds)[3].

There is need for more research on the extent and level of media literacy of older people. Nevertheless, based on research conducted so far, we already know that there are needs for support and education in all areas of media literacy[4]. For instance, some older people struggle in assessing the reliability and accuracy of news spread on social media[5] and the health-related information available in the media[6].

DIGITAL SUPPORT IS AVAILABLE

Internationally, the majority of media education training provided to older people is concerned with using digital devices. The training is rarely focused on understanding, critically assessing and producing media content. While there is need to pay special attention to areas concerned with understanding and critically assessing information as well as content creation, there are also needs for education concerned within all areas of media literacy (using, understanding, creating).[7]

In Finland, organisations (such as Finnish Pensioners' Federation, Enter ry, The National Seniors' Union, the Finnish Association for the Welfare of Older People), libraries, community colleges, projects, municipalities and companies offer training, guidance and support in using digital devices and media. The Digital and Population Data Services Agency supports the work of digital support providers at the national level[8]. Meanwhile, less training and support is available on the other dimensions of media literacy: the ability to understand, critically assess and analyse, and personally produce different media content, such as text, image, sound and combinations of these.

TOWARDS MORE EXTENSIVE MEDIA EDUCATION FOR OLDER PEOPLE

As previously mentioned, attention should be paid to the ability of older people to produce, critically analyze and understand media content. However, the media literacy training must always be founded on the individual's own starting points (such as the level of knowledge and skills, and available devices), be based on needs and take into account the diversity of the target group[9].

1 Rasi, 2020
2 see e.g. Rasi et al., 2020; Rivinen, 2020; Rivinen et al., 2020
3 Lee et al., 2018
4 Rasi et al., 2020; Rivinen, 2020; Ofcom, 2015, 2019
5 Guess et al., 2019
6 Eronen et al., 2019
7 Rasi et al., 2020
8 https://dvv.fi/digituki
9 see. e.g. Rasi et al. 2020; Rivinen, 2020; Rivinen et al. 2020; Vuojärvi et al., 2020

It is worth noticing that as people age, not only their needs but also their interests change, and this should be taken into account in planning and implementing media education[10]. In the future, the heterogeneity of the target group will gain even more emphasis, as a result of the retirement of age groups with even more advanced skills in using digital media and information and communication technology[11].

Older people must be perceived as potential content creators as well as socially, culturally and societally active users not unlike any other age group instead of merely users of necessary services, such as online banking. The goal must be to support older people in the various roles that change during a person's life course, including as family members and friends, active citizens, consumers and customers[12]. A key part of developing media literacy also involves influencing people's attitudes, particularly reducing fears and increasing a positive mindset.

Therefore, media education must be developed and maintained across all life stages. In addition to formal and traditional education institutions, other agents also play a significant role, including people close to the older person, associations, various service providers, libraries, media and adult education centres. Support provided by other older people, i.e. peers, which brings simultaneous benefits to both parties, the help provider and recipient, has turned out to be particularly beneficial[13]. Intergenerational support is particularly important if younger generations get to guide older people based on their own knowledge and skills[14] instead of external instructions and views. The provision of support and the development of the comprehensive media literacy of older people should thus be set as a joint goal for all of us instead of making it a responsibility of a single service provider or close relative. ■

This myth-busting review aims to correct a common misconception with arguments based on research knowledge. This is a non-systematic meta-review in that it is based on high-quality research but does this selectively.

This evidence synthesis is based on research conducted in the IkäihMe project (2018–2021) by the University of Lapland. The research data comprise (1) a systematic literature review on interventions for the media education of older people and (2) four case studies. The case studies have examined the views of older people, the experts working with them, and teacher students specialised in adult education concerning how the media education of older people should be implemented and how the views of teacher students on the media education of older people change during a study module on related themes. The argument is a joint synthesis by the authors of this article.

10 Rasi et al., 2019
11 Rivinen, 2020
12 Rasi et al., 2020
13 Rasi et al., 2020; Rivinen, 2020; Rivinen et al., 2020
14 Rasi et al., 2020

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ARGUMENT REVIEW

An argument review uses systematic methods and its arguments are based on reliable research. However, it is a narrative review whose aim is to make an impact.

WHY WE SHOULD STOP TALKING ABOUT SCREEN TIME

LAURI HIETAJÄRVI

Summary

> Research findings do not support the idea that spending time with media would directly affect the wellbeing or health of children or young people.

> The discussion on screen time shifts the responsibility for the impacts of the media on the individual and diverts attention from the role and operating principles of the producers of technology and media services.

In which area is there still a lack of knowledge?

> While a lot of research is available, a considerable share of it is poor in terms of quality and value of evidence.

> There is a lack of objective, i.e. measured, information about the actual time people spend consuming media.

Recommendation

> The examination of media use and experiences related to media requires the introduction of concepts more precise than merely the time spent in front of a screen.

> Instead of placing the responsibility and blame on individuals, i.e. media users, we should divert our focus on the producers of media services.

FOR A LONG TIME BY NOW, screen time and recommendations concerning an appropriate time spent using devices have been hot topics of discussions among parents, educators and others working with children and young people, resembling a moral panic. The definition of screen time has been broad: screen time is typically considered to refer to the time spent on digital technology outside school hours. For years, screen time recommendations have followed the easy-to-remember recommendations published by the American Academy of Pediatrics (AAP) several years ago: no screen time for children under two years old and no more than two hours per day for those over two. These recommendations were never founded on research knowledge, and have indeed been later modified. Adapted versions have emerged alongside the AAP recommendations. What these recommendations have in common is their aim to find a balance between

media use and the other aspects essential to the wellbeing and development of children and young people. What does the most recent research evidence tell us about screen time, and why is it high time we should stop talking about screen time?

There seems to be a common misconception that the effects of screen time have not been sufficiently studied. There is actually a lot of research on the topic: several hundreds of original studies, dozens of reviews and, within the past year, already several overviews of reviews. The current knowledge is, therefore, based on summaries compiled of hundreds of studies. The results of the reviews of high scientific quality do nonetheless invariably indicate that a significant share of research generally concerned with screen time or the effects of media is of poor quality in terms of methodology and has poor weight of evidence. Perhaps due to the fact that this is both a topic that touches upon the daily lives of many people and one that is sure to attract some media attention, the published studies have included histrionics, publication bias, lack of transparency, selective reporting, and other practices that undermine the reliability of research. As a result, a large share of the research related to screen time is not credible.

PSYCHOLOGICAL WELLBEING

Despite the above shortcomings, the most recent research knowledge indicates that there is a primarily negative relation between screen time and the psychological wellbeing of children and young people; however, this relation is negligibly small and probably follows an inverted U curve—indicating that very little or too much media use is connected with poorer wellbeing[1, 2]. On average, the limit for screen time outside work or school hours indicating excessive media use appears to be set at 5–7 hours on weekdays[3] and more on weekends. The results appear to be the same even if we replace screen time with some other variable, such as time spent on social media[4] or gaming[5]. The strength of the relation between screen time and wellbeing is illustrated by the fact that a comparison of screen time and other explanatory factors picked from the same data sets reveals that the negative relation between screen time and people's wellbeing is at the same level as eating potatoes and less substantial than wearing spectacles[6]. Meanwhile, social media appears to have a greater positive relation to social wellbeing and social relationships[7]. As the majority of studies on the topic are questionnaire surveys using a cross-sectional setting, i.e. the survey responses have been given at the same time, nothing can be said about causal relationships. Nevertheless, the most recent studies[8] indicate that the time spent on social media either hardly affects a person's wellbeing or the relationship is reversed in that challenges in wellbeing, such as experiencing symptoms of depression, predict an increase in social media use. Meanwhile, spending time worrying about screen time is prone to have a negative impact on wellbeing[9].

HEALTH BEHAVIOUR

In addition to psychological wellbeing, concern has been raised in connection with young people's physical activity and sleeping habits. The time spent in front of a screen has been presumed to reduce the time spent exercising or sleeping, and this view has been partly used to explain the possible link between screen time and wellbeing. However, scientific evidence does not particularly support this concern. While the impacts of screen time have been examined by equating it with sedentary behaviour, the result is the same: on average,

1   Pathological, problematic, obsessive or addiction-like media consumption is a specific marginal phenomenon, which is discussed in the evidence summary *Digital media, addiction and wellbeing* (p. 50).
2   Odgers & Jensen, 2020; Orben, 2020; Stiglic & Viner, 2019
3   Przybylski & Weinstein, 2019; Przybylski et al., 2019
4   Orben, 2020
5   Ferguson, 2015
6   Orben & Przybylski, 2019
7   Appel, Marker & Gnambs, 2019; Orben, 2020
8   Puukko et al., 2020; Coyne et al., 2020; Heffer et al., 2019; Stavrova & Denissen, 2020
9   Shaw et al., 2020

there is only a minor relation[10]. An extensive study carried out in Finland also indicates that time spent on media does not seem to reduce engagement in other recreational activities[11].

Even though there is moderately reliable knowledge of the link between screen time and overweight and poorer than average eating habits[12], research shows that screen time is not the cause of sedentary behaviours and unhealthy lifestyles but rather a part of these. For instance, the measures aimed at reducing the screen time of young people do not appear to increase physical activity on their own[13]. The causes of sedentary or other unhealthy behaviours are more complicated, but may have some common denominators with screen time. Lower socioeconomic status contributes to explaining the more substantial screen time and unhealthy eating habits of children of day-care age[14] and the lower physical activity of 15–16-year-olds and higher amounts of screen time among girls[15]. While many reviews noted that there was a minor relation between substantial screen time and less time spent sleeping[16], the quality of the studies used as references in these reviews was so poor that the results are unreliable. Indeed, newer, high-quality original studies have argued that even though more screen time has been repeatedly found to be related to less sleep, the scale at which this occurs is infinitesimal: increasing screen time by one hour is correlated with a 3–9-minute reduction in sleep[17].

In the context of school performance, average results also repeat the pattern that has emerged in research on human wellbeing: Screen time is not strongly connected to school performance[18], and neither is the time spent on social media[19] or gaming[20]. This also applies to eating disorders or risky behaviour[21].

WHY DOES THE RESEARCH ON SCREEN TIME NOT CORRESPOND TO EVERYDAY EXPERIENCES?

Quite a lot of studies are already available on the effects of screen time, and the research indicates that there is no cause for alarm related to screen times. The benefits of digital media far outweigh their disadvantages, also in the context of children and young people. Why, then, does this not seem to align with people's everyday experiences? Screen time has been known to cause worries, irritation and conflicts in families. People are outraged by their own and others' media consumption, and instructions on a balanced media diet are offered similarly as with physical activity and eating. Why is there a mismatch between research and everyday experiences? Here are a few reasons:

1. **There is a lot of research available, but its quality is poor.** Screen time has been mostly studied by asking respondents to assess their average screen time during a specific period of time, such as on weekdays and weekends or to fill out a questionnaire. However, the results obtained using these methods do not respond to the findings obtained when genuinely measuring media use[22]. This means that we do not have particularly thorough knowledge of the actual amount of screen time or how this is linked to other factors.

2. **Screen time does not exist as a separate entity**. Considering screen time or the media as separate variables with isolated impacts is an example of common faulty reasoning. Users create their own screen time in an interaction with media content.

10 Rodriguez-Ayllon et al., 2019
11 Kaarakainen & Saikkonen, 2019
12 Fang et al., 2019; Stiglic & Viner, 2019
13 Throuvala et al., 2020
14 Lehto et al., 2018
15 Männikkö et al., 2020
16 Carter et al., 2016, Stiglic & Viner, 2019
17 Orben & Przybylski, 2020, Przybylski, 2019
18 Adelantado-Renau et al., 2019
19 Appel, Marker & Gnambs, 2019
20 Ferguson, 2015
21 Stiglic & Viner, 2019
22 Ellis, 2019

In their everyday contexts, people encounter media as it is, as part of their lives. These situations and the media content vary. In low-quality research, the media experience has been reduced into minutes self-reported by the users even though each screen experience is different. While a two-hour session spent in front of a screen is bound to contain a vast amount of different media experiences, some of them beneficial, some harmful, and the majority probably trivial, research on screen time will reduce all of this into a single variable. From the individual's perspective, the reasons for using media, the consumed content and the situations in which the media is used are more essential than time.

3. **Media does not affect everyone in the same way.** There are no two similar screen time experiences. Different people will encounter the same media content differently, and the same person will experience the same content differently in different situations. In fact, the impacts of the media should be examined at the level of individuals with an aim to identify the individual, developmental and situational factors that cause reactions. This is the aim of the Differential Susceptibility to Media Effects model[23], based on which the assumptions made on the potential effects of the media must be adapted to both the media content as well as individual differences, development stages and varying situations. As a result, a specific media experience can be harmful to a specific person in a specific situation, but may have a different effect on a different person or in a different situation.

4. **Values and norms are slow to change.** Technology has quickly transformed everyday situations, cityscapes and how we spend time with other people. It is understandable to feel appalled by the sight of a bus full of morning commuters staring at their mobile phones or a young person seemingly frozen in front of a computer. For an outsider, the media use of another person may be confusing and even appear unnatural. However, this does not automatically mean that there is anything dangerous

going on. Many bus passengers use their smartphones to access the same news articles others read from printed newspapers. There are many situations in which we still lack a common understanding of how devices and screens should be used, and this is prone to cause conflicts. Social norms are still in the process of forming. We should be able to create mutually agreed practices and behavioural models without pathologizing screen time.

WHY SHOULD WE ABANDON THE CONCEPT OF SCREEN TIME?

Media and people are in the process of change and also transforming each other. Nonetheless, it appears unlikely that screen time is beneficial or harmful to people in itself. By contrast, what with all the negativity involved, the discussion on screen time may be harmful, and worrying about screen time is known to cause harm. What makes the discussion on screen time problematic is the way it shifts the responsibility to the individual while diverting attention from the responsibilities of technology and media service producers as well as the principles on which the services are built: how users are manipulated, which user data are collected, and what is done with these data and for what reason. These are societal questions that cannot be solved by determining an appropriate number of hours of screen time. When we talk about digital media, we talk about a massive playing field of economic, political and social interests—thousands of varying choices and situations in which media is used at the individual level. We should abandon the concept of screen time, at least as a concept used in research. As an higher level category, its relation with its subcategories is, at best, fickle. At the same time, we should do away with the concept in more general discussion, instead aiming to address those areas of media use that cause concern at a given situation and whether the responsibility lies with the user or the producer. When we talk about screen time, we cannot know for sure what exactly is meant by it in a given context.

There are other challenges connected to media and wellbeing besides the time spent in front of a screen. The ways in which people use media should also be

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23 Valkenburg et al., 2016

examined using more precise concepts in the discussion on people's wellbeing. Even if a person's screen time falls below the maximum time limits, they may find the media experience exhausting for reasons such as constant interruptions. Meanwhile, even if the recommended screen time is exceeded, the media use may have a positive impact. Instead of worrying about negative impacts on wellbeing, it would be beneficial if we aimed to identify and increase potential positive effects.

At the individual level, it is key to focus on strengthening media literacy and examining everything that people do when spending time in front of a screen, what conscious and unconscious decisions are made every day, which position media use assumes in people's day-to-day life as a whole, and whether the time spent on media is time well spent. With all its positive and negative fringe phenomena, the media is too big of an entity to be reduced into a discussion on screen times. Talking about screen time does nothing to increase our understanding of it. ■

This argument review is based on the strongest research evidence, but is selectively focused on forming an argument. The argument is a synthesis by the authors. The evidence synthesis method has been described in more detail on page 17.

This evidence synthesis is based on a literature list of international systematic reviews compiled by an information specialist based on a systematic information search and Finnish case studies on the effects of digital media on young people (more detailed description of the information search on p. 20–21). For this synthesis, reviews and studies concerning the time spent using media and the relation of this on human wellbeing or health were systematically selected from the list based on their title and abstract. Sources analysing problematic media use or the contents of media use were excluded from the synthesis. A further criterion for reviews providing evidence included a low risk of bias, i.e. the reviews had to include the quality assessment of the original studies. The criterion applied to Finnish original research was that the research methodology had to be at an at least acceptable level (for the assessment criteria, see p. 15). This synthesis also makes reference to theoretical discussion papers and selectively to the latest high-quality international studies.

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SOCIAL MEDIA IS AN ENVIRONMENT THAT SUPPORTS INTERACTION

LAURI HIETAJÄRVI & JANNE MATIKAINEN

Summary

➤ Valuable communities that provide social support and help users build their identities operate and emerge on social media.

➤ While the positive and negative impacts that time spent on social media has on wellbeing largely cancel each other out, the social benefits of social media persist even with high social media use.

In which area is there still a lack of knowledge?

➤ Social media is not the same for everyone, and the relation between the various ways of using social media and wellbeing may vary between individuals. However, this topic has not yet been sufficiently studied.

Recommendation

➤ There is a need for more versatile research that pays attention to the differences in both social media and the people using it.

THE FOCUS of discussions and psychological research on social media has largely been on disadvantages, particularly mental health effects, depression and anxiety. Even though spending high amounts of time on social media appears to be linked with mental anguish or slightly lower psychological wellbeing, summaries compiled based on dozens of reviews also indicate that positive effects also emerge in relation to social media use. These include higher social wellbeing and wider social capital, i.e. confidential social networks [1]. On average, the positive and negative impacts that time spent on social media has on wellbeing largely cancel each other out, but the social benefits persist even with high social media use.

Finns use social media in various ways and for a variety of purposes depending on their gender, age and educational background[2]. At the individual level, social benefits and harms are divided unevenly according to individual differences, and the ways and purposes of media use. Active content creation and

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1   Appel, Marker & Gnambs, 2019; Orben, 2020
2   Ertiö et al., 2020; Koiranen et al., 2019

interaction, and passive content consumption, can be distinguished as separate entities in social media use. It appears that a negative effect on wellbeing occurs in the context of passive use, while more positive phenomena are reported in relation to active use[3]. An extensive study conducted in Finland revealed that media forms a social arena for young people, at the core of which lie recreation, enjoyment and social interactions[4]. In fact, instead of looking at the time spent on social media, we should examine social media as a social phenomenon. For instance, the same basic factors that constitute friendships are present on social media as in face-to-face interactions[5]. Young people have active agency on social media instead of being merely a passive object of media influence. In fact, we should examine the impacts of media as consequences of active agency and interacting, as the benefits and harms of social media reflect the interactive situations in which people engage in on social media.

Social media is transforming social interaction. According to an extensive scientific review[6], this transformation includes the following:

1. The number of encounters has increased and the threshold for interacting has lowered.
2. Social pressures and expectations (e.g. being constantly available and getting comments or likes) have become more pronounced.
3. Interactive situations have changed: there has been an increase in different forms of interaction, such as commenting and liking posts, while there are fewer non-verbal messages related to body language and tone of voice.
4. Forming friendships and connecting with others has also become possible between people who would not otherwise meet and who may struggle with face-to-face social situations.
5. New forms of peer behaviour have emerged, including various viral video challenges, and quantitative measurement and valuing of interactions (e.g. a Snapchat *streak*, where the goal is for two users to send a Snap to each other every day without interruptions). Some young people go as far as to even modify their own behaviour in face-to-face situations to maintain a certain online identity, which may negatively or positively affect their interactions.

COMMUNITIES PROVIDE SUPPORT

The experience created by social media is influenced by the ways in which people use social media, which can be divided as follows[7]:

1. consuming content alone and passively,
2. producing content actively and socially without a specific goal or target; and
3. active interaction with a clear purpose, such as engaging in a certain community.

This division can be used to examine the possible impacts of the content shared on social media and interactions with peers on shaping the users' identity and self-image as well as their wellbeing. It can be presumed that the effect of passive media consumption of a person's self-image or wellbeing differs from the impacts of active social media use related to maintaining friendships or developing personal interests[8].

The potential impacts of passive or aimless social media use on the users' self-image are indirect and weak. By contrast, active communities built around a common interest appear to be particularly characteristic to social media. They provide nearly unlimited opportunities for learning skills, for instance[9]. On the other hand, these communities have considerable potential for also influencing their users in other ways—for instance, homogenous communities related to appearances, weight and eating may have a major positive or negative impact on the users' body image[10]. Young people with more active than average social media use are slightly more

3 Verduyn et al., 2017
4 Kaarakainen & Saikkonen, 2019
5 Yau & Reich, 2018
6 Nesi et al. 2018a, 2018b
7 Rodgers et al., 2016a; 2016b
8 Orben, 2020
9 Ito et al., 2020
10 Rodgers et al. 2016

likely to participate in such communities than the average user[11]. These communities can be considered to form a so-called third space[12], where members meet their friends and spend their leisure time in a way that involves social interactions that are just as genuine and relaxing as face-to-face encounters[13]. Social media communities also emerge around more serious topics. In the worst case, these can turn into an echo chamber or an identity bubble, which accentuate certain opinions of views shared by the members. Conceptions related to self-harm or a pathological self-image may also become normalised[14]. Nevertheless, even in these communities, the impacts are not solely negative. Young people struggling with various problems also get friends, support and help from social media communities[15].

Social media appears to be more clearly related to the users' body image compared to its effects on wellbeing[16]. Feeling a pressure to look a certain way because of social media is particularly common among young women and especially the users of platforms whose focus is on visuality, such as Instagram. The more followers a user has, the higher the experienced pressure.[17]

Identity-building and self-expression are an essential part of social media use. Interactions between peers on social media play a key role in the way young people perceive their identity and future prospects[18]. Meanwhile, some may feel pressure related to how they present themselves on social media. According to one prevalent norm, people should present themselves as authentically as possible, as their genuine selves, on social media[19]. At the same time, presenting oneself more authentically on Facebook appears to be related to a better self-esteem[20].

Social media has made sexting, or sharing sexually explicit content, a part of young people's sexual behaviour. This is not merely a case of innocent young people unwillingly encountering sexual content produced by adults. Sexual content and messaging are also part of the active interactions with peers of Finnish youths[21]. It is more common among more sexually active young people and a normal part of the sexual behaviour between young people and their growth and development[22]. However, in this context, it is essential to make a distinction between consensual sexting and non-consensual provocation, sexual harassment or internet-facilitated sexual offences[23] (see also the evidence summary *Perils of the Internet*, p. 60).

In conclusion, social media has facilitated new forms of interaction, and research reviews indicate that above-average social media use is strongly related to wider than average social capital[24]. Long research series have shown that interactions on social media and the internet may be just as socially regulated as their face-to-face counterparts[25]. Social identity, i.e. the group identity emerging among users, is an essential explanatory factor. This may, then, also emerge online, enabling a positive group experience and interactions.

In summary, previous research indicates that social media is an environment supporting social interaction and wellbeing in multiple ways. Valuable communities that, among other things, provide social support and help users build their identities emerge and operate on social media. This is an important perspective supported by clear research evidence. Nevertheless, we cannot declare the disadvantages of social media as debunked, as the dark side of human interaction is also present on social

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11 Kaakinen et al., 2020
12 1st space: the same physical space, 2nd space: a different physical space, 3rd space: for example, an online community where the place and time may differ (see e.g. Kaarakainen & Saikkonen, 2019)
13 Kaarakainen & Saikkonen, 2019
14 Dyson et al., 2016; Rodgers et al., 2016
15 Dyson et al., 2016; Nesi et al., 2018a
16 Appel, Marker & Gnambs, 2019
17 Åberg et al., 2020
18 Mannerström et al., 2018
19 Uski et al., 2016
20 Orben, 2020
21 Spišák & Paasonen, 2017
22 Mori et al., 2019
23 Krieger, 2017
24 Appel, Marker & Gnambs, 2019
25 Spears & Postmes 2015

media. This is a complex issue and the data available on the topic are fragmented and inaccurate. Indeed, research should be harnessed in an aim to specify the understanding of what sorts of activities on social media generate positive or negative outcomes, and in which groups do these benefits or disadvantages accumulate. ■

This argument review is based on the strongest research evidence, but is selectively focused on forming an argument. The argument is a synthesis by the authors. The evidence synthesis method has been described in more detail on page 17.

This evidence synthesis is based on a list of international systematic reviews compiled by an information specialist based on a systematic information search and Finnish case studies on the effects of digital media on young people (more detailed description of the information search on p. 20–21). For this synthesis, reviews and studies concerning themes related to social interactions on social media and their relation to human wellbeing or behaviour were systematically selected from the list based on their title and abstract. No sources concerning problematic media use or other media use were selected. A criterion for selecting reviews providing evidence included a low risk of bias. In other words, the reviews had to include assessment of the level of evidence in original studies, and the methodological level of Finnish original studies had to be at least acceptable (for the assessment criteria, see p. 15). Moreover, this synthesis refers to theoretical discussion papers and selectively to the latest hight-quality international studies.

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EVIDENCE SUMMARY

An evidence summary is a systematic review. It provides information that is as objective as possible on what the most reliable and high-quality evidence says about a topic at a given time.

DIGITAL MEDIA, ADDICTION AND WELLBEING

LAURI HIETAJÄRVI

Summary

➤ Problematic and excessive use of digital media is known to exist. The problems related to digital media use are linked to challenges in wellbeing, particularly symptoms of depression and anxiety.

In which area is there still a lack of knowledge?

➤ Efforts to clearly determine the problems related to media – whether this is a matter of a behavioural addiction or something else – have failed. There is variation in diagnoses, assessments of the prevalence of problems, and in care guidelines.

➤ Causal relations are not known. Are the problems in wellbeing the cause or the effect of problematic media consumption?

Recommendation

➤ Qualitative understanding of the problematic media use must be increased.

➤ Concepts must be used precisely, and the differences between various online services and content must be taken into consideration (for example, there is a significant difference between email, Facebook and pornography).

➤ It is also important to include exclusion criteria to the diagnostic criteria for addiction, as these enable ruling out an addiction.

➤ Causal relations must be determined to correctly target a diagnosis and treatment measures.

PROBLEMATIC DIGITAL MEDIA USE has been characterised and studied from the perspectives of addiction, obsessive behaviour and excessiveness. Studies have concerned areas such as the internet (both at a general level and in further detail in relation to topics such as online shopping, pornography and other online content), digital games, social media and smartphones (see table on the following spread). While this behaviour is commonly referred to as an addiction, from a research perspective, the definitions of problematic use of digital media are still rather incomplete, and the field of research is plagued by the diversity of concepts and methodological problems[1]. Although there have been efforts to include problematic media use in the field of

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1   Ellis et al., 2018; Griffiths, 2018; Panova & Carbonell, 2018; Ryding & Kaye, 2018; Starcevic et al., 2018

behavioural addictions (DSM-5, 2013), the criteria and diagnostic methods of this area have been prepared for gambling addictions, and are deficient or incomplete, which may not make them appropriate for determining such an extensive and complex phenomenon[2].

The following theoretical models have been used in an aim to describe problematic media use:

1. In accordance with the so-called **components model of addiction**, generalised internet addiction is perceived as a consequence of biopsychosocial processes similar to those found in substance addiction: addictive behaviour is caused by an activation of the dopaminergic reward system of the brain which elicits pleasure in the user[3]. In other words, using the internet makes the user feel good or experience pleasure, resulting in repetitive behaviour.

2. Various **cognitive behavioural models** assume that media use is a consequence of a need to fulfil some more fundamental psychological need or a form of escapism, a desire to escape reality[4].

3. According to **the model of compensatory internet use**, excessive digital media use results from compensating for challenges in other areas of life or for mental health symptoms[5] rather than an addiction caused by digital media or a technological device.

4. According to the **I-PACE model** (Interaction of Person-Affect-Cognition-Execution)[6], individual differences (person) and related factors exposing individuals to addiction (mental health symptoms, personality factors, genome) play a crucial role in the early stages of developing an addiction.

The development of addiction-like behaviour results from experiences of pleasure or appropriateness caused by interaction between environmental and situational factors.[7]

Despite these different theoretical models, it remains unclear whether the term addiction can describe problematic consumption of digital media sufficiently comprehensively. It at least appears that there are no grounds for referring to problematic smartphone use as addiction[8]. Many models for problematic behaviour would seem to be related to digital media use and no single explanatory model is universally applicable.

PROBLEMATIC GAMING is at least partly perceived as a stand-alone phenomenon, and is so far the only type of behaviour included in the ICD-11 (6C51.0 Gaming disorder, predominantly online); however, there is also no consensus of this among researchers[9]. For instance, withdrawal symptoms, characteristic to addictions, have not been described in detail in previous research[10]. There is no clear understanding of what all of this is about, and differing definitions make it more difficult to understand the meaning of the phenomenon at the practical level (see table on the following page). It would be important to determine behavioural addiction without pathologizing it, i.e. diagnosing normal human behaviour as a disease. The [OSF website][11] has a currently ongoing project for this definition development.

In addition to the lack of clarity in definitions, the research in problematic media use is marked by a poor level of evidence: The majority of research is based on data collected in a cross-sectional setting, which involves respondents personally assessing their media use. Most of the samples are non-representative convenience samples using data from most conveniently available subjects, which may lead to various biases in the biased sample

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2 Billieux et al., 2019; Kardefelt-Winther et al., 2017; Kuss & Billieux, 2017
3 Kuss & Billieux, 2017
4 Griffiths, 2018; Ryding & Kaye, 2017
5 Kardefelt-Winther et al., 2017
6 Brand et al., 2019
7 *Affective–cognitive* response guides e*x*ecution, which responds by further increasing individual differences.
8 Panova & Carbonell, 2018
9 Rumpf te al., 2019; Van Rooij et al., 2018
10 Kaptsis et al., 2016
11 https://osf.io/q2vva/

META-ANALYSES AND SYSTEMATIC REVIEWS EXAMINING THE EXCESSIVE USE OF DIGITAL MEDIA				
Source	Type	Operationalisation of excessive use	Number of studies	Total number of participants (N)
Fumero et al. (2018)	meta-analysis	excessive internet use	28	48,090
Fumero et al. (2019)	meta-analysis	internet addiction	23	35,684
Ioannidis et al. (2019)	meta-analysis	problematic internet use	40	2,922
Lanthier-Labonté et al. (2020)	systematic review	problematic internet use	44	357,964
Anderson et al. (2017)	systematic review	problematic internet use	29	36,808
Cheng et al. (2018)	meta-analysis	internet gaming disorder	69	58,834
Gonzalez-Bueso et al. (2018)	systematic review	internet gaming disorder	24	53,889
Paulus et al. (2018)	systematic review	internet gaming disorder	252	(not known)
Männikkö et al. (2020)	meta-analysis	problematic gaming behaviour	50	129,430
Casale & Banchi (2020)	systematic review	problematic social media use	21	30,657
Marino et al. (2018)	meta-analysis	problematic Facebook use	23	13,929
Sohn et al. (2019)	meta-analysis	problematic smartphone use	41	41,871
Mac Cárthaigh et al. (2020)	systematic review	problematic smartphone use	9	6,923

(not representative of the population). The used indicators and their interpretation may vary. Thus far, there has been rather limited utilisation of objective data depicting the actual quantity and quality of media consumption. Nevertheless, studies conducted using objective data indicate that, overall, the self-report data does not correspond to measured use[12], which reduces the reliability of most studies. As this is a topic that the general public may find interesting, there is also a major risk of selective reporting. So far, few studies have involved pre-registration of research questions and methods or open distribution of data and related materials. This has been mainly done

in the context of research in problematic gambling and only very recently[13], as a result of which reviews on these topics are not yet available.

PREVALENCE OF PROBLEMATIC USE

Due to the methodological and diagnostic shortcomings presented above, no reliable information is available of the prevalence of problematic use. Estimates vary depending on the used battery of questions and the applied criteria. The following table presents the results concerning Finland in the WHO's most recent survey of

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12 Ellis, 2019
13 Carras & Kardefelt-Winther, 2018; Weinstein, Przybylski & Murayama, 2017

health behaviour in school-aged children[14]. The survey used a battery of questions including nine statements to assess the prevalence of problematic social media use[15].

SHARE OF CHILDREN MEETING THE CRITERIA FOR PROBLEMATIC SOCIAL MEDIA USE		
	girls	boys
11-year-olds	6%	5%
13-year-olds	13%	11%
15-year-olds	14%	10%

Source: WHO, 2020

In a review by Fumero et al. (2018) the share of people with excessive internet use was estimated to be over 13 per cent. A review by Sohn et al. (2019) indicated that the prevalence of people with problematic smartphone use was up to more than 23 per cent. These differences highlight the dependency of the prevalence estimates of the used methods and sample. A problem emerges in the reviews from summaries compiled based on different scales and non-representative samples. The prevalence estimates in the reviews concerning digital gambling were lower as the number of gamers is lower than that of overall internet users. Based on representative samples, on average around 2 per cent of young people feel that their gaming is at a problematic level[16]. Estimates were similar (2.2 per cent) in a pre-registered extensive and representative study that involved collecting data from seven European countries[17]. Depending on the used battery of questions and analysis method, non-representative samples collected in Finland indicated that either 0.9 per cent[18, 19] or, based on the same data, 1.3–2.8 per cent had problematic use, depending on the method of analysis[20, 21, 22].

LINK BETWEEN PROBLEMATIC DIGITAL MEDIA USE AND PSYCHOLOGICAL WELLBEING

It is fairly likely that the psychological wellbeing of individuals reporting problematic use of digital media is also below average in other areas. Taking the above limitations into account, the level of evidence in this area is primarily poor but stable: a weak or average link has been repeatedly found between problematic media use and psychological wellbeing. In the context of problematic gaming behaviour, results also appear to be coherent at the international level[23]. However, the strength of this relation appears to vary considerably from one study to another: the sampling method, definitions of psychological wellbeing, used scales and approaches all affect results. Most research on psychological wellbeing

14 www.hbsc.org
15 The Social Media Disorder Scale (van den Eijnden et al., 2016): The scale includes nine questions investigating symptoms of the problematic use of social media (for example: "Within the past year, have you made any attempts to reduce the time you spend on social media but failed in doing so?"), with "yes" and "no" response alternatives. Selecting the "yes" alternative at least five times indicated that the respondent's social media use is problematic.
16 Paulus et al. 2018
17 n = 7,865; Carras & Kardefelt-Winther, 2018
18 n = 465; Männikkö et al., 2020
19 The Problematic Online Gaming Questionnaire (POCQ) investigates problematic gaming based on six DSM-5 criteria (*preoccupation, overuse, immersion, social isolation, interpersonal conflicts* and *withdrawal*) and a total of 18 statements examining these (e.g. "How often do you unsuccessfully try to reduce the time you spend on gaming?"). Respondents select a response alternative on a scale of 1–5, and a respondent's gaming is considered problematic if they score at least 66 points on a scale of 18–90.
20 n = 773; Männikkö et al., 2019a; 2019b (NB. same data used)
21 The Internet Gaming Disorder Test (IGD) scale investigates internet gaming disorders and is based on the nine symptom criteria of the definition for a gaming problem in the DSM-5 and ten statements (e.g. "Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?"). The response alternatives are 0 (never), 1 (sometimes) and 2 (often). Selecting the alternative "often" for at least five of the symptoms is considered to indicate problematic gaming. The scales often follow the criteria also included in the suggestion for the DSM-5 definition (https://www.psychiatry.org/patients-families/internet-gaming), but there is considerable variation in the number of statements, response scale and criteria used for scoring and analysis methods.
22 For more detail on the topic, see: Kuuluvainen, S. & Mustonen, T. (2019). Digitaalinen viihdepelaaminen ja digipeliriippuvuus. Katsaus pelaamisen eri ulottuvuuksiin (in Finnish; second edition), Sosiaalipedagogiikan säätiö, Helsinki and Tanner, N., Radwan, R., Korhonen, H. & Mustonen, T. (2020). Sosiaalinen media, ongelmallinen sosiaalisen median käyttö ja someriippuvuus (in Finnish), Sosiaalipedagogiikan säätiö, Helsinki.
23 Cheng et al., 2018

is concerned with depression and anxiety symptoms (see table on the following page), and there is in fact a moderate level of evidence available in this context.

META-ANALYSES AND SYSTEMATIC REVIEWS EXAMINING PSYCHOLOGICAL WELLBEING			
Source	Operationa-lisation of excessive use	Degree of evidence for symptoms of depression	Degree of evidence for symptoms of anxiety
Fumero et al. (2018)	excessive internet use	medium	poor
Gonzalez-Bueso et al. (2018)	internet gaming disorder	medium	medium
Männikkö et al. (2020)	problematic gaming behaviour	poor	poor
Marino et al. (2018)	problematic Facebook use	medium	medium
Sohn et al. (2019)	problematic smartphone use	medium	medium

There is significant heterogeneity in all of these studies, i.e. the results of different studies (included in a single review) differ considerably.

Nevertheless, the connection between excessive media use and psychological wellbeing is not unambiguous. According to the reviews, the young people with mental health issues or self-destructive behaviour reporting excessive media use also received significant help and support for their problems[24].

There is also a weak connection between internet addiction and a lower amount of sleep and increased sleeping problems[25,] and this also appears to be the case with excessive smartphone use[26.] However, there is little evidence available of the correlation with sleeping problems, as most studies are based on retrospective questionnaire surveys instead of the objective measurement of smartphone use or sleep or even diary data. A weak relation has also been detected between internet addiction and self-reported alcohol and cannabis use, but the level of evidence is also low in this context[27.]

CAUSES AND EFFECTS OF PROBLEMATIC MEDIA USE

So far, research has failed to reliably demonstrate cause-and-effect relationships. Few longitudinal analyses have been conducted, and most studies have also failed to take mutual, intermediary or external factors affecting the connections into consideration. However, there is moderately strong evidence of a connection between lower self-regulation or executive function (nonconscious regulation of actions, and conscious planning, coordination and monitoring) capacity and problematic internet use[28], and these can be considered to constitute a neurobiological background exposing individuals to excessive use in accordance with the I-PACE model. There are no clear gender differences, although problematic gaming behaviour has been found to be more common among boys[29.]

It appears that both mental health symptoms and a negative attitude towards studying can be perceived as both a factor predicting problematic media consumption and vice versa[30.] Similar results have also been obtained in Finland. Symptoms of depression and academic burnout predicted an increase in excessive internet use; correspondingly, excessive internet use predicted increasing symptoms of depression and academic burnout[31.] A bidirectional link has also been observed between problematic gaming and loneliness and symptoms of depression[32.] There is a weak correlation between loneliness and compulsive internet use[33.] Poor self-esteem can be considered both a factor predicting compulsive internet

24 Marchant et al., 2017; Sedgwick et al., 2019
25 Alimorad et al., 2019
26 Mac Cárthaigh et al., 2020; Sohn et al., 2019
27 Lanthier-Labonté et al., 2020
28 Ioannidis et al., 2019
29 Anderson et al., 2017
30 Anderson et al., 2017
31 12–14 yrs., n = 1,702; 16–18 yrs., n = 1,636; Salmela-Aro et al., 2018
32 n = 2,059; Krossbakken et al., 2018
33 n = 1,200; Savolainen et al., 2020; Tóth-Király et al., in print

use[34], but also its consequence[35]. The level of evidence related to self-esteem is also limited.

Factors protecting against problematic media consumption include a family that is supportive of a person's autonomy and has a positive attitude[36] and the fulfilment of psychological basic needs in line with the self-determination theory[37]. The same factors also reduce problematic gaming[38].

IN CONCLUSION

Research has demonstrated that problems related to digital media exist. These cause behaviours and harm clearly diverging from normal, balanced behaviour. There is no need to deny this and necessary help and support must be available for those in need. However, there is hardly any more knowledge of the topic beyond this. This is a complex phenomenon. In fact, the diversity of activities people engage in in the context of digital media is a key challenge in creating cohesive definitions and charting prevalence. In the context of digital media use, separating active use from problematic behaviour is relevant – making a distinction based on time alone does not suffice. There may not be common denominators in the different types of problematic digital behaviour; instead, different functions are based on different needs, and the degree to which these reward and addict users vary[39].

A larger problem lies with a threat of pathologizing normal behaviour, i.e. determining it as a disease. Just because a person engages in an activity in great amounts does not automatically mean that the person has an addiction or some other problem, and it may not have any significant consequences. Similarly, problematic use of digital media does not automatically mean that a person has an addiction. In addictions, a person's behaviour is clearly causing them harm and mental suffering and differs from normal behaviour. In order to ensure that those with problems related to media use are provided with the support or treatment they need, diagnoses must be correct and true causes identified. As a result, exclusion criteria must be included in the criteria determined for an addiction: it is crucial to identify when a case does not concern an addiction but the person's media use is a symptom of some other problem[40].

The current research evidence indicates that excessive media use is mostly concerned with compensating for challenges in one's personal wellbeing. This may partly be a case akin to behavioural addiction. While there are always serious harms related to addiction, overuse of the term will lead to inflation, which can easily result in underestimating the needs for help of individuals experiencing serious harm. Excessive use of digital media may be related to a variety of factors, and it is important to distinguish between these. Media use may be simply part of a person's studies, work or hobby. It may also be a symptom of problems, a tool or target of problematic behaviour. Nevertheless, it is not possible to reliably distinguish between these. Instead, concepts are used haphazardly and generalisation is common.

Research evidence does not indicate that excessive media use has significant consequences on its own. Indeed, the discussion about harms could shift from excessive use to focusing on how the daily use of digital media required by today's society and the related constant interruptions can cause exhaustion and impair people's ability to concentrate. Digital media use can also bring about disagreements in families and has been statistically found to increase a person's susceptibility to encounter harmful media content or exposure to disadvantageous treatment. It may also expose people to negative impacts, including financial ones. However, individuals are not responsible for preventing these. Indeed, different attractive and addictive solutions developed to increase media use[41] and their regulation at the societal level should be examined in more detail. While there are problems associated with digital media, insufficient understanding of their root causes, mechanisms and targets inhibits both preventive and corrective measures. ■

34 Anderson et al., 2017
35 n = 2,809; Donald et al., 2018
36 Anderson et al., 2017; Fumero et al., 2018
37 Anderson et al., 2017
38 Przybylski & Weinstein, 2019; Weinstein et al., 2017
39 Ryding & Kaye, 2018
40 Kardefelt-Winther et al., 2017
41 Neely, 2019

An evidence summary is a systematic review that summarises the latest and strongest evidence related to a specific topic. Instead of forming arguments or speculating, evidence summaries are as objective as possible. They present the consensus of the researcher community, knowledge of the strongest level of evidence. An evidence summary must pass an assessment process. The evidence synthesis method has been described in more detail on page 17–18.

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PERILS OF THE INTERNET

LAURI HIETAJÄRVI

Summary

> Internet use also involves some risks. Internet users may encounter phenomena with significant harmful effects on their wellbeing.

> Nevertheless, harmful phenomena are rare.

> Strengthening media literacy reduces risks.

In which area is there still a lack of knowledge?

> The definitions of the threats vary and they are inadequately reported. As a result, the prevalence of various threats is not very well known.

> Causal relationships are unknown.

Recommendation

> There is need to increase qualitative understanding of the phenomena.

> The concepts must be used more accurately.

CYBERBULLYING

Over the past decade, 24 different definitions have been given to cyberbullying[1]. Based on these, cyberbullying can be determined as the use of information and communication technology to harm, harass, insult or embarrass other people, in a deliberate and repeated manner[2].

Based on estimates, the prevalence of becoming victimised by cyberbullying ranges from 15 to 35 per cent internationally[3], but the most recent statistics reveal less concerning results. For instance, of the pupils in years 8 and 9 of basic education who responded to the 2017 School Health Promotion study by the Finnish Institute for Health and Welfare, 25.2 per cent had been bullied at least once during the previous year, but only 28.9 per cent of these respondents reported that the bullying occurred online or via mobile phone. As a result, around 7 per cent

1   Peter & Petermann, 2018
2   Peter & Petermann, 2018
3   John et al., 2018

of young people had encountered cyberbullying at least once during the school year. 5.8 per cent of the respondents in 2017 and 5.5 per cent in 2019 had encountered weekly bullying (including cyberbullying)[4]. According to a follow-up study conducted in two Finnish cities, 3.5 per cent was experiencing cyberbullying, while 18.2 per cent had been subject to so-called normal bullying[5]. According to a smaller data set collected from a single city, 18 per cent had experienced cyberbullying, 20.6 normal bullying and 11 per cent both kinds of bullying[6]. The results of the most recent Global School-based Student Health Survey are as follows:

SHARES OF PUPILS WHO HAVE BEEN SUBJECTED TO CYBERBULLYING		
	girls	boys
total global average	14%	12%
Finnish 11-year-olds	16%	14%
Finnish 13-year-olds	17%	13%
Finnish 15-year-olds	15%	13%

Source: WHO's Global School-based Student Health Survey, 2020

There is variation in the numbers, and forming a clear picture is difficult due to the aforementioned lack of a common definition, the poor quality of research, and the absence of a summary of long-term research and qualitative case descriptions.

A medium-sized effect with varying accuracy has been found between cyberbullying and worse wellbeing and self-esteem, more self-destructive behaviour and other challenges in peer-to-peer interaction[7]. For instance, there is a medium-strong relation between cyberbullying and suicide ideation, depression and anxiety[8]. However, this is not a unidirectional relation,[9] and the situations are not identical. Young people with mental health or wellbeing challenges may also be more likely to be subjected to bullying. This is particularly the case with chronically ill or disabled people: the estimate of prevalence varies between as much as 2.0 and 41.7 per cent in this group[10]. There is a clear but weaker relation between cyberbullying and self-esteem, physical symptoms and externalizing symptoms, such as self-harm or substance abuse. Compared to non-bullied young people, those subjected to cyberbullying have an around twofold risk for self-harm and, similarly, those who self-harm are at a risk of being subjected to bullying[11]. However, it appears that active online communications do not particularly expose young people to online bullying. By contrast, according to a study based on the WHO's Global School-based Student Health Survey, the young people most active in using online messaging services have the highest number of close friends and they encounter the least bullying, and exclusion from these group chats appears to be a common form of bullying[12]. According to a Finnish study, becoming a victim of both normal bullying and cyberbullying appears to be most harmful[13].

There is a clear and significant relation between cyberbullying and worse wellbeing outcomes. Practising socioemotional skills, media literacy, and media behaviour appear to succeed in combating cyberbullying[14]. In managing bullying cases and helping victims, it is also key to consider that in each cyberbullying situation, bullies and victims are different and impacts vary[15]. Although the consequences of cyberbullying are significant in the worst cases, more serious cyberbullying appears to be rather rare. Overall, the biennial monitoring of the School Health Promotion study indicates that bullying is becoming less common—or is increasingly likely to fall out of the reach of research methods[16].

4   Finnish Institute for Health and Welfare (THL), School Health Promotion study
5   n = 2,061, Tiiri et al., 2019
6   n = 700; Uusitalo-Malmivaara & Lehto, 2016
7   Kwan et al., 2020
8   Fisher et al., 2016
9   Kwan et al., 2020
10   Alhaboby et al., 2019
11   John et al., 2018
12   Bjereld et al., 2017
13   Tiiri et al., 2019
14   Hutson et al., 2018
15   Peter & Petermann, 2018
16   Haaste, 2019; THL, 2020

REVIEWS AND META-ANALYSES EXAMINING CYBERBULLYING			
Source	Type	No. of studies included	No. of participants
Kwan et al. (2020)	review summary	19 reviews	(unknown)
John et al. (2018)*	meta-analysis	26	156,384
Fisher et al. (2016)*	meta-analysis	55	257,678
Hutson et al. (2018)	systematic review	23	(unknown)
Peter & Petermann (2018)	systematic review	24	(unknown)
Alhaboby et al. (2019)	systematic review	10	3,070

*Also included in a summary by Kwan et al.

SEXUAL HARASSMENT AND OFFENCES

Although most of sexually explicit messaging, i.e. sexting, involves normal peer-to-peer interactions[17], it may also contain some risks. When assessing risks, a distinction should be made between consensual behaviour and non-consensual activities and criminal offences[18]. Around 20.3 per cent of young people have been non-consensually exposed to sexual content and 11.5 per cent to sexually explicit suggestions[19]. Of the young people, 14.8 per cent had sent sexually explicit messages, i.e. sexted; 27.4 per cent had received such messages. 12 per cent had shared messages without the recipient's consent, and 8.4 per cent had unwillingly received messages [20] According to the 2019 School Health Promotion study, 20.6 per cent of Finnish pupils in years 8 and 9 of basic education had experienced disturbing sexual propositioning or harassment, and 16.9 per cent had experienced these via their mobile phone or online[21].

Increasing internet use had also enabled new forms of sexual offences, such as sexual predation targeting children known as grooming[22]. While the number of reports related to grooming has been growing, the phenomenon is known poorly so far. The dearth of theory

REVIEWS AND META-ANALYSES EXAMINING SEXUAL HARASSMENT AND OFFENCES				
Source	Type	Topic	Number of studies	No. of participants
Madigan et al. (2018a)	meta-analysis	non-consensual exposure to sexual content or suggestions	40	55,921
Madigan et al. (2018b)	meta-analysis	sexting	39	110,380
Mori et al. (2019)	meta-analysis	sexting	16	35467
Fernet et al. (2019)	systematic review	online domestic violence (women)	32	13,143
Nikolovska (2020)	systematic review	grooming	135	(unknown)

17 Mori et al., 2019
18 Krieger, 2017
19 Madigan et al., 2018a
20 Madigan et al., 2018b
21 Finnish Institute for Health and Welfare (THL), School Health Promotion study
22 Nikolovska, 2020

and research specifically focused on the online environment is a key problem of grooming research, as sexual grooming online is explained and partly created by the special characteristics of the online environment[23]. Between 1 and 78 per cent of young women have been subjected to harassment online or in person or other domestic violence. The great variation in the estimates is due to a lack of overall definitions.[24] Key aspects in preventive work include mindful decision making online, media literacy and ensuring confidential information flow between children and young people, and their guardians and the authorities[25].

OTHER PERILS

Other harmful marginal areas are also found online. For instance, the active social media use of 18–25-year-olds appears to be moderately related to alcohol consumption[26], which can be partly explained by peer-to-peer interactions. The young people spending more than average time on digital media are also more likely than others to be exposed to so-called harm-advocating content (pro-self-harm, pro-eating disorder and similar content[27]) or cybercrimes, which are related to poorer subjective wellbeing[28]. Nevertheless, the harm-advocating content does not appear to considerably increase self-destructive behaviour[29], but often has the opposite effect. Correspondingly, 63 per cent of Finnish young people or young adults had encountered online hate speech, and those with prior experiences of being victimised found this more disturbing than others[30]. Overall, measures developing media literacy work fairly well in preventing the impacts of harm-advocating content or engaging in risky online behaviour[31]. ∎

23 Nikolovska, 2020
24 Fernet et al., 2019
25 Nikolovska, 2020
26 Savolainen et al., 2020
27 see e.g. Keipi et al. 2017
28 Kaakinen et al., 2018
29 see e.g. Dyson et al., 2016
30 Savimäki et al., 2018
31 Vahedi et al., 2018

An **evidence summary** is a systematic review that summarises the latest and strongest evidence related to a specific topic. Instead of forming arguments or speculating, evidence summaries are as objective as possible. They present the consensus of the researcher community, knowledge of the strongest level of evidence. An evidence summary must pass an assessment process. The evidence synthesis method has been described in more detail on page 17–18.

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Nikolovska, M. (2020). *The Internet as a Creator of a Criminal Mind and Child Vulnerabilities in the Cyber Grooming of Children*. Jyväskylä: Jyväskylän yliopisto (diss.). http://urn.fi/URN:ISBN:978-951-39-7963-8

Peter, I., & Petermann, F. (2018). Cyberbullying: A concept analysis of defining attributes and additional influencing factors. *Computers in Human Behavior,* 86, 350–366. https://doi.org/10.1016/j.chb.2018.05.013

*Savimäki, T., Kaakinen, M., Räsänen, P., & Oksanen, A. (2018). Disquieted by online hate: Negative experiences of finnish adolescents and young adults. *European Journal on Criminal Policy and Research,* 1–15. https://doi.org/10.1007/s10610-018-9393-2

*Savolainen, I., Oksanen, A., Kaakinen, M., Sirola, A., Miller, B. L., Paek, H.-J. & Zych, Izabela. (2020). The association between social media use and hazardous alcohol use among youths: A four-country study. *Alcohol and Alcoholism,* 55(1), 86–95. https://doi.org/10.1093/alcalc/agz088

Terveyden ja hyvinvoinnin laitos (2020). *Kouluterveys-kysely*. https://sampo.thl.fi/pivot/prod/fi/ktk/ktk1

*Tiiri, E., Luntamo, T., Mishina, K., Sillanmäki, L., Brunstein-Klomek, A., & Sourander, A. (2019). Did bullying victimization decrease after nationwide school-based anti-bullying program? A time-trend study. *Journal of the American Academy of Child and Adolescent Psychiatry,* 59(4), 531–540. https://doi.org/10.1016/j.jaac.2019.03.023

*Uusitalo-Malmivaara, L., & Lehto, J. E. (2016). Happiness and depression in the traditionally bullied and cyberbullied 12-year-old. *Open Review of Educational Research,* 3(1), 35–51. https://doi.org/10.1080/23265507.2016.1155168

**Vahedi, Z., Sibalis, A., & Sutherland, J. (2018). Are media literacy interventions effective at changing attitudes and intentions towards risky health behaviors in adolescents? A meta-analytic review. *Journal of Adolescence,* 67, 140–152. https://doi.org/10.1016/j.adolescence.2018.06.007

World Health Organization. (2020). Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. http://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/publications/2020/spotlight-on-adolescent-health-and-well-being.-findings-from-the-20172018-health-behaviour-in-school-aged-children-hbsc-survey-in-europe-and-cana-da.-international-report.-volume-1.-key-findings

RESEARCH ON DIGITAL MEDIA USE SO FAR

What kind of research has been conducted on the media use of Finnish children and young people? Which research is still lacking? The available research is highly similar with the international research on the topic, also in terms of its deficiencies.

HENRIIKKA VAITTINEN & LAURI HIETAJÄRVI

WE SYSTEMATICALLY EXAMINED all the studies on the digital media use of Finnish children and young people found by an information specialist and in our supplementary literature searches. In total, there were 122 studies. (See page 71 for a description of the search criteria). We explicitly focused on research concerning Finnish children and young people, as similar *evidence gap map* analyses have already been previously conducted on international research (e.g. by EPPI Centre and Unicef[1]). So, what did we find, and which sort of research was lacking?

Above all, the recent research is highly focused on harms: significantly more attention has been paid to the negative impacts of media use than any positive effects.

Children aged under 12, and particularly under 7, have been the focus of least research. There is good reason to examine their media use and its connections to various factors in more detail.

There is room for improvement in the accuracy of the description of various phenomena related to media use and the meticulousness of examining causal relationships. The majority of the research is based on self-reported data simultaneously collected from respondents using a cross-sectional design. As a rule, self-reported data sets do not fare very well at describing actual media

1   For example:
     Dickson K., Richardson M., Kwan I., MacDowall W., Burchett H., Stansfield C., Brunton G., Sutcliffe K., Thomas J. (2018): *Screen-based activities and children and young people's mental health: A Systematic Map of Reviews.* London: EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London. http://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Systematic%20Map%20of%20 Reviews%20on%20Screen-based%20activties_08.01.19.pdf
     Kardefelt Winther, D. (2017). *How does the time children spend using digital technology impact their mental well-being, social relationships and physical activity? An evidence-focused literature review.* Innocenti Discussion Papers no. 2017-02, UNICEF Office of Research, Innocenti, Florence. https://www.unicef-irc.org/publications/925-how-does-the-time-children-spend-using-digital-technology-impact-their-mental-well.html
     Stoilova, M., Livingstone, S., Khazbak, R. (2021). *Investigating Risks and Opportunities for Children in a Digital World: A rapid review of the evidence on children's internet use and outcomes.* Innocenti Discussion Papers no. 2021-01, UNICEF Office of Research, Innocenti, Florence. https://www.unicef-irc.org/publications/pdf/Investigating-Risks-and-Opportunities-for-Children-in-a-Digital-World.pdf

use, and causal relationships cannot be determined in a cross-sectional design[2].

The biggest deficiencies in previously conducted research are concerned with methodology. Self-reported data is commonly used despite the fact that its problems are well-known. Cross-sectional studies and questionnaire surveys using convenience sampling are also rather too common, the latter involving drawing a sample from the most easily available respondents, such as the students in the researchers' organisation. Instead, there is a need for surveys utilising sufficiently extensive and representative samples as well as longitudinal data collected at several data collection points. To the extent possible, there is also a need for experimental studies that involve examining the impacts of phenomena on one another in a controlled environment and situation created for the purpose of the study. Regrettably few studies have also been based on genuine user data and register data sets thus far.

Compliance with open science policies[3], such as the pre-registration of research questions, methods and hypotheses, and open publication of data and analyses, is also unfortunately poor. Even though 43 of the quantitative and 25 of the qualitative studies in the data are open access publications, only one quantitative study used a pre-registered research design. The data of only two of the studies had been shared openly, and only one of these also provided an analysis code and printouts required for the repeatability of results. To ensure the reliability and quality of research, it is important that the open research policy is widely adopted.

In the following pages, we will present in more detail which topics and user groups the research on media use has covered, which samples, sampling methods and data sets have been used, and the level of the journals in which the studies have been published. Quantitative research is first presented and is followed by the qualitative studies. ◼

In total, we found 122 studies on the digital media use of Finnish children and young people. The share of quantitative and qualitative research is as follows:

30%
Qualitative studies
(36)

70%
Quantitative studies
(86)
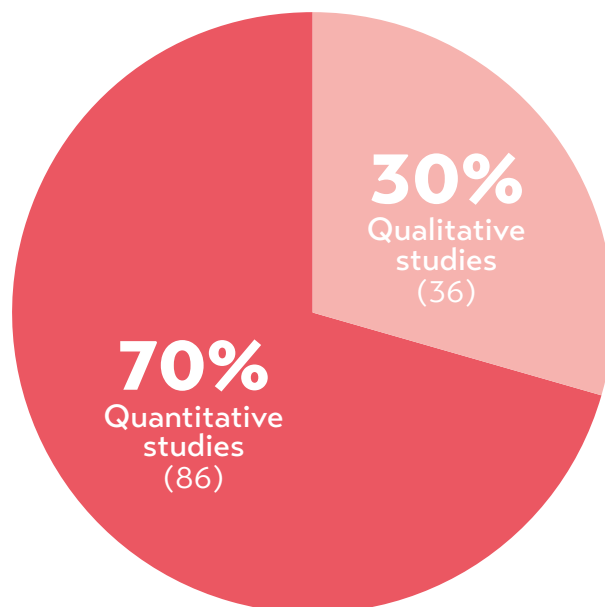
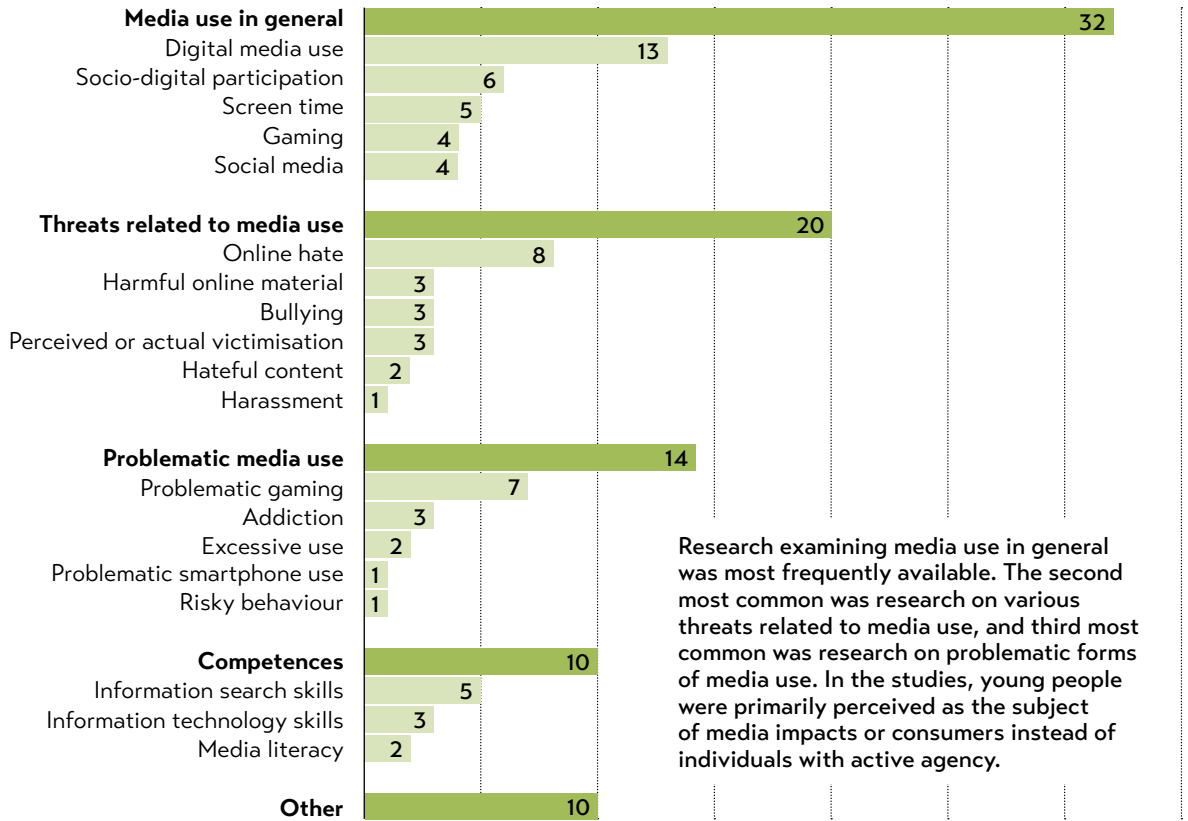2   Ks. Parry, D., Davidson, B. I., Sewall, C., Fisher, J. T., Mieczkowski, H., & Quintana, D. S. (2020, October 1). Measurement Discrepancies Between Logged and Self-Reported Digital Media Use: A Systematic Review and Meta-Analysis. https://doi.org/10.31234/osf.io/f6xvz
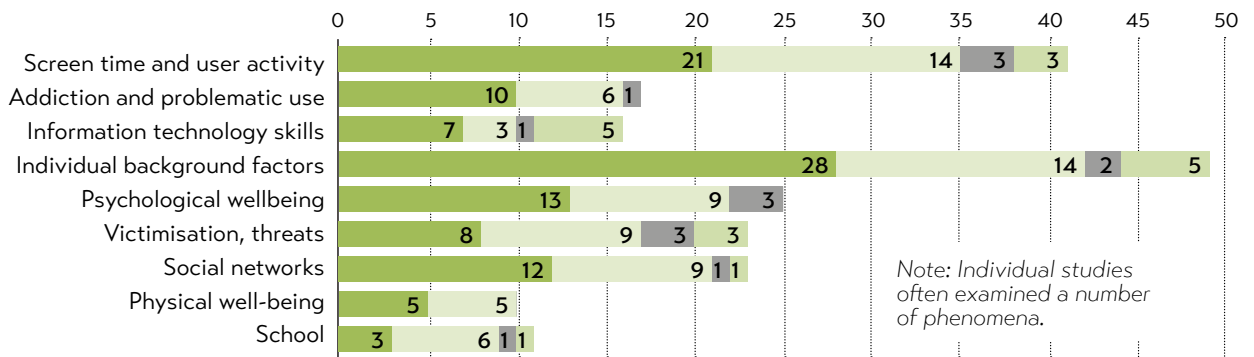
3   Declaration for Open Science and Research 2020–2025, https://avointiede.fi/sites/default/files/2020-02/declaration2020_0.pdf

I QUANTITATIVE RESEARCH

WHICH TOPICS HAVE BEEN MOST OFTEN STUDIED QUANTITATIVELY?

Media use in general — 32
Digital media use — 13
Socio-digital participation — 6
Screen time — 5
Gaming — 4
Social media — 4

Threats related to media use — 20
Online hate — 8
Harmful online material — 3
Bullying — 3
Perceived or actual victimisation — 3
Hateful content — 2
Harassment — 1

Problematic media use — 14
Problematic gaming — 7
Addiction — 3
Excessive use — 2
Problematic smartphone use — 1
Risky behaviour — 1

Competences — 10
Information search skills — 5
Information technology skills — 3
Media literacy — 2

Other — 10

Research examining media use in general was most frequently available. The second most common was research on various threats related to media use, and third most common was research on problematic forms of media use. In the studies, young people were primarily perceived as the subject of media impacts or consumers instead of individuals with active agency.

WHAT IS THE RELATIONSHIP BETWEEN MEDIA USE AND THE EXPLANATORY OR EXPLAINED PHENOMENON?

	0	5	10	15	20	25	30	35	40	45	50
Screen time and user activity					21			14	3 3		
Addiction and problematic use		10		6 1							
Information technology skills		7	3 1	5							
Individual background factors							28		14 2	5	
Psychological wellbeing			13		9 3						
Victimisation, threats		8		9 3 3							
Social networks			12		9 1 1						
Physical well-being		5	5								
School		3	6 1 1								

Note: Individual studies often examined a number of phenomena.

■ Media use is explained by the phenomenon *(40 studies)*
■ Media use explains the phenomenon *(29 studies)*
■ Bidirectional relationship *(6 studies)*
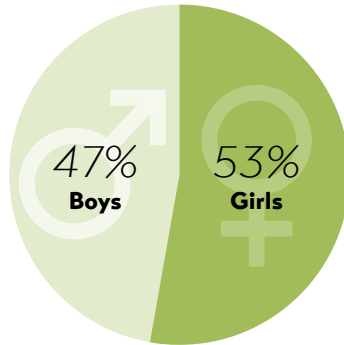■ Not specified *(9 studies)*

The majority of research sets out to explain media use or related phenomena—particularly screen time and other media use activity, but also problematic media use or falling victim to online threats. Common explanatory factors include individual background factors and psychological wellbeing.

The examined phenomena were fairly similar in both studies in which media use was a key explanatory factor as well as in studies explaining media use. Ho-

wever, in topics such as those related to school, media phenomena were more often attributed an explanatory role.

Most of the studies used a cross-sectional design, which does not lend itself to the identification of causal relationships, i.e. as a rule, naming the explained and explanatory phenomenon is arbitrary. Only few of the studies utilised a longitudinal design and examined the actual direction of the effects.

WHOSE MEDIA USE HAS BEEN STUDIED QUANTITATIVELY?

**13–18-year-olds** *(79 studies)*

19–25-year-olds *(50)*

Adults *(27)*

Under 12-year-olds *(30)*

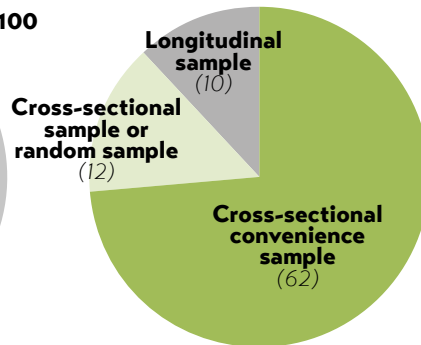**Under 7-year-olds** *(6)*

47% Boys

53% Girls
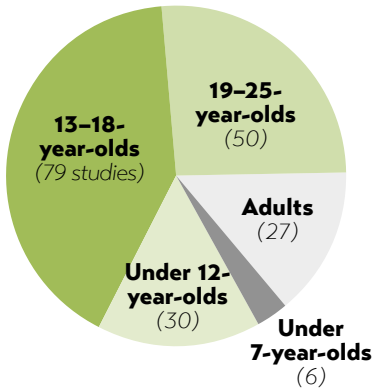
The quantitative studies were focused on 13–25-year-olds. Under 12-year-olds have been studied fairly little, and those under 7 very little. On average, the gender division is even: around 52 per cent of the data concerns girls.

Note: Individual studies often covered a number of age groups.

WHAT WERE THE SAMPLE SIZES?

Over 5,000 *(9)*

Under 100 *(2)*

1,000–5,000 *(23 studies)*

100–500 *(22)*

500–1000 *(25)*
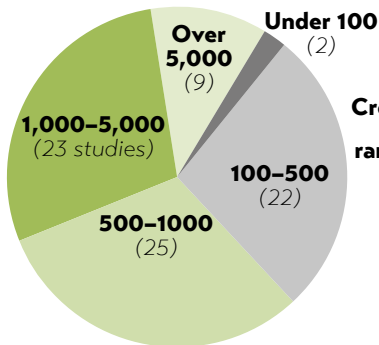
WHAT KIND OF SAMPLING WAS USED?

Longitudinal sample *(10)*

Cross-sectional sample or random sample *(12)*

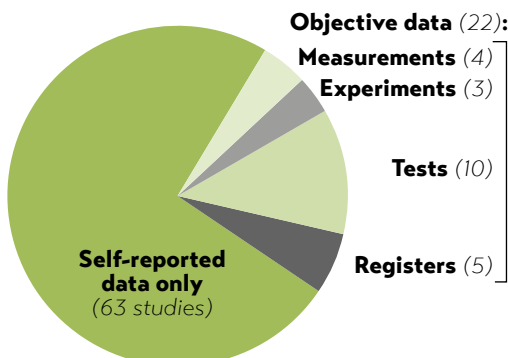**Cross-sectional convenience sample** *(62)*

Small samples including less than 1,000 persons were most common. Many of the studies used the same data.

The majority of the studies used convenience samples collected in a cross-sectional setting. The representativity of the samples was either unknown or had not been clearly indicated in the study. As a rule, all of the studies used a correlative, i.e. non-experimental research design, which can be used to investigate relations between issues but not actual causal relationships. Only 12 of the studies used a longitudinal design.

WHAT SORT OF DATA WAS USED IN THE STUDIES?

Note: One of the studies occasionally used several different data sets.

Objective data *(22)*:

Measurements *(4)*

Experiments *(3)*

Tests *(10)*

Registers *(5)*

Self-reported data only *(63 studies)*

The majority of the studies were based on self-reported data. Only 22 studies were found that were based on so-called objective data. The most common type of objective data was different skills tests, which had been utilised in 10 studies, and register-based school grades.

WHERE WERE THE STUDIES PUBLISHED?

Category 0 *(6)*

Not categorised *(9)*

Category 3 *(4)*

Category 2 *(14)*

Category 1 *(53 studies)*
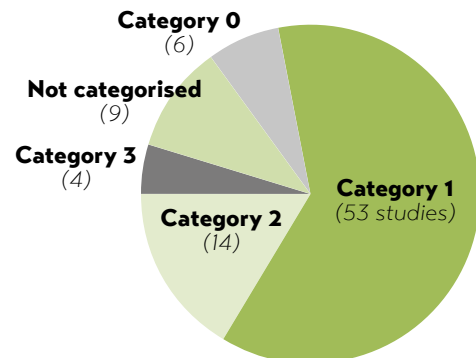
Most of the articles have been published in the JUFO category 1 publications or publications not categorised at all. Only 21 percent of the research (18 studies) had been published in the leading journals (categories 2 and 3).

II QUALITATIVE RESEARCH

WHICH TOPICS HAVE BEEN MOST OFTEN STUDIED QUALITATIVELY?

Media use in general — 11
Social media — 4
Digital technology use — 2
Discussion forums — 1
Reading using a smart device — 1
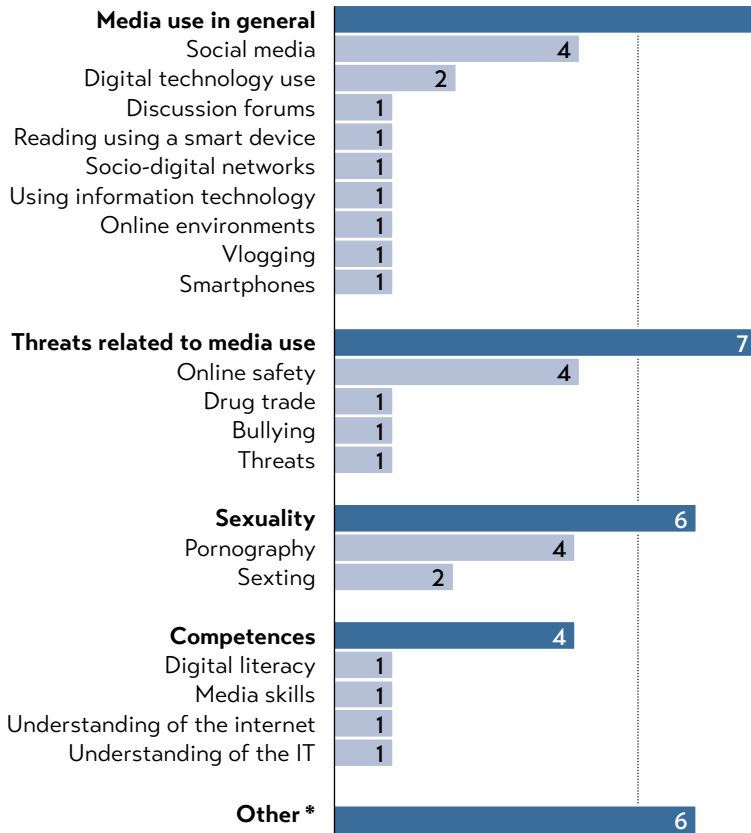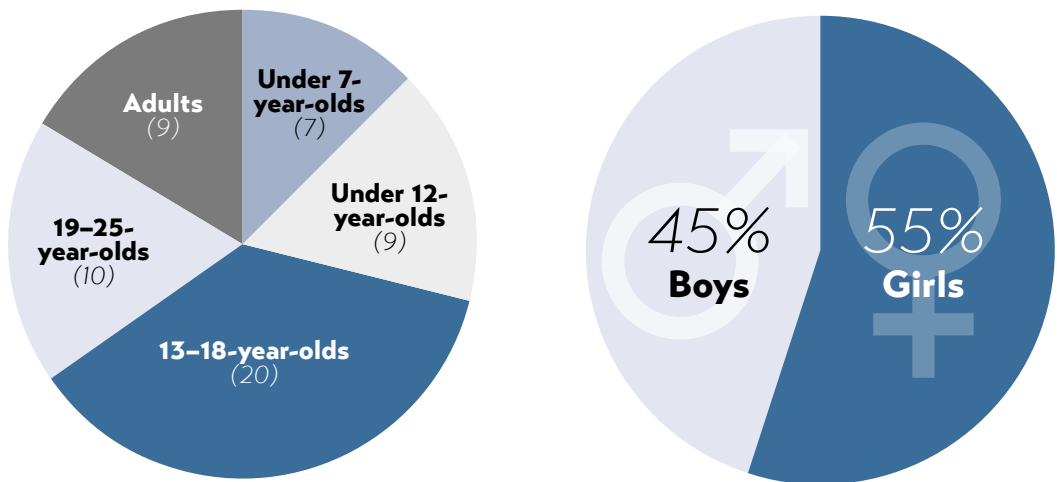Socio-digital networks — 1
Using information technology — 1
Online environments — 1
Vlogging — 1
Smartphones — 1

Threats related to media use — 7
Online safety — 4
Drug trade — 1
Bullying — 1
Threats — 1

Sexuality — 6
Pornography — 4
Sexting — 2

Competences — 4
Digital literacy — 1
Media skills — 1
Understanding of the internet — 1
Understanding of the IT — 1

Other * — 6

The qualitative studies were largely concerned with the same themes as the quantitative ones, but had a slightly broader and more versatile scope. Young people's role in actively shaping their media landscape also emerged more often.

* Topics in the category "Other":
  • anonymity
  • digital work
  • ubiquitous information technology and the Internet of Things
  • reading online material together
  • depression interventions
  • Minecraft and peer learning

WHOSE MEDIA USE HAS BEEN STUDIED QUALITATIVELY?

Note: One study involved examining several age groups for several times.

Adults *(9)*
Under 7-year-olds *(7)*
Under 12-year-olds *(9)*
19–25-year-olds *(10)*
13–18-year-olds *(20)*

45% Boys
55% Girls

Similarly as in quantitative research, the age distribution of the qualitative studies was focused on 13–18-year-olds. Gender distribution was not as even as in the quantitative research.

WHAT SORT OF DATA WAS USED IN THE STUDIES?

Objective data *(6)*

Both *(6)*

Self-reported data *(23)*
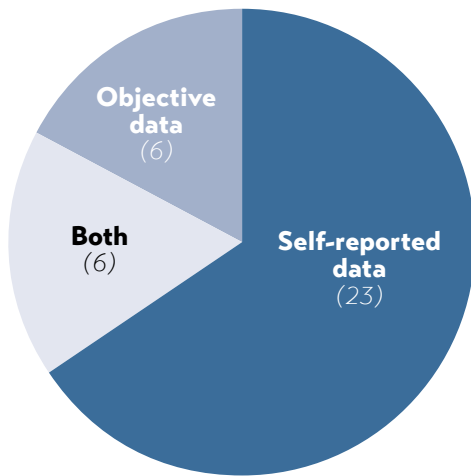
The qualitative research also largely relied on the respondents' personal views. The use of different observation data was low, albeit relatively more prevalent than in the quantitative studies.

WHERE WERE THE STUDIES PUBLISHED?

Not categorised *(7)*

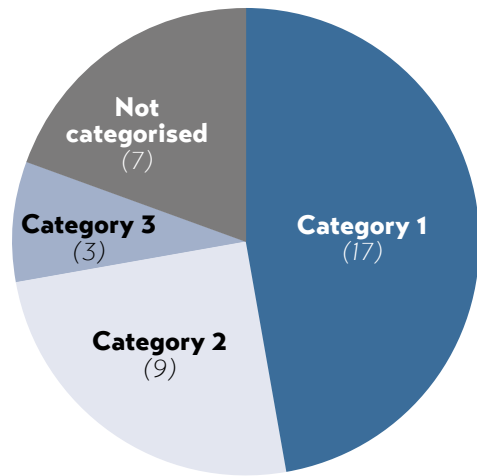**Category 3** *(3)*

Category 2 *(9)*

Category 1 *(17)*

While relatively more of the studies had been published in the JUFO category 2 and 3 publications compared to the quantitative studies, the emphasis was also on category 1 in qualitative research.

IMPLEMENTATION OF THE EVIDENCE GAP MAP

The evidence gap map is based on a literature search conducted by an information specialist in the spring of 2020, which was further supplemented in autumn 2020 using the same search criteria (for a more detailed description of the literature search by the information specialist, see p. 20–21). The supplementary search was used to look for articles published in 2020, which concern young people (mainly under 25 years of age) from Finland and whose topic is some area of digital media.

The supplementary search was conducted in the Google Scholar, Scopus and Web of Science databases using the following search phrase:

(adolescents OR children OR students OR young people OR nuoret OR lapset OR opiskelijat OR nuoriso) AND (internet OR social media OR smartphone OR facebook OR digital games OR digitaaliset pelit OR sosiaalinen media OR verkko OR cyber) AND (finland OR finnish OR suomi OR suomalainen)

As the data is based on a database search, any deficiencies in the data set are caused by the keywords in the articles and the search term choices.

After excluding any inappropriate sources from the data, any duplicates, i.e. articles already included in the data, were removed. The results were subsequently categorised.

HOW TO STRENGTHEN THE BENEFITS AND RESTRAIN THE HARMS OF DIGITAL MEDIA?

What do the results presented above mean in practice? We used them as the basis for preparing proposed measures for public administration and companies.

ARE RESEARCHERS meant to give practical suggestions for measures based on research findings? Based on one view, the answer is no: decision-makers should only be provided with research evidence describing a phenomenon, which they can make use of in the way they deem best. According to another view: it is good that in addition to research findings, which may be difficult to grasp, researchers, as experts in their field, provide decision-makers with an informed opinion of which actions should be taken based on the results. This makes the work of decision-makers easier, as they are constantly at the midst of a flood of information. As the goal of this phenomenon map is to summarise reliable research evidence in a format that is as easy to utilise as possible, we formulated a set of proposed measures, presented on the following pages, together with experts.

The evidence syntheses explain what has been studied thus far and how the topic has been discussed. We aim to use the proposed measures to move the discussion forward. The proposals are targeted at, above all, different levels of public administration, and for companies. We had no interest in providing instructions at the level of individuals and families, as too much responsibility for restraining the problems related to media use has already been placed on them.

We started by examining the syntheses to detect the key problems to be solved. We found the following:

1. The responsibility for preventing the harm caused by media has been strongly placed on individuals and families.
2. The blame on excessive media use is put on individuals, while at the same time, creating services that are as addictive as possible is deemed acceptable.
3. The UN Convention on the Rights of the Child requires providing children with a rich media landscape while protecting them against potential harm.
4. Diagnosing and treating harm caused by media remains unclear. We do not know what actually causes the harm and whether the phenomena related to problematic media use are actually symptoms of other wellbeing or mental health challenges.
5. The majority of the services offered by society are digital. Do people have sufficient media skills?
6. The conceptions of digital media users are stereotypical, and user groups are considered homogenous.

We looked for potential solutions in two workshops. The participants included experts acquainted with the above questions representing the scientific community, administration and non-governmental organisations alike. The ideas generated by the working group were categorised and summarised as proposed measures, which were sent for a round of comments for everyone participating in the process. You can read the outcome of this work in the following pages.

1. THE ACCURACY OF THE EXAMINATION OF THE IMPACTS OF MEDIA USE MUST BE IMPROVED

Media is used in various ways and for different purposes. The impacts of media are diverse, ranging from positive to negative and from minor harm to serious crimes. Preventing, combating and treating serious harms requires identifying and precisely naming these. Any measures and recommendations by public administration and healthcare in particular must be founded on research evidence, and the messages must have accurate and intelligible content.

What does this mean in practice?

1. The accuracy of terminology and criteria must be improved. The unclear use of terms such as *screen time* or *addiction* should be abandoned, as these are difficult to understand and involve excessive generalisation.

2. Up-to-date, precise and objective information about media use and its effects is needed. This requires long-term research based on follow-up data, user experiences, user data, and register data.

3. Research has emphasised the harms caused by media use. However, media use also has immense positive effects. We need more information about the positive effects so that we can strengthen them while preventing the negative impacts better than currently.

4. In measures that aim at preventing the harm caused by media,
   - there is need to separate
     1) the regrettable but harmless effects of media,
     2) serious harms, and
     3) criminal offences (particularly serious internet-facilitated sexual offences targeting children aged under 18). Information about what kind of online activity meets the characteristics of a criminal offence must be provided for all internet users.
   - genuinely problematic media use must be distinguished from non-problematic use. The diagnostic criteria of mental health issues caused by media use must be confirmed, and these must include exclusion criteria which indicate when the use is not problematic. Current Care Guidelines and a treatment path must be drawn up for healthcare.
   - there is need to separate

   a) harm resulting from the user's own activities and
   b) harm resulting from the activities of other users.
   - we must recognise that young people can be both victims and perpetrators in internet-facilitated criminal offences, and also produce material to support the prevention of crime (e.g. for identifying the limits of criminal activity).

5. Digital skills must be perceived as part of civic skills needed in daily lives and a continuum, whose development must be supported in people of all ages based on their own needs and starting points, from early childhood education and care through all levels of education and beyond formal education.
   - The assessment of digital skills and related supplementary training must be integrated into labour market training.
   - The development of digital skills must be considered a cross-cutting part of all education instead of a separate entity that can be ignored in many school subjects.

6. Public administration services must be developed to better correspond to the needs and capabilities of all different user groups. The user-friendliness of the services must be constantly monitored and updated.

7. Public administration must enhance its competence in both obtaining and utilising user data (e.g. in the anticipation of harm caused by media, identification of risk groups, and planning of services). It must have the capacity to regulate related services.
   - Any measures by the public administration— including those aimed at preventing harm caused by media—must be founded on actual,

comprehensive data on digital media use and various users. The special features of different age groups must be taken into consideration.

8. Any media companies receiving public funding must be required to use responsible and ethical technology respectful for human rights (e.g.

Ethical OS Toolkit), and engage in cooperation with public administration in preventing and responding to harm related to media use. Funding applications must be made to include an assessment of the potential impacts of the service on users.

2. STATUTES AND CONVENTIONS PROMOTING THE SAFETY OF MEDIA USERS MUST BE ADOPTED

There are already some promising statutes, recommendations and conventions that aim at protecting media users. These must be fully introduced and their implementation must be monitored and followed. Relevant administrative bodies must also be named.

What does this mean in practice?

1. International conventions, guidelines and statutes must be addressed in a national collaborative body, which is also responsible for preparing and following the implementation of these instruments. For example:
   - European Commission Guidelines to respect, protect and fulfil the rights of the child in the digital environment (Recommendation CM/Rec(2018)7) must be adopted in Finland, and the implementation must be followed.
   - Under the EU's Audiovisual Media Service Directive (AVMS), video sharing platform services must promote media literacy. Sufficient public authority resources for related monitoring must be ensured and the implementation must be followed.

2. There is need to bring together everyone involved in monitoring the digital operating environment and the instructions, rules and materials they produce. So far, different authorities and administrative branches have borne the responsibility for the phenomena related to media use, which has made it difficult for those working with children and young people, and especially young people themselves, to find the information or authority they are looking for. Collaboration between different agents should be increased and the information should be compiled into one place.
   - Support should be more easily available for those affected by various levels of harm and particularly the victims of crimes. A clear, official body must be appointed as the first contact for a treatment path enabling people to report any inappropriate activity they have

experienced or observed with a low threshold, and which will refer those looking for help or advice to the relevant authority or service.

3. The main responsibility for the harm caused by media and the prevention of internet-facilitated sexual offences targeting children lies with the Ministry of Education and Culture. This preventive work must also be integrated in the Internal Security Strategy of the Ministry of the Interior. Non-governmental organisations play an active role in the field, and there is need to strengthen the collaboration with them.

4. Resources must be safeguarded for the responsible bodies:
   - There is need to strengthen the resources of the police and the judicial system in investigating internet-facilitated crime targeting children.
   - There is need to strengthen the resources of the social and health authorities and NGOs operating in the sector in treating and preventing serious harm caused by media to children.
   - There is need to strengthen the resources of educational work and student and pupil welfare services (school social workers and psychology) that aim at preventing cyberbullying and sexual harassment and other inappropriate online behaviour. For example, supplementary training must be provided to ensure that those working with children and young people are aware of their official responsibilities related to harassment and know how to respond to this.

LITERATURE SEARCH RESULTS

MARIA HAKALAHTI (ACTUAL LITERATURE SEARCH) &
LAURI HIETAJÄRVI (SUPPLEMENTARY SEARCHES)

1. EXCESSIVE USE

INTERNET AND SMART DEVICES

Blinka, L., Škařupová, K., Ševčíková, A. et al. (2015). Excessive internet use in European adolescents: What determines differences in severity? *International Journal of Public Health,* 60, 249–256. https://doi.org/10.1007/s00038-014-0635-x

Huotari, P., Aunio, M., Paavola, L. & Kallio, J. (2019). Passiivisesti vietetty ruutuaika ja sen sisällölliset muutokset sekä yhteydet fyysiseen aktiivisuuteen 7. luokalta 9. luokalle. *Liikunta ja tiede,* 56(2), 84–89. https://jyx.jyu.fi/handle/123456789/64921

Karacic, S. & Oreskovic, S. (2017). Internet addiction through the phase of adolescence: A questionnaire study. *JMIR Mental Health* 2017, 4(2). https://doi.org/10.2196/mental.5537

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Phenomenon map presents what is known about a phenomenon based on the most recent and high-quality research—in this case about the impacts of digital media on children, young people and senior citizens.

A PHENOMENON MAP is a method used in producing reliable evidence syntheses on complex topics corresponding to user needs. This report includes all parts of the first phenomenon map, which explored the impacts of digital media. It provides useful reading material for anyone interested in the effects of digital media, the media use of children, young people and older people as well as evidence syntheses and their production.

- **Six evidence syntheses at different levels**
  - *There are no digital natives*
  - *Older people need media education that transcends mere digital support*
  - *Why we should stop talking about screen time*
  - *Social media is an environment that supports interaction*
  - *Digital media, addiction and wellbeing.*
  - *Perils of the Internet*
- **An evidence gap map** shows which research has been conducted on the digital media use of Finnish children and young people and what is still missing
- **Suggested measures** that experts have drawn up based on evidence syntheses
- **Models for assessing the level of evidence** in reviews and original studies
- **A list of literature** on the most recent research on the impacts of digital media on children and young people
- **Descriptions of methodology and processes**

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