Towards a Nordic MIL-index

A feasibility study for a

Nordic Media and Information Literacy Index

by:

MEDLiE (Media Literacy and Education Research Group) v /

Daniel Schofield, Associate Professor

Vegard Frantzen, Assistant professor

Reijo Kupiainen, professor

Department of Education and Lifelong Learning, NTNU

This is a feasibility study written on behalf of the Swedish Media Council and the media authorities in Norway, Denmark and Iceland in connection with measuring aspects of Media and Information Literacy (MIL) in the population in the respective countries.

The feasibility study has been conducted by the Department of Education and Lifelong Learning (IPL) at the Norwegian University of Science and Technology (NTNU). MEDLiE (Media Literacy and Education Research Group), which consists of Daniel Schofield (project leader and lead author), Reijo Kupiainen and Vegard Frantzen, has been responsible for the project.

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Preface

This report was conducted under very special circumstances that left a serious and somewhat threatening mark on everyday life, but which also demonstrated the need we in 2020 and 2021 have for skills, knowledge and attitudes related to information and media use. 2020 was a year colored by two major global events; the covid-19 pandemic and the election campaign in the United States. Both of these events also were *media* events, which put people to the test when we have to deal with the continuous flow of news and information of varied sources, different genres and formats. Media and information literacy is therefore highly relevant and important for the entire population.

Writing the report has been an extensive but very educational process. We would like to thank Hans Petter Ulleberg, head of department at the Department of Education and Lifelong Learning, for support and for providing conditions that made it possible for us to complete the report. We would also like to thank Anita Oxaas Karlsen, Wenche S. King and Annika Marstrand for administrative support, Vegard Johansen at IPL, NTNU for excellent advice regarding methodological choices, and Jan Christofferson at the Swedish Media Council for efficient help in several phases of the project. Finally, big thanks to Anette Novak, for the constructive feedback and support throughout the process.

Trondheim March 15, 2021

Daniel Schofield, Vegard Frantzen, Reijo Kupiainen

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Summary

This feasibility study is an assignment from the media authorities in Sweden, Norway, Denmark and Iceland, who aim to carry out periodic measurements of aspects of Media and Information Literacy (MIL) among the populations in the respective countries. A long-term goal is to be able to follow developments over time and ultimately to identify possible vulnerabilities and suggest direct efforts towards these vulnerabilities. A goal of this feasibility study has been to conduct a preliminary analysis and make an assessment of how indicators and an index of MIL might look like.

The main methodology is a systematic review of existing research. We have analyzed research publications related to measuring media and information literacy levels in the period between 2000 and 2020. In addition to extensive searches in academic databases, we have reviewed key documents and other relevant literature in the field. We find that this is a field dominated by international actors such as UNESCO, Ofcom, EAVI and the European Commission, and several of the best developed frameworks for measuring media and information literacy have their origins in initiatives from such international organizations. The frameworks from EAVI, Ofcom, Livingstone, DigComp and UNESCO are all different complex conceptual frameworks but have several clear common features.

We recommend two frameworks with associated indicators for the further work with measuring MIL. This applies to *Media and Information Literacy* scale developed by Lopes, Costa, Araujo, and Ávila (2018) and *DigComp*, a framework for measuring digital literacy, and which is reviewed by Siddiq, Hatlevik, Olsen, Throndsen, and Scherer (2016). These frameworks stand out in our research review because they are comprehensive and broadly defined, they have been validated through pilot studies or through extensive reviews of previous research. The framework developed by Lopes et al. (2018) is validity tested in a pilot study and is well documented for measuring a variety of different aspects of MIL, while DigComp emphasizes "new" media use and captures aspects of MIL that we see as important in a future perspective.

The feasibility study also provides recommendations for a long-term development of a MIL index in the Nordic countries; Methodologically, we recommend that a survey should include

a combination of self-reporting and various proficiency tests or task-based measurements, which will strengthen the quality of the survey's methodology. Furthermore, we recommend that critical assessments need to be made with regard to the complexity of the conceptualization and operationalization of media and information literacy.

We outline two design alternatives; *1)* a relatively narrow and limited study and *b)* a conceptually broader study, where certain aspects of MIL are measured on "rounds" in a thematically rotating system. Finally, we recommend that a pilot study is carried out in order to validate and critically assess the index before a full-scale mapping is implemented, and also that the measurement is researcher-led, and that high scientific standard is ensured.

1. Introduction

In 2020, the media authorities in Sweden, Norway, Denmark and Iceland announced a tender for an assignment that consisted of conducting a feasibility study of how the measurement of media and information literacy in the populations of the countries can be done. The research group MEDLiE (Media Literacy and Education Research Group) at the Department of Education and Lifelong Learning at NTNU, Norway, was awarded the tender.

In this chapter, we present the background for the feasibility study and introduce the goals and the basis of our work. We also briefly account for the key concepts related to media and information literacy as well. We also discuss what we consider to be the most important points regarding the theoretical background for media and information literacy, but also theories related to concepts such as media literacy and digital literacy. Following this, we present the most important limitations in the study and finally, and finally an overview of how the report is structured.

1.1. Background for the feasibility study

In the invitation to tender (see Appendix 1), it was described that the media authorities in Sweden, Norway, Denmark and Iceland aims to measure the level of important aspects of media and information literacy (hereinafter referred to as MIL) in the populations of the respective countries. The concrete assignment was to conduct a feasibility study where existing indicators and indexes of MIL are explored, and an aim was to assess how a such a measurement could be designed and ultimately what a future Nordic MIL index might look like. An index should be designed in a way that allows for regular measurements that are comparable over time. This feasibility study can therefore be seen as important for preparing and identifying indicators of MIL and for proposing a MIL index.

The invitation to tender further described that the feasibility study *is expected* to contain the following (see p. 1 in appendix 1):

1. A mapping of internationally existing methods for developing a MIL index, including indicators and tools for measurement.
2. An analysis of the different methods that are found in the mapping.
3. A recommendation of the most appropriate method or methods.

A discussion of the preconditions for a long-term management of the proposed method. The feasibility study should therefore include an account of how the method can be managed and maintained over time, also by actors other than the person/persons who developed the specific method/methods. In addition, it is expected that the feasibility study proposes (named) actors who can administer the MIL mapping in the long term.

Moreover, it is expected that the feasibility study should prioritize an analysis of the different methods' validity, reliability, and comparability over time, and also their sensitivity to technological development. It is also specified that the feasibility study should prioritize reviewing methods collecting quantitative data.

1.2. Presentation of the research group

MEDLiE is an acronym for Media Literacy and Education Research Group. MEDLiE consists of the group leaders Daniel Schofield (Associate Professor at NTNU, Department of Education and Lifelong Learning) and Vegard Frantzen (Assistant Professor at NTNU, Department of Education and Lifelong Learning). The other group members are Reijo Kupiainen (Adjunct Professor at NTNU and University Lecturer at Tampere University, Finland), Soilikki Vettenranta (Professor Emerita at NTNU, Department of Education and Lifelong Learning), Mia Fasting (PhD research fellow at NTNU, Department of Education and Lifelong Learning).), Anne Torhild Klomsten (Associate Professor at NTNU, Department of Education and Lifelong Learning) and Odin Fauskevåg (Associate Professor at NTNU, Department of Education and Lifelong Learning).

In this feasibility study, however, the following people have been active contributors:

- **Project leader and lead author:** Associate Professor Daniel Schofield
- **Participating parties:**
    - Professor Reijo Kupiainen
    - Assistant Professor Vegard Frantzen

1.3. Objectives of the project

Based on the invitation to tender, our goal with this feasibility study is to carry out an initial analysis and assessment of what a future index of Media and Information Literacy (MIL) might look like and also an analysis of relevant indicators. As mentioned, the feasibility study is based on an assignment from the media authorities in Sweden, Norway, Denmark and Iceland, who

want to carry out regular measurements of important aspects of MIL in the populations in the respective countries. The aim is to follow developments in the populations' MIL levels over time and to identify possible changes. The feasibility study is meant to be a basis for defining media and information literacy, and also for selecting and designing a MIL index. The feasibility study is also a basis for selecting of actors who can perform the MIL measurements and administer the MIL mapping in the long term.

1.3.1. MEDLiEs specific goals

The specific goals of this feasibility study are to:

- Map and analyze existing methods for measuring MIL, including indicators and tools for measurement tools.
- Map and evaluate existing concepts
- Analyze and compare key findings from the mapping mentioned above.
- Analyze and compare applications of concepts from the mapping mentioned above
- Identify any research gaps, as well as the strengths and weaknesses of existing methods and surveys.
- Prepare a recommendation of methods, concepts and indicators that the Nordic media authorities could use in their further work.
- Discuss the prerequisites for further work, future management and administration of the methods proposed. This includes a recommendation of named actors who can lead the MIL mapping in the longer term.

As researchers, we are particularly concerned with assessing the different types of methodology that exist, particularly research quality, i.e., validity and reliability, possibilities for generalization and replicability, and also the possibilities for comparison over time and whether the methods are sustainable and suitable for capturing changed media practices due to technological development. Our main methodology in the feasibility study is a *systematic review,* which is most appropriate for achieving these goals is. The method is described more in detail in chapter 2.

1.4. Research question

Based on the invitation to tender and the goals described above, our main research questions are:

What methods for measuring levels of media and information literacy exist and what characterizes them? Moreover, in which countries are the measurements carried out, when were they carried out, what sample are they based on and what data collection methods are used?

In addition, the following sub-questions are important:

- *What concepts are applied in the existing surveys and how are they defined?*
- *What are key findings in the various studies found in the systematic review?*

Based on these open problem formulations, we aim to respond to the goals described in section 1.3.1., relating to possible research gaps, recommendation of methods, concepts and indicators, as well as recommendation on the management of a future long-term strategy with mapping of MIL in Sweden, Denmark, Norway and Iceland.

1.5. Contextual description

Before we elaborate on our theoretical considerations when it comes to *media and information literacy*, we see it as necessary to describe the context of the feasibility study and more generally the need for literacy in the 21st century. As we see it, the ambition of mapping the level of MIL should be seen in the light of what is often understood as an increasing need for media and information literacy in general. This does not apply exclusively to the population in the Nordic countries, it is a topic of great international interest. In recent years, issues such as fake news, misinformation and similar phenomena has received a lot of attention. But media use is also to related to coping with everyday life, and with education, learning, mental health, and a number of other associated aspects. Skills and knowledge related to media use and information is thus linked to a large part of the problematic aspects of the contemporary culture. At the same time, media use and access to information are related to several of the "benefits" of modern society, such as democracy and the freedom of speech, and access to entertainment, social practice, play and development. These issues have been given attention in general in the Nordic countries, but also specifically in school and education, where learning in and through the media and "new" forms of expression have been emphasized.

Concepts such as digital literacy (digital *literacy* or '*kunnighet'* in the Nordic countries), media literacy (media *literacy* or '*kunnighet'* in the Nordic countries), information literacy and 'media and information literacy' have been widely used to describe the knowledge and skills needed

to cope with a digital and media-dominated culture (Erstad, 2010c). In this respect, there exists several areas of literacy with different applications, but which are largely related to each other, such as digital literacy, multiliteracies, media literacy, information literacy and 'critical media understanding'. In policy documents in the Nordic countries, such areas of literacy are often described as basic skills that are necessary to cope with everyday life, as well as in education and in the future professional life (Godhe, 2019). The rationale for this view can be traced to the international political discourse expressed in e.g. OECD's (2005) definition of key competences and the European Commission's (2009, 2019) description of 21st century skills and competences.

In theories of digital and media literacy and associated concepts, literacy or literacy is most often understood as something that is not only developed in formal arenas such as school. Such everyday literacies are rather seen as something developed in a holistic and lifelong process. This view is particularly relevant with regard to literacies related to media use, and information search on the internet and digital surfaces. Today we use the media and communicate through the media during most of the day and in most aspects of life. The role of the media in our everyday lives is also constantly changing. The same can be said about concepts associated with media and information literacy - the view on the importance of different literacies has changed over time. In the Nordic schools, emphasis was for a long time placed on general media knowledge and on critical reception of media messages (Erstad, 2010a, 2010c; Frantzen & Schofield, 2018). Today, the focus is more on broad areas of literacy related to both social practices and individual processes taking place in and through digital media.

Phenomena such as fake news and misinformation are today central threats to democracy and strengthening people's media and information literacy are seen as an important measure to 'deal with' and resist disinformation. Increasing people's awareness and strengthening people's skills in source criticism are often highlighted as particularly important. Education is emphasized as critical when it comes to increasing children's and young people's media and information literacy, and although literacy is developed in all areas of everyday life, school is seen as a very important arena for developing media and information literacy. This view is recognized in key policy documents, for example from Nordic Co-operation (Nordisk samarbeid, 2020, our translation), where the following is stated:

> *"It has never been more important to be able to distinguish between correct and fictitious news, and we should strengthen the exchange of experiences in the Nordic countries when it comes to these issues. To handle all the information, we are confronted with every day represents a massive challenge, [...] We need to become better at assessing and analyzing the flow of information".*

Thus, the importance of gaining more knowledge about media and information literacy is often emphasized. When the special report "The media literate citizen - media literacy in a Danish context"[1] (Kulturstyrelsen, 2014) was launched, the following was highlighted:

- *In the new fragmented and complicated media reality, citizens have almost unimaginable possibilities, which all require competencies to utilize and master in order to acquire knowledge and information and protect themselves where necessary.*
- *Media literacy is - maybe increasingly – a prerequisite for citizenship, participation in the democratic conversation and for making qualified choices that are for the best – both for the individual and for society.*

In the same report it was also described that the knowledge of the level of media literacy in the Danish population was limited. The same can today be said about the populations of the other Nordic countries; there has not been conducted any regular and/or systematic surveys of media literacy, information literacy or media and information literacy in the general population. But in 2019, the Norwegian Media Authority (Medietilsynet, 2019) conducted a survey of *critical media understanding*[2], which is a different but related concept to media and information literacy. This survey was called a "*zero-point survey*" and was meant to be a starting point which future surveys can be compared to. The Norwegian Media Authority has set a goal to conduct periodical and comparable surveys of critical media understanding in the Norwegian population (Medietilsynet, 2019). The survey conducted in 2019 had 1363 participants between 16 and 100 years. The survey on critical media understanding is further reviewed in our research review in Chapter 4 and is also discussed in Chapter 5.

All in all, this feasibility study should be seen in connection with the aim of initiating a survey of the MIL level of the populations in Sweden, Denmark, Norway and Iceland. The feasibility

[1] Our translation of the Danish title «Den mediekompetente borger – media literacy i en dansk kontekst» (Kulturstyrelsen, 2014)

[2] Our translation. In Norwegian: «Kritisk medieforståelse».

study aims to review and analyze how media and information literacy is understood and defined, and further analyze existing indicators of MIL and MIL indexes, and also suggest a basis for possible future designs of a Nordic long-term mapping of MIL. First, we will in chapter 2 take a closer look at the concept of media and information literacy.

1.6. Structure of the report

To get a comprehensive overview, we recommend that the report is read in its entirety, but for readability the report is divided into chapters so that the different parts of the report are accessible and possible to read on their own. The first chapter is an introduction to the feasibility study, including a presentation of the background, the research group, the feasibility study's goals and research questions, accounts of important concepts and also the limits of the report. The second chapter provides an overview of the most important theoretical and methodological developments in the scholarly field concerned with media and information literacy, where the main focus is on the last 20 years. In the third chapter, we present the method we have used in the literature search and the systematic research review. In chapter Four, we discuss the most important findings from the review and more specifically the key indexes related to the measurement of media and information literacy. In the fifth chapter, we discuss relevant designs and indexes for a Nordic measurement of media and information literacy, including prerequisites for choosing methods, concepts and indicators. In the last chapter, we discuss the conditions for further management of the proposed indexes and summarize the key points of our report.

2. Theoretical and methodological background for media and information literacy

In this chapter, we account for our theoretical basis for understanding MIL, which is a starting point for how we discuss the methodological approaches to measuring or mapping the MIL level in the Nordic population. As we see it, media and information literacy should be understood as a term that is part of an extensive international tradition related to literacy and competence development, information and new media technology. As such, an important point is that there exists a large number of similar concepts that have much of the same meaning.

In our view, designing a scientifically based measurement of media and information literacy is in essence a *choice*, in the sense that several alternatives could potentially provide fairly equivalent answers. Making such a choice is strongly connected to the theoretical traditions behind different conceptual understandings and, implicitly, the measurements made. Historically, several different concepts have been applied to describe the knowledge, skills and competencies seen as important to cope with and participate in the media and information society and use new technology. And, not least, there are many different interpretations of these terms. In order to draw a broad image of how MIL has been and is understood, we therefore give a brief account of different views on media literacy, information literacy, digital literacy and ultimately, media and information literacy.

2.1. Key concepts

We will not elaborate on the meaning of every related concepts, but it is still useful to mention that concepts such as media literacy, digital literacy, information literacy, ICT literacy, multiliteracies, "new literacy", critical media literacy and news literacy are closely connected to each other, and in some cases the definitions are overlapping and even synonymous. Nevertheless, we would like to point out that there exists a large number of different definitions as well as many different theoretical frameworks and academic traditions as basis to different understanding of the concepts. In this section, we will highlight some of the most important interpretations of MIL without going into detail, before we outline our definition of MIL and present how we use this definition in the remaining parts of the report.

Different definitions and concepts indicate that the task of *measuring* media and information literacy will be a challenging task. According to Renee Hobbs (2017), an experienced media

literacy researcher, media literacy has been described as a "constellation of life skills", and many different approaches have been used to measure these skills. Moreover, she argues that media literacy in reality includes a wide range of different competencies that all are related to the potential opportunities and challenges of growing up in a media saturated society. These relate to such diverse aspects as power and empowerment, protection, self-presentation, the ability to create media content, the ability to evaluate and critically analyze media content, techniques to attract and hold on to attention, and so on. Different measurements of media and information literacy also involve different goals, contexts, situations and values. In other words, seeking to measure MIL levels, it is very important to delimit and define which aspects of media and information literacy are in focus.

Concepts such as media literacy, information literacy, digital literacy, and 'media and information literacy' are often understood broadly, which in some cases can be an advantage, but it can also lead to unwanted complexity and ambiguity. The established definitions of these concepts originate from a number of different theoretical traditions, from disciplines such as media studies, education, technology, sociology, psychology, literary science, and linguistics. These disciplines are related to each other, but they are also still very different, and, for example, involve different conceptualizations of knowledge, research and perspectives on reality (Kupiainen, 2018; Schofield & Frantzen, 2018). A broad understanding gives important opportunities because such a definition can capture a wide range of features related to people's learning and literacy. This could be said to correspond well to "reality", where people's competences are broad and complex and difficult to define. A broad definition is also in many ways a response to criticism of a narrow definition, which necessarily limits literacy to some (few) aspects of literacy, while others are excluded. At the same time, a broad orientation can be problematic, because it can be *too* broad, which can make mapping and measuring media and information literacy difficult.

In this feasibility study, we understand media and information literacy in line with UNESCO's (2013, p. 29) general definition:

> MIL is defined as a set of competencies that empowers citizens to access, retrieve, understand, evaluate and use, to create as well as share information and media content in all formats, using various tools, in a critical, ethical and effective way, in order to participate and engage in personal, professional and societal activities.

This definition clearly shows MIL as a very complex and ambitious concept or *set of concepts*. In addition to media and information literacy being a separate term for a comprehensive area of literacy, it is also, as mentioned, similar to a number of other concepts that also are established in various research traditions and practice fields, such as media literacy and information literacy, digital literacy, digital skills and ICT literacy. This means that in our work we have had a relatively broad perspective and in systematic review we have initially included a number of other terms in addition to media and information literacy.

Hence, sets of competencies or 'literacies' such as media and information literacy are complex, which is a point that we return to several times in this report. An important aspect of such competencies is that they have both an individual and a contextual, or social side. To understand the full context of media and information literacy, it is therefore important to not only understand individuals' abilities to understand, communicate and participate, but also the social, political and economic context as well as aspects on the "miso" level or 'group level'. This includes social conditions such as network, family background and school, for example. As such, it is important to acknowledge that we in this report primarily concentrate on measuring *individual* media and information literacy[3].

2.1.1. Media literacy

Areas of competencies related to developments in the media and the information society have been discussed from a wide range of perspectives. Such sets of competencies have been defined both as individual and primarily cognitive sets of skills, knowledge and attitudes, and as broader and more contextually defined social competencies (Erstad & Amdam, 2013). For example, Potter (2004; 2018, p. 23) defined media literacy as "*a set of perspectives that we actively use to expose ourselves to the mass media to process and interpret the meaning of the messages we encounter*". This can be understood as a *functional* and *individual* definition, in that it specifies some basic competencies needed to perform specific tasks. Buckingham (2006) and Erstad (2010b) argue for a broader and more critical form of

[3] For a thorough account of the relationship between individual and contextual media and information competence, see for example Pérez Tornero and Pi (2010).

media literacy. For example, Erstad (2010b) sees media literacy as a comprehensive, broad concept with five dimensions, which include;

1) Basic skills
2) The media as an object of analysis
3) Knowledge building in various disciplines
4) Learning strategies
5) Cultural competence.

Both narrow and broad definitions have their strengths and weaknesses. A narrow, and "functional" definition, such as Potter's definition, has its strength in that it is tangible and is closely linked to practice (Elf, 2009). But such a definition has also been criticized because it implies a limited understanding of literacy and thus maybe an underestimation of the importance of, for example, social practice and the context of people's media use (Buckingham, 2003; Elf, 2009). One of the strengths with a broad understanding is that it embraces some of the complexities and the broad range of today's literacy practices, while it is challenging that such complex definitions can be difficult to operationalize and thus use as an instrument for measurement and research. Media literacy is a widely used term in several different theoretical perspectives. Thus, many different definitions and theoretical frameworks have also emerged. One of the most cited and widely applied definitions is Aufderheides (1993) definition. The definition often credited to her is that media literacy is about being able to "*access, analyze, evaluate, and communicate messages using a wide variety of forms"*, which for example Hobbs (2017) refers to. This definition can also be recognized in policy documents from, for example, UNESCO (2013)[4]. This can be seen as a very open and inclusive definition, which also is open to various media and possible new media tools and platforms. Therefore, Aufderheides definition is still widely used in various fields. A definition that is relatively similar, is Ofcom's definition: "*the ability to access, understand and create communications in a variety of contexts*" (Buckingham, 2005). Ofcom's definition can today be considered one of the standard definitions of media literacy. This way of understanding media literacy is based on the so-called Aspen definition[5], which originally had four dimensions: access, analyze,

[4] Originally, Aufderheides (1993, p. 6) definition is somewhat different; «the ability of a citizen to access, analyze, and produce information for specific outcomes»

[5] The Aspen definition of Media Literacy was the result of discussions and deliberations in dialogues between several of the leading researchers on media literacy in the early 1990s, in which both Tyner, Hobbs and Aufderheide participated. This was under the auspices of the Aspen Institute. The result of the dialogue was,

evaluate and produce (Tyner, 1998, p. 120). In these definitions media literacy can be seen as quite abstract, individualized skills relating to using the media (access), understanding and critically evaluating different forms of information (understand) and producing media content (produce). The European Commission (2009) also applies the same type of definition in different contexts.

2.1.2. Information literacy

Compared to media literacy and digital literacy, the term *information literacy* alone is used to a somewhat lesser extent in the Nordic languages. However, internationally the term is widely applied. In pace with the emergence of the "information society", media literacy and information literacy has in some publications been used interchangeably. And, as with media literacy, there exists a range of definitions of information literacy. Information literacy can be understood very broadly as a literacy that enables people to "*seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. It is a basic human right in a digital world and promotes the social inclusion of all nation* " (Wilson, Grizzle, Tuazon, Akyempong, & Cheung, 2011, p. 16 Sanchez, Rojo, & Martinez, 2019). This is in many ways an ambitious definition, but it is often emphasized that this is a type of literacy that applies not only to media practices per se, but rather to most areas of modern life.

In recent years, information literacy has often been used in combination with media literacy, and *media and information literacy* has become an established concept in both research, practice fields such as school and education, and perhaps particularly in public institutions and in policy organizations, such as UNESCO, the EU Commission and others. UNESCO also sees information literacy as a broad term, which has been used to "*emphasize the importance of access to information, the evaluation, creation, and sharing of information and knowledge, using various tools, formats and channels*" (UNESCO, 2013, p. 29).

Information literacy is, as media literacy is, closely linked to universal values such as quality of life, democratic participation, access to cultural goods and critical reception and critical reflection. It is also worth noting that UNESCO's definition can be described as *pragmatic*, in

among other things, a definition of media literacy which later became known as the Aspen definition. See https://www.medialit.org/reading-room/aspen-institute-report-national-leadership-conference-media-literacy

the sense that it does not rely heavily on one particular academic tradition or discipline but is rather associated with the role and function of information and media in the contemporary culture.

2.1.3. Media and information literacy

As mentioned above, we understand MIL in line with UNESCO's (2013, p. 29) broad definition, namely as "*as a set of competencies that empowers citizens to access, retrieve, understand, evaluate and use, to create as well as share information and media content in all formats, using various tools, in a critical, ethical and effective way, in order to participate and engage in personal, professional and societal activities*". However, UNESCO's way of defining MIL is not without problems if seen as a starting point for research and measurement of, for example, different levels of MIL in the Nordic population. The definition is broad and comprehensive and might be difficult to operationalize. An alternative could have been to focus more exclusively on *either* media *or* information literacy. But, according to Livingstone, Van Couvering, and Thumim (2005b), there are still several good reasons for including both media *and* information literacy if one is to map competencies and literacies in today's media-saturated culture. Today, information and media are almost fully converged, in the sense that for instance information- and media platforms flow into each other, but originally media literacy and information literacy have emerged from two different academic traditions; According to Livingstone et al. (2005b), media literacy was a concept that primarily included literacy related to television and radio, while the focus of information literacy was on the literacy needed to use and understand computers and later the internet. But today, when for example mobile phones, tablets and digital TV, have become widespread media tools, we see clearly that information and media have converged. So, although media literacy and information literacy in many ways have evolved from two different traditions, they share many common values (Livingstone et al., 2005b).

According to Luque, Becerra, Abengozar, and Simón (2014), MIL is a theoretical perspective where UNESCO, who started their work with MIL in the 1970s, is one of the most important stakeholders. In UNESCO's work, MIL is seen as an important starting point and basis for active citizenship and for society in general. Luque et al. (2014) argues that media literacy, information literacy and also digital literacy are equally important parts of MIL. In this context, media literacy refers to understanding and using the media, whereas information literacy concerns more specific tasks, such as the ability to recognize, identify and retrieve information,

as well as to evaluate and communicate in different formats. Digital literacy, which also is closely related to MIL, is more about the ability to use digital technologies and communication tools.

Considering today's media world, there are as we see it, several good reasons to continue to explicitly emphasize both a "media side" and an "information side" to MIL, even though the distinction between them has become more blurred. For example, in order to really gain insight into and "reveal" false news, one needs both broad and deep knowledge and skills related to the media and information world. One would need knowledge of the media in general, of media ownership and the mechanisms of social media as well - as skills in decoding, interpretation and reception different types of information. These are all aspects that are often associated with media literacy. But – to understand, evaluate and analyze false news, aspects such as historical insight, knowledge of language and genre as well as skills in source criticism and rhetoric are also of critical importance. These latter examples are aspects that typically have belonged to information literacy. Hence, as Livingstone et al. (2005b) emphasize, both the media and information literacy perspectives are still important, for example in the development of media policy.

Media and information literacy is most often understood as a set of individual knowledge, skills and attitudes that develop in line with media development and that go beyond what is traditionally seen as digital skills or digital literacy (Sanchez et al., 2019). Moreover, media and information literacy can also be understood as a set of competencies that are necessary to seek and benefit from available information, which today should be seen as a fundamental human rights (Wilson, Grizzle, Tuazon, Akyempong, & Cheung, 2014). Digital arenas and tools are today apparent parts of both information literacy and media literacy but are not necessarily specifically included in all the frameworks for MIL. But Sanchez et al. (2019) emphasize that media and information literacy is a broader and more comprehensive concept than many other concepts of «new» literacies, it can be called an umbrella term that *include* other literacies such as media literacy, digital literacy, ICT literacy and information literacy. Table 1 shows an overview of the relationship between these three central literacy concepts, where the following is specified; the academic traditions they are derived from, which sub-competencies are emphasized and which development areas they primarily refer to.

Table 1. Presentation of the background for media, digital and information literacy, reproduced from Sanchez et al. (2019)

Literacy	**Media**	**Information**	**Digital**
Academic tradition	*Media studies*	*Library studies and information science*	*ICT and informatics*
Sub-competencies	*Analysis, understanding and evaluation of media messages*	*Access to and analysis of information*	*Use of software and digital tools*
Areas of development	*Social and political*	*Organization of information*	*Technology*

There has not been established an agreed understanding of how the two parts of *media* and *information* literacy relate to each other. Wilson et al. (2014) emphasize that there are two main perspectives in this respect; information literacy can be seen as the superior field, while media literacy is understood as subordinate. The other perspective is the other way around, where information literacy is seen merely as part of media literacy. However, as we see it, to rank the dimensions of media and information literacy is not very important. The point is rather that rather that media and information literacy is understood as a complex umbrella term that encompasses the competencies that become important for participation in a constantly changing and dynamic media landscape *and* information society.

It is also useful to see the two concepts of media literacy and information literacy in relation to each other. In figure 1 below, Wilson et al. (2014, p. 18) presents the most important elements of media and information literacy. This is also useful in terms of understanding which indicators will be central in a possible measurement of sub-competencies under MIL.

Figure 1: Key elements in media and information literacy (Wilson et al., 2014, p. 18)

Information literacy						
Define and articulate information needs	Locate and access information	Assess information	Organize information	Make ethical use of information	Communicate information	Use ICT skills for information processing

Media literacy				
Understand the role and functions of media in democratic societies	Understand the conditions under which media can fulfil their functions	Critically evaluate media content in the light of media functions	Engage with media for self-expression and democratic participation	Review skills (including ICTs) needed to produce user-generated content

These key elements show that a multitude of different subcompetencies are emphasized in the media and information literacy, which forms one of several starting point for our analysis and discussion related to existing indexes used in mapping and measuring the levels of MIL among different populations, and also when we discuss possible future ways of measuring MIL.

2.2. MIL in «the big picture»

Media literacy is often seen as an important premise for citizenship and participation in society and democracy. Different variants of the concept, such as digital literacy, media literacy, information literacy and others are thus regularly highlighted by politicians and academics in various debates (Buckingham, 2003; Lopes et al., 2018) as well as stakeholders and international organizations (European Commission, 2009, 2019; European Parliament, 2006; UNESCO, 2013). In this context, media literacy concern both understanding and critically interpreting media messages and communicating messages effectively and in an ethical and responsible manner.

One of the most used definitions of media literacy was defined in 2006 by the 'Media Literacy Expert Group' as "the ability to access media, to understand and critically evaluate the different aspects of the media and media content and to create communications in a variety of contexts" (Lopes et al., 2018, p. 509). While UNESCO, as mentioned above, define media and information literacy in this way: A set of competencies that empowers citizens to access, retrieve, understand, evaluate and use, to create as well as share information and media content

in all formats, using various tools, in a critical, ethical and effective way, in order to participate and engage in personal, professional and societal activities (UNESCO, 2013, p. 17).

As we see from UNESCO's definition, MIL is understood very broadly. It is much broader than the basic definition of, for example, media literacy. This does not necessarily mean that one of the definitions is *better* than the other, but this is a clear example of a narrow versus a broad definition of literacies. Possible strengths and weaknesses will be further elaborated and commented in Chapters 4 and 5. But it can be pointed here as well, that a key point in most definitions of MIL is that *production*, i.e. an *active* component, is often included as equally important as *understanding*, i.e. an interpretive dimension of literacy. This is a crucial point associated with the possibilities of Internet-based and social media, where users constantly are given more opportunities for being active and produce content through a variety of different services and available expressions, like expressive reactions (with emoticons, "likes", etc.), participation in discussions, communication and other types of social practice. Due to these active and participatory practices that are made possible in today's media technology, Zacchetti (2013) in Lopes et al. (2018) argues that a media-literate person is able to create his or her own content and communicate effectively in and with media. In many cases, this type of literacy is also seen a prerequisite for being able to exercise active citizenship and participation in democracy.

Lopes et al. (2018) point out that there has been done many quantitative surveys focusing on media practices, such as surveys of media use. This is something we also have found, like the surveys from EU Kids Online (2014) and Medietilsynet (2018, 2019). These often measure for example time spent using media and mapping patterns of media use. Research capturing evaluations and explorations of media and information literacy (MIL) are more seldom. Lopes et al. (2018) thus claim that instruments designed to measure MIL have primarily provided insight into topic-specific and quantitative knowledge, often within limited populations. They mention several studies with few participants as examples of research that give limited findings with limited importance. Lopes et al. (2018) found that several of the studies they have reviewed had a narrow focus and did not measure for instance the capability to create media content. This is a weakness, according to Lopes et al. (2018).

An important premise for our work in this feasibility study is that we define MIL as a comprehensive and holistic concept, which includes a number of different sub-competencies that apply in almost all aspects of everyday life, professional life, as well as in school and education. We therefore understand MIL in line with Wilson et al. (2014), which define MIL as a holistic set of competencies, which includes a combination of different forms of literacy, in the form of *both* knowledge, skills and attitudes. As such, MIL is not necessarily in conflict with other areas of literacy, such as digital literacy, internet literacy, media literacy or others. As Siddiq et al. (2016) point out, there are seemingly some fundamental differences between the different concepts, in that they refer to different *domains*, such as 'media', 'digital', or 'information' and also different perspectives on knowledge, such as 'competence', 'skills' or 'literacy'. However, there are probably more common features than there are differences. Siddiq et al. (2016) highlight four such common features; Firstly, all these concepts emphasize *locating and processing information,* secondly, *production* is an important aspect, and thirdly, *ethical and responsible use of ICT* is central to most definitions. The fourth common feature is that *communication* is an essential component. In other words, MIL can be a broad, collective term, like Wilson et al. (2014) argues. They see MIL is a broad set of literacies that can tie other competencies together, in a way that increased media and information literacy also can provide increased access to other competencies and literacies. Wilson et al. (2014) presents the ecology of MIL in figure 2 below:

Figure 2: The ecology surrounding MIL (Wilson et al., 2014)

2.3. Basis for the review

As we elaborate further in Chapter 3 about methods, we have done a systematic review with a focus on methods for measuring levels of MIL, which we consider to be most central aspect of our assignment. But when it comes to key concepts, such as media literacy, digital literacy, information literacy, media and information literacy, and several others, we have also made use of the earlier review publications and publications. Here we have used publications that are considered generally central in the field, and which are published in highly ranked publishers and are widely cited. This is especially true of these key sources:

- David Buckingham (2003): *Media education: literacy, learning and contemporary culture*.
- Ola Erstad (2010a) : *Digital kompetanse i skolen [eng: Digital literacy in school]*. Oslo: Universitetsforlaget.

- Ola Erstad (2010c): Media literacy and education: the past, present and future. In S. Kotilainen & S.-B. Arnolds-Granlund (Ed.), *Media Literacy Education. Nordic Perspectives* (pp. 15-27). Gothenburg: Nordicom.
- Ola Erstad and Synnøve Amdam (2013): From protection to public participation. A review of research literature on media literacy. *Javnost - the public, 20* (2), 83-98.
- Colin Lankshear and Michelle Knobel (2008): *Digital literacies: Concepts, policies and practices* (Vol. 30). New York: Peter Lang.
- The New London Group (1996): A Pedagogy of Multiliteracies: Designing Social Futures. *Harvard Educational Review, 66* (1), 60-93.

We have also used reviews that have similarities with this feasibility study, although with different questions:

- David Buckingham (2005): The media literacy of children and young people. A review of the research literature on behalf of Ofcom.
- Sonia Livingstone, Elizabeth Van Couvering and Nancy Thumim (2005): *Adult Media Literacy. A review of the research literature on behalf of Ofcom.*
- Gitte Bang Stald , Morten Hjelholt and Laura Høvsgaard Nielsen (2015): *Specialrapport. Media Literacy i en dansk kontekst. Rapport for Kulturstyrelsen og Medierådet for Børn og Unge*. [Special report. Media Literacy in a Danish context. Report for the Danish Agency for Culture and the Media Council for Children and Young People]
- Leslie Haddon, Davide Cino, Sonia Livingstone, Giovanna Mascheroni (2020): *Children's and young people's digital skills: a systematic evidence review*
- Fazilat Siddiq, Ove Edvard Hatlevik, Rolf Vegar Olsen, Inger Throndsen, Ronny Scherer (2016): *Taking a future perspective by learning from the past - A systematic review of assessment instruments that aim to measure primary and secondary school students' ICT literacy*

2.4. Theoretical starting point

How technological and societal changes affect learning, literacy and education is not a new question. Several of the most important challenges in the global community are in one way or another related to developments in media use and digital media technology or vice versa. Contemporary society is often said to be characterized by both *digitalization* (Schou & Hjelholt, 2018) and *mediatization* (Hepp, 2012, 2020; Hjarvard, 2008, 2013). These two theoretical concepts are important theoretical conceptualizations of the current times and are part of the theoretical starting point for this report. Digitalization implies that society changes fundamentally because aspects such as communication, leadership, information flow and knowledge-sharing and a number of other important social practices are increasingly taking place in or in relation to digital arenas (Schou & Hjelholt, 2018). When the forms of communication and our relationships with other people change, it means that our culture also

changes - in a "deep" way, according to Drotner (2011). Mediatization implies that the logic of the media is becoming more and more dominant in all our social institutions and challenges how for instance we learn and create meaning from the world (Hjarvard, 2008). Researchers and theorists in many disciplines have been concerned with what digitalization and mediatization, which can be termed as quite general phenomena may have to say for our needs for knowledge, skills, attitudes, competencies and ultimately *literacies* (Buckingham, 2003, 2006; Drotner, 2001; Erstad, 2010b; Kress, 2003; Lankshear & Knobel, 2003; Østerud, 2007).

This has led to a number of new conceptualizations for knowledge, skills and attitudes related to among other aspects, decoding and coding new texts and to producing utterances. In a Nordic context, the term *competence* (kompetanse) has often been applied, which is closely related to the OECD's (2005) definition and selection of key competencies (DeSeCo), which were specifically associated with basic skills in reading, writing, mathematics, natural science and problem solving. Competence is associated with being able to solve tasks within these areas. Internationally, these areas of competence have to a greater extent been linked to the term *literacy.* Literacy is traditionally associated with the written language, and more specifically to the ability of reading and writing. Literacy can also be understood as basic knowledge and skills in understanding (reading) and writing (producing) text in one's own environment. But this environment is changing rapidly, in line with the media-related and technological developments in our culture, and also the transformation of our available "cultural tools" (Säljö, 2006). Both the texts or the media content, the cultural tools and the environment has developed substantially over time. As Erstad (2018) emphasizes, several researchers in the 1970s and 1980s gradually became critical of the traditional understanding of literacy, and a new direction in literacy research emerged, which is often referred to as "new literacy" research. Literacy and competence thus have somewhat different traditions, but in practice these two concepts have many common features, as mentioned, and are in several contexts used synonymously. This applies, for example, to digital literacy, which is the international term, and digital competence, which is a term often used in Norway.

2.4.1. The sociocultural turn

Especially in education research, there has in the last 20 years been a so-called socio-cultural turn. This implies that media use and literacy related to new media and new technology increasingly is seen in the light of the social, cultural and historical context in which the media

practices take place. In sociocultural theory, the social dimension is considered a premise for cognitive and mental functions (Wertsch, 1991). This does not mean that psychological and individual learning processes and literacy development are discredited, but rather that the social and cultural circumstances are emphasized and understood as inextricably connected to the individual aspects. For example, in an internalization process, where an individual gradually becomes familiar with and automates the use of a new media tool, the social and cultural context will, from a sociocultural point of view, be just as important as the individual's cognition.

In socio-cultural theory, *mediating artifacts* are an important concept. Artifacts consist of both semiotic and material systems, objects, products, tools, aids and symbols that we use to observe, operate in and process the world surrounding us (Frantzen & Schofield, 2013). In this sense, it is through learning to use artifacts that we become and can operate as members of society (Säljö, 2006), and today, for example mobile phones, tablets, computers and smartwatches are seen as 'natural' and necessary artifacts that are part of many of the practices in which we participate in everyday life. The communication architecture in modern media can both expand and limit the mediation potential for both media users and media producers. Therefore, a sociocultural perspective on media and information literacy will emphasize a broad interpretation, in the sense that literacy will not only be seen as based on decoding processes, information processing or reading and writing skills in isolation. Literacy in general and various literacy practices in particular, will rather be understood with a more holistic approach where both an expanded and multimodal concept of text is included, as well as knowledge of media technology and media practices, social and cultural literacy, and participation perspectives.

2.4.2. New Literacy Studies

One of the best known and most cited terms in this landscape is "*New Literacy Studies"*, from which many of the other literacy concepts has developed. New Literacy Studies refers to several different studies that flourished in the 1980s (Gee, 2015). Gradually, as the media became more and more digital, and learning and literacy were defined as more social, more visual, more multimodal than what had been done traditionally (Barton, 1994; Gee, 2010; Kress, 2003). The perspectives drawn upon in the New Literacy Studies came from a wide range of different disciplines, such as linguistics, history, cultural psychology, anthropology, pedagogy, media studies and rhetorics (Gee, 2015). This can be said to have become a common feature of research on "new" areas of competence and literacy; the research is often based on a complex

and interdisciplinary perspective. While New Literacy Studies traditionally involved a focus on language and communication in a broad sense, other researchers have been more specifically concerned with literacy in light of the media and the information society and particularly the digital media. Key researchers and theorists in media literacy, such as Masterman (1985), Buckingham (2003), Potter (2004, 2018), Livingstone (2004), Drotner (2001) and Erstad (2005, 2010a) have also placed special emphasis on competencies related to media and technology development. They have seen *media literacy* and *digital literacy* broadly and as a prerequisite for participation and citizenship. An important inspiration in this respect has been the widely used term *multiliteracies*, which was coined by the New London Group in the manifesto "Pedagogy of Multiliteracies" (The New London Group, 1996, pp.; see also Cope & Kalantzis, 2009). Multiliteracies concerns how people create meaning from a large number of different texts, symbols, and visual and auditory signs in various social and linguistic contexts.

Roughly drawn, three features stand out as characteristic of the "new" theories of literacy. *Multimodality* is the first feature we would emphasize. This concerns that we increasingly interact with texts, messages and communication that combine written, auditory, visual and interactive expressions, signs and symbols. Multimodal communication is becoming an increasingly important basic form of communication. The second feature is that our literacy practices, or what we "*do* with different types of texts" (cf. Barton & Hamilton, 1998) are increasingly *social practices.* Literacy is not just an individual, cognitive activity, but should be understood as something that is constructed in social contexts. This has become an important perspective especially in pedagogical and school-related perspectives on literacy and learning, Where a sociocultural perspective often is presumed, often influenced by Vygotsky (1986), Säljö (2006) and Wertsch (1998) Vygotsky (1986), among others.

The third characteristic feature of new theories of literacy concern the context of literacy practices, and the *increasing complexity* of our culture. The contexts in which new texts and media content are produced are important for how they are understood and for how we can create meaning in them. Theorists such as Castells (2010), Beck, Giddens, and Lash (1994) and Qvortrup (2004) have in different ways highlighted complexity as a fundamental trait of modern society. Both individuals and social institutions are today characterized by complexity and constant change and what can be described as continuous reflexivity (Beck, 1994). There are several social phenomena that are important in this respect, not only digitalization and

mediatization, phenomena that we mentioned in the introduction, but also media convergence (Jenkins, 2014) and not least globalization (Appadurai, 1996; Rantanen, 2005) Where a sociocultural perspective often is presumed. Although local media still are important to people, perhaps especially in the Nordic countries (Carlsson, 2018; Statistisk sentralbyrå, 2019), it is also a clear development trait that the media is increasingly global in terms of both content, distribution and ownership (Hjarvard, 2014). This is especially true if we look at the major media actors such as Facebook, Google, Apple and Microsoft. These are global media companies that have increasingly strong interests in both ownership, content, technology, software and marketing, and ultimately people's media practices. Another aspect related to complexity is related to content production. The production of media content is today in many ways "democratized", as it has become possible for "everyone" to produce and publish content through interactive internet-based services and applications. In reality, it is as if "everyone" actually *can* or *wants to* publish media content. This is rather a question of, among other things, literacy and "competent access". This aspect of access to participation and production has a number of implications for what competencies and literacies that are needed in today's and tomorrow's society.

3. Method

In this chapter, we elaborate how we have proceeded to obtain knowledge about surveys conducted related to measurement of media and information literacy. The main method has been a systematic literature review of peer-reviewed research publications. We account for this below. But we have also obtained information from public institutions and assessments of media and information literacy or other similar knowledge, skills and literacy areas that are not necessarily peer reviewed. We have also searched for EU-initiated surveys, of which some publications are also peer-reviewed. In addition, we have sought information about other mappings that we consider relevant in this context, such as national media usage statistics and the like.

There exists several literature reviews of concepts such as digital literacy and media literacy, but most of them focus on literature related to theoretical frameworks and conceptualizations, such as Bawden (2008), Erstad and Amdam (2013), Buckingham (2005) and Livingstone et al. (2005b) to name a few (see Siddiq et al., 2016 for more on this). Hence, there are quite few literature studies that explicitly synthesize measurements or evaluations of competence areas related to media and information. The systematic review from Siddiq et al. (2016) is as such an exception, because it explicitly analyzes existing research literature on the measurement of ICT literacy and some other related concepts or phenomena. The study from Siddiq et al. (2016) is highly relevant to our feasibility study, but we find that it is timely to do an updated systematic review, with a different focus and perspective. We are primarily seeking research-based knowledge about measuring, mapping and evaluating the concept of media and information literacy in a Nordic perspective, and to our knowledge there are no updated systematic reviews dedicated specifically to this.

Our main method is therefore what is internationally described as a systematic review study. According to Green et al. (2015), a systematic review can be defined as attempting to "*collate all empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question. It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made*". More specifically, we have been inspired by a procedure defined by Gough, Oliver, and Thomas (2017; see also Siddiq et al. (2016)), which recommend the following steps in a systematic review study : 1) Formulation of specific research questions, 2)

perform searches in recognized and relevant databases, 3) analysis of the studies according to specified inclusion and exclusion criteria, 4) description of the studies' characteristics, 5) broad and «rich» assessment, and finally 6) synthesis. These steps are described below.

3.1. Searches in databases

Based on the assignment, we have developed a search protocol as a tool to ensure that we find recent and updated research in the relevant research areas, which is focused on the measurement of media and information literacy (MIL). We have delimited the scope to the last 20 years, a due to the media development and the aim of focusing on relevant and updated research. A limitation to searching within the scope between year 2000 and 2020 means that we mainly concentrate our findings on measurements of MIL after the development of the internet, social media and mobile media. A search in databases also presupposes that the search is done in what is considered to be recognized databases. We account for this below. To some extent the searches overlap (i.e. the databases find some of the same results).

3.1.1. Research databases

Of international databases, we have included the following databases: ERIC, Scopus, Web of Science, and ScienceDirect. In these, searches have been made in both English and Nordic languages (Norwegian, Swedish and Danish). Based on our knowledge of established theory and concepts in this area, as described in Chapter 2, we wanted to search as broadly as possible within our given frames. We have also combined all keywords with synonyms. This is explained below.

The following databases have been included:

***ERIC**:* The largest database with peer-reviewed publications in education. ERIC includes over 1.5 million articles, books, reports and other publications.

***Scopus**:* A comprehensive and interdisciplinary international database of peer-reviewed publications. Covers both social sciences, technology, humanities and other disciplines.

***Web of Science**:* An established interdisciplinary database with peer-reviewed publications, covering the social sciences, technology and the humanities.

ScienceDirect: Peer-reviewed publications from the large scientific server Elsevier. Includes e-books, articles and e-journals in, among other things, health sciences, social sciences and the humanities.

3.2. Selected search strings

The databases mentioned above to some extent require different ways of conducting searches, which means that you have to formulate the search strings individually according to what the databases require. Therefore, we developed several different search strings that cover media and information literacy and critical media understanding, which are two of the most established concepts related to the measurement of MIL, which are in use. Terms such as digital literacy, media literacy and information literacy are covered by the use of synonyms in the searches (see more about this below).

3.2.1. Synonyms for media and information literacy

Media and information literacy is a complex concept, which in principle includes two basically different concepts, media literacy and information literacy. In addition, the term itself has a number of different synonyms. We have included the following synonyms:

> Media and information litera*; Media Litera*; Information litera*; Media competen*; Information competen*; Media and information competen*; Media litera*; Information litera*; Media and information litera*; Digital competen*; Digital litera*; Digital skills.

As seen, we have used truncation for some keywords, in order to capture different grammatical forms of the words. When truncating, an asterisk (*) is used, which results in that all words that contain a root of a word is found in the search. An asterisk is therefore often used on keywords in broad searches. In our case, this applies to, for example, different forms of literacy, which are typically used in both the singular form (literacy) and in the plural form (literacies), or different forms of measure and competence, where several different forms of the words can be used (measure, measures, measurement, etc. and competence, competency, or competencies). In such cases, we have truncated to, for example, measur* or competen*.

3.2.2. Synonyms for measurement and indicators

Measurement can also be described using a number of different words. We have included the following: Measurement; mapping; Measur*; map*; assess*; evaluat*; survey; index; indicator*.

In addition, method and method choice were an important exclusion aspect in the analysis of the findings. This is further elaborated below.

3.2.3. Examples of search strings

The searches have been done by using the OR operator between synonyms, and AND between different keywords. For example, *media OR digital AND literacy OR literacy ... etc.* To simplify the search, all searches are done in two rounds, one search in English and one in Nordic languages (Norwegian, Swedish and Danish). We have found English synonyms in the Oxford English Dictionary and the Oxford University Dictionary (Oxford Dictionaries, n.d.). Nordic synonyms are found in ordnett.no.

The searches were made in different periods between August 2020 and November 2020. The same search requests are basically made in the different databases, but it varies how many keywords the databases accept in the same search; therefore, the searches are in some cases divided into different sub-searches.

The search strings were like this in Scopus, which is one of the databases that accepts full strings without any length restrictions.

TITLE-ABS-KEY ("media literacy" OR "information literacy" OR "media and information literacy" OR "media comp*" OR "information comp*" AND measure* OR assess* OR evaluate* OR survey) AND PUBYEAR < 2000 AND (LIMIT-TO (SRCTYPE , "j") OR LIMIT-TO (SRCTYPE , "b") OR LIMIT-TO (SRCTYPE , "k")) AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ARTS") OR LIMIT-TO (SUBJAREA , "PSYC") OR LIMIT-TO (SUBJAREA , "MULT")) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "ch") OR LIMIT-TO (DOCTYPE , "bk"))

In this example search, the type of publication / channel is restricted, as we received very many hits outside our focus if we did not include any restrictions.

This search resulted in 2677 hits in Scopus, which was the first database we searched in. Searching within this topic generated a lot of findings. This meant that we needed to delimit our search to dealing primarily with the *measurement* of *media literacy and / or information literacy* and *measurement*. We have also limited the searches to peer-reviewed publications, and the findings are limited to publications from *after* 2000. It became important to limit to *measurement* of media and information literacy, as general publications about media and information literacy are outside of our scope. We therefore searched with inclusion of measurement and synonyms for measurement. In English, the most important and most commonly used synonyms are *measure, assess, evaluate, mapping* and *surveying*. Using asterisk, we hence included several forms of these words. For example, measur* includes measur*ing,* measure*ment* and measur*e*. After we did searches in Scopus, we made some revisions in our searches in the further databases, which meant that we reduced the number of "open" results in the other databases.

Subsequently we made an analysis of the publications' abstracts, which implies an initial analysis in order to exclude publications that were not relevant to our study. In this phase, we included studies that had one or more of these characteristics (and excluded those that didn't have any of these characteristics):

- Refers to studies of measurement of MIL or similar concepts. Here we found relevant studies in both ICT Literacy, digital literacy / competence, media literacy / competence, media literacy skills, "new media literacy", information literacy / competence, and media and information literacy.
- Refers to the development of indexes and/or indicators for measuring MIL
- Is published in peer-reviewed publication channels.
- In this review, we have prioritized publications with a strong connection to our research question.
- Refers to studies of a minimum of 200 participants or which could potentially be used to research samples of over 200 people.
- Is based on quantitative studies
- Publications that discuss methodological aspects of measuring MIL or similar terms.
- We included some publications that explicitly thematized and / or examined the measurement of MIL, despite the fact that they did not meet the other criteria mentioned above.

These are exclusion criteria:

- Studies of small samples
- Measurement of MIL in very specific occupational groups or with very narrow focus (an example here is measurement of informational / information literacy in librarian studies)
- Measurement of information literacy defined as information processing

Some studies were included after the first sorting but was later excluded from the analysis phase. This applies, among other things, to studies that have a low theoretical quality and / or measure very limited parts of MIL, and / or have a very rough scale which in our view does not hold a high enough methodological and theoretical quality. These are documented and briefly explained in Appendix 2 (result table).

We have also included some review articles. This applies to articles that are close to our topic and that have been published relatively recently. This is especially true of *The media literacy of children and young people. A review of the research literature on behalf of Ofcom* (Buckingham, 2005), *Adult Media Literacy. A review of the research literature on behalf of Ofcom* (Livingstone et al., 2005) and *Taking a future perspective by learning from the past - A systematic review of assessment instruments that aim to measure primary and secondary school students' ICT literacy* (Siddiq et al., 2016). These are all high-quality articles or reports that are widely cited. In addition, a recently published review report from Haddon et al. (2020); *Children's and young people's digital skills: a systematic evidence review* included. These are also included in our discussion chapter and are discussed explicitly due to their methodological contributions.

Furthermore, we excluded publications that:

- were primarily theoretical studies
- primarily reported on qualitative studies
- primarily reported on practice-oriented studies
- interprets measurement, mapping or evaluation of MIL as assessment in school and education.

3.2.4. Nordic journals and established top journals

In addition to this, we have made searches in Nordic databases and specific established journals, some of which also include articles in Nordic languages. This includes the following sources:

Nordicom Review and *Nordicom Information:* these are peer-reviewed journals that focus on media and communication research in a Nordic perspective. We searched open on media literacy, information literacy and media and information literacy as well as on "Nordic concepts" such as mediekompetanse (media competence), information competence (informasjonskompetanse) and medie- og informasjonskompetanse (media and information competence)/ mediekunnighet, infomationskunnighet and medie- og informationskunnighet / mediekompetence, informationskompetence and medie- og informationskompetence. This resulted in a total of 74 hits and 7 articles that were selected for further analysis. These were primarily articles that addressed MIL in a broad and general perspective and few that focused on measurement or mapping.

Nordic Journal of Digital Literacy, a peer-reviewed journal that thematically focuses on ICT, media use and digitalization in relation to education, school and learning. We searched openly on media literacy, information literacy and media and information literacy. Hits: 161, 2 of which were selected for further analysis. Both are general articles without analyzing specifically surveying, mapping, assessment, indicators or indexes.

Idunn: Universitetsforlagets / Scandinavian University Press' digital platform, with approx. 32000 journal articles and other publications in several different subject areas. A number of Norwegian publications relevant to our search can be searched. We openly searched on media literacy, information literacy, media and information literacy (including the Swedish, Norwegian and Danish terms). This gave 49 hits, but none that were selected for further analysis.

In addition, we have made searches directly in a selection of international journals that are established as top journals in media studies, education and learning. Methodological articles published here usually have a strong design and are strictly validated. This applies to:

Computers and education
50 hits, 2 were considered relevant, but had already been found through ScienceDirect (see above).

Computers in Human Behavior
77 hits, 1 was considered relevant, but had already been found through ScienceDirect (see above).

New Media and Society
65 hits, but none were considered relevant enough for further analysis.

Media, Culture and Society
72 hits, but none were considered relevant enough for further analysis.

3.2.5. «Gray literature »

Google Scholar: Large international interdisciplinary database. Covers most journals, as well as some other types of publications, which are not necessarily found in academic databases, such as dissertations, doctoral degrees, master's theses and others (Wikipedia, 2020a). Google Scholar has quite limited opportunities to filter the results according to criteria such as peer review or other. It is also not possible to use database search strings like we have done in the other databases.

Google Web: The largest online search engine, which can search through over 8 billion indexed pages. Hits are sorted using various algorithms that show the most relevant hits first (Wikipedia, 2020b).

We have primarily done relatively basic searches in *Google Scholar* and the *Google web* by searching for relevant search phrases such as “media and information literacy measurement”, “media literacy levels survey” and others. We have also been able to search the Nordic languages here. In this way we can identify so-called “gray literature”, which is literature that can be relevant for our study but are not published in scientific publication channels. Such publications can be relevant sources for several reasons. This applies to for instance popular science, policy documents, technical reports, public reports and other public sources (see also Siddiq et al., 2016). Grey literature can potentially add extra value to a systematic review, as long as we document and present what kind of search we have done (Siddiq et al., 2016). We

therefore considered it important to include Google scholar and Google web search. In such a dynamic field as media and information literacy, it can be seen as especially important to include gray literature. In total, we found 17 relevant publications in this way

3.2.6. Network

The last main source used in the review is also a type of references that are not accessed through the established research databases. This applies to well-known surveys such as public media surveys that are not necessarily peer-reviewed, public statistics and sources we have gained access to through "tips" from actors in the research group's network.

3.3. Methodological process

In the article *Development of a Media Literacy Skills Scale*, Eristi and Erdem (2017, p. 255) describe nine steps in the development of a scale for media literacy skills. The steps are these: 1) literature review to define what is to be measured and which components that should be included, 2) generate an "item pool", i.e. an overview of various items that have been measured, 3) determine an appropriate format for measurement, 4) development of a proposal for measuring tools, 5) critical review of experts in the field, 6) pilot study 7) administration of the measuring instrument, 8) conduct studies of reliability and validity and 9) completing the measuring instrument. Due to the limitations of our feasibility study, we will primarily emphasize points 1, 3, 4 and 5, and we will make suggestions for indicators and format for measurement. However, in our recommendations (Chapter 7), we will discuss how the remaining steps can be implemented, which we consider should follow after our work on the feasibility study has been completed.

4. Results from the research review

In this chapter, we summarize the most important findings from the research review. We have analyzed the publications from the research review based on the research question described in section 1.4. The main research question was:

What methods for measuring levels of media and information literacy exist and what characterizes them? Moreover, in which countries are the measurements carried out, when were they carried out, what sample are they based on and what data collection methods are used?

In addition, the following sub-questions are important:

- *What concepts are applied in the existing surveys and how are they defined?*
- *What are key findings in the various studies found in the systematic review?*

For in-depth information, see also Appendices 2 and 3, which are the main tools for analysis.

4.1. About the findings

The research review shows that there are many publications related to the keywords media literacy, information literacy, and media and information literacy, but when we limited the search to dealing with measurement and measurement methods for these areas of literacy, the search was significantly narrowed. The first open queries gave so many hits, while the more refined and "directed" searches done later in the process gave fewer and qualitatively better results.

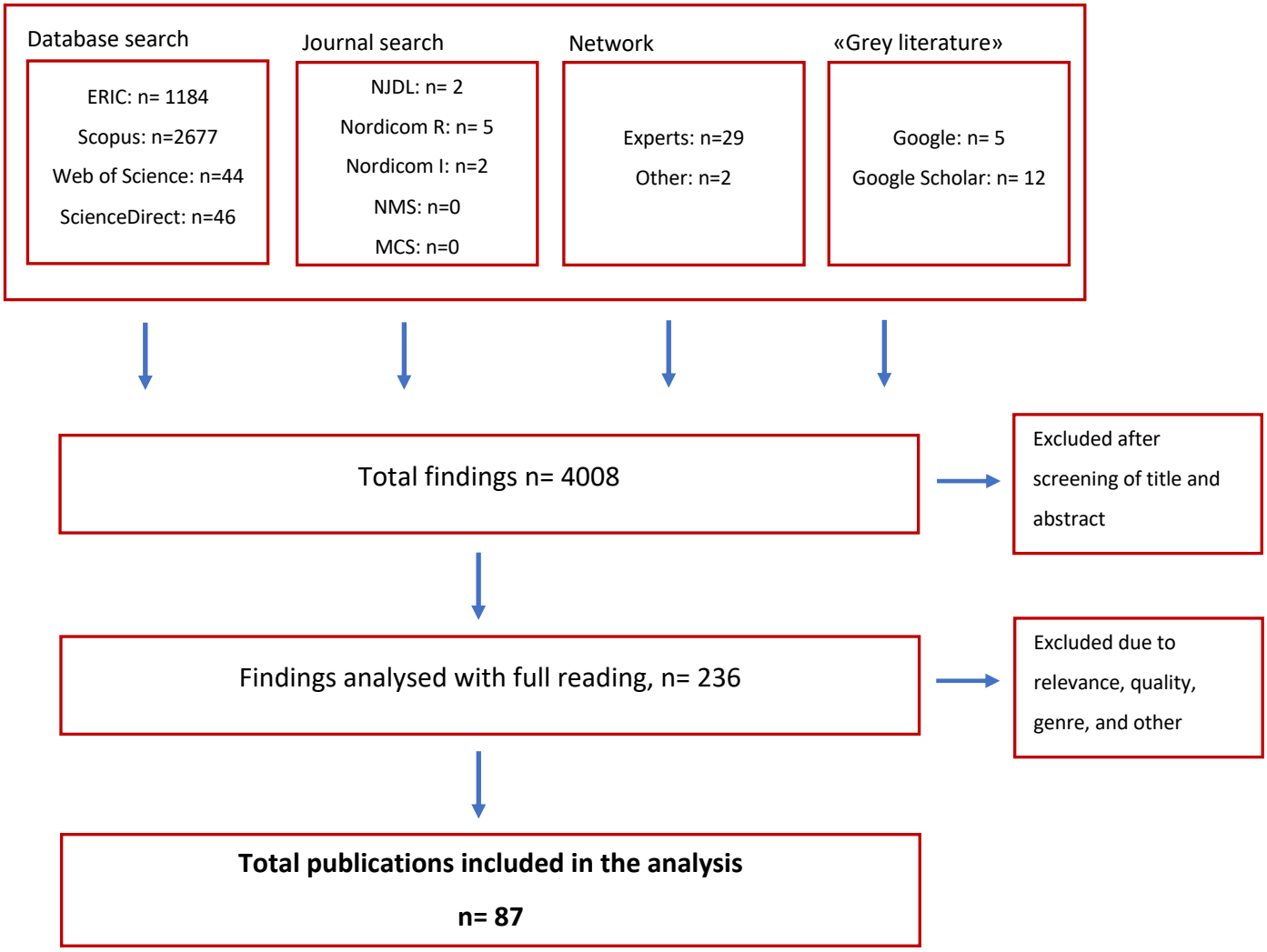
We got the following hits:

Scopus: 2677
ERIC: 1184
Web of Science: 44
ScienceDirect: 46
Journals (total): 9
Network: 31
«Gray literature»: 17

4.2. Flowchart of the search process

In Figure 3, we present a flow chart of the search process, which also shows how many hits we had for each step in the process. The diagram therefore includes both database searches, searches in specific journals, findings from networks and from searches in the open web for «gray literature».

Figure 3: Flowchart showing the full search process (layout adapted from Siddiq et al., 2016)



4.2.1. Hits in the databases

Scopus: Initially gave 2677 hits, but this was reduced to 47 relevant hits that were included in the review study. Scopus was the first database we used, and it was here that we had the most open question formulation for the search. This was revised in the subsequent database searches,

which resulted in fewer first hits and generally better "accuracy". This is reflected in how many hits we got.

ERIC: initially gave 1184 hits, which was reduced to 44 relevant hits that were included in the review study

Web of Science: here we used a narrower database question. As this is a database with relatively similar themes as ERIC and Scopus, this was used as a quality check against the others, and we basically got 44 hits here. As this was the third database we worked with, we got several overlapping hits here compared to ERIC and Scopus.

ScienceDirect: In the same way as in Web of Science, we were able to perform more sophisticated searches in this database. Here we got 46 relevant hits, some of them overlapped with the other databases.

4.3. Review of the studies

Based on this, we ended up with 87 publications, which we analyzed in more detail. Some of these were relevant to the study but weren't purely empirical articles. A total of 26 publications were considered particularly relevant empirical articles and were systematically analyzed. In appendix 2, we show an overview of the studies that were selected for an in-depth analysis after we made an assessment of quality and relevance, i.e. we did a critical analysis of the publications where we assessed what we considered to be important studies and what was relevant to our report, where the research question was the most important guideline. The empirical articles have used different frameworks for measuring or mapping MIL or related areas of expertise. Based on the literature reviews of Haddon et al. (2020), Siddiq et al. (2016) and Ferrari (2012), we have for each of the empirical studies included the aspects shown in Table 2 in the systematic review.

Table 2: overview of criteria for analysis in the research review

- Names of authors
- Year of publication
- Year of when the data collection was done
- Where the data collection took place
- Name of the publication

- Number of other publications that have cited the relevant publication. We consider this to be one of several quality criteria, but in some cases, it is insignificant because the publication is relatively new
- Sample size
- Type of methodology, especially if it was self-reporting or proficiency tests
- Whether the study / survey is based on an explicit theoretical framework
- Which framework the survey or survey is based on
- Whether specific indicators have been used and if so, what the main categories are called
- The types of findings the publication primarily reports on
- Which age groups have been included
- Whether background variables have been collected, where particularly socio-demographic variables are of interest
- Any special remarks

The remaining publications are included in our discussion but have been assessed and analyzed in a more comprehensive way, where the most important ones are discussed explicitly later in this chapter.

4.4. General findings

Methodologically, the publications have mainly used quantitative questionnaires, but there is a difference between the *type of questions* (self-reporting, self-perception, etc.) that have been used, some studies have applied different types of tasks or tests (for instance reflective tests related to understanding, specific media content). Most studies are single studies (not comparative), and most are based on relatively small samples (from n = 167 to n = 2300), but two studies have larger samples (n> 60,000 and n = 11850), but these both use available data from the larger ICILS study[6].

As mentioned, we have disregarded studies that do not measure quantitatively, this typically applies to studies such as case studies, qualitative observations and interview studies. The reason for this choice is among other things that it is specified in the invitation to tender. We have nevertheless included a few studies with relevant methodological discussions despite the fact that they have a small sample. For example, we have analyzed the article from Holma, Krumina, Pakalna, and Avanesova (2014) because it applies UNESCO's framework for MIL

[6] ICILS= International Computer and Information Literacy Study, international study that maps digital skills in over 60000 junior high school pupils (https://icils.acer.org)

using a mixed methods design. It is a pilot study with only 23 informants, but still provides interesting information.

4.4.1. Self-reporting or proficiency tests

Measurement of MIL has previously been influenced by perspectives from both the humanities and social sciences. According to Hobbs (2017), qualitative studies have dominated the general and practice-oriented research related to media literacy and digital literacy, especially interventions and case studies have been important. But when it comes to measuring and mapping competencies, some quantitative studies have been done, and self-reporting questions dominates. The same is documented by Siddiq et al. (2016) in their literature review. As Hobbs (2017) considers it, self-reporting can be a useful methodology. Researchers ask informants to evaluate their own knowledge, skills, attitudes and behavior. The collected data gives possibility to assess and analyze for example the relationship between media literacy and other variables. Self-reporting can be considered a type of *indirect* measure, which primarily captures a participant's self-concept or self-esteem (Siddiq et al., 2016). The researcher thus gets an insight into what people think and believe about their own literacy, but not a direct measure of what they actually master or know. Bias is also a weakness in self-reporting. Hence, the researcher primarily gain insight into *perceived literacy*, and self-perception and self-confidence on behalf of the informants' literacy.

Because analysis, critical reflection and judgement are important parts of media literacy as well as information literacy and MIL, self-reporting has long been common in measuring literacies in relation to media and technology development. The data of analytical skills, behaviors and attitudes is often collected in combination with data of media use, for instance time spent on media. This has been done, for example, by Ofcom (2008) and EU Kids Online (2014).

Although self-reporting has clear strengths, Hobbs (2017) defines proficiency testing or performance-based measurement as a kind of "gold standard" when it comes to media use and literacy. This is because such measures can capture media literacy through tasks similar to everyday practices that involve communication, media use, analysis and creation of media content in the real world.

Some studies of media literacy have focused on cognitive abilities and tested informants in their use, analysis of and production of media content of various kinds (Hobbs, 2017). In this way, different media users can demonstrate their creative and analytical skills. Tests of skills in "real contexts" can be conducted for example at home or in a school context. Tests can also capture people being active in a specific form of media communication, generating a personal response to something or it can test people creating a media product (Siddiq et al., 2016). But other variants of proficiency tests in various forms have also been included in quantitative studies, for instance in combination with self-reporting in questionnaires. This applies, for example, to the Norwegian Media Authority's (Medietilsynet, 2019) survey of "critical media understanding" in the Norwegian population. Here, the informants were asked to interpret examples of specific media content and answer questions that made it possible to analyze the level of the participants' reflection.

Siddiq et al. (2016), like Hobbs (2017), emphasizes that proficiency tests can provide a better and more realistic measure of informants' thinking and reasoning related to authentic tasks. When studies have compared findings from self-reporting and proficiency tests, a large discrepancy has sometimes been found. Hobbs (2017) refers for example to the iSkills test that for a long time was conducted in the USA. In a sample of the participants, 90% considered themselves as "highly skilled ICT users". However, in proficiency tests, over 50% of these participants scored lower than the average of all participants in the iSkills test. The same is shown by Siddiq et al. (2016); the majority of studies that compare self-reporting of people's literacy with their tested literacy show merely low correlation. According to Hobbs (2017), such findings confirm that proficiency tests provide more credible knowledge about people's media literacy.

One of the challenges with proficiency tests is the changing media environment. In a world of rapidly changing media and technology, it can be difficult to create proficiency tests based on the current media technology, and it is especially a challenge if the aim is to measure a population's media and information literacy over time.

In our research review, we found different approaches to measuring MIL, which mainly can be divided into three groups:

a) Self-reporting of "experienced" MIL (includes both media literacy, information literacy, media and information literacy and digital literacy / digital skills),
b) knowledge claims (with answer options), and
c) demonstrated skills from different tests.

This is in line with what Haddon et al. (2020) found in their recent review of research on digital skills in children and adolescents. They found four main approaches to measuring digital skills; self-perception, specific knowledge claims, demonstrated skills and performance tests (Haddon et al., 2020, p. 26). However, most studies do self-reporting (n = 15).

4.4.2. The participants' age

Few of the surveys measure «the entire population», the vast majority of studies (n = 21) measure different specific age groups of the population. The most common groups are students (n = 10) and "children and young people" (n = 9). A few studies map adults (n = 2) and some (n = 3) address larger age ranges, for example Holma et al. (2014) which map the age group 25-62, but this is a pilot with only a few participants. Of larger studies, Lopes et al. (2018) study media and information literacy in a sample of people aged 18-81 (n = 500) and Dornaleteche, Buitrago, and Moreno (2015) research media literacy in an age group of people aged 15 to 99. Both of these studies are therefore interesting in terms of our report. They have both used broad frameworks as a starting point, but with different focus. Dornaleteche et al. (2015) take a fairly narrow focus and measure primarily media use (with 45 items related to the use of digital tools and 2 questions related to meta-reflection). Lopes et al. (2018) has developed their own framework with a focus on a broad interpretation of MIL. We return to this in section 4.8.

4.4.3. Quality assessment

There is a great variation in how the various studies measure, assess and document quality aspects of the studies mentioned. Some reasons for this are that the studies in some cases are in very different phases, some report on a pilot study, while others report at a much later project phase and account more generally for a more comprehensive process. Also, some studies are included in our review because they have more methodological focus and thus have less research findings as a main content. Most studies discuss the research *reliability* and method, but how detailed this is done varies quite much. Most studies that report on empirical findings have accounted for validity, i.e. whether the study's arguments are valid or not, but also here the level of detail varies quite strongly. Aspects such as sample size, and whether the survey is

based on and explains an explicit theoretical framework are also important in quality assessment of empirical studies. We have considered all the studies that are included in our analysis to be quality studies, but as mentioned, few of the studies are part of larger studies, and most appear as individual studies.

Reliability and validity: we have assessed this on all selected publications, but as mentioned, how this is reported varies strongly. We have not had the opportunity to control the validity or reliability, but we have assessed the various publications according to whether the general methodological impression is satisfactory or not. In those cases where we have assessed the methodological quality as unsatisfactory, we have excluded them from further analysis. Our assessment is that the studies included in the further analysis (see Appendix 2) are of acceptable quality.

The most common reliability measure is Cronbach Alpha, which is reported as generally acceptable in the studies that have applied it. However, the measures of reliability and validity vary too much for them to be comparable across studies, and in most of the studies we do not consider the assessment of quality it to be strongly enough documented. The most important thing in this context is that the studies that are included all have made different measures of reliability and validity. In order to make a valid assessment and a possible statistical assessment of the validity of the various existing indicators, one needs access to the entire data set for the relevant surveys. We have not had access to that in this case. We have therefore, as mentioned, rather made a comprehensive and critical assessment of the validity and reliability and discussed the potential opportunities to meet important quality requirements over time.

4.5. Use of concepts

In this section, we discuss how the studies have defined the areas of literacy they measure and which specific concepts that have been used. Due to the internationally different ways of conceptualizing the areas of literacy, we have included studies that use both media literacy / media competence, information literacy / information competence, digital literacy / digital competence and media and information competence / media and information literacy. In practice, we still focused mainly on media literacy (media skills) and media and information literacy (media and information literacy), and in some cases, information literacy. But information literacy is in relatively many publications interpreted as a rather narrow concept

related to library science and information processing or knowledge. Some of these publications were excluded.

Although there is great variation in the use of concepts in the reviewed studies, there are some definitions that stand out in that they appear to be relatively established and are widely referred to. This applies in particular to UNESCO's (2013) pragmatic definition of media and information literacy. This definition used in practically all publications that explicitly apply the concept of media and information literacy (MIL), and UNESCO's definition is applied without any fundamental critical questions being asked. Of other concepts, media literacy is widely used, this applies to the whole spectrum of publications. In the publications that focus specifically on media literacy (n = 13), reference is often made to established theorists such as Aufderheide (1993) (n = 9), Buckingham (2003, 2005) (n = 11) and Livingstone et al. (2005) (n = 14). These three references have a lot in common, and their definitions and categorization of media literacy are almost identical, although Buckingham and Livingstone refer to somewhat more developed frameworks for methodological application. They have in common that they all, albeit in somewhat different ways, focus on a broad form of media literacy with a focus on access and use, comprehension and creation and communicating. To some extent, American and Asian studies have a more cognitive perspective on media literacy, with Potter (2004, 2018) being the most widely used reference (n = 7).

As mentioned, however, many of the frameworks are to varying degrees developed by the researchers themselves. This means that they often expand models with different "additional" competencies or literacy aspects, these are competencies that are added to the various studies based on local, experience-based or theoretical considerations. Most of the applied concepts nonetheless are quite similar. An important characteristic in this respect is that all the studies apply a relatively broad conceptual framework and approach to measuring MIL. This means that the studies seek to capture media and information literacy in a complex and holistic perspective, which cover access and use, understanding, analysis and evaluation as well as participation, communication and creativity.

4.6. Different models and indicators

As mentioned, many of the surveys have developed their own frameworks and indicators. Haddon et al. (2020) also found something similar in their recent review of research

on digital skills in children and young people. As Appendix 3 shows, a variety of different frameworks have been used in the studies in our review. This can be a strength because the studies appear to be original, but it can also be a weakness if it doesn't exist any well-established frameworks that can contribute to developing the field. At the same time, there is a clear tendency that several of the studies are based on some of the known frameworks for media literacy or MIL, so that some frameworks are likely to become established eventually. The frameworks that are referred to most often are UNESCO's framework (n = 11), Ofcom (n = 6) and concepts developed by Livingstone et al. (2005) (n = 14) and Buckingham (2005) (n = 11). EAVI (n = 5) and DigComp (n = 3). The most comprehensive frameworks are the frameworks from UNESCO, DigComp and EAVI. All of these are characterized by the fact that they can be called consensus concepts, which are developed over time as result of a larger processes in which the major international actors are important stakeholders, such as the EU (EAVI and DigComp) and UNESCO (MIL). In the studies in our review, usually only parts of these frameworks have been used, as it is argued that they are too comprehensive for a single study. Some of the studies are also based on information literacy as a separate concept and use so-called standard frameworks within information literacy. One of the most commonly used (n = 6) is a standard level division developed by the Association of College and Research Libraries (ACRL) (see Livingstone et al., 2005).

In the following, we highlight some of the most relevant and well-developed frameworks from the research review.

4.6.1. Application of the UNESCO framework

Holma et al. (2014) have based their study on UNESCO's index for mapping MIL. Holma et al. (2014)'s study is a pilot, but the findings are interesting and may be worth looking into. Through a case study using both questionnaires, interviews and practical assignments, they have used UNESCO's framework to analyze their own empirical data. As mentioned, UNESCO's work on MIL has been of great importance for research related to media and information literacy. The framework is intended to contribute to the assessment and measurement of skill levels related to the various areas of literacy (UNESCO, 2013, p. 60). This framework basically includes three levels:

1. **level (basic):** the informant has a basic level but needs significant improvement to be able to use the media and benefit from information effectively.

2. **level (intermediate):** the informant has a good level of knowledge and skills, but there are some shortcomings in some areas.
3. **level (advanced):** the informant has a very good level of knowledge and skills.

In Holma et al. (2014)'s study a «zero level» is added, which includes informants who have knowledge and skills below the basic level. There are empirical reasons for that. They find a zero level, especially when measuring literacy in practical tasks. Including a zero level, four levels are linked to UNESCO's framework for MIC, and more specifically the three main components *access, evaluation* and *creation,* in this way:

- **MIL component 1, Access :**
  - *Level 1 indicator:* the informant can define his or her information needs, can also select relevant sources of information, is able to search and can temporarily store found information
  - *Level 2 indicator:* The informant is aware that the definition of information needs may vary and that there may be at least two different sources, as well as that there are different methods for searching and storing information.
  - *Level 3 indicator:* The informant is competent to define his or her information needs in relation to the search strategy. The informant is also able to select the most relevant sources, has good literacy when it comes to choosing search strategies and can store information as needed.
  - *The "zero level"* here means that the informant finds it difficult to define information needs, locate and select sources of information and to store information.
- **MIL component 2, evaluation :**
  - *1st level indicator:* no clear criteria, often the first source, or the source that is easiest to access is often selected. There is no special organization of useful information or storage.
  - *Level 2 indicator:* the informant knows the criteria for good quality information and uses them in practice and is also able to organize information so that it is stored and can be used again.
  - *Level 3 indicator:* the informant is able to evaluate whether a source of information is relevant and of good quality, has good skills when it comes to storing and organizing information.
  - The **"** *zero level* **"** means that the informant finds it challenging to choose a source, has no criteria for choosing and often does not know how the information can be organized for storage or reuse.

- **MIL component 3, create** :
    - *Level 1 indicator***:** the informant can provide a summary of information, can present the information, knows about various services and sharing options, but is not concerned with aspects such as rights (copyright for example)
    - *Level 2 indicator: the* informant can create new information and new formats based on obtained information, knows that there are different types of information and channels for presentation of information, and knows how they can be used.
    - *Level 3 indicator: The* informant can analyze, critically evaluate and create new information based on a variety of different sources. The informant is aware of rights such as copyright, is able to select and use information channels with different target groups, can present private information online in secure ways and uses various digital services.
    - **The "** *zero level* **"** here means that the informant does not have sufficient literacy to make summaries of information obtained, has low digital literacy and has little or no awareness of rights such as copyright or data security.

This index one appears to us as interesting, it relates to an established scale, but it develops on the basis of lessons learned from empirical data and also distinguish well between the different levels.

4.6.2. Dimensions of MIL

Sanchez et al. (2019) refers in their article to UNESCO's work with MIL and has developed an instrument for measuring MIL. The article refers to a pilot study but is included here because it is test-based and aims to measure recognition and mastery of different types of tasks. It is based on four main dimensions: media access and use, language and critical understanding, production and programming processes and «transforming one's situation through communication»

Figure 4. Dimensions of MIL (Sanchez et al., 2019)

Dimension	Category
Media access and use	a. Production mechanisms b. Telematics and technological tools c. Media and information use
Language and critical comprehension	d. Interpreting images and justifying one's decisions e. Image-based creation f. Aesthetic criteria and value judgments
Production and programming processes	g. Production phases h. Cultural function of the media and information
Transforming one's situation through communication	i. Receptive and critical awareness j. Communications skills k. Technological appropriation

This is one of the few frameworks that explicitly includes aesthetic and value assessments as separate categories. This is something that several theorists in media literacy and media education emphasize as important competencies for participation in the media-dominated digital public (for example, Mihailidis, 2018).

4.6.3. Information literacy

The most commonly used framework in the studies that apply the term 'information literacy' is a standard level division developed by the Association of College and Research Libraries (ACRL) (see Livingstone et al., 2005). This model is divided into five levels:

- **Level 1**: Determine the nature and extent of the information needed.
- **Level II**: Access needed information effectively and efficiently.
- **Level III:** Evaluate information and its sources critically and incorporates selected information into his or her knowledge base and value system.
- **Level IV:** Use information effectively, individually or as a member of a group, to accomplish a specific purpose.
- **Level V:** Understand many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

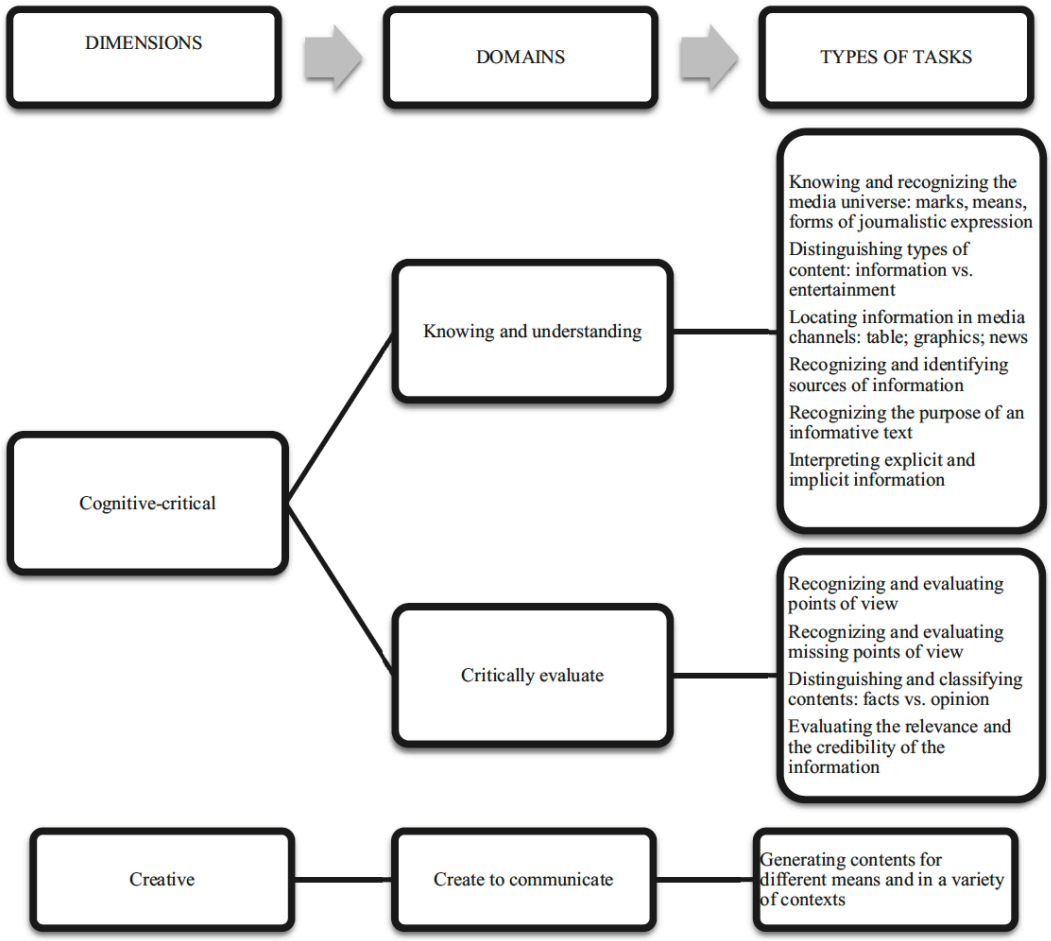
4.6.4. Cognitive-critical and creative MIL

As mentioned in 4.4.1, the informants in Lopes et al.'s (2018) study are in an age range of 18-81. The study is therefore interesting in this context. Their framework has two main dimensions: Cognitive-critical and creative. The first dimension consists of knowledge and understanding as one domain and critical evaluation as another. The creative dimension has a subdomain; create to communicate. In this sense, this is a framework with several similarities

to the established frameworks, which we will explain in more detail in the next section. This applies, for example, to the frameworks from EAVI, UNESCO and Ofcom.

Graphically, the dimensions from Lopes et al. (2018) can be illustrated as in Figure 5 below.

Figure 5. Dimensions, domains and task types from Lopes et al. (2018, p. 513)



This study was in our review one of the few based on practical tests. With a sample of around 500 participants, Lopes et al. assessed the informants' "media and information literacy skills" through various tasks, tests and questions. The first dimension Cognitive-critical involved two domains**:** a) Knowing and understanding and b) critically evaluate. The creative dimension has one domain, 'create to communicate', and was measured by a test that evaluated the participants' skills in creating and generating media content. This was a more time-consuming task than tasks related to the cognitive-critical dimension, yet there were two such tasks in the test. The development of this test is based on established theory within MIL, including Arke and Primack (2009), EAVI (Celot, 2015) and UNESCO (2013).

4.6.5. DigComp

DigComp stands for The European Digital Literacy Framework, and is a framework for digital literacy, initiated and organized by the European Commission[7]. As mentioned, this is a starting point for some of the studies in our research review. DigComp is a framework based on a literature review of 15 different frameworks related to ICT literacy and associated areas of competence, which Siddiq et al. (2016) refers to as the most comprehensive and robust systematic review related to ICT literacy until 2016. According to Siddiq et al. (2016) DigComp is also a relatively newly developed and comprehensive framework that sees ICT in a broad and inclusive way, i.e. that many aspects related to ICT and ICT's social and cultural opportunities and challenges are taken into account. In addition, this is a *general* framework that is, as we see it, basically suitable for embracing all age groups. DigComp also includes thorough competency descriptions, which according to Siddiq et al. (2016) make it applicable in many areas, also in a process where indicators and tests are developed. For these reasons, we believe this framework is relevant, despite the fact that a different term than MIL is used. At the first level, the framework has five areas of competence: *information, communication, content-creation, safety* and *problem solving.* At the next level, specific sub-competencies are also linked to these areas. The third level consists of different skill levels for each literacy, and the fourth of examples of knowledge, skills and attitudes to each literacy. The fifth level shows a contextual explanation with examples of how the different competencies can be used for different purposes.

Siddiq et al. (2016, p. 62) presents levels 1 and 2 from DigComp in Table 3, which is a revised framework. The framework has been revised on the basis of a major systematic review, where they have, among other things, added a new area of competence that has not been sufficiently covered in previous research, an area 6 called *technical-operational competence.*

[7] More about DigComp here: https://ec.europa.eu/jrc/en/digcomp

Table 3: Revised DigComp framework (Siddiq et al., 2016, p. 62)

Table 3
The revised DIGCOMP framework.

Competence areas (level 1)	Competences (level 2)
1. Information	1.1 Browsing, searching and filtering information
	1.2 Evaluating Information
	1.3 Storing and retrieving information
2. Communication	2.1 Interacting through digital technologies
	2.2 Sharing information and content
	2.3 Engaging in online citizenship
	2.4 Collaborating through digital technologies
	*2.1.1 **Asynchronous Communication**
	*2.1.2 **Synchronous Communication**
	*2.4.1 **Asynchronous Collaboration**
	*2.4.2 **Synchronous Collaboration**
3. Content-creation	3.1 Developing content
	3.2 Integrating and re-elaborating
	3.3 Copyright and Licenses
	3.4 Programming
4. Safety	4.1 Protecting devices
	4.2 **Managing and protecting personal data**
	4.3 Protecting health
	4.4 Protecting the environment
	4.5 **Netiquette**
5. Problem solving	5.1 **Solving problems with use of digital technology**
	5.2 **Collaborative problem solving**
	5.3 Innovating and creatively using technology
	5.4 Identifying digital competence gaps
6. Technical operational	6.1 **Solving technical problems**
	6.2 **Identifying needs and technological responses**
	6.3 **Basic technical skills**

There are several reasons to include DigComp, as we see it, for example the strong validation and reliability that the framework has undergone through several research studies. The most general areas of literacy (level 1): information, communication, content-creation, safety and problem solving and technical-operational, also have much in common with the understanding related to MIL.

4.6.6. The Norwegian Media Authority (Medietilsynet, Norway)

The Norwegian Media Authority's survey of critical media understanding (Medietilsynet, 2019) is included in our review for several reasons, despite the fact that it has not been published in peer-reviewed channels. It is nevertheless very relevant, as it is a recent survey of the Norwegian population in a sample of people between 16 and 99 years and is thus a survey that has a design that has several similar traits to a survey aiming to measure MIL in "the entire population" in Sweden, Norway, Denmark and Iceland. The first survey was conducted by Kantar on behalf of the Norwegian Media Authority and in collaboration with researchers from the University of Bergen.

In 2019, the Norwegian Media Authority conducted a survey of what is described as *critical media understanding* (kritisk medieforståelse) in the Norwegian population. The sample was as mentioned 1363 people between 16 and up to 99 years. The survey was meant to be a so-called "zero-point survey" that can potentially be followed up and compared to future surveys. The Norwegian Media Authority's definition of critical media understanding is (Medietilsynet, 2019): *knowledge and skills we need to orient ourselves in today's dynamic media landscape and to make informed choices about the media content we consume, create and share.* This is a quite narrow definition of a literacy area, and in this context, it is significantly narrower than media and information literacy. It can perhaps best be compared with one of the *sub-* dimensions of the frameworks discussed in our report, such as *understanding* or *critical understanding.*

The Norwegian Media Authority's report does not refer to any clear theoretical basis, but as we see it can be referred back to Ingulfsen and Gilje (2014)'s report on surveys of media competence, where *critical understanding* is highlighted as a key aspect of media literacy, with reference to EAVI's framework. In addition to questions related to evaluation, analysis and understanding of media content and media use, the survey had practical tests related to specific media examples. The survey also collected background data such as age, gender and education.

The following indicators are included in the survey (Medietilsynet, 2019, p. 86):

- *Ability to evaluate important news sources.*
- *Ability to uncover content marketing.*
- *Ability to assess trust in different media.*
- *Awareness of algorithms, and how this affects the content.*
- *Ability to assess the credibility of various media.*
- *Ability to distinguish between editorial and commercial content.*
- *Ability to assess signs of credibility.*
- *Awareness of how the media are financed.*
- *Ability to distinguish opinions from facts.*
- *Awareness of who owns the media.*
- *Ability to use media to orientate oneself in society.*
- *Know how and where to go when complaining or getting help in relation to the media.*
- *Ability to uncover illegitimate ways to convey news (fake news).*
- *Ability to distinguish sources / text types from each other.*

- *Knows the rules for criminal utterances (potential pedagogical role towards others, children, surroundings).*
- *Ability to use the media to form one's own opinion about politics / society.*
- *Uses a varied selection of news sources.*
- *Ability to publish content without infringing copyright.*
- *Uses news sources that have a different point of view or can deepen understanding.*
- *Ability to protect oneself through privacy settings.*
- *Ability to protect oneself against bullying, threats, harassment, fraud, etc.*
- *Ability to protect against fraud.*
- *Ability to assess the truthfulness of news via online searches.*
- *Ability and see the importance of using several different media when understanding a case.*
- *Ability and see the importance of finding which media / sources are the source of cases on the internet.*
- *Ability to assess the truthfulness of news before sharing on the internet.*

As one of few surveys, the Norwegian Media Authority has included variants of proficiency tests in addition to self-reporting and evaluation. As mentioned above, such combination is a recommended design when mapping literacy (see Haddon et al., 2020; Hobbs, 2017; Siddiq et al., 2016). But it seems unclear which theoretical basis the indicators have. A clear theoretical framework is one of the most important quality criteria in research (Siddiq et al., 2016).

The Norwegian Media Authority present the findings in a matrix where the categories were low/high understanding and analog / digital literacy. After a conversation with the Norwegian Media Authority, it was stated that the next survey planned for 2021 will be based on a revised framework and analysis apparatus. This was not clear at the time we completed our report.

4.7. Key points from policy documents and other actors

In the following, we review publications that are not necessarily peer-reviewed research publications, but which nevertheless have had a major impact in the MIL field. They are therefore included in our review. These include policy documents from the European Commission and UNESCO, as well as research reviews and reports commissioned by Ofcom (UK) and Slots- og kulturstyrelsen (Denmark), as well as major projects and surveys related to media literacy (EAVI). These do not appear in the established research databases but are included in our evaluation, as several of the publications refer to frameworks and models that

have been used and / or further developed in research and practice. Several of the articles from the database searches have referred to these documents. We have focused relatively strictly on documents and publications that discuss or analyze methods and frameworks for measuring MIL.

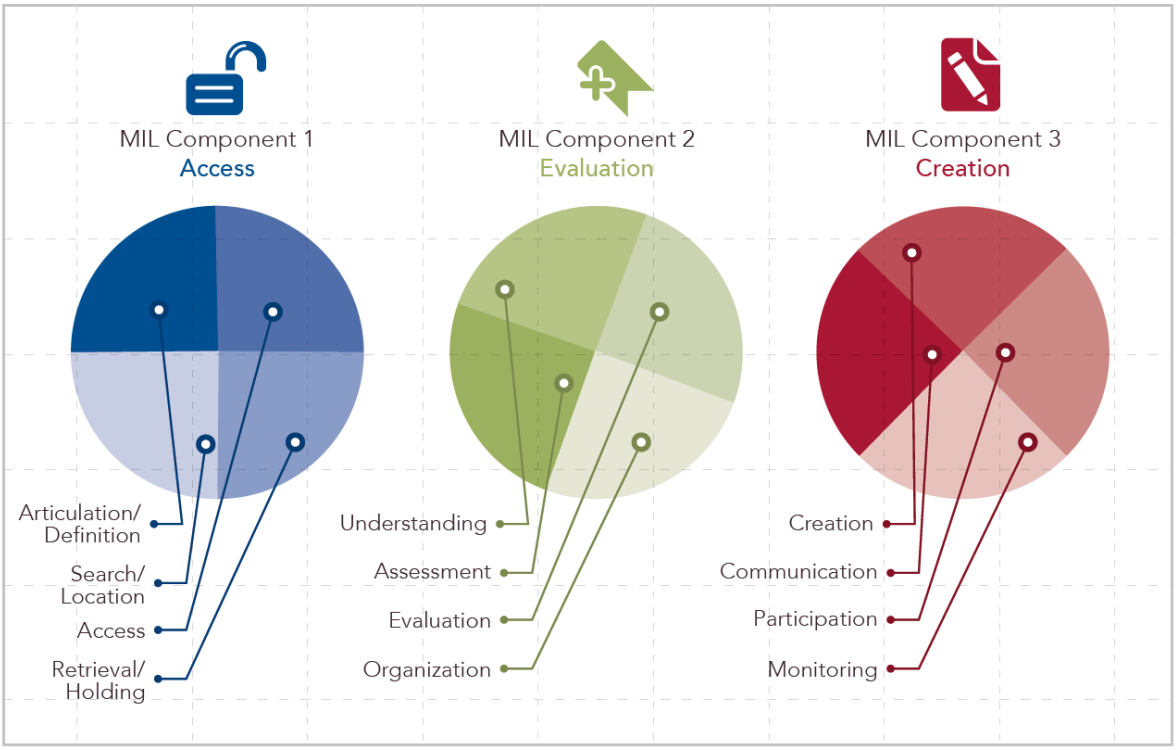
4.8. UNESCO

UNESCO has for a long time focused on media and information literacy and has declared quite ambitious goals in terms of both research and practice related to MIL. UNESCO is a key actor in research, practice and communication about MIL. The report *Global Media and Information Literacy (MIL). Assessment Framework: Country Readiness and Competencies* (UNESCO, 2013), which has been written in collaboration with a number of researchers describes and assesses a framework for assessing MIL and is thus highly relevant to this report. The UNESCO-report emphasizes the different levels of MIL, where a contextual, national level constitutes an overarching level and MIL competencies and teachers' MIL two other levels. Here we focus on the individual MIL competencies and possible measurement of them.

A crucial ability in MIL, according to UNESCO (2013, p. 55), is the ability to "mobilize and use internal resources such as knowledge, skills and attitudes, as well as external resources such as databases, colleagues, peers, libraries, tools, and instruments, among others, in order to solve a specific problem efficiently in a real-life situation". UNESCO emphasizes these are *situated competencies*, that only can be measured in the situations and contexts in which they are used. This means, as we see it, that the development of, for example, a Nordic index must be tested in precisely in a Nordic context and optimally in the various countries that will conduct a survey. In the UNESCO- report, MIL indicators are presented with three main components: *approach*, *evaluation* and *creativity*.

Figure 6 shows the main components and subcategories:

Figure 6. MIL - main components and subcategories (UNESCO, 2013, p. 56)



Access: This is seen as a key competence because it is about accessing, finding and storing information and media content, but also about using technology in an adequate way. This also includes the ability to recognize the need for information, media content and knowledge and to be able to identify which information and which media content is useful and not. This corresponds to what is included in the other frameworks that all have access as a main component.

Evaluation: This main component contains both understanding, evaluation and assessment of information and media content. It thus contains what is called 'critical understanding', for example in the EAVI model, and 'understanding' in Ofcom's model for media literacy. UNESCO's framework specifies that this dimension is about both understanding, critical analysis and evaluation of information and media content. In addition, it is described that understanding and critically evaluating the media's function and role, human rights and other societal factors is important. This includes, for example, understanding the difference between fact and fiction, insight into genre and assessing the quality of information.

Creativity: This component includes creating information and media content and communicating in and with the media. It is thus about mastering the production of knowledge

and media content and communicating effectively with others. This also includes ethical aspects and attitudes towards media, information and ICT at a more general meta-level. For the various main components, the UNESCO-report further proposes 12 "subject matters" or sub-topics, which in turn are attributed to dedicated sub-competencies:

Table 4: indicators from the UNESCO framework (UNESCO, 2013, p. 59)

MIL component	MIL subject matters	MIL Competency Media and Information literate person is able to:
1. Recognizing the demand for, being able to search for, being able to access and retrieve information and media content	1.1. Definition and articulation of a need for information	1. Determine and articulate the nature, role and scope of the information and media (content) through a variety of resources.
	1.2. Search and location of information and media content	2. Search and locate information and media content.
	1.3. Access to information, media content and media and information providers	3. Access needed information and media content effectively, efficiently and ethically as well as media and information providers.
	1.4. Retrieval and holding / storage / retention of information and media content	4. Retrieve and temporally hold information and media content using a variety of methods and tools.
2. Understanding, assessment and evaluation of information and media	2.1. Understanding of information and media	5. Understand necessity of media and information providers in society.
	2.2 Assessment of information and media content, and media and information providers	6. Assess, analyse, compare, articulate and apply initial criteria for assessment of the information retrieved and its sources, as well as evaluate media and information providers in society.
	2.3. Evaluation of information and media content, and media and information providers	7. Evaluate and authenticate information and media content gathered and its sources and media and information providers in society.
	2.4. Organization of information and media content	8. Synthesize and organize information and media content gathered.
3. Creation, utilization and monitoring of information and media content	3.1. Creation of knowledge and creative expression	9. Create and produce new information, media content or knowledge for a specific purpose in an innovative, ethical and creative manner.
	3.2. Communication of information, media content and knowledge in ethical and effective manner	10. Communicate information, media content and knowledge in an ethical, legal and effective manner using appropriate channels and tools.
	3.3. Participating in societal-public activities as active citizen	11. Engaged with media and information providers for self-expression, intercultural dialogue and democratic participation through various means in ethical, effective and efficient manner.
	3.4. Monitoring influence of information, media content, knowledge production and use as well as media and information providers	12. Monitor the impact of created and distributed information, media content and knowledge as well as use existing media and other information providers.

It is emphasized that the intention is not to constitute a standard model, but rather that these are proposals, which can be used by the various countries to research on MIL and that each country must assess what the individual indicators should look like.

The overview in table 5 can be used as a tool to analyze levels of literacy. UNESCO's report emphasizes that the level of literacy must be understood as a continuum and that it is very dynamic, i.e. it is something that can be developed over time. But as a rough guide, MIL can be analyzed according to different skill levels, as shown in Table 5 below:

Table 5: MIL framework for three skill levels (UNESCO, 2013, p. 60)

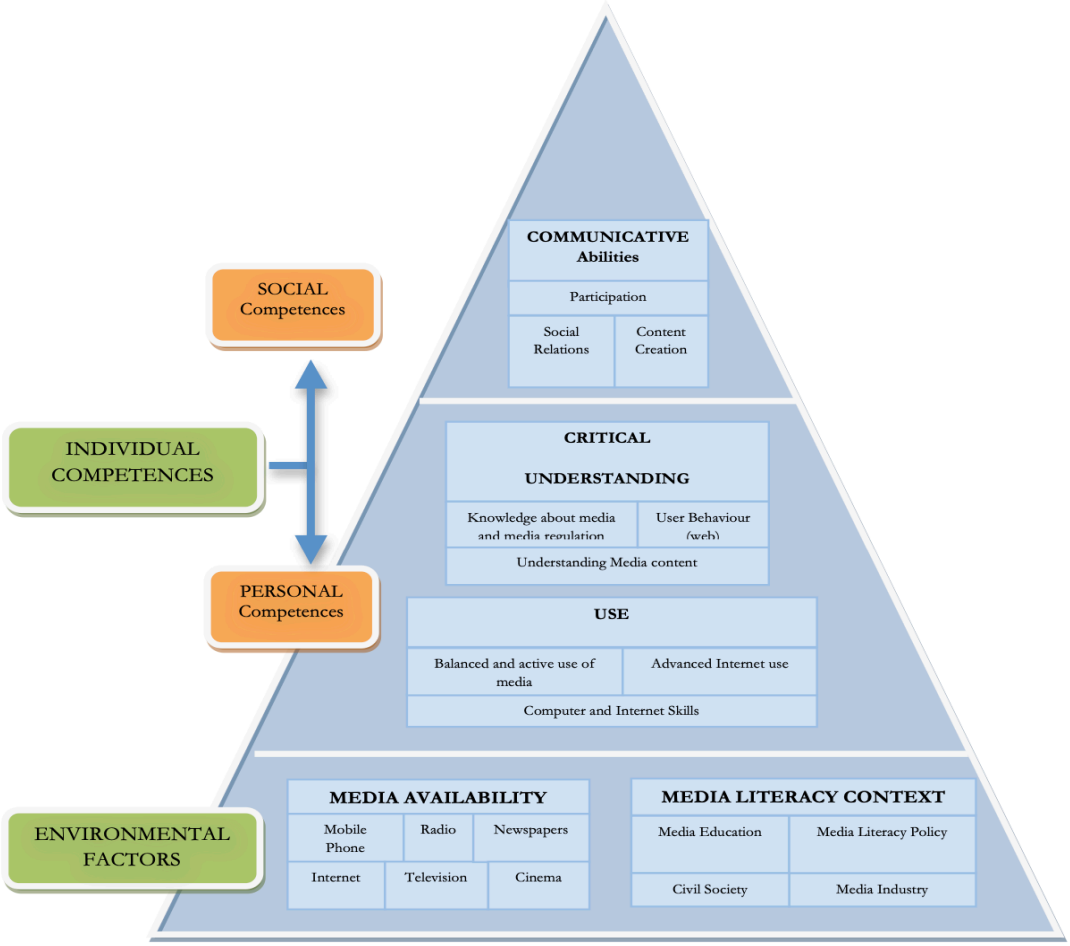
Basic level a respondent has basic level of knowledge, training, or experience on MIL, but significant improvements are needed for effective application. *It enables the individual to:*	**Intermediate level** a respondent has a good level of knowledge and skills acquired from practice and training on MIL, but there are gaps in certain areas. *It enables the individual to :*	**Advanced level** a respondent has a very good level of knowledge and skills acquired from practice and training on MIL. *It enables the individual to:*
Recognize his or her information and media (content) need, identify and save information and media content from easily located and accessed information sources using basic tools.	Specify the nature, role and scope of his or her information and media (content) need, in order to locate and select from various and potentially conflicting information sources and providers of information and media content using various tools, storing it and applying key legal and ethical principles.	Formulate his or her information and media (content) needs into concrete strategies and plans to search for and access information from diverse sources using relevant and where necessary diverse tools in a systematic, explicit and efficient manner, and retrieve existing information for further utilization.
Select information sources without clear assessment criteria, and with limited application and awareness of major principles, conditions and functions of media and information providers in society as well as authentication of information and media content.	Analyze and differentiate quality of and evidence of relevant information sources and content, understanding the necessity of media and information providers and their implications for society, being unable to recognize different viewpoints; as well as store selected information and media content for further application.	Within the context and multiple conditions applicable, interpret, compare, critically evaluate, authenticate and hold synthesized information and media content, appreciating work of author(s), and media and information providers within the context of sustainable development of society, organization or community.
Organize and save retrieved information without substantive synthesis using basic tools and distribute without critical appraisal or ethical and legal considerations for limited application.	Create, produce and communicate new information and media content in new formats using appropriate channels and tools for well-defined application as well as engaging in a dialogue with others with limited awareness of ethical and legal implications.	Combine information and media content for creation and production of new knowledge considering socio-cultural aspects of the target audiences and then communicate and distribute in various appropriate formats and tools for multiple applications in a participatory, legal, ethical and efficient manner, as well as monitor influence and impact made.

This should also be understood as a starting point for further development in the contexts that carry out a survey of MIL. In the chapter on recommendations, we return to some considerations in relation to this framework, among other things.

4.9. EAVI

UNESCO is an important actor in terms of media and information literacy. Also, EU is central in policy related to literacy in general and media literacy and information literacy in particular. The framework that has been developed by the EU Commission and EAVI (Celot, 2015; Celot & Pérez-Tornero, 2009) is frequently used both for conceptual presentation and mapping and measurement of media literacy and media and information literacy.

Figure 7. EAVI's structure for assessment and measurement of media literacy criteria. (Celot & Pérez-Tornero, 2009, p. 8):

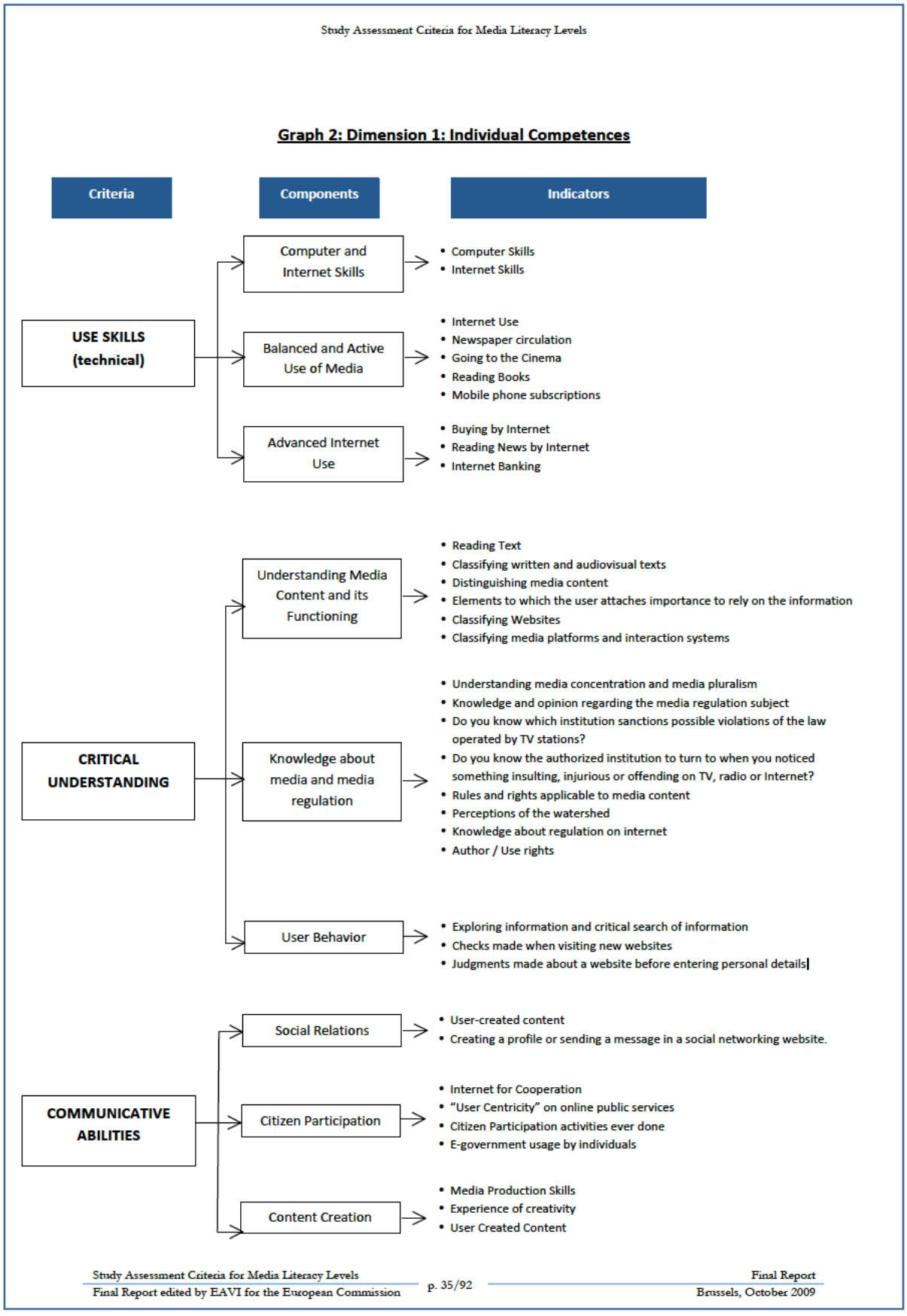


This model is a map of a so-called multi-level instrument that has been developed to measure both several aspects and levels of media literacy. The indicators have been developed on the

basis of a lengthy process, initiated by the UNESCO report *Towards Information Literacy Indicators* (Catts & Lau, 2008) and Ofcom's reports on media literacy (Buckingham, 2005; Livingstone et al., 2005). In addition, the framework has been empirically validated and revised on the basis of several audits. Also, new indicators have been tested through questionnaires and audits by a separate group of experts. Moreover, a pilot study has been conducted in four pilot countries (Czech Republic, Finland, Italy and the United Kingdom), which in turn has led to revisions and improvements. This framework can therefore be regarded as one of the most quality-tested frameworks when it comes to mapping areas of literacy related to MIL.

The framework includes both environmental factors and individual competencies, which is what we focus on in this report. The individual competencies are defined as individual capacities related to practicing specific skills (access, analysis and communication). But the main dimensions are called use, critical understanding and communicative abilities. Each of these dimensions is linked to a number of indicators that have been empirically validated and revised through, among other things, piloting. Graphically, this is presented as follows:

Figure 8. Dimensions and indicators in EAVI's framework (Celot & Pérez-Tornero, 2009, p. 35):



4.10. Other important literature reviews

4.10.1. Media Literacy children and young people

The Systematic Literature Review "*The Media Literacy of Children and Young People. A review of the research literature",* conducted by David Buckingham (2005) was commissioned in 2005 by Ofcom, the UK's official media and communications authority. This review has had a major impact and has since been widely cited. It is based on Ofcom's definition of media literacy; "*The ability to access, understand and create communications in a variety of contexts*" (Buckingham, 2005, p. 3). The literature review focuses primarily on general literature and conceptual interpretations related to children and young people's media literacy, and thus has a much broader focus than our feasibility study. But Buckingham also accounts for a conceptual apparatus that has since been widely used in research and mapping of media literacy. Ofcom's definition has three key dimensions that can be developed into a conceptual framework, which can conceivably also be a framework for forming indicators for measuring the MIL level. The dimensions are access, understand and creativity. *Access* is primarily about the skills and knowledge needed to access media content, and to use available technology and software. *Understanding* is about awareness of the media's "language" and logic, understanding the difference between fact and fiction, being aware of tools in advertising and exercising critical judgment in relation to different types of media content. In other words, both aesthetic and emotional reception, interpretation and evaluation are important. *Creativity* is also an important element, and today perhaps even more central as an element in media practices than it was in 2005, when Buckingham's review was published. The media is increasingly used for communication and to express oneself. Expressing oneself creatively in different ways is therefore something that most studies in our review also prioritize, albeit in different ways.

In addition, two aspects are added that may be important factors in a mapping of media literacy, especially in a socio-cultural perspective where the social and cultural context and situation of individuals is central to understanding and capturing literacy. These are *potential barriers* to media literacy. This can be a very broad aspect, but Buckingham refers primarily to important societal factors such as social class and socio-economic status. These are known structural factors in social science research that potentially play a role in most findings when it comes to human practice. The second aspect that is emphasized is *potential facilitators* for media literacy. This applies, for example, to parental support, teachers and networks. Both research

and experience show that such facilitators can have a lot to say for people's experienced media literacy.

Several of the studies in our review refer to Buckingham's study and several apply the conceptual apparatus directly or indirectly in their frameworks. An interesting point with Buckingham's review and conclusion is how well the framework still is applicable 15 years later, and it is still one of the most used frameworks in research related to media literacy and MIL.

4.10.2. Ofcom

As Buckingham's report described above, another systematic literature review was done on behalf of Ofcom, *Adult Media Literacy. A review of the research literature on behalf of Ofcom*. These two reports were published together and provided a broad insight of research related to media literacy in the perspective of children and adolescents as well as adults. The latter report is written by Sonia Livingstone, Elizabeth Van Couvering and Nancy Thumim (2005) and is concerned specifically with media literacy and adults. This report is also based on Ofcom's general definition of media literacy, as "*the ability to access, understand and create communications in a variety of contexts*". In the analysis, *access* is divided into four sub-categories: 1) basic access and ownership, 2) navigational competence, 3) control competence and 4) regulation competences. *Understanding* is seen as containing two main aspects: 1) comprehension and 2) critique. *Creativity* in this report includes both 1) interactivity with the media and 2) creation of media by the public.

Like Buckingham (2005), this report emphasizes potential barriers and specifies age, socioeconomic status including education and income, gender, various disabilities, ethnicity and language skills. Potential facilitators that potentially can contribute to strengthen people's media literacy include a number of factors: design of technology and contents, opportunities for adult education, consumer information and awareness, perceived value of media goods and services, self-efficacy, social networks, family composition, work involving use of technology and institutional actors, and institutional stakeholders.

In Ofcom's survey *adults' media use and attitudes survey* (Ofcom, 2020) the sample is 1882 adults over the age of 16, and in the related survey *Internet users' concerns about and*

experience of potential online harms[8] he sample is 2057 participants. Both of these studies are relevant in our context. The surveys are done annually. The first mentioned report, *adults' media use and attitudes survey,* examines media use, attitudes towards the media and knowledge of the media, and Ofcom assesses how this change over time among adults over 16 years of age. The focus is broader than on media literacy alone, but there is a particular focus on critical thinking and awareness, which are important parts of media literacy; One of the main components of Ofcom's framework is *access and the ability to evaluate its media use and media situation.*

An important element of Ofcom's work is that a relatively big part of the data is made available openly online. This applies, for example, to the questionnaires[9] and statistical data. However, the analysis process and a concept-based framework are not available in the same way. Ofcom's annual surveys have many features that will be important to explore more in detail for learning about how to design a MIL-index, including how they link different surveys together for mapping a broader area of competence and media use. At the same time, it is problematic that certain aspects of media literacy are mapped more in detail than other, with a predominance of basic skills in one survey, and negative aspects (harm) in the other. Seen together there seems to be less emphasis on creativity and participation. It is also problematic that no clear connection has been drawn between the definition of media literacy and the actual questions used in the survey. This is a potential weakness, as generally it is important that research designs have clear links between theory, concepts, research, choice of framework and indicators, as well as the applied methodology in the form of, for example, questionnaires.

Ofcom's survey is done in connection with media use more generally, and as we see it, they do not map the entire "breadth" of MIL. But the design has several relevant features that can be used as a starting point for designing a long-term and regular mapping of MIL in the Nordic countries. When it comes to design, there are several interesting aspects in this respect, including how different thematic surveys are linked together to paint a broader picture. It is interesting, for example, that Ofcom has divided their mapping into two surveys, one related to

[8] https://www.ofcom.org.uk/__data/assets/pdf_file/0029/161975/msom-research-projects-overview.pdf

[9] https://www.ofcom.org.uk/__data/assets/pdf_file/0029/196373/adults-media-use-and-attitudes-2020-questionnaire.pdf

adults' media use and attitudes and another related to Internet users' experience of potential online risk. This can be a way to connect different studies that captures more aspects of the complex concept of MIL than can be done with a single study.

4.10.3. Special report on media literacy in Denmark

The report '*Media Literacy i en dansk kontekst'* [media literacy in a Danish context] is written by Gitte Bang Stald, Morten Hjelholt and Laura Høvsgaard Nielsen (2015) for *Danish Agency for Culture* and *the Media Council for Children and Young People* in Denmark. They both conducted a broad literature review and a study of media literacy in Denmark. They point out, like several of the studies in our review, the significant challenges of measuring media literacy. Similar to Buckingham (2005); Bulger (2012) and Livingstone et al. (2005), they emphasize that it is challenging to capture the complexity inherent in the contemporary media practices in which critical media understanding and creativity are expressed. To meet some of the challenges, they propose what they call a module-based survey of media literacy, which can ensure knowledge across the population over time. They suggest the use of several methodologies, such as broad surveys as well as qualitative surveys and not least a clear link to different fields of practice where media literacy is central. Specifically, they recommend a rotating principle between qualitative and quantitative surveys, which can be conducted every two years.

In table 6 below, we show an overview of the recommendations from the report, which can also be seen as a contribution to the discussion of indicators for MIL in a Nordic context. It is interesting to note that demographic factors have more emphasis here than in most studies we have reviewed in our study. The main categories are:

- Background, context and demographics
- Access, use and practical skills
- Experiences and reflection

Table 6: categories and topics from Media literacy in a Danish context (Stald et al., 2015, p. 86)

Categories		
Background/context/ demography	**Access, use, practical competences**	**Experiences and reflection**
Areas and themes		
Personal data Age Gender Education Work	**Access/use** Media technologies Current media ecology The interior design of everyday life with media Media habits Which platforms for what purposes	**Experience with / learning media handling** Social practices over time Instruction Family / friends Manuals / info pages
Family At home? In life?	**Purpose of media use - work / private / citizen** Information Communication (Entertainment) Participation	**Control/strategies for media use** Reflections on media use (various contexts) Rules for media use (various contexts) Experience of control/not control
Residence Region City (size) / rural Living situation	**Content / which media (formats, senders, services)** What kinds of content News Background information Debate Culture (broadly defined) Local / national / international	**Trust / risk** trust in technologies Trust in media institutions Trust in media content from media companies Trust in media content from social media Protection of personal data Attitude towards the system's "monitoring" Attitude towards "monitoring" of social relations
Language Mother tongue Bilingual / multilingual	**Activities** Forms of communication Use of media for handling private life Use of media for dealing with civic life Creative use of media	**Critical reflection on media** The importance of the media is considered Attitude towards media development (plus one's own media use) The media as an anchoring Media as a national and global outlook
(Special terms) Social Culturally Personally	**Competencies and challenges** In relation to media across areas in life In relation to media technologies In relation to media content In relation to one's own activity Experience of competencies / challenge	**Critical reflection with media** Commenting in the news media? Commenting on social media? Is it acted on the basis of media coverage? Changes in attitude? One's own media reality and the experience of citizenship, respect, opportunities for action, influence (or not)

4.10.4. Media Literacy 2014.

The report *Mediekompetanse 2014. En systematisk oversikt over studier av mediekompetanse i befolkningen* [Media literacy 2014. A systematic overview of studies of media literacy in the population] was written by Ingulfsen and Gilje (2014) and is a review of surveys on media use and media literacy in the Norwegian population between 2010 and 2014. The report is largely based on the model for EAVI as shown in section 4.9. Ingulfsen and Gilje see the surveys in the light of this threefold division of media literacy: *use, critical understanding* and *communicative abilities*. They find that user skills were the most common focus, and that literacy has mostly been mapped in children and young people and less in adults and the elderly. They also point out that the levels of media literacy differ in the population in correlation to socio-demographic factors such as age, gender, immigrant groups and socioeconomic status. An important point for our feasibility study is that there seems to be major shortcomings when it comes to mapping literacy particularly related to critical understanding and communicative abilities. But, mapping of critical understanding has subsequently been initiated by the Norwegian Media Authority, as we have addressed above.

4.10.5. Other assessments of indicators for measuring MIL

1) MIL Competences: from theory to practice. Measuring citizens' competencies on Media and Information Literacy

This is a literature review done by Luque et al. (2014). They analyze various studies that measure media literacy skills among the population in different countries, framed in a media and information literacy framework. They base their work on EAVI's framework and discuss how the MIL concept also has been used to capture more specifically the knowledge aspects that are often associated with the media, but also libraries, archives and other sources of information in democratic societies. They therefore refer to UNESCO and how MIL has been oriented around six main competencies:

1. To understand the role of the media and information in democracy
2. To understand media content and media use
3. To evaluate information effectively
4. Critical evaluation of information and information sources
5. Using new and traditional media and media formats
6. To be able to identify the sociocultural context of media content

Such an understanding of MIL differs from some of the other definitions of concepts, as there is less emphasis on one's own production, creativity and communication. We will return to this point in the discussion chapter.

2) *Measuring media literacy in a national context: challenges of definition, method and implementation,* by Monica E. Bulger (2012)

Bulger's review is also based on EAVI's framework for media literacy, but she also reviews a number of other frameworks for analyzing and comparing the various conceptual models. The table below shows how the different frameworks cover the different dimensions in EAVI's framework:

Table 7, compilation of the frameworks for EAVI, Ofcom and Livingstone (excerpt from Bulger, 2012)

EAVI		Ofcom	Livingstone
Personal competences	Use	Access / use	Basic access and ownership
			Navigate
			Control
			Regulate
	Critical understanding	Understand	Comprehend
			Critique
Social competences	Communicate	Create communications	Create
	Citizen Participation		Interact

Bulger (2012) thus reviewed EAVI's framework (see Table 7) and conducted a statistical validation of this framework and various indicators related to it. She found 58 indicators related to the framework, by reviewing research done with these frameworks as a starting point. As we can see in table 7, the different frameworks have a lot in common. Bulger found that most of the indicators were more of theoretical concepts that were not supported by research data. They are thus in principle not well enough tested nor validated. Research based on the EAVI framework or the other frameworks that are compared with EAVI's framework, including for example Ofcom and Livingstone's conceptual framework, should therefore be piloted and validated in the relevant contexts in which they wish to be used. What is interesting is that this

is particularly true for the category of critical understanding. In addition, Bulger (2012) points out that there is a need to pilot contextual indicators such as education, economic status / income and other socio-demographic aspects. Both of these types of dimensions can be tested and validated in a pilot study followed by work with statistical validation[10].

3) *A New Horizon: Media Literacy Assessment and Young People in Europe,* by José Manuel Pérez Tornero and Mireia Pi (Pérez Tornero & Pi, 2010)

This is a review of the importance of international actors that UNESCO and the European Commission have had for media literacy and initiatives to map and measure media literacy. We primarily emphasize what Pérez Tornero and Pi (2010, p. 116) describe as the dimension of MIL concerning individual competencies here, which they define as follows:

> *A personal, individual ability to exercise certain skills (access, use, analyze, understand and create). These skills are found within a broader set of abilities that allow for increasing levels of awareness; the capacity for critical analysis; a creative, problem-solving capacity; and the ability to create and communicate content regarding inter alia participating in public life.*

This is broken down into three individual sets of literacy areas, which are similar to what we have seen in several other studies, but this provides more detailed descriptions than many other studies. The individual competencies are described as follows (Pérez Tornero & Pi, 2010, p. 117):

1) **Use skills (technical):** Skills related to media use. The Use component is centered on the relationship between the individual and the media (as a platform); it is in this sense that the study refers to it as a technical dimension. These are the instrumental and operative abilities required to access and effectively use media communication tools. They specifically refer to a set of devices and tools available in a certain context or environment: access and use.

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[10] Bulger's analysis is also part of a larger evaluation of research and mapping of media literacy in the EU, where full analysis can be found in the reports *Testing and Refining Criteria to Assess Media Literacy Levels in Europe* (Danish Technological Institute, 2011) and *Study on assessment criteria for media literacy levels. A comprehensive view of the concept of media literacy and an understanding of how media literacy levels in Europe should be assessed* (Celot & Pérez-Tornero, 2009).

2) Critical *Competences:* Aspects related to the critical comprehension and evaluation of content and media. The Understanding component is centered on the relationship between individual and content (information – attribute of the message; or comprehension – attribute of the individual), that is, a cognitive dimension. This is thus primarily seen as a cognitive dimension as Pérez Tornero and Pi (2010) present it.

3) Communicative abilities: Communicative and participative abilities are partly related to technical and cognitive abilities. They may be appropriate in different fields, such as social relations, creation and production of content and civic and social participation, which involve personal responsibility. These abilities allow for processes ranging from simple contact to the creation of complex cooperation and collaboration strategies that use media tools as their base. The main fields of application of both the communicative and participative skills are the following:

Social relations: These relate to the capacity of being in contact with others, cooperating with them and establishing different kinds of networks and communities.

Citizen participation: These refer to citizen participation in public life (engagement in e-government institutions as well as the civic field).

Content creation: These are related to the individual and collective capacity to create new media content and produce media text. The abilities used to create and produce allow the implementation and manifestation of a meaning or understanding of information through media messages and texts.

Pérez Tornero and Pi (2010) emphasize that complex competencies such as media literacy are not only an individual matter but are also closely linked to contextual factors such as politics, cultural aspects, civil rights, media industry, economics and so on. We will not go into details on this here, but we note that these aspects are important in a further development of research in this area.

5. Discussion

In this chapter, we highlight the key aspects from our review of research publications and established literature and other documents related to the measurement of media and information literacy. Our starting point is the general aspects, but the focus is on what is related to measurement of MIL, primarily which concepts and indicators that appear to be central and - in terms of quality - most interesting to use as a starting point for further development of a Nordic MIL index. We begin the discussion with a view to what we see as potential opportunities and challenges in measuring MIL in several of the countries in the Nordic region.

5.1. Potential opportunities and challenges in measuring MIL

Our review shows that it is possible to develop a reliable and valid framework for measuring MIL. But the review also shows that the basis for concluding how strong and realistic the measurement of the level of MIL in broad population groups with a broad age range is relatively weak. Relatively few empirical studies have been done on MIL measurement, and even fewer with large samples with a broad age composition. Our review further shows that MIL is defined very broadly and that the field is still dominated by so-called policy documents and theoretical publications, while there are relatively fewer research publications that analyses empirical measurements of MIL, and very few in the Nordic context. The latter point can of course in itself can be a timely motivation to initiate research and research collaboration in this field.

5.1.1. Possibilities

As we see it, there is great potential in developing a research tool for the Nordic countries Sweden, Denmark, Norway and Iceland, which is included as focus countries in this feasibility study. These are countries with historically relatively similar cultural and social composition, and which have relatively few inhabitants. As a research group, MEDLiE are also of the opinion that there is great potential when it comes to developing research-based processes that include both theory development, methodological development and practice development related to MIL. Key documents from high-profile international actors such as UNESCO and the European Commission have provided a solid theoretical basis concerning MIL, which means that there exist several theoretical frameworks and proposals for indicators. But what they have in common is that they only to a relatively small extent been followed up by long-term and structured research projects that have led to an established research tradition or a validated set of concepts and indicators.

5.1.2. Challenges

There are also several challenges associated with implementing a survey of a literacy area such as MIL. Our review shows that the goal of measuring the "entire" media and information literacy area is quite ambitious and also challenging. As Bulger (2012, p. 91) comments in her comprehensive assessment of the framework for measuring media literacy, there are in general significant scientific challenges when researchers are moving from a theoretical concept to measuring the concept. This can be extra challenging when trying to examine concepts and conceptualizations that have been developed in so-called consensus papers. Some of the conceptualizations we refer to in our report can be characterized as 'consensus frameworks', which are developed on the basis of broad literature reviews and the voices of many actors. Examples of this can be policy documents or reports from international actors such as the European Commission and UNESCO. Siddiq et al. (2016)' s review nevertheless shows that structured processes where researchers build on experiences from others who have researched with the same framework can contribute to a gradual strengthening of both the theoretical and methodological quality related to the mapping of for instance competencies.

5.2. Methodological considerations

There are several considerations that needs to be made before implementing a study with the aim of measuring levels of MIL. One such consideration is about the types of question used in questionnaires. One of the most central discussions in the publications in our review deals with whether the surveys collect data from self-reporting or from various practical or proficiency tests. Our literature review does not give any clear evidence in one direction or another. But both Siddiq et al. (2016), Hobbs (2017) and Haddon et al. (2020) emphasize that proficiency tests or practical tests probably can give better indications of literacy than self-reporting. Rosman, Mayer, and Krampen (2015) find that there is not necessarily a strong connection between how research participants assess their own literacy and how they perform in practical tests. Rosman et al. (2015, p. 751) puts it this way:

> *we would like to issue a note of caution at this point: correlations between self- reported and actual ability tend to be rather small, and our findings show that standardized tests have a much higher predictive value […] Therefore, we urge researchers and practitioners not to assess information literacy with self-reports alone.*

Thus, they conclude that self-reporting on information literacy has clear methodological weaknesses, and they express their argument quite strongly: they *do not recommend* collecting data exclusively from self-reporting. Studies that include method triangulation will in all probability be stronger methodologically, but there is a minimum of studies that have done this in our review. Nevertheless, studies such as EU Kids Online (2014), which have put triangulation in system (applying quantitative questionnaires as well as qualitative in-depth interviews with children and the children's parents), can be of inspiration in that the triangulation strengthens both the study's validity and reliability as well as the "social impact". Buckingham (2005), Hobbs (2017) and Haddon et al. (2020) all argue that there is a need for more task-based research in order to map MIL or similar competency areas, and perhaps especially when it comes to certain age groups. Dezuanni (2017) points out that in our time there may in fact be more knowledge and skills than before that cannot be verbalized or expressed, as they are functional in practice, also as reflexive and critical actions, but cannot in any easy way be "translated" to concrete articulated reflection. This applies in particular to media use, where action and reflection at least to some extent could be seen as implicit in our actions.

5.2.1. Sample

Another key aspect concerns the sample. Relatively few of the studies in our review had a representative sample of an entire population, especially in terms of age. The majority of the studies in the review have measured MIL or similar competencies in specific groups of the population, of which the group "students" is the most common group. We however find some studies with both breadth and prevalence, such as the study from Ainley, Fraillon, Schulz, and Gebhardt (2016) who have a sample of over 60,000 participants in their study, and has measured participants from over 20 countries. But the study is based on ICILS, which tests 8th graders. The age range is therefore very narrow compared with the goal for the Nordic MIL survey. We also found some studies that measured large sections of a population, such as Dornaleteche et al. (2015) which measures the population in the age range 15-99 years. This study also has over 1500 participants, but apart from this we find few studies that have both a wide age range and a large number of participants. That there are not many comparable designs is as such a challenge for the design of a Nordic MIL study, as the goal of the Nordic MIL survey is "the entire population", similar to the Norwegian Media Authority's survey on critical

media understanding. There are therefore few studies that can inform for instance if the indicators and not least the specific questions in a survey will give different results in different age groups. This may apply in particular to possible practical tests or questions related to specific media content, where the preferences of different ages are potentially very different. This makes validity a potential problematic issue. In our view, a pilot and an evaluation as well as continuous instrument development are very important in the design and implementation phases. In general, it needs to be pointed out that there are several challenges associated with measuring media use and competencies related to the media and information world in samples with a broad age range. The media world is very dynamic, and changes are happening fast and continuously.

5.2.2. Contextual and sociodemographic factors

The frameworks of both UNESCO and EAVI have included what can be called contextual, social or environmental prerequisites for media and information literacy. However, the extent to which these aspects are captured in the reviewed studies varies greatly. Often, these aspects are scaled down, often for pragmatic reasons. But there is a limitation in quantitative research in general in that the scope of a survey, for example, needs to be delimited both in terms of scope and the time participants need to fulfil the survey or questionnaire. Relatively few of the studies therefore collect broad contextual data, but all have some, of which age, gender and level of education are the most common factors. But the question is to what extent MIL is weighed against such factors as socio-economic background, family, gender, age, ethnicity, and so on. We believe that such aspects are important if a test is to be conducted across countries and cultures. A mapping of MIL without particularly breadth of contextual goals can thus miss some potentially important tools. In one of the studies that analyzes socio-demographic aspects related to MIL-related competencies, Ihme, Senkbeil, Goldhammer, and Gerick (2017) find that information-based tasks are particularly dependent on socio-economic status. They argue that students with highly educated parents benefit from access to digital tools, but also from more parental support. Thus, they have more opportunities to use and experience "success" with digital tools and then also to develop knowledge and skills. For similar reasons, Stald et al. (2015) advocate a relatively broad data collection of contextual data, precisely because media and information literacy may vary greatly in accordance with social, cultural and personal conditions.

5.2.3. Broad or narrow?

Our findings suggests that the scope of a MIL survey should be thoroughly discussed. A broad survey that covers larger areas of competence related to media use and information has both strengths and potential weaknesses, and the same will apply to a narrower, more focused survey. Several of the studies in our study argue in similar ways. Vraga, Tully, Kotcher, Smithson, and Broeckelman-Post (2015) for example, argues that a broad framework can be problematic, and that a narrower, more specific study of media literacy would potentially result in clearer, more accurate findings. This would require a limitation of the definition of the terms being explored. In some ways this could speak in favor of a delimitation like the one The Norwegian Media Authority (2019) did by analyzing more specifically how the population master critical reflection related to media content. Nevertheless, Vraga et al. (2015) also emphasize the importance of broader, more multidimensional approaches. They find that surveys of literacy areas related to MIL should be broader than measuring only individual elements of the media or the effect of media content, for example. Among other things, it is important to embrace the increasing complexity in the media's different types of content and forms of communication. In other words, it is not easy to decide whether a MIL survey should have a broad perspective or more narrow and focused starting point.

5.3. Critical perspectives

As we see it, there are several critical perspectives that are important to highlight in a development phase. Although MIL is basically a very broad concept, there are still some aspects that may be underestimated. This applies to for instance democratic participation and understanding of democracy**,** which are key aspects of media and information literacy that in many ways points beyond the media context and into other disciplines and other areas of literacy. Many researchers, practitioners and not least the political field are interested in the relationship between news, media and information literacy and democracy. Nevertheless, there are few research findings that focus specifically on measuring these aspects of MIL. Vraga et al. (2015) also discusses this. Vraga et al. (2015) refer to a new aspect of media and information literacy, which they call the *Value of Media Literacy* (VML). They argue it is important to also measure the value people associate with media and information literacy in a societal perspective. Several researchers, such as Mihailidis (2018), have in recent years emphasized value-based and "civic" media literacy as one of the most important aspects of media literacy today and in the future. In the Nordic context, this is similar to what is often

referred to as media bildung or "mediedanning" (Drotner, 2003; Østerud, 2007). This also concern so-called meta-literacy, which, for example, Qvortrup (2004) emphasizes as a crucial level of literacy in our complex, media-saturated society.

Another aspect that may be underestimated and possibly also difficult to capture in quantitative research is creativity, communication and interactivity. These aspects are most often included in the frameworks, but often not given as much emphasis as the other dimensions of MIL, something which also Luque et al. (2014) point out in their review of UNESCO's perspectives on MIL. Still today, it can be said that some of the surveys to some extent reflect a "mass media" society, while both media use surveys and our everyday experience confirm that media culture today to a much greater extent is dominated by social media although the use of mass media continues to be quite important. This means that the media culture today has a much greater diversity and complexity where, among other things, interactivity, social practice and communication are distinct.

Another important point is emphasized by several researchers in our review, namely that the highly dynamic media development and continuously changing media practices entail several challenges when it comes to measuring MIL, something which is pointed out by Eristi and Erdem (2017), for example. An example of this is that a scale developed 10 years ago today can have major limitations, in that the smartphone was uncommon in 2010, while today it is the most used media tool we have. A survey such as EU Kids Online, which has studied media use among European 9-16-year-olds in two rounds, where the first data collection was done in 2009 and the second in 2018/2019, clearly shows this problem. The use of tablets and smartphones is barely visible in the results from the first survey (Livingstone, Haddon, Görzig, & Ólafsson, 2011), while it dominates in the second (Ní Bhroin & Rehder, 2018). Surveys that aim to map the media and information world and not least competencies related to this, thus need to take this into account.

5.4. Important frameworks and indicators

As pointed out earlier, research on media and information literacy can be placed in research field characterized by institutional actors such as UNESCO, EAVI and the European Commission having a relatively strong position. Their frameworks and indicators still play a major role in the field, which makes it difficult not to emphasize these frameworks as important

premises for a possible implementation of indicators for longitudinal measurement of MIL in the population in the Nordic countries. As we see it, such a survey should be research-based and should commit to scientific criteria. One such criterion is to base the survey on existing research. Concepts that are widely applied and accepted can contribute to the "communicative validity" of the research. In principle, this means that there should exist "good reasons" for addressing new concepts or concepts that few others use. This in itself is a reason to choose from some of the most widely used frameworks, such as those developed on the basis of the Ofcom reports (Buckingham, 2005; Livingstone et al., 2005) UNESCO (2013), EAVI (Celot, 2015) or DigComp (Vuorikari, Punie, Carretero, & Van den Brande, 2016). As we see it, these frameworks all have their different strengths.

DigComp (Vuorikari et al., 2016) is the framework that is perhaps most comprehensively validated and is also applied in broad research studies (see Siddiq et al., 2016) but it is relatively little used in the studies in our review focusing on MIL and is also based on a different theoretical concept than MIL (digital literacy). UNESCO (2013) is extensively referred to in our review, but it is a complex and very comprehensive framework. However, it has an exciting starting point with links to contextual factors and it can potentially be connected to, for example, other research and statistics that together can contribute to forming a holistic and contextual understanding of MIL. In addition, there exist indicators and criteria for level assessment to the individual dimensions in the framework. EAVI (Celot, 2015) is also a quite widely used framework and is also tested in different contexts. The framework was originally developed for media literacy and, in the same way as UNESCO's framework, it has not implemented perspectives explicitly from information literacy, although many aspects are transferable. The frameworks developed from or based on the Ofcom reports (Buckingham, 2005; Livingstone et al., 2005) are also widely referred to and used in research. These frameworks vary a bit more and the studies that use them in our review are generally not directly comparable across contexts.

Table 8. Compilation of selected frameworks, adapted from Bulger (2012)

EAVI		Ofcom	Livingstone	DigComp	UNESCO
Personal competences	Use	Access / use	Basic access and ownership	Technical-operational	Access
			Navigate		
			Control	Safety	
			Regulate		
	Critical understanding	Understand	Comprehend	Information	Understand and evaluate
			Critique		
Social competences	Communicate	Create communications	Create	Communication	Create and communicate media content
	Citizen participation		Interact	Content production	
				Problem solving	

As we see from Table 8, the various frameworks are partly conceptually consistent, in that they cover many of the same sub-competences. DigComp is the one that differs the most from the others and has a different division and "order" in the dimensions. The frameworks EAVI, Ofcom, Livingstone and UNESCO have in common that the four dimensions use and access, understanding, communication and creativity are emphasized, with some variation in wording, and number of dimensions or sub-competences.

Studies indicate that it is challenging to measure complex literacy sets such as MIL or related literacy areas like media literacy or digital literacy. For example, Jin, Reichert, Cagasan, de la Torre, and Law (2020) point out that few studies have succeeded in capturing the different dimensions of a multidimensional literacy such as digital literacy. It may nevertheless be worthwhile to try to develop a framework that distinguishes between so-called basic skills and more reflective knowledge and skills. It is important to be aware that research so far (see, for example, Jin et al., 2020) indicates that subdimensions of complex literacy sets such as MIL and others are not necessarily as unambiguous as the theoretical frameworks suggest. These points are important moments for further work, we believe, and indicate that one should work "locally" with the development of indicators that measure distinctly different knowledge and skills, in the sense that the Nordic index needs to be tested and validated in the Nordic context. Also, there should be established and ensured a close connection between the theoretical frameworks, the conceptual apparatus and the indicators. At the same time, the conceptual framework and the relevant indicators should undergo scientific processes based on

the specific context in which the survey is planned to be conducted. Furthermore, the indicators should be the subject of critical reflection in a scientific community, and pilot studies should be carried out.

Our review also shows that the problem with complexity can be solved in several different ways; MIL is a very complex concept that also refers to a very complex phenomenon in the "real world", which also concern many arenas in the human life world, such as working life, education, everyday life, and the social practices we are part of. MIL thus touch upon both cognitive processes as well as social and cultural spheres. In addition, the fact that the aim is to examine MIL in "the entire population", which usually implies an age range of 16 -100 years or equivalent adds even more complexity. An alternative in this respect is to delimit the relevant phenomenon that is researched, and a more pragmatic and feasible concept could be applied. Another alternative can be to structure a long-term survey of MIL over several years, so that over a five-year period, for example, "the whole spectrum" of MIL has been mapped, but that only one of several sub-aspects is examined for each year. For instance, Bulger (2012) and Stald et al. (2015) proposes such alternatives, a point we will return to in the next chapter.

6. Conclusions and recommendations and

The process of conducting a comprehensive review of research and of existing literature related to the measurement of MIL has provided the basis for a selection of recommendations for further development of a design, framework and an index for measuring MIL in Sweden, Denmark, Norway and Iceland.

6.1. Ensure a strong scientific profile

We recommend that the mapping of MIL should be researcher-led, and that strong scientific profile is established and ensured. The mapping or measurement should therefore be connected to either an established research milieu or an environment where scientists have a central position. In our eyes, it is important for such a measurement that the theoretical framework is strong and has a strong connection with the categories and indicators applied in the research. As the aim is to map MIL across different countries in the Nordic countries, we see it as important that researchers and other resource milieus from each of the countries actively participate in all phases related to the research.

There are as we see it, a lot of opportunities for methodological innovation and development in such a future potential project. Emphasis should be placed on developing a robust research design and an environment and network capable to run a MIL survey with a long-term perspective. *Methodological expertise* will be crucial. We would strongly recommend piloting the survey and gradually building up an apparatus including a locally developed "indicator pool" that can help ensure methodological solidity. Furthermore, in line with a strong scientific profile, it will be important to have a strong connection to the international research community as well as to various relevant fields of practice. Several of the frameworks we have highlighted are internationally based and have strong research communities to which it will be important to connect.

We believe that a strong scientific profile can contribute to the media authorities in the Nordic region playing an important part in this field, at the same time as strong research communities could be attracted to contribution to the project, if it is made visible and given a strong research profile. Media and information literacy is a highly interdisciplinary area, and it will be a strength to build on a broad and interdisciplinary perspective on literacy. We would also

recommend that the survey should follow important research standards, such as transparency, open publication and open archives. Handled in a good way, we believe that this can provide opportunities for both strengthening of the design and stimulation of more research, and also for building a research community related to MIL and more specifically measuring MIL.

6.2. Necessary competencies in the «research team»

We see it as important to build on the competence that exists in research and practice communities in the Nordic countries, but at the same time it will be important to develop new competence and a specific competence milieu centered around the measurement and mapping of MIL. We want to emphasize the importance of research competence in general and the importance of putting together an interdisciplinary team. This has several reasons: such a profile can help in order to enhance the possibilities for *political support.* The field related to media use and media literacy has been underestimated in research funding, and a broad and long-term survey could help to strengthen media research in the Nordic region. A research profile will also contribute to ensure the level of knowledge. Numbers are not knowledge in themselves but require interpretation and theoretical and contextual insight. We would warn against collecting statistics that are not placed in a theoretical or conceptual context.

Related to this, there should also be a management group both at the overall level, which in this case will be the Nordic level (Sweden, Denmark, Norway and Iceland), and at the national level, as for example UNESCO (2013) recommends. Linking MIL measurement to other national goals such as media use surveys, ICT in schools and education, economics and other aspects can be important. Although we in this report focus on individual literacy, there is no doubt that MIL is related to contextual and cultural levels. The Norwegian Media Authority will be a natural interlocutor and potential collaborator, especially because they have conducted the 'critical media understanding'- survey, but the other media authorities in Sweden, Denmark and Iceland are also natural participants. As in all alternatives, we recommend that a pilot is carried out that is validated and quality assured, as well as critically analyzed before the full-scale survey is implemented.

Communities that are thematically interested in and have high competence in media and information literacy, media education, digital literacy, media and learning or similar topics are important. But media use and media and information literacy are closely linked to other fields,

so it will be important for the research to link their knowledge with psychology, education, sociology, and law, among others. At the same time, it is important to support and build up a specific competence related to this field. Research communities that are relevant should be interdisciplinary and should be able to draw on different types of collaboration, both with different actors, and across the Nordic countries.

6.3. Recommended definition and framework

Based on our work with the feasibility study, we have concluded that there exist some appropriate definitions of the concept of media and information literacy and frameworks that can be used as a starting point for mapping MIL in the Nordic countries. We believe that the most central definitions in connection with MIL are the definitions from UNESCO (2013) and Ofcom from the reviews of Livingstone, Van Couvering and Thumim (2005) and Buckingham (2005). Ofcom has initiated and led several different surveys that are done regularly that are very relevant in connection with our feasibility study. They use the term media literacy, i.e. without 'information', but we consider their definition of the concept, framework and design to be relevant to highlight.

Ofcom's (Buckingham, 2005; Livingstone et al., 2005) definition of Media literacy is thus widely used and cited, and reads: *to be able to "access, understand and create communications in a variety of contexts"*. UNESCO's (2013) definition shows that media and information literacy are defined as an even broader concept. Their definition is that media and information *literacy* is "*a set of competencies that empowers citizens to access, retrieve, understand, evaluate and use, to create as well as share information and media content in all formats, using various tools, in a critical, ethical and effective way, in order to participate and engage in personal, professional and societal activities.*" (UNESCO, 2013, p. 29). As mentioned, these are the most commonly used terms, also in our research review, and are also the definitions we emphasize most when we have examined more specifically in our recommendations. The definitions set the premises for what are considered core competencies and further sub-competencies and possible indicators.

In our recommendations, we have also emphasized that the frameworks have a clear anchoring in relevant and established theory and definitions of MIL, that reporting on the application of the frameworks is published in recognized channels, that the frameworks are adequate with a

broad definition of MIL and that the frameworks including sub-competencies or indicators are valid and reliable.

We further recommend that a pilot study is done together with the development of a research instrument, which is validated and quality assured, as well as critically analyzed before it is implemented in a larger study. We discuss this in more detail in section 6.7.

6.3.1. General principles

We recommend a broad approach to MIL, which will be potentially challenging given the complexity of the MIL concept. But we agree with Buckingham (2005), who argued that researchers must be careful with a too narrow approach to measuring media and information literacy.

6.3.2. Relevant frameworks

In our research review, we find several frameworks that may be relevant for mapping MIL, but there are few that have been fully validated and tested through actual research, and as we have pointed out previously, there are few studies that map broad age groups and with a broadly defined framework.

By framework, we refer to a starting point for a research study that is clearly linked to a theoretical foundation and to a clear definition of the phenomenon that is to be investigated. Also, a framework describes concepts in detail and concepts are often categorized into smaller components and aspects that are possible to study. It is somewhat different how these aspects are described. In our research review, concepts such as core competencies, sub-competencies, sub-competencies, items and indicators are used. We have chosen to use the term *indicator* when we discuss what enables a theoretical or scientific concept to be measured, in our case in quantitative research (snl.no, 2020). A phenomenon such as MIL cannot be measured by a single indicator, but with a combination of several indicators. Such a combination of several indicators is often called an *index*. MIL is an example of an 'umbrella concept' with several implicit sub-concepts and sub-competencies and is not directly quantifiable.

Celot and Pérez-Tornero (2009, p. 51) define an indicator in the EAVI framework as an instrument that provides information on the status and progress of a particular situation, process or condition. Indicators enable simple, straightforward and accessible knowledge of a specific phenomenon. Further, they describe indicators as simple or complex, depending on whether they are a set of specific and precise data or the result of a series of simple indicators combined. As we see it, indicators must be defined strictly and concretely enough so that they can be operationalized into questions or tasks. As we have found in our review, it is a challenge when it comes to MIL that the indicators in several of the frameworks still are at a fairly abstract level. Therefore, a research instrument must be designed specifically for this purpose; to measure the level of MIL in the Nordic countries, and the indicators must be validated through, among other things, a pilot study.

Indicators meant to be used in research should be evaluated according to several factors, of which *validity* and *reliability* are the most important. In addition, *costs* are something that is often highlighted in larger studies as an important factor to take into account. For many reasons, a study should balance the considerations of research quality and breadth on the one hand, but also efficiency and societal benefit on the other. Moeller, Joseph, Lau, and Carbo (2011) refer to Ellis et. al (Catts & Lau, 2008) who concluded that all research based on indicators for larger conceptual apparatuses should take into account 12 particularly important factors:

- *Relevance*: that the data is relevant for decision making and the problem to be measured.
- *Current*: that the data is made available quickly before it becomes outdated.
- *Accuracy*: that the data is correctly calculated and not subject to errors.
- *Frequency*: that data collection can be repeated on a regular cycle to measure trends.
- *Cost-effectiveness*: that data collection is not too expensive
- *Validity*: the data measure what they are supposed to measure.
- *Reliability*: the data are stable and do not change too quickly to be captured.
- *Consistency*: that indicators or individual responses do not contradict each other.
- *Economics*: it is preferable to choose the minimum number of indicators needed to cover the maximum scope of the course. This minimizes the burden of the data collection.

- *Independence*: that indicators measure different aspects of a topic; they should therefore not be overlapping, although some indicators may be related to each other.
- *Transparency*: that the data sources and the construction of indexes should be as clear as possible to the 'reader'.
- *Comparability*: that data should be comparable across different cultures and economies.

There are no general rules for how many indicators a research study can or should have, but one must take these factors into account and make assessments based on it. In addition, as several of the studies in our survey emphasize, a common problem must be taken into account when talking about research, relating to what is often known as *respondent fatigue* or *questionnaire fatigue.* This is a well-documented phenomenon concerning the participants in the survey becoming tired of the tasks and questions in the survey in a way that could affect the answers they give and which thus affects the quality of the data in the survey (Ben-Nun, 2020). As several researchers point out, for example Pereira and Moura (2019), this is also a challenge when it comes to measuring literacy in connection with media and information use. First of all, one must be aware of the scope of the survey, which becomes especially important if one is to measure the entire population. It is therefore often suggested (Bulger, 2012; Celot, 2015) either relatively short surveys or various forms of thematic rotation or the like, as we have mentioned earlier. A survey that aims to examine participants in the age group from 16 years and up must also take into account that the survey should suit people in several different age groups. It is also often recommended to vary between types of tasks where some are more time consuming than others.

As Pereira and Moura (2019) argues, a measuring tool for MIL should take into account the main dimensions of the concept, and ultimately the researchers have to find the balance between what they want to measure and what data it is possible to collect. This is not an easy decision due to the complexity of the concept and the lack of agreement on which aspects of MIL are most important to measure. The conclusion in this respect is that there are good reasons to balance the ambitions of what one can actually measure; Since media and information literacy is part of everyday life and is involved in a number of influences, connections and actions, research alone cannot provide a complete assessment (Danish Technological Institute,

2011), but a measurement can provide a "simplified" picture and an *indication* of general trends in media and information literacy in the population.

Measuring MIL over *time* is also a special challenge. Developments in society in general and in technology and media in particular are rapid and extensive. This applies both to the user level, group level and the societal level, such as infrastructure and media policy. This must be taken into account, and one can probably not aim to develop indicators that are totally independent of time. As Moeller et al. (2011) point out, changes in the media field or within for example, technological infrastructure will involve changes in what constitutes a sufficient or "necessary" MIL level in the population.

In our view, developing and validating a research instrument to measure literacy level is a challenging, time-consuming and resource-intensive task that usually has many steps until each indicator can actually be said to indicate the literacy of the respondents in a survey. This also applies to knowledge and skills that a "competent" person is able to demonstrate in a survey. These have been important premises when we have discussed relevant frameworks in this feasibility study. Our recommendations must therefore not be read as absolute recommendations, but rather as an input in the debate, because we consider it difficult to make concrete decisions in advance of such a complex survey actually being carried out. What is clear at the time of writing is that full validity has not been measured on each indicator. We have therefore seen it as our role to propose *potential* indicators, which we believe must be tested and validated in a pilot study.

6.4. Recommended frameworks

As we have mentioned, MIL is a concept applied in a field where international actors such as UNESCO and the European Union (through EAVI, the EU Commission and others) have been important. There are relatively few researchers that have done actual and long-term research on the measurement of MIL, and therefore there is generally a need for more research in this field. Further, this means that there are few models and indicators that have actually been validated. This is also pointed out, for example, by Siddiq et al. (2016) and Haddon et al. (2020). According to Haddon et al. (2020) this applies in particular to indicators related to the critical dimension. In addition, we find that several of the studies have somewhat less emphasis on the creative dimension of MIL than on understanding and basic use. Therefore, indicators

related to the critical and creative dimension should be emphasized when it comes to validating and testing in a pilot study.

In our review, there are some frameworks that stand out because they have either been validated through pilot studies or reviews of previous research. In addition, we consider them adequate with regard to the other quality objectives we have analyzed them according to (see Appendix 1). This applies to the scale from Lopes et al. (2018), which apply a scale for *Media and Information Literacy,* and Siddiq et al. (2016)' s review related to *DigComp*. These have different strengths and weaknesses. The strength of Lopes et al.'s design is a relatively detailed validity testing of all the indicators and that it is practically applied. The article reports findings from a study, which was conducted with 500 participants, and it was analyzed with regard to different levels of MIL, which is a goal also in the Nordic survey. A weakness is that there hasn't been published any replicated studies done by other researchers and the framework is thus in our knowledge not yet tested in other contexts than in Portugal.

The strength of DigComp, which Siddiq et al. (2016) use as a basis for a larger review of studies that measure ICT literacy, is that this framework is based on one of the most documented studies of skills and literacy related to digital media. However, it is a weakness in our context that DigComp conceptually does not measure media and information literacy, but rather the related concept of digital literacy (or ICT literacy).

Two other widely discussed and cited frameworks are the ones from EAVI and UNESCO. But as we consider it, they are not as directly applicable at this time, as they, according to our review, are very broadly defined and somewhat more abstract because they are less reported in research publications and less tested in practical application.

In sum, it can be said that quite many studies of media and information literacy have been done on the theoretical and partly on the conceptual level, something we also discuss in our research review. But there are fewer studies that have used validity-tested frameworks and concrete indicators to measure different populations' media and information literacy levels. Our choice is therefore that we base on the broad definition of media and information literacy from UNESCO, and we have further focused on the framework from Lopes et al. (2018) framework, which is used for measuring media and information literacy. And, due to the fact that DigComp

in a thorough way takes new media and participating media practices into account, we have also included this framework.

6.4.1. Lopes et al. (2018): Measuring media- and information literacy skills

Lopes et al. (2018) build on several different works concerning MIL, such as Ofcom (Buckingham, 2005; Livingstone et al., 2005), EAVI and UNESCO (Celot, 2015; UNESCO, 2013). The framework is designed to enable an evaluation of individuals' ability to master information in the media, to interpret it and to "act with it or on it". They have based their framework on two main dimensions of MIL, which they describe as *cognitive-critical* and *creative.* These reflect largely the three main dimensions of the UNESCO (2013) framework, *access, evaluation* and *creative* (see Figure 6). The first dimension, *cognitive-critical*, is divided into four different core competencies, which concern being able to:

a) Identify and recognize media content

b) Locate / find information

c) Understand and interpret the meaning of a media message, and

d) Critically evaluate information

The *creative* dimension was in Lopes et al. (2018)'s framework designed to be able to evaluate the respondents' competence in creating media content. This implies being able to:

e) select and use key information as background information

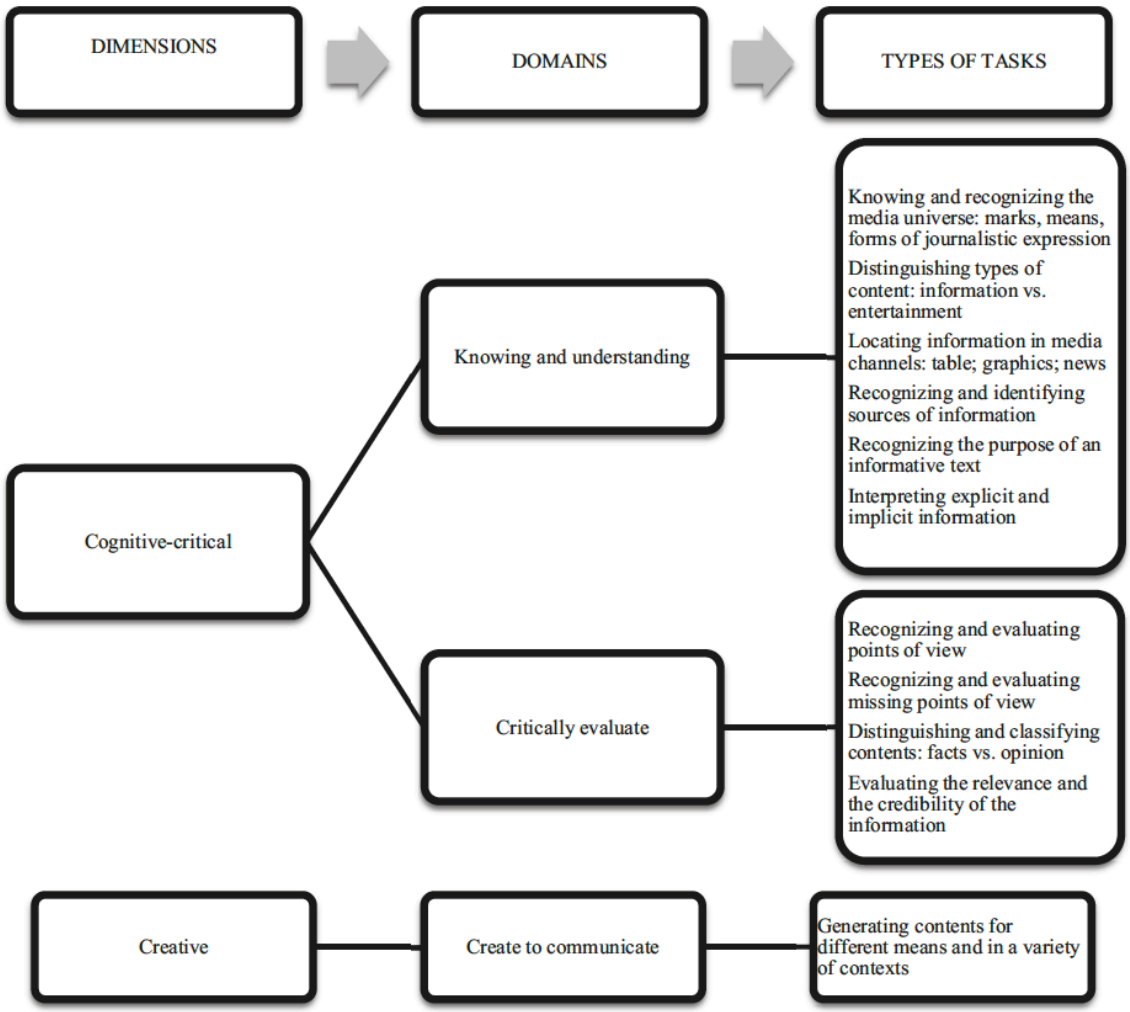
f) construct a media message.

Lopes et al. (2018)'s framework is based on Item Response Theory, which can link the indicators both to degree of difficulty and parameters that can distinguish between different degrees of difficulty. The test also contributes to the fact that the indicators are basically independent of which population is being tested and which specific questions and tasks are being used. The goal of Lopes et al. (2018) is to develop a standardized measurement tool that can provide consistent and reliable results over time. In addition, Lopes et al. (2018) argues that the Item Response Theory made it possible to test how efficient the instrument measured, and furthermore that new questions and tasks can be added into the scale. In addition, this means that the respondents can be analyzed using the same scale, which in turn

enables comparison between respondents, between different questions and between respondents and questions. In sum, this implies that the scale is generic, in the sense that it can be adjusted to local and temporal conditions, and in principle questions and tasks can be replaced without comparative indicators being lost. This is because the framework has generic operationalizations and also task descriptions that can be relatively easily replaced according to the contexts in which the survey is conducted.

The scale is primarily task-based and thus it corresponds quite well with the critique often raised about self-evaluation of competences. The tasks are of three types: a) constructed response, b) open-ended questions and c) multiple-choice assignments. All these tasks are classified according to the expected difficulty in four levels. As Lopes et al. (2018) have classified them the most difficult tasks are related to cross-checking of complex cognitive operations and complex media channels. An example is that creating content is more complex than finding and identifying information. These tasks are linked to different types of *structure* and *processes* and thus to different *degrees of difficulty,* see Table 9. The scale can be illustrated as follows:

Figure 9. Media and information literacy dimensions and task types (Lopes et al., 2018)



These tasks are linked to different types of *structure* and *processes* and thus to different *degrees of difficulty,* see Table 9 on the next page.

Table 9. Structural variables and process variables (Lopes et al., 2018)

Structure variables:	**Process variables:**
⇩	⇩
Format of the media channel: Continuous text Non-continuous text Image **Source:** Printed Digital **Type of information:** Textual informative Textual opinion Textual prescriptive Visual informative Visual opinion Visual instrumental	**Type of cognitive strategy:** (N1) Locating and identifying (N2) Integrating and interpreting (N3) Evaluating and reflecting (N4) Generating

In Lopes et al. (2018)'s research, the different types of tasks were linked to the four process variables that can also be classified as degrees of difficulty. In this way, the different domains in the model can constitute different degrees of difficulty. The test was operationalized as in Table 10.

Table 10. Operationalization

Dimensions	**Domains**	**Cognitive strategy**	**Task types**	**Number of «items» / indicators**
Cognitive-critical	Knowing and understanding	Locating and identifying	1,2,3,4,5,6,7,8,17	9 (45%)
		Integrating and interpreting	9,10,11	3 (15%)
	Critically evaluate	Evaluating and reflecting	12,13,14,15,16,19	6 (30%)
Creative	Create to communicate	Create / generating	18.20	2 (10%)

In the article, Lopes et al. (2018) provide some examples of tasks, but unfortunately the article does not include tasks for all the indicators. But the article shows examples of tasks corresponding to the different levels 1) Locating and identifying, 2) Integrating and interpreting, 3) Evaluating and reflecting and 4) Generating and creating for communication and in different formats, with different sources and types of information (cf. table 9). The entire article can be found openly on the internet[11], where the tasks we briefly summarize here are described in more detail.

As an example of a *level 1* task (Locating and identifying), the authors describe a task related to the recognition and identification of an established logo. It is thus a type of visual information, the source is digital, the domain is knowledge and understanding (cf. Table 10) and it belongs to the cognitive-critical dimension.

As an example of a *level 2* task (integrating and interpreting), Lopes et al. describe a task that deals with ethical guidelines in journalism. This is a continuous, linear text where the respondent is asked to interpret and indicate whether a statement is true or not, based on the content of the text excerpt. The source here is printed information, the format is continuous text, the intention is to interpret implicit information and make decisions based on one's own interpretation, the domain is knowledge and understanding and the cognitive strategy is integration and interpretation.

At *level 3* a task is described that contains a text where the respondents must answer a specific question that requires critical analysis and evaluation. The format is a continuous text, the source is digital, the meaning is recognition and evaluation of an author's perspective and argument, the dimension is cognitive-critical, the domain is critical evaluation, and the cognitive strategy is evaluation and reflection.

At the most advanced level, *level 4,* Lopes et al. (2018) describes a task where the respondents are asked to read a statistics table with results from the PISA survey and then write a newspaper article based on information from the table. It should follow a specific structure (what happened, with whom, where, when, how and why). The media format here is non-continuous

[11] https://www.degruyter.com/view/journals/comm/43/4/article-p508.xml?language=en

(a table), the type of information is visual graphics, the source is printed, the purpose is selection, organization and creation of information and to take into account the task of the press. The dimension is creative, the domain is create for communication and the cognitive strategy is to create.

The latter type of task is unusual in larger quantitative surveys, but at the same time it is relatively common to include open fields. This creative dimension Lopes et al. (2018) see as a more complex and time-consuming dimension when it comes to measurement or mapping. However, as several emphasize, there are several good reasons to include proficiency tests when mapping literacy (Haddon et al., 2020; Hobbs, 2017; Siddiq et al., 2016). Lopes et al. (2018) also believe that they have succeeded in including this dimension. Further development of this creative dimension and testing in a pilot phase can help ensure stronger validity.

The indicators in Lopes et al. (2018) frameworks are designed in a way that according to the authors makes it possible to distinguish between respondents with low and intermediate level of skill, while the validity tests show somewhat less distinct findings when it came to the participants with a high skill level. This is therefore also an aspect with potential for improvement. They write that: "Results also show that the test discriminates well among people with low and medium proficiency levels, but less well among people with higher ability levels. In this sense, if the aim is to capture the skill level of high-ability adults, it is desirable to design items that can discriminate among subjects at higher ability levels" (Lopes et al., 2018, p. 530). A strength of the framework is that t Lopes et al. (2018) recognize different modalities, such as visual literacy as well as reading, comprehension, textual and complex literacy in the form of creativity and construction of communicative content. In addition, it will be possible to actually assess whether there needs to be different tasks for different age groups, which is a strength with a view to researching the "entire population".

6.4.2. DigComp

Lopes et al. (2018)' s framework has its clear strengths, in that it is validity tested, including all indicators, it is test-based and that it is dynamic, i.e. that the content of the tasks can be changed without changing the validity. But as we see it, there are other frameworks that perhaps even better captures the 'new' media use, which is characterized by digital and social media, with

the increased importance of interactivity, communication and social practices, not to mention issues related to security, privacy and other ethical aspects of the new media. DigComp is one such framework.

Siddiq et al. (2016) find, like several other researchers, that there are relatively many studies of "basic competencies" that focus on the mastery of information and technical skills, while there are fewer studies that examine content production, communication, and even fewer studies that have measured areas of competence related to security, problem solving and cooperation. We think it is interesting in the context of the recent years of media development, where aspects such as data security, algorithms and "big data" has been in the spotlight, that so few studies have mapped such competences. It should also be pointed out that in there is relatively little focus on competences related to social skills and collaboration, which is also often emphasized as important competences in "new media". This is supported by Siddiq et al. (2016). Part of the reason for this can be that some competence areas are considered easier to measure than others (Siddiq et al., 2016), but also that, given the complexity of MIL and other literacy areas, it is seen as very difficult to measure all areas in one test, a point that we have already underlined. Anyhow, it seems that there is a gap between how MIL is defined theoretically and how it has been measured and evaluated. This should be taken into account in a future survey of MIL. In our opinion, a broad understanding and definition of MIL should be used as a basis.

DigComp is a framework based on a literature review of 15 frameworks related to ICT literacy and related areas of expertise, which Siddiq et al. (2016) refer to as the most comprehensive and robust systematic review of mapping of this area of literacy until 2016. According to Siddiq et al. (2016) DigComp is also a newly developed and comprehensive framework that sees ICT in a broad and inclusive way, i.e. many aspects related to ICT and ICT's social and cultural opportunities and challenges are taken into account. Moreover, this framework, like Lopes et al. (2018)'s framework is a *general* framework, meaning that it is basically suitable for embracing all age groups. DigComp also includes thorough competency descriptions, which according to Siddiq et al. (2016) makes the framework applicable in many areas, also in a process where indicators and tests are developed. For these reasons, we consider the DigComp framework highly relevant to our feasibility study, despite the fact that a different term than MIL is applied. This framework has on the first level defined five areas of competence; *information, communication, content-creation, safety* and *problem*

solving. But Siddiq et al. (2016) expand the framework with another competence area; *technical-operational*. At the next level, specific sub-competencies are associated to these areas. The third level consists of different skill levels for each competence on level 2, and the fourth level consists of examples of knowledge, skills and attitudes associated with each competence. The fifth level is a contextual explanation with examples of how the different competencies can be applied with different purposes.

Table 11. Areas of competence in DigComp

Competence areas (level 1)	**Competences (level 2)**
1. Information	1.1 Browsing, searching and filtering information 1.2 Evaluating Information 1.3 Storing and retrieving information
2. Communication	2.1 Interacting through digital technologies *2.1.1 Asynchronous Communication *2.1.2 Synchronous Communication 2.2 Sharing information and content 2.3 Engaging in online citizenship 2.4 Collaborating through digital technologies *2.4.1 Asynchronous Collaboration *2.4.2 Synchronous Collaboration
3. Content-creation	3.1 Developing content 3.2 Integrating and re-elaborating 3.3 Copyright and Licenses 3.4 Programming
4. Safety	4.1 Protecting devices 4.2 Managing and protecting personal data 4.3 Protecting health 4.4 Protecting the environment 4.5 Netiquette
5. Problem solving	5.1 Solving problems with use of digital technology 5.2 Collaborative problem solving 5.3 Innovating and creatively using technology 5.4 Identifying digital competence gaps
6. Technical operational	6.1 Solving technical problems 6.2 Identifying needs and technological responses 6.3 Basic technical skills

Vuorikari et al. (2016) define sub-competencies that belong to the individual competence areas in DigComp, which are listed in table 11 below. Vuorikari et al. (2016) does not include competence area 6 or the points 2.1.1., 2.1.2., 2.4.1. or 2.4.2., as these are new competence areas defined by Siddiq et al. (2016).

Table 11. Competencies and sub- competencies for DigComp 2.0. (Vuorikari et al., 2016,)

INFORMATION
1.1 Browsing, searching and filtering information To articulate information needs, search for data, information and content in digital channels, access them and navigate between them. To create and update personal search strategies .
1.2 Evaluating information To analyze, compare and critically assess the credibility and reliability of data sources, information and digital content.
1.3 Storing and retrieve information To organize, store and retrieve data, information and content in digital environments. To organize and process them in a structured environment.
COMMUNICATION
2.1 Interacting through media technology To interact through a variety of digital technologies and understand digital means of communication that fit in different contexts.
2.2 Sharing information and content To share data, information and digital content with others through appropriate digital technology.
2.3 Engaging in online citizenship To participate in society through the use of public and private digital services. To seek opportunities for empowerment and participatory citizenship through digital technology.
2.4 Collaborating through digital technologies To use digital tools and technologies for collaborative processes, and for collaboration and co- creation of resources and knowledge.
2.5 Mastering «digital identity» To create and manage one or more digital identities, to be able to protect one's own reputation, to handle the data one produces through several digital tools, environments and services.
CONTENT-CREATION
3.1 Developing content To create and edit digital content in different formats, to express oneself in digital ways.
3.2 Integrating and re-elaborating To modify, refine, improve and integrate information and content into existing knowledge to create new, original and relevant content and knowledge.
3.3 Copyright and Licenses Understand copyright and licenses for data, information and digital content.
3.4 Programming To plan and develop various instructions for a computer system to solve a given problem or perform a specific task.
SAFETY
4.1 Protecting devices

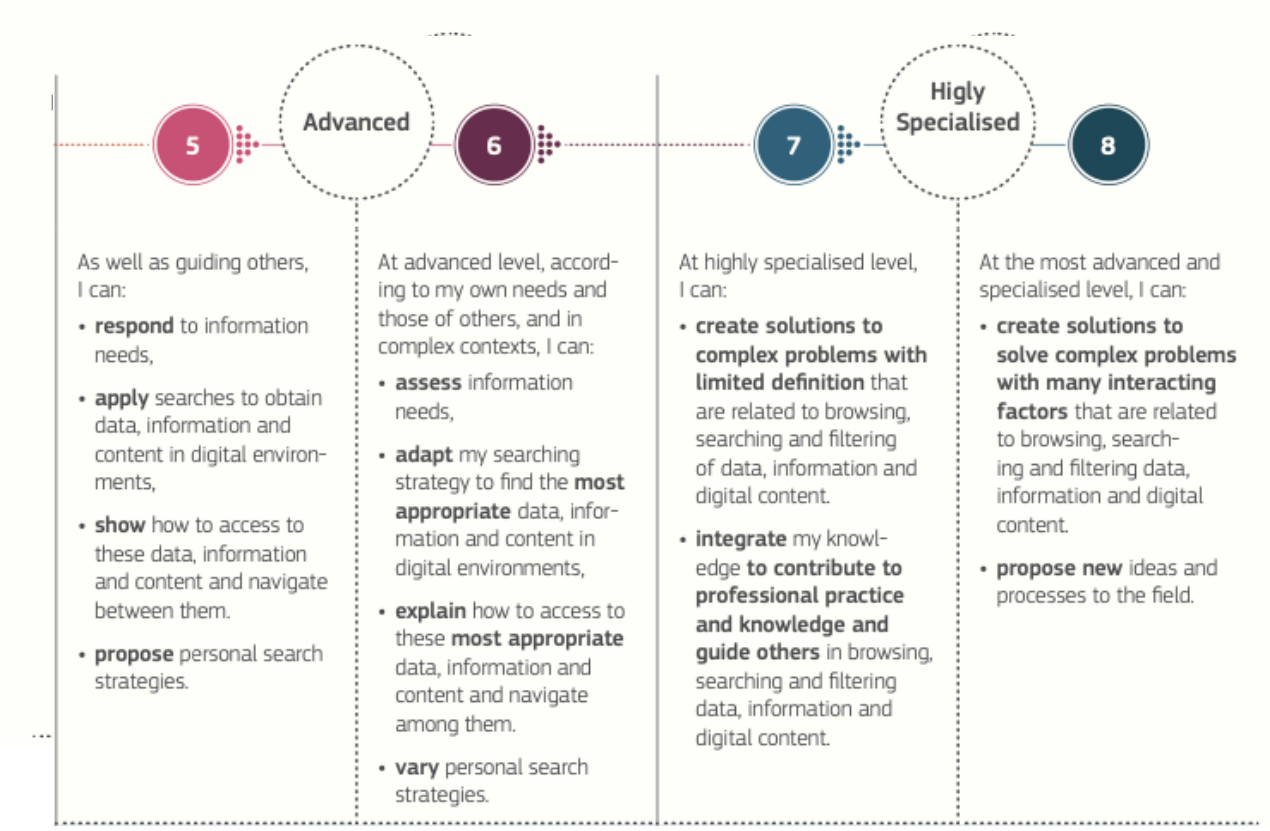
To protect devices and digital content, and to understand risks and threats in digital environments. To know about security and safety measures and pay attention to reliability and privacy.
4.2 Managing and protecting personal data To protect personal information and privacy in digital environments. Understand how to use and share personally identifiable information and how to protect yourself and others from harm. To understand that digital services have a "Privacy Policy" that is used to inform how personal information is used.
4.3 Protecting health To be able to avoid health risks and threats to physical and mental health in connection with the use of digital technology. To be able to protect oneself and others against possible dangers in digital environments (e.g. cyberbullying). To be aware of digital technology as a starting point for positive social practice and social inclusion.
4.4 Protecting the environment To be aware of the environmental impact of digital technology and their use.
4.5 Netiquette To be aware of norms of behavior and the knowledge needed to use digital technology and interaction in digital environments. To adapt communication strategies to specific audiences and be aware of cultural and generational diversity in digital environments.
PROBLEM SOLVING
5.1 Solving problems with use of digital technology To identify technical problems when using digital devices, and to solve them (from troubleshooting to solving more complex problems).
5.2 Collaborative problem solving To assess needs and identify, evaluate, select and use digital tools and possible technological answers to solve the needs. Adapting digital environments to different personal needs (eg. Accessibility).
5.3 Innovating and creatively using technology To use digital tools and technologies to create knowledge and new processes and products. To engage individually and collectively to understand and solve conceptual problems and issues in digital environments.
5.4 Identifying digital competence gaps To understand where one's own digital literacy needs improvement or updating. To be able to support others with their digital literacy. To seek opportunities for self-development and to stay up to date on the digital evolution.

Furthermore, there are a number of examples of level 3 (skill levels), level 4 (knowledge, skills and attitudes) to each literacy and level 5 which is a contextual explanation with examples of how the different competencies can be applied to different purposes. These are published

openly on the internet[12]. Different skills at 8 levels, from basic to highly specialized, are linked to specific exemplified scenarios.

For example, a basic skill level in the field of information literacy is considered to be able to identify one's own needs for information, do certain searches and gain access to various data sources. While at an advanced level, one is able to create one's own solutions to solve complex problems and also propose new ideas[13]. Figure 10 shows examples of competence areas with 8 levels of skills.

Figure 10. example of literacy areas with 8 skill levels



As we see it, DigComp and the rich descriptions of areas, sub-competencies and associated descriptions can be a good starting point for further development of questions and tasks related

[12] For example: https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106281/web-digcomp2.1pdf_(online).pdf

[13] For more details and insight into how the indicators can be measured at level as well as examples of different skills in different contexts, see https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106281/web-digcomp2.1pdf_(online) .pdf .

to MIL. A relatively rich material that can be used as a starting point for designing a research instrument. As mentioned, the sub-competences under competence area 6 are not further described in detail as these are new sub-competencies suggested by Siddiq et al. (2016) suggest. The strength of DigComp is that "new" media use is clearly included and emphasized. Given the developments in media technology and media use in the recent years, we see it as important that a measurement of MIL takes into account that more and more media use is dominated by digital, interactive and social media formats.

A future development of a framework for MIL measurement can also combine these two frameworks. As both are general frameworks, they are both open to change and new media forms and expressions. In particular, we want to emphasize that competencies related to safety and ethics as well as creativity and active participation are emphasized. These are more clearly implemented in the DigComp model than in Lopes et al. (2018)'s framework. We assess that Lopes et al. (2018)'s framework is perhaps closer to being a fully developed instrument that can be replicated in another context, while DigComp is a very comprehensive framework with competence areas with associated sub-competencies, which will have to be operationalized before they can be used in a research instrument. But there exists a rich selection of examples of indicators, questions and tasks that can be employed.

6.5. Challenges related to the recommended frameworks

There are several challenges associated with both frameworks. As Siddiq et al. (2016) also find, there is a predominance of studies based on DigComp that test the most basic competence areas, such as information, while there are fewer who explore the creative, critical and communicative competence areas. It is also worth noting that we find few comparative studies across countries in our review. This is confirmed by Siddiq et al. (2016). This means that a possible survey of MIL across countries in the Nordic countries to a large extent can be described as groundbreaking work. The same applies to mapping of MIL in all age groups - as mentioned, we find few studies that have done this before.

As we have pointed out previously, there are also some aspects of the frameworks that are somewhat underestimated in light of the recent years' development in media use and technology. One such aspect is the *ethical* aspects of media and information. There are many issues that can be highlighted in this respect, like data security, privacy and copyright. But also

unwanted or "harmful" media content, sharing of illegal data material and risk behavior online are important, as algorithms and surveillance are. These issues can be said to be part of the other aspects of MIL, such as critical understanding, but in our view, this does not sufficiently cover the ethical aspects of being a competent actor in the media and information society. A media theorist who has placed particular emphasis on such critical and ethical aspects of media literacy is Paul Mihailidis (2018), who advocates a value-based, critical form of media literacy. In a MIL-mapping, it will in any case be important to delimit specifically which aspects of media and information literacy one wants to be able to measure. A complete examination of MIL in all its breadth will not be possible regardless of which framework or design is chosen.

6.6. Recommended principles for designing a long-term survey.

When it comes to principles for designing a mapping of MIL in a long-term perspective, we cannot go into too much detail at this point, as we believe it is crucial that the details are determined in accordance with the future research group and their perspectives. In our view, the team that is to manage the mapping should validate the research instrument themself, as the experience with fully developed research tools that map MIL in a way that is relevant to a Nordic MIL survey is insufficient. Nevertheless, there are a number of principles we can recommend based on the experiences we have gained during the work with the feasibility study.

6.6.1. Sample

Sample size is a challenge in a study with the aim of mapping adults aged 16 and up ("the adult population"). But a general number that can be used as a goal can be approximately 1000 research *participants* in *net samples* in each country. In practice, this means that one should probably have a gross sample of around 3000 people per country. This gives a margin of error of +/- 3% in each country and just over 2% for the sample as a whole. Of comparable studies, EU Kids Online (2014) had 1000 participants from each country, the Norwegian Media Authority's (2019) survey had 1363 respondents, while Ofcom's (2020) survey of adults' media use had 1882 participants.

National surveys usually use stratified samples (UNESCO, 2013), which we would recommend in this case. Stratification can contribute to better control over the sample. The population is then divided into groups (strata) from which samples are drawn. It can help to ensure a basis for calculating for some of the axes we have found to be important in a survey of individuals'

competence or literacy. Gender, age, education level, place of residence and geography and immigration background are the most common stratification variables (SSB, 2006). When it comes to stratification, there are many models that can be used as a starting point, and a relevant variant of this is done, for example, in Ofcom's (2020) survey.

To measure MIL over time, it will not be possible in a large sample to follow specific individuals over time, but one can follow different groups over time that can be compared. However, this requires that the total sample has large enough groups within each criterion mentioned above (age, gender, level of education, etc.).

6.6.2. Methodology

We have previously pointed out challenges and opportunities related to the type of questions or tests used to measure MIL. As several of the researchers in this field also argue (Buckingham, 2005; Bulger, 2012; Livingstone et al., 2005), there are some possible difficulties associated with measuring literacy, which in itself is a complex concept *and* phenomenon. This is especially the case with media and information literacy because it is so intertwined with our everyday routines, actions and attitudes (Bulger, 2012). Self-reporting, self-evaluation, multiple-choice assignments, open-ended questions, practical tests and proficiency tests are some of the most common methods used according to our review. As we have pointed out, there are problems related to self-reporting and to an even greater extent self- *evaluation* of literacy, as Haddon et al. (2020), Siddiq et al. (2016) and Hobbs (2017) drew attention to. At the same time, self-reporting is easier to design and is effective in the way that a survey can include relatively many such types of questions in one survey.

Both Haddon et al. (2020), Siddiq et al. (2016) and Hobbs (2017) find that practical tests and proficiency tests that measure the level of literacy show better validity. The challenge with such tests, however, is that they can be demanding to develop, and there are also significant challenges associated with the age composition and which tasks to choose in that respect. Here it will be important to do a pilot on how the tasks turn out in different age groups. For example, UNESCO (2013) concludes that tests need to be so-called age appropriate. It will therefore be both time-consuming and resource-intensive to construct valid proficiency tests that measure MIL in different age groups. However, both Lopes et al.'s (2018) framework and

DigComp (Siddiq et al., 2016) are interesting because the designs allow for different task content in categories that measure the same sub-literacy.

Therefore, we assess that it will be a strength for a MIL-mapping to include various types of proficiency tests *and* a variety of types of questions. Surveys with self-reporting can provide useful insight into people's attitudes and assessments but have limitations when it comes to measuring literacy levels in a valid way. For example, Siddiq et al. (2016) and Hobbs (2017) point out that combining self-reporting with proficiency tests can both strengthen the measurement of specific competencies and provide opportunities for comparison and thus strengthen the validity of individual indicators and the study as a whole. Hobbs (2017) emphasizes skill testing or task-focused measurements as a kind of "gold standard" for measuring competence related to media use. In several research studies, proficiency tests of various kinds also show better validity and reliability than self-reporting. According to Siddiq et al. (2016), tests that resemble real-world situations will have more reliable and valid results, but there are few studies that map MIL and other similar areas of competence that have done this. Therefore, there is not enough evidence to conclude whether proficiency tests will be feasible in a MIL-mapping, and even less evidence concerning a mapping of entire population groups across multiple countries. Still, it may definitely be worth trying this out, precisely because of the potentially more reliable and "rich" results. A pilot study will be able to help test and validate different types of tests.

Self-reporting still has other strengths that also may be worth taking into account. Self-reporting is more efficient to design, easier to translate across contexts, and probably provides greater opportunities for research in large samples, and the possibilities for comparison across countries in the Nordic region may be greater with self-reporting. Therefore, a combination of self-reporting and well-designed practical proficiency tests seems to be a good and exiting alternative. For example, a questionnaire may contain examples of media content with related analytical questions that can be level- assessed. This was done in some of the studies in our review, also in the Norwegian Media Authority's (2019) survey. Self-reporting combined with practical tests in some way also opens interesting methodological discussions, which can help to enhance the survey's scientific contribution.

A combination could thus be a good choice, perhaps with a variant that includes practical tests where analytical competencies are measured, for example, by giving tasks related to a specific media content, as for example the Norwegian Media Authority did in their survey published in 2019. The study by Bulger (2012) also shows good results by combining questions about attitudes and assessments with "action-related questions", which will be able to elaborate the information from the respondent at the same time as the answers to the two types of questions can be compared. For example, a question about attitudes to advertising can be followed up with a question about what the informant would do in a specific situation related to advertising, preferably with answer options. The main point here is that variation in the type of questions can strengthens the quality of a survey, and we recommend that as a minimum requirement it is ensured that the survey does not only contain self-reporting questions.

6.6.3. Delimitation or rotation

Another challenge, which we have mentioned earlier, concerns the *scope* of the MIL study. As mentioned, MIL is complex, and most of the frameworks we have reviewed are comprehensive and thus challenging to fully embrace in an individual study. This can be solved in different ways. One alternative can be to focus on a more narrow and more pragmatic set of concepts. The comprehensive MIL-frameworks are perhaps too ambitious and wide. When researching with a questionnaire, one must also take into account methodological limitations, like the phenomenon known as "respondent fatigue", which we mentioned above. An important question is to ask whether it could be sufficient with fewer key indicators at MIL, where the "essence" of some main dimensions is measured (for example, access / use, understanding and participation / creativity). Our review shows that few of the studies can draw a full, holistic picture of such a complex set of competencies as MIL. Bulger (2012) argues that no feasible surveys can capture the full complexity of MIL.

However, there is reason to warn against reducing the scope of MIL as well. Our review shows that media and information literacy is precisely complex and multidimensional, which Buckingham (2005) also concluded in his review. In many ways, we agree with Buckingham's assessment that because media literacy is intertwined with our complex social practices, we must be careful about introducing a reductive or mechanic approach to measuring media literacy levels among the population. Some of the key to understanding MIL and other areas of competence is precisely to see how the various aspects and levels are connected in insoluble

ways. All the theoretical frameworks used in our review also emphasize how complex MIL is, and that the individual parts are inextricably linked together, such as access and use, understanding and evaluation and creation of own media content in UNESCO's model. A delimitation should therefore optimally not compromise with this by, for example, measuring only one of these aspects. For example, Luque et al. (2014) emphasize that MIL is precisely a holistic perspective where both the use, critical understanding and communication of media, information and digital literacy as equal parts.

Another alternative, which is recommended in the EAVI report (Danish Technological Institute, 2011), for example, is to design a rotating thematic study, in which certain aspects of MIL are measured on "rounds", and that this is done in a way that makes it easy to add to the research that builds up over time. This is a way of managing MIL- measurement over time and a way of developing a research field and apparatus, over time. EAVI's recommendation is a 5-year cycle, precisely for methodological reasons. In the report (Danish Technological Institute, 2011), such a rotating cycle is recommended, which alternately measures various aspects of MIL, such as access and use, communicative skills, critical understanding and awareness, along with national and local contexts and sociodemographic factors. This could also contribute to the gradual development of a precise selection of indicators, as also pointed out by the Danish Technological Institute (2011). Another option is a circulation every two or three years, with a different focus for each year. Stald et al. (2015) recommend a circulation between qualitative and quantitative surveys, which they believe can be conducted every two years. In connection with an MIL survey in the Nordic countries, a three-part rotation could be a way of conducting a survey, where one can, for example, alternately focus on 1) basic literacy (access and use), 2) evaluation and critical understanding and 3) creativity and participatory media practices. This could open up for studies in a broader range of these three competence areas and could also open up for more triangulation where qualitative and mixed methods design can also be considered. However, the frameworks we recommend can also provide a basis for developing a research instrument that measures MIL in a satisfactory manner. The weakness of a rotating design is that it requires a very long-term perspective, and for pragmatic reasons this can challenge the research.

Our primary recommendation is therefore to put together a research team that can develop a stable research instrument that can map MIL in a way that ensures comparability, optimally

every year, or alternatively every other year. As a starting point, we have recommended basing such work on the frameworks from Lopes et al. (2018) and DigComp (Siddiq et al., 2016). One possibility is, as mentioned, to use Lopes et al. (2018) as the main basis and complement with some indicators from DigComp that emphasize "new" media practices, including aspects related to creativity and safety / ethics. Ofcom, for example, maps several different aspects of media use and media habits each year, which over time generates a large data base and a large potential for different types of analyzes. If this option is chosen, it is important to design a survey that can map people in a very wide range of ages. It is not possible to specify an exact number of questions or length of the survey, which also depends on the type of questions or tasks. But we can note that Lopes et. al (2016) had 20 questions in their study that together measured indicators on their index for MIL.

We would also recommend emphasizing a relatively broad mapping of socio-demographic factors. For example, Livingstone et al. (2005) argues that a number of different socio-demographic factors can provide both opportunities and challenges when it comes to MIL. Livingstone et al. (2005) highlights both gender, age, socioeconomic status, education, disability, ethnicity, language skills, confidence, networks and family as important in this context. As a minimum, it is common to include gender, age, education, place of residence / geography and immigration background.

To develop a stable research instrument, a pilot study is essential.

6.7. Recommended principles for pilot study

We cannot draw a too detailed map of what a pilot study should look like and how it should be conducted, as we believe it is crucial that the details are determined in accordance with the research team's competence and profile. Regardless of the chosen framework, it will however be crucial to conduct a pilot study that contributes to the development of a robust research instrument. In this development, there can be good reasons to also include qualitative methods, although this is not something we have specifically analyzed in our feasibility study. In line with Siddiq et al. (2016) it can nevertheless be mentioned that since mapping of competence areas related to media and technology development is still a new tradition, it may be "useful to carry out more smaller in-depth qualitative studies before launching large-scale quantitative assessments" (Siddiq et al., 2016, p. 77).

There are different goals with conducting a pilot study, but the essence is that a pilot study is a smaller version of a full-scale study and often also a scientific test of a research instrument, such as a questionnaire (Van Teijlingen & Hundley, 2010). Pilot studies are therefore often critically important in the design of a research study. When it comes to a study that is planned to be repeated over several years, it can be seen as particularly important to do a pilot study. There are several important reasons to conduct pilot studies before larger surveys are conducted (Johanson & Brooks, 2010, p. 394); to conduct a pilot study is considered important when implementing major research studies in general and in the development and implementation of new research tools or instruments particularly (Van Teijlingen & Hundley, 2010). A pilot study can:

- Ensure that a scale uses clear and appropriate language
- Ensure that there are no clear errors or omissions in the study
- Ensure that the study has adequate indicators
- Estimate response rate
- Examine the feasibility of the study
- Contribute to determining the final sample size of the main survey

There are basically no general rules to how large the sample in a pilot study should be. But based on the main goal, which is to be able to conduct a larger quantitative survey of media and information literacy levels in the population in Sweden, Denmark, Norway and Iceland, one can make some choices. As we see it, it is important that the size of the pilot study is feasible and effective, and the final decision in this regard must be made by the final team that is to carry out the survey. In some studies, it is said that a kind of general rule is that the sample size of the pilot study should be around 10% of the sample size in the main study (Johansson & Brooks, 2010). Another, pragmatic size range in a pilot is between 5 and 10% of the sample size, which we consider makes sense. However, this must be decided in connection with the decision on the size of the main study. An example is if the sample in the main survey is 1000 respondents, an acceptable size of the pilot will be between 50 and 100. However, it is just as important to ensure good representativeness and that there is a certain spread according to the sample criteria it is decided that the main study should have.

In this case we consider that the pilot can have several purposes:

1) To examine whether the question formulations work as wanted and that answer options are exhaustive
2) To get some signals on the distribution of answers and possibly use the answers from the pilot to further develop the research instrument (if there are particularly interesting or surprising findings for example), and
3) To make an empirical quality assessment of the indicators.

As we see it, points 1 and 2 are the simplest ones, and will require a pilot sample of around 60-100 people in total. Point 3 is more complex and requires analyzes of optimally between 150 and 200 respondents[14]. If the research team considers the Nordic countries to be relatively comparable, it will, as we see it, be sufficient with a total sample of between 150 and 200 respondents, but it will be important to ensure comparable representativeness with the main survey.

6.8. Limitations:

Our feasibility study has some limitations. We have based our discussions, analyzes and recommendations on existing research and scientific literature. This has limitations, and a study will, despite broad searches, never be able to provide a complete picture of a research topic. We therefore acknowledge that there might exist other research that we have not found in our review. Furthermore, in line with the invitation to tender, we have limited our search to quantitative research. This also has its limitations. A quantitative survey will not be able to give a complete picture of MIL. This will require a more diverse collection of data and different methods. As it is written in UNESCO (2013, p. 87): "Should a Member State wish to explore the full extent of cultural nuances in MIL, quantitative indicators as proposed for the UNESCO Global MIL Assessment Framework would not be sufficient and additional qualitative methods will be required". We therefore believe that including qualitative studies and mixed methods design would be a means of complementing the research and knowledge development regarding MIL in the Nordic countries.

[14] We would like to thank Vegard Johansen, NTNU for discussion on sample sizes

6.9. Closing comment

The research review shows a field in need of more research, and as we consider it, the Nordic countries are well equipped to take the initiative for an ambitious project such as mapping the Nordic populations' level of media and information literacy. There are several strong research communities, and the media authorities show initiative to put the work on the agenda.

Appendix 1 Anbudsinbjudan gällande förstudie av ett nordiskt MIK-index

Uppdragsbeskrivning och omfattning

Mediemyndigheterna i Sverige, Norge, Danmark och Island har för avsikt att mäta nivån av medie- och informationskunnighet bland invånarna i respektive land. Mediemyndigheterna vill därför genomföra en förstudie av hur en sådan mätning och ett sådant index kan se ut.

Statens medieråd (Sverige) leder processen i denna direktupphandling.

Vad syftar förstudien till och vad ska den innehålla?

De nordiska mediemyndigheterna har identifierat ett behov av att mäta nivån av MIK-kompetens inom (olika) delar av befolkningen. Mätningen ska genomföras för att kunna följa utvecklingen över tid samt mäta förändringar. För att kunna följa utvecklingen ser de nordiska mediemyndigheterna ett behov av att identifiera indikatorer eller ett MIK-index. Om sådana indikatorer eller MIK-index är gemensamma för de nordiska länderna innebär det dels en resursbesparing, dels ger det en jämförbarhet mellan länderna. De nordiska mediemyndigheterna har därför gemensamt beslutat att ta fram en förstudie hur sådana indikatorer eller ett sådant index kan se ut.

Medietilsynet i Norge genomförde under 2019 en första kartläggning av detta slag – *Kritisk medieforståelse i den norske befolkningen* – och den utgör ett exempel på vad som ska analyseras i denna förstudie. https://medietilsynet.no/mediebildet/kritisk_medieforstaelse/)
För att uppnå dessa mål **ska** förstudien innehålla:

1. en kartläggning av internationellt existerande metoder för att ta fram ett MIK-index, inklusive mätverktyg och indikatorer.
2. en analys av de olika typerna av metoder som framkommit i kartläggningen.
3. En rekommendation av vilken/vilka metoder som är lämpligast.
4. En utredning av förutsättningarna för långsiktig förvaltning av den föreslagna metoden. Förstudien ska därför också innehålla en redovisning av hur metoden kan förvaltas, även av annan än den aktör som tagit fram den, samt förslag på (namngivna) aktörer som kan förvalta metoden långsiktigt.

Förstudiens slutsatser och rekommendationer ska särskilt beakta metodernas:

- validitet
- replikerbarhet
- jämförbarhet över tid
- känslighet för teknisk utveckling

Det är också av vikt att metodens mätningar, antingen i form av test, eller andra indikatorer huvudsakligen består av kvantitativa data.

Förstudien **ska** vidare levereras i form av en rapport i PDF- och Word-format samt vara skriven på svenska eller norska.

Leverans

Förstudien ska levereras senast den 30 november 2020.

Krav på anbud

- Anbudet **ska** innehålla en beskrivning av det praktiska genomförandet av uppdraget, inklusive tillvägagångssätt för genomförandet, tidsplan för genomförandet, eventuella avgränsningar och problematik som anbudsgivaren identifierar som risk för genomförandet,
- Anbudet **ska** vara undertecknat,
- Anbudet **ska** innehålla kontaktperson hos leverantören,
- Anbudet **ska** vara skrivet på svenska eller norska.

Krav på leverantör

För att delta i utvärderingen **ska** följande krav vara uppfyllda:

- Leverantören **ska** ha erfarenhet av minst ett (1) liknande uppdrag under de senaste fem åren, att ta fram eller genomföra kvalificerade analyser av olika mätmetoder. Detta ska verifieras av beskrivningar av detta/dessa uppdrag.
- Leverantören **ska** ha minst en deltagare i projektet med minst 5 års relevant arbetslivserfarenhet. Deltagaren **ska** ha utbildning inom medie- och kommunikationsvetenskap eller annan för uppdraget relevant utbildning. Verifieras i CV.

- Leverantören **ska** därutöver kunna leverera minst två deltagare i projektet med för uppdraget relevant utbildning. Deltagarna **ska** antingen ha minst 2 års relevant arbetslivserfarenhet eller vara doktorander. Verifieras i CV.

Vid utvärderingen kommer följande **bör**-krav att beaktas.

- Leverantören **bör** ha erfarenhet av tidigare forskning/mätningar inom området medie- och kommunikationsvetenskap, utbildning eller digitalisering. Beskrivs i anbudet.
- Minst en av de deltagare som ingår i genomförandeteamet **bör** vara disputerad inom för undersökningen relevant område. Verifieras i CV.

Pris

- Anbudet får inte överstiga 450 000 SEK.

Utvärdering

Uppdraget kommer att tilldelas den leverantör med det mest ekonomiskt fördelaktiga anbudet.
Prövning av anbuden sker i dessa tre steg:
1. Uteslutning och kvalificering – prövning av anbudsgivare i syfte att kontrollera eventuell förekomst av någon uteslutningsgrund samt att kontrollera om anbudsgivare uppfyller ställda kvalificeringskrav.
2. Obligatoriska krav – kontroll av att samtliga ställda obligatoriska krav (så kallade ska-krav) är uppfyllda. Endast de anbud som uppfyller samtliga ska-krav utvärderas.
3. Utvärdering av anbud – Beställaren kommer att anta det anbud som är ekonomiskt mest fördelaktigt.

Bör-kraven bedöms enligt tre kriterier – uppfyller inte kravet, uppfyller kravet samt uppfyller kravet mycket väl. Bedömningen genererar ett värde som **dras av** slutpriset. Modellen ser ut som följer:

	Uppfyller ej kravet	Uppfyller kravet	Uppfyller kravet mycket väl
Bör-krav 1	0 – inget avdrag	Avdrag 50 000 kr	Avdrag 100 000 kr
Bör-krav 2	0 – inget avdrag	Avdrag 50 000 kr	Avdrag 100 000 kr

Beslut om tilldelning kommer att meddelas skriftligt, via e-post.

Anbudsinlämning och sista anbudsdag

Anbud **ska** skickas med e-post till Statens medieråd på adressen *registrator@statensmedierad.se* senast 2020-06-08.

Anbudets giltighetstid

Anbudets giltighet ska vara minst 2 månader.

Avtal

Avtal med villkor framgår av Bilaga 1 Uppdragsavtal. Samtliga avtalsvillkor accepteras genom att anbudsgivaren inkommer med anbud.

Avbrytande

Anbudsförfarandet kan komma att avbrytas om det finns sakliga skäl för detta, till exempel;

- Om det visar sig att anbudsdokumenten är behäftade med fel eller förutsättningarna för genomförandet förändrats
- Om budgeterade medel väsentligt överskrids
- Om tillräcklig konkurrens ej uppnåtts
- Andra förändrade förutsättningar, till följd av exempelvis politiska beslut

Ansvarig för direktupphandlingen

Statens medieråd

Org. Nr: 202100–6396

Adress: Box 27204, 102 53 Stockholm

Tel: 08-665 14 60

Information om Statens medieråd finns på https://statensmedierad.se

Kontakt hos Statens medieråd

Jan Christofferson

jan.christofferson@statensmedierad.se

08-665 14 67

Appendix 2: Selected frameworks and indicators from the research review

Table 1. Dimensions of self - directed information literacy for engineering students. From Douglas, Fernandez, Fosmire, Van Epps and Purzer (2020)

Dimension	Self-directed information literate student behaviors
Recognize	Begin projects by analyzing the problem for information needs. As part of the problem scoping and task definition stages of design, they think critically beyond the information provided to identify elements of underlying intent, potential ambiguities, gaps in the provided information, and gaps in their knowledge. They ask or form questions to identify what information they need and develop a plan to obtain that information.
Seek	Develop a contextualized information search strategy based on their current level of knowledge and gaps in their understanding. They use an intentional and structured process to gather formal and informal information. They are able to identify the appropriate resources (e.g., databases, search engines, forums, colleagues) to find specific information (e.g., patents, industry standards). They are also able to efficiently navigate and access information.
Evaluate	Probe and determine the credibility of their information sources through use of evaluative criteria and heuristics (e.g., relevancy, dates of publication, purpose of source, intended audience, scholarly agreement). They are able to identify trustworthy and appropriate sources of information for their intended use and articulate why they are relevant.
Use	Incorporate found and personal information into their ideation, analysis, and sense-making process. They use information to inform all aspects of their project from problem scoping to concept generation and testing. They resolve rather than just reject information that may contradict their ideas or lead to a change in a design solution.
Document	Organize, document, and appropriately cite their information so that others may obtain access to their sources. When writing reports or presenting orally, they reference the source of the information used in making decisions in accordance with professional norms (e.g., professional society standards, policies).
Reflect	Give careful thought to how they handled information in the course of their project: How they recognized their information needs, gathered, evaluated, used, and documented information. They reflect on what they did, what information they still do not know, what strategies worked well, and what could be done differently in future projects.

Table 2. IT and information competencies. From Hajduová, Smolag, Szajt and Bednárová (2020)

Variable IT Competences	**Variable Information Competences**
T1 Write, edit and send text in a text editor T2 Verify the text by checking you need T3 Insert images/symbols in a text editor C2 web browsing T4 Insert and edit tables in a text editor T5 agencies Use drawing/graphics applications such as Power Point T6 Move files/folder on the computer T7 Move files/folder on the smartphone other than Polish T8 Move files/folder between devices T9 Use copy tools from the Internet T10 Use cutting tools T11 using the basic functions of spreadsheet computer T12 compressing files T13 Connect and install new devices, e.g., e.g., placing them in lists and tables printer, scanner, etc.? T14 Install the program on your computer T15 Search for and install a smartphone program/application T16 Uninstall the program on your computer T17 Uninstall the program/application yourself on your smartphone C9 Assess the security level of publishing information on the T18 Programming in a specialist language Internet, for example on Facebook, T19 Use internet search engines (e.g., Google, Yahoo etc.) C10 entering information using a template on the web T20 transferring data from a spreadsheet C11 Read and/or comment on the blog T21 Set up/create private email address T22 Send and receive e-mail T23 Send an email with attachments T24 using e-mail/calendar systems T25 using file-sharing programs (P2P) T26 creating websites T27 Transfer photos from a digital camera to a computer T28 Transfer photos from a smartphone to a computer T29 Make calls via the Internet T30 creating an electronic signature T31 Send/receive SMS/MMS from a mobile phone T32 Connect to the Internet using a mobile phone T33 Order and buy tickets online T34 Buy and sell goods via native websites T35 making commercial transactions using languages other than native T36 Use IP telephony or Skype T37 Using an electronic signature T38 Participate in online communities, e.g., Facebook or Instagram	C1 locating pages with the information spelling/dictionaries C3 Finding the specific information you need on the websites of government C4 searching websites in a language C5 selection of the right information C6 organized file organization on your C7 Organize the information found by C8 Assess the quality of information that can be found on the Internet, for example, whether it is old, biased or unreliable

Table 3: From the European Commission's report Mapping of UNESCO's MIL to DigComp:

Competences in DigComp	Media and Information Literacy Curriculum for Teachers (2011)
1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content	IL: Define and articulate information needs IL: Locate and access information IL: Assess Information IL: Organize Information IL: Use ICT skills for information processing ML: Critically evaluate media content (...in the light of media functions)
2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity	IL: Communicate Information IL: Make ethical use of information ML: Engage with media for self-expression and democratic participation
3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming	ML: Review skills (including ICTs) needed to produce user-generated content
4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment	
5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps	

Table 4: From the European Commission's report Mapping "Global Media and Information Literacy Assessment Framework" to DigComp

Competences	Global Media and Information Literacy Assessment Framework (UNESCO, 2013) "MIL Subject Matters"
1.1 Browsing, searching and filtering data, information and digital content 1.2 Evaluating data, information and digital content 1.3 Managing data, information and digital content	1.1. Definition and articulation of a need for information 1.2 Search and location of information and media content 1.3 Access to information, media content and media and information providers 1.4 Retrieval and holding/storage of information and media content 2.2 Assessment of information and media content, and media and information providers 2.3 Evaluation of information and media content, and media and information providers 2.4 Organisation of information and media content
2.1 Interacting through digital technologies 2.2 Sharing through digital technologies 2.3 Engaging in citizenship through digital technologies 2.4 Collaborating through digital technologies 2.5 Netiquette 2.6 Managing digital identity	3.2 Communication of information, media content and knowledge ... (see below) 3.3 Participating in societal-public activities as active citizen 3.4 Monitoring influence of information, media content, knowledge production and use, as well as of media and information providers
3.1 Developing digital content 3.2 Integrating and re-elaborating digital content 3.3 Copyright and licences 3.4 Programming	3.1 Creation of knowledge and creative expression 3.2 .... in an ethical and effective manner
4.1 Protecting devices 4.2 Protecting personal data and privacy 4.3 Protecting health and well-being 4.4 Protecting the environment	
5.1 Solving technical problems 5.2 Identifying needs and technological responses 5.3 Creatively using digital technologies 5.4 Identifying digital competence gaps	

Table 5. DigComp 2.0 (Vuorikari et al., 2016) :

1.1 Browsing, searching and filtering data, information and digital content To articulate information needs, to search for data, information and content in digital environments, to access them and to navigate between them. To create and update personal search strategies.
1.2 Evaluating data, information and digital content To analyse, compare and critically evaluate the credibility and reliability of sources of data, information and digital content. To analyse, interpret and critically evaluate the data, information and digital content.
1.3 Managing data, information and digital content To organise, store and retrieve data, information and content in digital environments. To organise and process them in a structured environment.
2.1 Interacting through digital technologies To interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.
2.2 Sharing through digital technologies To share data, information and digital content with others through appropriate digital technologies. To act as an intermediary, to know about referencing and attribution practices.
2.3 Engaging in citizenship through digital technologies To participate in society through the use of public and private digital services. To seek opportunities for self-empowerment and for participatory citizenship through appropriate digital technologies.
2.4 Collaborating through digital technologies To use digital tools and technologies for collaborative processes, and for co-construction and co-creation of resources and knowledge.
2.5 Netiquette To be aware of behavioural norms and know-how while using digital technologies and interacting in digital environments. To adapt communication strategies to the specific audience and to be aware of cultural and generational diversity in digital environments.
2.6 Managing digital identity To create and manage one or multiple digital identities, to be able to protect one's own reputation, to deal with the data that one produces through several digital tools, environments and services.
3.1 Developing digital content To create and edit digital content in different formats, to express oneself through digital means.
3.2 Integrating and re-elaborating digital content To modify, refine, improve and integrate information and content into an existing body of knowledge to create new, original and relevant content and knowledge.
3.3 Copyright and licences To understand how copyright and licences apply to data, information and digital content.
3.4 Programming To plan and develop a sequence of understandable instructions for a computing system to solve a given problem or perform a specific task.
4.1 Protecting devices To protect devices and digital content, and to understand risks and threats in digital environments. To know about safety and security measures and to have due regard to reliability and privacy.
4.2 Protecting personal data and privacy To protect personal data and privacy in digital environments. To understand how to use and share personally identifiable information while being able to protect oneself and others from damages. To understand that digital services use a “Privacy policy” to inform how personal data is used.
4.3 Protecting health and well-being To be able to avoid health-risks and threats to physical and psychological well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments (e.g. cyber bullying). To be aware of digital technologies for social well-being and social inclusion.
4.4 Protecting the environment To be aware of the environmental impact of digital technologies and their use.
5.1 Solving technical problems

To identify technical problems when operating devices and using digital environments, and to solve them (from trouble-shooting to solving more complex problems).
5.2 Identifying needs and technological responses To assess needs and to identify, evaluate, select and use digital tools and possible technological responses to solve them. To adjust and customise digital environments to personal needs (e.g. accessibility).
5.3 Creatively using digital technologies To use digital tools and technologies to create knowledge and to innovate processes and products. To engage individually and collectively in cognitive processing to understand and resolve conceptual problems and problem situations in digital environments.
5.4 Identifying digital competence gaps To understand where one's own digital competence needs to be improved or updated. To be able to support others with their digital competence development. To seek opportunities for self-development and to keep up-to-date with the digital evolution.

Table 6. Framework for surveys in Crawford-Visbal, Crawford-Tirado, Ortiz-Záccaro and Abalo (2020) :

Category	Digital Competence Level	Type of Questions	Instruments
Personal Information	-	Age Gender Semester	All
Internet Access		Access to Internet Device Ownership Average weekly connection time	All
Use of Internet	Communication & Collaboration	Regular online activities _Social networks used _Online services used	All
Content Creation	Digital Content Creation	_Types of content _Time spent	All
Information Search	Information & Data Literacy	_Preferred search engine & scientific repository _Time spent looking for information _Time spent solving problems	All
Progress in Digital Competences	-	_Changes in ICT usage _Perceived relationships between digital competences and professional development _Perceived differences between freshmen and older generations	Focus Group & Semi-Structured

Table 7 from Xu, Yang, MacLeod and Zhu (2019) : Relationship between "social media literacy" and Digital citizenship

Table 3. Analysis of the SMC dimensions and digital citizenship.

Independent variable	Dependent variable	*B*	SE	β	*t*	VIF
Social media self-efficacy	Digital citizenship	0.49	0.03	0.50	15.53*	2.31
	Respect Yourself/Respect Others	0.47	0.04	0.42	12.69*	
	Educate Yourself/Connect with Others	0.48	0.04	0.44	13.22*	
	Protect Yourself/Protect Others	0.53	0.04	0.47	14.42*	
Social media experience	Digital citizenship	0.43	0.03	0.51	15.95*	2.43
	Respect Yourself/Respect Others	0.40	0.03	0.42	12.70*	
	Educate Yourself/Connect with Others	0.42	0.03	0.45	13.77*	
	Protect Yourself/Protect Others	0.47	0.03	0.49	15.27*	
Effort expectancy	Digital citizenship	−0.14	0.03	−0.20	−5.53*	1.73
	Respect Yourself/Respect Others	−0.11	0.03	−0.14	−3.84*	
	Educate Yourself/Connect with Others	−0.15	0.03	−0.19	−5.33*	
	Protect Yourself/Protect Others	−0.19	0.03	−0.24	−6.65*	
Performance expectancy	Digital citizenship	0.36	0.02	0.49	15.25*	1.54
	Respect Yourself/Respect Others	0.45	0.03	0.53	17.19*	
	Educate Yourself/Connect with Others	0.28	0.03	0.34	9.75*	
	Protect Yourself/Protect Others	0.26	0.03	0.30	8.54*	
Facilitating conditions	Digital citizenship	0.32	0.03	0.43	12.88*	1.59
	Respect Yourself/Respect Others	0.33	0.03	0.39	11.38*	
	Educate Yourself/Connect with Others	0.29	0.03	0.34	9.95*	
	Protect Yourself/Protect Others	0.34	0.03	0.39	11.58*	
Social influence	Digital citizenship	0.05	0.03	0.06	1.79	1.63
	Respect Yourself/Respect Others	0.13	0.03	0.14	3.91*	
	Educate Yourself/Connect with Others	0.00	0.03	0.00	0.10	
	Protect Yourself/Protect Others	−0.07	0.03	−0.08	−2.11*	

SMC: Social media competence.
*$p < 0.05$.

Table 8. From Pérez-Rodríguez, Delgado-Ponce, Marín-Mateos and Romero-Rodríguez (2019) :

Ferrés (2007) as a basis to conceptualize media competence:
Language, knowledge of the codes used in the construction of audio-visual messages, and a capacity for analysis and expression according to the communicative situation;
Technology, the capacity to utilize tools and devices that make communication possible;
Reception and audience, the concept of audience and active reception in relation to screens;
Production and programming processes, knowledge of the functions assigned to the main production agents;
Ideology and values, the capacity to produce messages that transmit values and contribute to the improvement of the social environment;
Aesthetics, analysis and evaluation of audio-visual messages from an aesthetic standpoint and its relation to other forms media and artistic output.

Dimension	Indicators
Language	Understanding the information transmitted by differ-ent codes and languages. Capacity to interpret and evaluate the different codes of representation, and the function they perform in the message. Capacity to express oneself through a range of repre-sentation and signification systems.
Technology	Knowledge of tools used to surf the Net Knowledge of different technological tools to get informed and to communicate.
Reception and audience	Capacity to evaluate the cognitive effects of emotions. Capacity to recognize the influence that media have on us. Capacity to recognize the influence that media have on others. Capacity to discern and manage disassociations that sometimes occur between feelings and opinions, and emotions and reason. Knowledge of the level of social responsibility re-quired. Capacity to select, review and self-evaluate one's own media diet in accordance with criteria that show awareness and a reasonable balance.
Production and programming processes	Knowledge of the role of media production professionals. Knowledge of the phases of the production processes and the infrastructure required by users to make their own productions.
Ideology and values	Skills to search for, organize, contrast, prioritize and synthesize information deriving from different sys-tems and settings. Skills to search for information deriving from differ-ent systems and settings. Capacity to assess the reliability of information sources, drawing critical conclusions from what is said and what is omitted. Capacity to make the best use of the tools of the new communication environment in order to be able to commit to culture and society as responsible citizens. Capacity to detect the intentions and interests that lie behind corporate and popular productions and their ideologies and values, be they explicit or hidden, by adopting a critical attitude towards them.
Aesthetics	Sensitivity to recognize a media production that falls short of the minimum standards of aesthetic quality.

Table 9 from Pereira and Moura (2019)

Table 4. General competences assessed and their main evaluating goals.

Dimension	General competences	Aims	Points available/mean of points achieved
Critical understanding	To interpret and classify media contents, institutions and players	To identify and interpret the relevance of specific parts in a given media content	14/3.77
		To identify, compare, distinguish and/or characterize media genres and contents	9/4.03
		To identify, compare, distinguish and/or characterize media institutions and players	17/7.52
	To understand the contexts of media contents, institutions and players	To acknowledge the ownership of media institutions	12/1.25
		To acknowledge the existence of different/alternative media and platforms	3/1.51
		To acknowledge media funding modes	6/2.29
		To recognize media regulatory instances	6/0.69
		To acknowledge the existence of copyrights and the need to identify the sources used	9/3.72
	To evaluate media contents, institutions and players	To acknowledge the different media available as possible tools	9/4.03
		To evaluate the origins and contexts of given media contents, institutions and players	10/4.67
		To evaluate specific goals of diverse media contents, institutions and players	3/1.11
		To suggest alternative media contents, institutions and players	2/0.14
Production and participation	To participate using the media	To use different media to participate and interact with others	10/1.91
	To produce	To create contents	10/1.91
		To be able to explain different production stages of their own creations	18/1.21

Table 10 from Pereira and Moura (2019) :

Table 5. Most and least scored competences and their questions.

	Competences	Questions' topics
Most scored competences	To acknowledge the existence of copyrights and the need to identify the sources used	To recognize the importance of identifying the sources used in a school assignment (attitudinal scale)
	To evaluate the origins and contexts of given media contents, institutions and players	To select two out of five possible information sources, based on a simulated Google search
	To identify, compare, distinguish and/or characterize media institutions and players	To classify a search engine as such, choosing from four alternatives (social network, search engine, content aggregator, online store)
	To identify, compare, distinguish and/or characterize media genres and contents	To read and classify an opinion article as such, choosing from three alternatives (news story, opinion article, special feature)
	To acknowledge the different media available as possible tools	To suggest and explain how one could promote an electoral campaign in school, for the students' association
Least scored competences	To acknowledge the ownership of media institutions	To explain the recurrence of Sony products in a 007 movie, considering its intro, where it is stated that Columbia Pictures is property of Sony Entertainment
	To be able to explain different production stages of their own creations	To describe, if applicable, their collaboration with any media outlet
	To suggest alternative media contents, institutions and players	To suggest alternative sources that could feature in a given news story about advertorials
	To be able to explain different production stages of their own creations	To describe, if applicable, their collaboration with any school media outlet
	To be able to explain different production stages of their own creations	To describe, if applicable, the production process of a video recorded by them

Table 11: From Khlaisang and Koraneekij (2019) , scale for information literacy, media literacy and ICT literacy

Information Literacy (49 items)	
Definition: Level of knowledge and understanding in using existing information accurately and that matches the needs. [15] **[16] [17]** **Scope:** Important features: (1) Ability to identify the needs for information (6 items) (2) Ability to access information (3 items) (3) Ability to manage information (9 items) (4) Ability to apply information (6 items) (5) Ability to have ethics in using information (13 items) **Rating Scale:** Score Ability Level Higher than 246 Highest 209-245 High 168-208 Medium 131-167 Low Lower than 130 Lowest	1. You can select the information source by yourself. 2. You can set the searching words for information by yourself. 3. You regularly keep up to date on the information source. 4. You can classify the type of information source. 5. You set the method before searching for information. 6. You set the period for searching for information. 7. You understand the components of the information source. 8. You perform the search according to the goal. 9. You consider the information you receive before using it. 10. You can organize the information you receive. 11. You consider the information you receive before trusting it. 12. You can explain the difference between information sources. 13. You can evaluate the value of each type of information source. 14. You can analyze the good and bad effects of information. 15. You can organize the information you receive into categories. 16. The information source provides the information that meets your needs. 17. You know which information source is a quality source. 18. You always develop yourself to be up-to-date on information. 19. You understand the information you gain. 20. You know how the information is useful. 21. You can tell what kind of information cannot be searched from which source. 22. You recognize when information is needed. 23. You can create a system and structure to manage information. 24. You can utilize the information. 25. You can apply the information to work. 26. You can summarize ideas from the information. 27. You can use the information to develop yourself. 28. You can create a new information source by yourself.

	29. You can ask a question from the information you find. 30. You can set the strategies for accessing information. 31. You understand the process of disseminating information. 32. You can discuss the information you receive. 33. You can write a reference for the information sources. 34. You can integrate information sources to access the information you need. 35. You can decide how to use the information by yourself. 36. You only search for useful information and knowledge. 37. You do not pass on illegal information. 38. You do not use an information source for commercial purposes. 39. You do not use the information obtained for illegal purposes. 40. When you find illegal information, you will notify the authorities. 41. You can recommend the right sources to others. 42. You consider the ethics in accessing information. 43. You respect the privacy of accessing personal information. 44. You are aware of the cultural context before disseminating information. 45. You are aware of the social context before disseminating information. 46. You consider the economic impact of disseminating information. 47. You do not corrupt the file during use. 48. You are careful not to have a computer virus spread. 49. You comply with requirements, laws, and act legally in accessing information.

Media Literacy (63 items)	
Definition: Ability to access, analyze, evaluate and create the content in a variety of contexts. Aware of the impact of media exposure. Choose to receive useful content and avoid unwanted content that the media offers. [18] [19] [20] **Scope:** Important features: (1) Assessing the media (15 items) (2) Analyzing the media (22 items) (3) Evaluating the media (6 items) (4) Creating the media (14 items) (5) Accessing the	1. You access to the media by yourself. 2. You receive information of accessing to the media from your family. 3. You receive information of accessing to the media from friends. 4. You receive information of accessing to the media from school/university. 5. You study the characteristics of the media every time before access 6. You can access the media quickly. 7. You can use various media skillfully.

media from various sources (3 items) (6) Using the media creatively (3 items) **Rating Scale:** Score Ability Level Higher than 296 Highest 255-295 High 203-254 Medium 159-202 Low Lower than 158 Lowest	8. The media you choose to access is up-todate and universal. 9. You access to the media at the right time. 10. You are in the area that is convenient to access to the media. 11. You participate in more than one social media. 12. You understand the meaning of vocabulary from the media. 13. You understand the mechanisms and techniques of the media used in the presentation. 14. You allocate your time to use the media. 15. You understand the motivation of the media producer. 16. You can differentiate the type of media. 17. You can interpret the hidden connotation in the media. 18. You can understand the sequence of the events from the media content. 19. You understand the content of the media. 20. You gain the idea from media exposure. 21. You can distinguish the fictional and fantasy stories in the media. 22. You can comment on the content of the media. 23. You use the pre-existing knowledge to access media. 24. You always compare the information received from the media. 25. You can analyze what is a passive advertisement in the media. 26. You know what the producer wants to communicate with the audience. 27. You can analyze whether the media is appropriate for the audience. 28. You can analyze whether the media is presented on the basis of democracy. 29. You can analyze the social values reflected in the media. 30. You can analyze the component of the media. 31. You can ask a question from the media. 32. You can analyze who or what the media fails to present. 33. You think the internet media is easy to access. 34. You think that language skills are needed to access the media. 35. You think the skills in using the media are important to access the media. 36. You can understand the meaning of the content effectively. 37. You think age is an important factor in accessing the media. 38. You think education level is an important factor in accessing the media.

	39. You consider the content of the media before deciding to act. 40. You think reading and interpretation skills are necessary for media consumption. 41. You select the media to match your needs. 42. You can use the media for yourself. 43. You can use the media for others. 44. You use the correct written language to present information. 45. You use the knowledge from the media to develop yourself. 46. You use an audio to create the content of the message. 47. You offer an opportunity for others to participate in creating the media. 48. You consider the ethics in using the media. 49. You can build relationships with others through the media. 50. You can organize the information gained from the media. 51. You motivate yourself from the media. 52. You use the media to convey your knowledge. 53. You protect yourself from internet privacy violations. 54. You help the society through media channels. 55. You use social media to communicate and transfer knowledge among friends. 56. You use communication technology to structure the content. 57. You can create your own media. 58. You create the media that interacts with others. 59. You can create the media that promotes learning. 60. You have changed your behavior from the media. 61. You can use the media in creative ways. 62. You can associate the content of the message with a personal experience. 63. You can tell the limitations of each media.

ICT Literacy (69 items)	
Definition: Ability to use digital technology, communication tools, and/or networks to access, manage, integrate, evaluate, and create information for learning society. [21] [22] [23] [24] **Scope**: Important features: (1) Accessing ICT (5 items) (2) Communicating ICT (7 items) (3) Managing ICT (6 items) (4) Integrating ICT (6 items) (5) Evaluating ICT (23 items) (6) Creating ICT (22 items)	1. You can find information from an ICT source. 2. You can collect information from an ICT source. 3. You can retrieve information from an ICT source. 4. You can use a variety of ICT tools. 5. The ICT that you use is quick for accessing information. 6. You understand the system of each type of ICT. 7. You understand the language and symbols used in ICT. 8. You can describe the use of ICT to others.

Rating Scale: Score Ability Level Higher than 323 Highest 278-322 High 226-277 Medium 177-225 Low Lower than 176 Lowest	9. You know the laws and regulations concerning the use of ICT. 10. You use ICT in electronic transactions. 11. You can create an ICT manual. 12. You use ICT to solve problems in learning/working. 13. You think that ICT results in integrating various media types. 14. You can use ICT to compare information. 15. You can use ICT to present arguments of information. 16. You can use ICT for research purposes. 17. You can use ICT to evaluate information. 18. You can use ICT for corporate management. 19. You can use ICT to synchronize information systems. 20. You can use the e-learning system to learn about ICT. 21. You think ICT is necessary in today's society. 22. You think that ICT enables broader access to information. 23. You think that ICT enables more rapid dissemination of information. 24. You think that ICT contributes to participation in information and information content. 25. You can identify the benefits of ICT. 26. You think that ICT can reduce travel costs. 27. You think ICT is a key factor in economic growth. 28. You consider ICT in making decisions before doing activities. 29. You use ICT to analyze the relationships of information. 30. You can use digital and communication technology to connect useful information. 31. ICT improves your thinking skills. 32. You think that ICT is an important factor in economic development. 33. You think that ICT is an important factor in the educational development of the country. 34. ICT enables communication without borders. 35. ICT creates learning outside the classroom. 36. ICT reduces the costs and time to travel. 37. You can distinguish the virtual world and the real world while using ICT. 38. You understand the results from what you have learned from and your use of ICT. 39. You analyze and evaluate the impact of using ICT. 40. You think that ICT improves the efficiency of ICT development. 41. You can adjust the ICT format. 42. You can design ICT by yourself. 43. You can use ICT to respond to cultural differences. 44. You can invent ICT by yourself. 45. You can use ICT to express your position. 46. You can develop an ICT system or program.

	47. You can use ICT to develop yourself. 48. You can use ICT to develop your organization. 49. You can develop ICT to meet the needs of users. 50. You may use ICT in accordance with the specific features of the media. 51. You can use ICT to respond to individual differences. 52. You can use ICT to create interesting information. 53. You use ICT to present information that is different from others. 54. You can use ICT to present propaganda information. 55. You can use ICT to link your devices for increased efficiency. 56. You use ICT to apply to your work. 57. You can use ICT for designing. 58. You can use ICT to develop software packages. 59. You have the ability to apply ICT in a specific way. 60. You can use ICT to build community learning resources and information. 61. You can use ICT to present information to others. 62. You can use ICT to express your own opinions. 63. You understand how to use ICT to produce media that meet your goals. 64. You can use ICT to create social networking. 65. You can use ICT to present easy-to-understand information. 66. You understand the rules and ethics of communication through information technology. 67. You are aware of the impact on individuals and society when using information technology to communicate. 68. You provide opportunities for others to exchange information on ICT. 69. ICT allows you to do multiple activities at the same time, such as a smartphone or a tablet, which can be used to call, take a photo, send an email and record work schedules.

Table 12: NML SCALE, BASED ON JENKINS, 21 st century skills, from Literat (2014)

Expressions used in research on NML skills (New Media Literacy Skills)

PLAY:
I have taught myself something new on a computer by seeing what happens when I play around with it.
When I have a new cell phone or electronic device, I like to try out all the buttons to see what they do.

I enjoy taking things apart and then putting them back together to find out how they work.
When I am faced with a problem, I usually try out a few different ways of solving it before I give up.
When I get stuck trying to solve a problem, I see it as a learning opportunity rather than a personal failure.

SIMULATION:
I try to put myself in other people's shoes to understand their problems or situations.
It is important to have simulations of dangerous events like earthquakes or safety evacuations, so that people know what to
do in a crisis.
I appreciate simulation games and activities like Second Life, SimCity, The Sims, FIFA, Tiger Woods PGA Tour, etc.
I think about the way in which reality is represented in movies with computer-generated simulation, like Avatar, Inception,
300, Sin City, Iron Man, X-Men, etc.
I would like to participate in a simulation of something I cannot experience in real life, like flying a space shuttle to the moon, or piloting a fighter jet.

PERFORMANCE:
I have often taken on a different identity in order to experience something new or to solve a problem (online games, role-
playing, theatre exercises).
I know what an avatar is.
I feel I am a different person online than
how I act in person. In certain situations, it
is necessary to not be yourself.
Actors learn a lot about life from the roles they play in films and on stage.

APPROPRIATION:
I have incorporated other people's public work to create my own piece of art, like mixing music tracks, making an art
collage, or stringing together video clips.
I have created something new that incorporates stuff from popular culture, like writing a short story based on a character in my favorite book, making a fan video, or a music remix.
When doing a creative multimedia project, I don't think it is wrong to take samples from my favorite artists' songs or videos. If I would make a fan video about my favorite celebrity or artist or band, they'd probably be happy if they found out about it. It is important for young people to learn how to use stuff from popular culture in their own creative ways.

DISTRIBUTED COGNITION
I don't agree that smart people are born smart.

My environment plays a big part in how smart I am.
I have to keep learning from my surroundings in order to become smarter.
I'm usually pretty good at knowing what do to do or who to ask if I want to find out more about a specific topic. I find it important to use tools like spell check, a calculator, encyclopedia, etc to help me in my learning or work.

MULTITASKING

I manage to do my work successfully while doing other things like listening to music or texting.
I can usually prevent getting distracted and focus on
tasks well when other things are happening around me, like people talking, TV, music,
internet, etc. When I work on my computer, I like to have different applications open in the same time.
My generation is good at multitasking, i.e. doing several things at once.
I don't think anybody should give me a hard time if I feel I can work on several things at once.

COLLECTIVE INTELLIGENCE

I enjoy working with others on projects or assignments.
When I can't solve a problem or find a piece of information by myself, I use the internet or social media to connect with others and find what I am looking for.
I enjoy the collaborative aspect of things like Wikipedia, team games, online fan communities, community message boards,
etc.
I think I can learn a lot from my friends.
I don't think it's a sign of weakness or stupidity to ask a friend or a colleague for help on work assignments or other problems.

JUDGMENT

I can effectively determine whether or not the information I find online is correct and reliable.
When I'm interested in a topic, I gather information from a bunch of different sources (like TV, radio, the internet, etc) to
try to get the full picture.
When I search for something online and I get thousands of results, I can effectively decide which ones will be the most useful for me.
I am able to enter the right words in a search engine to find what I am looking for.
I can identify prejudice or bias in media (e.g. racism on certain websites, prejudice against women in song lyrics, etc).

TRANSMEDIA NAVIGATION

I follow my favorite shows, actors, musicians etc across different platforms and media (TV, magazines, internet, Facebook,
Twitter, etc).
I can imagine the same story being told in different ways, such as through music, acting, writing, drawing, etc.
I often visit the websites (either official or fan-created) of my favorite TV
shows, bands, etc. If I am curious about something I saw on TV, I will check
it out online later.
I'm happy that I can learn about my favorite things in different ways (on TV, on the internet, on Facebook, etc)

NETWORKING

I think that reading other people's recommendations on sites like Amazon or Yelp is useful in helping me make decisions. I like to share my favorite links or creative work on social media sites like Facebook or YouTube or Twitter.
I often share links on Facebook, Twitter, my blog, etc.
When I go online, I like to feel like I am part of a community.
It is important for me to be able stay in touch with my friends online too, and not only in real life.

NEGOTIATION
My experience on the internet and/or in videogames has made me more understanding of those different from myself.
I think the internet offers a very important opportunity to get to know people from different backgrounds and different
places.
I am happy that I can interact online or on Facebook with people from all over the world.
I have learned something new about another culture from surfing the internet, playing online games, participating in online
communities or forums, etc.
I think that using the internet and/or playing videogames makes people more open to other cultures.
VISUALIZATION
I feel I understand things better when I can think of them visually.
When I prepare a project for work or school, I like to use as many images, graphs and diagrams as possible. I think I am pretty good at understanding information from images, graphs, diagrams and other visual tools. I like the fact that I can see all my friends on my Facebook profile.
I find Google Maps and/or Google Earth to be extremely useful tools.

Part 4: Civic Engagement

NOTE: For all the questions below, the possible answers were: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree.

I believe I can make a difference in my community.
Being actively involved in national, state and local issues is my responsibility. I have volunteered in my community.
I have done something to help raise money for a charitable cause.
I stay informed on current events and politics.

Table 13. Framework from Arke and Primack (2009): (Combination and comparison of different theoretical models)

Table 1. Theoretical framework of media literacy.

Label	Domain	Item code	Item(s)	Aufderheide	NAMLE Key Questions	Bloom
A	Recall	Recall	Factual recall items	Access	Content	Knowledge
B	Purpose	Purpose	Explain the purpose of the message.	Access	Purpose	Comprehension
C	Viewpoint	Sender	Identify the sender of the message.	Analyze	Author/Audience	Analysis
		Missing	What points of view may be missing?	Analyze	Author/Audience	Analysis
D	Technique	Technique	How does the sender attract and hold your attention?	Analyze	Techniques	Analysis
E	Evaluation	Evaluation	What attitudes or feelings are you left with afterwards?	Evaluate	Credibility	Evaluation
		Inference	What does the information suggest?	Evaluate	Credibility	Synthesis

Figure 1: From Lopes et al. (2018) : Measuring media and information literacy skills: Construction of a test.

Lopes et al's conceptual framework / framework provided a matrix that gives guidelines for how the test should be constructed and how to ensure the inclusion of different media channels and a variety of media types and degrees of
difficulty:

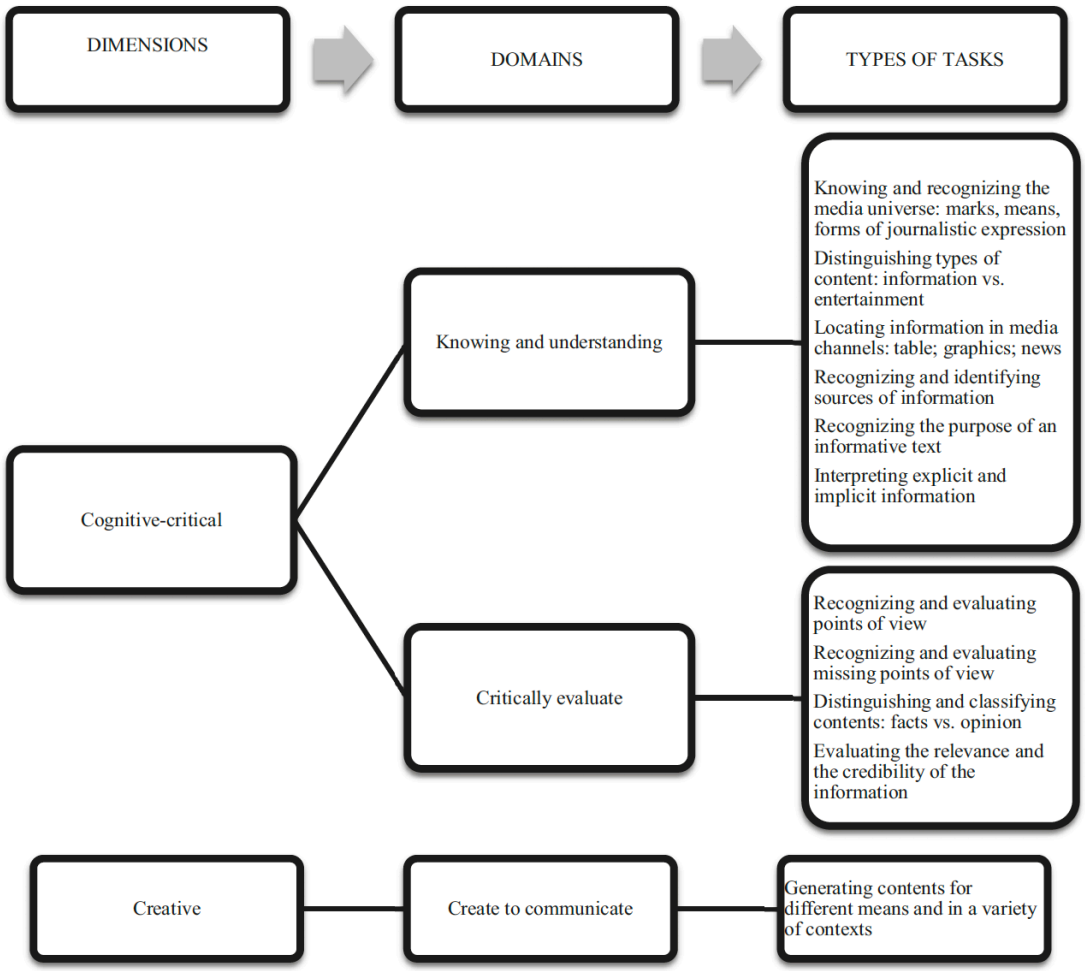


Figure 2: Dimensions, main categories and task types in Lopes et al. (2018, p. 513)

Structure variables:	Process variables:
Format of the media channel: Continuous text Non-continuous text Image **Source:** Printed Digital **Type of information:** Textual informative Textual opinion Textual prescriptive Visual informative Visual opinion Visual instrumental	**Type of cognitive strategy:** (N1) Locating and identifying (N2) Integrating and interpreting (N3) Evaluating and reflecting (N4) Generating

NML Framework with indicators and definitions from Lee, Chen, Li and Lin (2015) :

Indicator	**Definitions**
Functional consuming literacy	
Consuming skill	A series of technical skills necessary for consuming media contents.
Understanding	The ability to grasp the meaning of the media contents at a textual level.
Critical consuming literacy	
Analysis	The ability to deconstruct media messages on its own.
Synthesis	This indicator bears much resemblance with Jenkins et al.'s (2006) appropriation, which refers to the ability to sample and remix media content in a meaningful manner.
Evaluation	This indicator includes individuals' ability to question, criticize, and challenge the credibility of media contents.
Functional prosuming literacy	
Prosuming skill	The set of technical skills necessary to produce/create media contents.
Distribution	This indicator refers the activities to disseminate information at hand.
Production	This indicator involves the activities to duplicate (partly or completely) or mix media contents.
Critical prosuming literacy	
Participation	It refers to activities to participate interactively and critically in new media environments.
Creation	This indicator refers to activities to create media contents especially with a critical understanding of embedded socio-cultural values and ideology issues.

CIL (Ainley et al., 2016) :

This conceptualization from Ainley et al. (2016) formulate both a theoretical concept and a measuring device, which is very interesting, also because they have done a large study where this has been applied. The study examined CIL in over 60,000 8th graders in 20 countries in Europe. The scale synthesizes what is an established treadling in CIL , and also in many other literacy definitions ; knowledge, skills and understanding at different levels. An interesting point is that the scale clearly equates the importance of understanding and production, each level refers to the participants' use of ICT to access and use information, but also to communicate with others. We believe this is a key factor to include in a MIL scale.

Strand 1 of the framework, titled **collecting and managing information,** focused on the receptive and organizational elements of information processing and management. It incorporated three aspects:

- **Knowing about and understanding computer use:** This refers to a person's declarative and procedural knowledge of the generic characteristics and functions of computers. It focuses on the basic technical knowledge and skills that underpin our use of computers in order to work with information.
- **Accessing and evaluating information:** This refers to the investigative processes that enable a person to find, retrieve, and make judgments about the relevance, integrity, and usefulness of computer-based information.
- **Managing information:** This aspect refers to the capacity of individuals to work with computerbased information. The process includes ability to adopt and adapt information-classification and information-organization schemes in order to arrange and store information so that it can be used or reused efficiently.

Strand 2 of the construct, titled **producing and exchanging information,** focused on using computers as productive tools for thinking, creating, and communicating. The strand had four aspects:

- **Transforming information:** This refers to a person's ability to use computers to change how information is presented so that it is clearer for specific audiences and purposes.
- **Creating information:** This aspect refers to a person's ability to use computers to design and generate information products for specified purposes and audiences. These original products may be entirely new or they may build on a given set of information in order to generate new understandings.
- **Sharing information:** This aspect refers to a person's understanding of how computers are and can be used as well as his or her ability to use computers to communicate and exchange information with others.
- **Using information safely and securely:** This refers to a person's understanding of the legal and ethical issues of computer-based communication from the perspectives of both the publisher and the consumer of that information.

From Vraga et al. (2015)

News Media Knowledge: A total of 18 multiple-choice items were used to measure news media knowledge. These items were adapted from previous research (Ashley et al. 2013; Maksl et al. 2015) and included questions of media structure, ownership, content creation, and media effects. Each item was coded ascorrect or incorrect, then summed to create a news media knowledge score (M=13.47, SD=3.58).

Current Events Knowledge: Six multiple-choice items asked people about current events, such as which party controls the US Senate, the US unemployment rate, and the number of female justices on the Supreme Court, adapted from other scales (Maksl et al. 2015; Pew, 2015). Each question was scored as correct or incorrect and summed to create a current events knowledge score (M=4.39, SD=1.20).

News Media Skepticism: Participants rated their agreement on seven-point scales for four items to measure media skepticism, including whether the news media is trustworthy, accurate, gets in the way of society solving its problems, and confidence in the press (Maksl et al. 2015). These items were averaged to create an index (α=.78, M=4.70, SD=1.11).

News Media Literacy Measures: Our measures for Authors and Audiences (AA), Messages and Meaning (MM), and Representation and Reality (RR) were identical to Study 1. However, additional items were included to measure Self-perceived Media Literacy (SPML) and Value of Media Literacy (VML). These items were added to further develop these constructs, which we discuss in more detail in the results section.

Sanchez et al. (2019) : MIL index :

Sanchez et al. (2019) have developed a MIL index based on **UNESCO** 's definition and four dimensions that include basic aspects of media use and communication, these dimensions are included:

1) Media access and use;

(2) Media language and critical comprehension;

(3) Production and programming pro- cesses; and

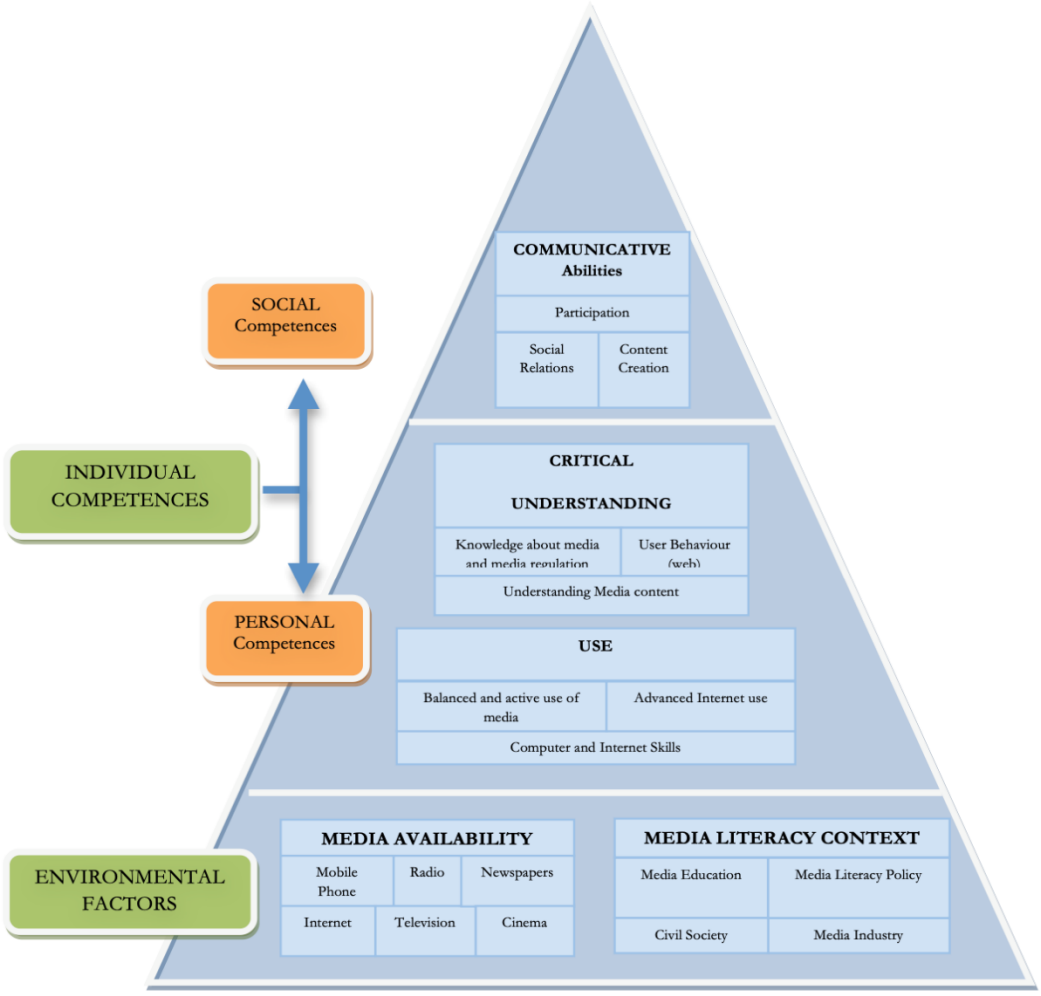
(4) Transforming one’s situation through communication

DIGCOMP from Siddiq et al. (2016) :

Competence areas (Level 1)	Competences (Level 2)
1. Information	1.1 Browsing, searching and filtering information
	1.2 Evaluating Information
	1.3 Storage and retrieving information
2. Communication	2.1 Interacting through technologies
	2.2 Sharing information and content
	2.3 Engaging in online citizenship
	2.4 Collaborating through digital channels
	2.5 Netiquette
	2.6 Managing digital identity
Content creation	3.1 Developing content
	3.2 Integrating and re- elaborating
	3.3 Copyright and Licenses
	3.4 Programming
4. Safety	4.1 Protecting devices
	4.2 Protecting personal data
	4.3 Protecting health
	4.4 Protecting the environment
5. Problem solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3 Innovating and creatively using technology
	5.4 Identifying digital literacy gaps

Figure 3: EAVI (Celot, 2015; Celot & Pérez-Tornero, 2009)

EAVI's structure for assessment and measurement of media literacy criteria. This is the structure of EAVI that they arrived at after a thorough process (Celot & Pérez-Tornero, 2009, p. 8):



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Appendix 3: Results from the systematic review

Table 1. Summary of results from the systematic review (model is adapted from Haddon et al., 2020; and Siddiq et al., 2016)

Forfattere (år)	År data	Land	Navn på publikasjon	Kvalitet / sitat-index	Utvalg (størrelse og spesielle valg)	Metodologi og design: (Oppgave/ selvrapportering)	Basert på eksplisitt teori? J/N	Rammeverk	Indikatorer	Type funn	Evt. aldersbegrensning	Validitetsvurdering	Bakgrunnsvariabler*	Merknader
Douglas, K. A. Fernandez, T. Fosmire, M. Van Epps, A. S. Purzer, S. (2020)	2015	USA	*Self-directed information literacy scale: A comprehensive validation study*	0 (ny artikkel)	1603 (ingeniør-studenter)	Selvrapportering, likert-skala	J	"Self-directed information literacy (SIL)"	SIL subfactors: (*Recognize*, *Seek*, *Evaluate*, *Apply*, *Document*, and *Reflect*)	Mål: utvilkling av måleinstrument. Funn: Nivå av SIL i henhold til ulike bakgrunnsvariabler	Studenter i første studieår	"Høy" indre konsistens (a=0.92)	1,2,3,6,7,	
Hajduová, Z. Smolag, K. Szajt, M. Bednárová, L. (2020)	2018	Polen og Slovakia	*Digital Competences of Polish and Slovak Students—Comparative Analysis in the Light of Empirical Research*	0 (ny artikkel)	343 (studenter)	Selvrapportering, spørreskjema	J	IT and information competences	En egenutviklet oversikt over ulike kompetanser som skiller mellom «IT competences» (ferdigheter) og «information competences» (refleksjon) (se vedlegg 3). Knyttet til work and professional development, relations with loved ones, realization of interests, health, finance, religion and spiritual needs, everyday matters and civic involvement.	Ulikheter i digital kompetanse I henhold til ulike sosiale grupper og yrkesvalg/studievalg	Studenter	Reliabilitet ved Alfa-Cronbach (a= 0.973).	1,2,3,8	Viser til Hatlevik & Ckristopherssen
Okeji, C. C. Ilika, O. M. Baro, E. E. (2020)	2019	Nigeria	*Assessment of information literacy skills. A survey of final year undergraduates of library and information science in Nigerian universities*	0 (ny artikkel)	1350 (studenter)	Selvrapportering, spørreskjema	J	Ikke angitt	Ulike items knyttet til studenters kunnskaper og nivå av evaluering av informasjon	Studenters evaluering, organisering, bruk og kommunikasjon av informasjon, knyttet til utdanning innen bibliotekar	Studenter	-	1,5,	
Crawford-Visbal, J. L. Crawford-Tirado, L. Ortiz-Záccaro, Z. Z. Abalo, F. (2020)	2017	Argentina, Colombia, Peru og Venezuela	*Assessment of digital competences in communication students across four Latin American universities*	0 (ny artikkel)	Tot. 229, spørreskjema (157), fokusgr (52), intervjuer (20)	Case studie; spørreskjema, fokusgruppeint, intervjuer	J	DigComp (EU kom)	Måler nivå knyttet tiul tilgang, bruk, innholdsproduksjon, søk og utvikling i digitale ferdigheter. Egen skala / tabell knyttet til DigComp (se vedlegg 3).	Sammenligning av nivå på studiesemester	Studenter	-	1,2,3	
Xu, S. Yang, H. H. MacLeod, J. Zhu, S. (2019)	-	Kina	*Social media competence and digital citizenship among college students*	12	746 college-studenter (NB: 557 kvinner, 189 menn)	Tredelt spørreskjema (demografi, SMCS, DCS), hovedsakelig selvrapportering	J	Individuelt nivå apå 'social media competence scale' (SMCS) og Digital Citizenship scale (DCS)	Undersøker sammenhengen mellom SMC og «digitalt borgerskap». SMC har seks indikatorer/dimensjoner: 1) sosiale media selvoppfatning 2)sosiale media erfaringer 3) forventet innsats, (4) forventet ytelse, (5) tilrettelegging av forhold og (6) sosial innflytelse (DCS har 46 items og 3 dimensjoner)	Sammenheng mellom demografi, SMC og DC	College studenter	Reliabilitet ved social media self-efficacy (a . 0.98), social media experience (a . 0.98), effort expectancy (a . 0.74), performance expectancy (a . 0.81), facilitating conditions (a . 0.66), and social influence (a . 0.66). Respect Yourself/Respect Others (a . 0.90), Educate Yourself/Connect with Others (a . 0.88), and Protect Yourself/Protect Others (a . 0.83).	1,2,3	
Pérez-Rodríguez, A. Delgado-Ponce, A. Marín-Mateos, P.	2015-2016	Spania	*Media competence in Spanish secondary school*	5	672 studenter	"ad hoc" spørreskjema med selvrapportering.	J	Mediekompetansemodell utledet fra Ferrés (2007) med	Mediekompetanse ble målt ved å fortolke responser på items på en skala fra 1-3 i henhold til om deltakeren anså seg selv som kompetent i de ulike	Nivå av mediekompetanse hos ungdomsskoleelver, samt relasjoner mellom dimensjonene i modellen, og	Elever ved «secondary school», 14-17 år	Validert med Delphi-teknikken (15 fagfeller følger prosessen). Pretest	1,2,3,5,9	

Romero-Rodríguez, L. M. (2019)			*students. Assessing instrumental and critical thinking skills in digital contexts*						dimensjonene. 19 indikatorer og 39 items (se tabell 6) (Ferrés, 2007): multimodal språkforståelse, teknologiforståelse og ferdigheter, resepsjon og publikum, produksjon og programmering, ideologi og verdier, estetikk og analyse	identifisere sammenhenger mellom demografiske variabler og mediekompetanse		ble gjort. Alfa-Cronbach – alle items over 0.7.		
Pereira, S. Moura, P. (2019)	-	Portugal	*Assessing media literacy competences: A study with Portuguese young people*	2	679 studenter	Online spørreskjema, selvrapportering	J	Mediekompetanse modell med 2 hoveddimensjoner (kritisk forståelse og produksjon og deltakelse) med 6 underdimensjoner	Mediekompetansenivå, 26 spørsmål, skala fra 0-100	Mediekompetansenivå, også sett opp mot sosiodemografiske faktorer, mediebruk og tilgang. Også mål om å utvikle en skala for å identifisere og evaluere mediekompetanse. Skala på tre nivåer.	17-19 år	Ikke oppgitt	1,2,3,4,5,8,9,10	Refererer til EAVI. **Interessant gjennomgang av media literacy**
Khlaisang, J. Koraneekij, P. (2019)	-	Thailand	*Open Online Assessment Management System Platform and Instrument to Enhance the Information, Media, and ICT Literacy Skills of 21st Century Learners*	5	2300 studenter	Tre faser; 1) utvikling av begrepsapparat 2) utvikling av online test (OOAMS, IL, ML og ICTL). 3) test av kvaliteten på OOAMS	J	Information Literacy scope, med 6 dimensjoner og 49 items Media Literacy Scope med 6 dimensjoner og 63 items, ICT literacy med 6 dimensjoner og 69 items	Måler nivå av tre ulike typer literacy; Information literacy, meda literacy og ICT literacy. scores på 5 nivå (lowest, low, medium, high og highest).	Målet er å utforske et instrument for måling av tre typer kompetanse, og funnene handler om metodikken	Studenter i høyere utdanning	Alfa-Cronbach (a= ikke oppgitt, men «god»). Også gjort exploratory factor analysis og confirmation factor analysis	-	Svært detaljerte indikatorer
Ihme, J. M. Senkbeil, M. Goldhammer, F. Gerick, J. (2017)	2013	12 Europeiske land; Kroatia, Tsjekkia, Danmark, Tyskland, Litauen, Norge, Polen, Slovakia, Slovenia, Sveits, Nederland, Tyrkia	*Assessment of computer and information literacy in ICILS 2013: Do different item types measure the same construct?*	3	Bruker data fra ICILS; 11850 deltakere	Metodologisk artikkel	J	Fra ICILS 2013; med to «strands»: 1) collecting and managing information og 2) bruke datamaskiner til tenkning, produsere, kommunisere	Sammenligner tre ulike modeller for analyse av «computer & information literacy» (CIL) i ICILS 2013: information-based response tasks, simulation tasks, and authoring tasks	Knytter funn til ulike typer kunnskap og til ulike kognitive prosesser.	14-16 år	Regresjonsanalyse	1,4,10, 11	
Literat, I. (2014)	N/A	N/A	*Measuring New Media Literacies: Towards the Development of a Comprehensive Assessment Tool*	19	327	Online spørreskjema selvrapportering	J	Skala utviklet på Jenkins' (2006) New Media Skills	Måler mediekompetansenivå i henhold til New Media Literacy scale; 12 skills med 5 items hver, totalt 60	Multivariat analyse (MANOVA)	Over 18 år, snitt 33,7 år	Faktoranalyse	1,2,3,6,7,10	Vektlegger deltakende og aktiv mediekompetanse
Maksl, A. Ashley, S. Craft, S. (2015)	N/A	USA	*Measuring News Media Literacy*	11	508	Spørreskjema v/ tlf med selvrapportering	J	Skala bygget på Potters kognitive mediekompetansemodell	Potters (2004) modell med 5 «grunnleggende strukturer»; kunnskap om 1) medieinnhold, 2) medieindustrier, 3) medieeffekter, 4) den 'virkelige' verden, 5) selvet. Tre deler som måler ulike aspekter ved NML	Måler nivå av 'news media literacy',	14-17 (ikke spesifisert)	analysert ved tostegs – «cluster analysis»	1,2,4,6	Bruker Potters kognitive modell
Rosman, T. Mayer, A.-K. Krampen, G. (2015)	N/A	Tyskland	*Combining self-assessments and achievement tests in information literacy assessment: empirical results and recommendations for practice*	13	82	Kombinasjon av selvrapportering og prestasjonstest	J	1) Selv-rapportert informasjonskompetanse vha SES-IB-16** 2) Information search tasks 3) Information literacy test	1) SES-IB-16 har 16 items målt med Likert-skala, 2) tre oppgaver med økende vanskelighetsgrad, 3) måles med PIKE-P test	Sammenligner funn mellom selvrapportering og andre tester.	Snittalder 22,33 år (NB: Skjev kjønnsfordeling, 91% kvinner)	Multippel Regresjonsanalyse, Alfa-Cronbach målt for alle variabler	1,2,3,9	Lavt antall, men interessant prosjekt og er inkludert på grunn av kombinasjonen av selvrapportering og standardisert test. Viser at selvrapportering har klare begrensninger
Arke, Edward T. Primack, B. A. (2009)	N/A		*Quantifying media literacy: development, reliability, and validity of a new measure*	37	34	Kvalitativ intervensjon med intervjuer og respons på ulike typer medieinnhold.	J	Taksonomi utv. Fra NAMLE / Aufderheide/Bloom	Kombinasjon av ulike eksisterende modeller, forsøker å lage en syntese. 7 indikatorer / 5 dimensjoner	Utvikling av måleinstrument for media literacy (egenkomponert) og critical thinking (CCTST)	N/A	Cronbach's alpha (a= 0.74-0.9). måler intern konsistens, innholdsvaliditet, og begrepsvaliditet	1,2,3,12	Få deltakere, men inkludert pga modell/instrument -utvikling. Pilotstudie

Lee, L. Chen, D. T. Li, J. Y. Lin, T. B. (2015)	2011	Singapore	*Understanding new media literacy: The development of a measuring instrument*	32	574	Online survey m/ selvrapportering	J	NML (new media literacy) Framework	Måler skills, productivity, criticality og sociality, 12 dimensjoner med 4 – 13 items	Søker å måle bade kunnskaper og produksjonskompetanse	10-17 år	Måler validitet og reliabilitet. Alle indikatorer er revidert etter ekspertpanel og det er gjort pilotstudie	2,3	Alle indikatorer er godt definerte
Dornaleteche, J. Buitrago, A. Moreno, L. (2015)	2010-2011	Spania	*Categorization, item selection and implementation of an online digital literacy test as media literacy indicator*	14	1506	test/spørreskjema (fysisk skjema), med tre moduler med 45 items	J	ODL-test Online Digital Literacy test	3 moduler: 1) sosiodemografiske variable, 2) 45 items ang. Bruk og kunnskaper om digitale verktøy, 3) 2 meta-refleksive spm	Søker å måle en populasjons kunnskaps-/kompetansenivå, samt aktivt bruk av digitale verktøy, knyttet til media literacy	15-99 år	Cronbach's Alpha coefficient (=0.961)	1,2,3,12	**Måler hele befolkningen, alder 15-99 år**
Young, J. A. (2015)	N/A	USA	*Assessing New Media Literacies in Social Work Education: The Development and Validation of a Comprehensive Assessment Instrument*	16	311 (161 studenter, 150 lærere)	Spørreskjema med "quiz"-form	J	Bruker Literat sin modell (Jenkins)	Måler mediekompetansenivå i henhold til New Media Literacy scale; 12 skills med 5 items hver, totalt 60	Ser etter likheter og ulikheter i mediekompetansenivå hos studenter og lærere	N/A	Cronbach's alpha på .917	1,2,6,8,9,12	Refererer til Literat.
Ainley, J. Fraillon, J. Schulz, W. Gebhardt, E. (2016)	2013	21 land I Europa	*Conceptualizing and Measuring Computer and Information Literacy in Cross-National Contexts*	19	> 60.000	Test med 83 items med fire prestasjonsnivåer, både spm og oppgaver, i 4 moduler på 30 min.. også intervjuer med rektorer og IKT-ledelse	J	Index med to strands, med hhv. Tre og fire underdimensjoner	Større studie gjort i regi av the International Association for the Evaluation of Educational Achievement i 21 ulike lands utdanningssystemer konseptualisering og mpling av CIL (Computer and Information Literacy). Bygger på ICILS.	Måler prestasjonsnivåer knyttet til index med to strands	8.klassinger, gj.snitt: 14 år	Gj.snittlig cross-country Cronbach's alpha: 0.76 Cronbach's alpha på ICT skills: 0.80, på interesse og engasjement: 0.81	1,2,3,4,5,10,11,12,13, 14	! Studie på tvers av flere land, men kun en alder er inkludert
Ashley, S. Maksl, A. Craft, S. (2013)	2010,	USA	*Developing a News Media Literacy Scale*	20	Del-prosjekt 1: 244, delprosjekt 2: 338	Spørreskjema med Likert-skala (1-7)	J	Konseptuell modell med tre domener, 1) sender og publikum, 2) budskap og mening, 3) representasjon og virkelighet	En «News media literacy scale» med 102 items.	Målet er å utvikle et instrument for måling av media literacy, spesifikt knyttet til produksjon og «konsumering» av nyheter. Gjennomført i tre deler: 1): Utvikling av skalaen, 2) Vurdering av reliabilitet, 3) Vurdering av prediktiv og begrepsvaliditet	Studenter (alder ikke spesifisert)	Validert gjennom pilot, tidl studier, prediktiv validitet Cronbach Alpha viser «høy intern validitet», gj.snitt: a=0,901.	1,2, 12	Måler «news media literacy», dvs. en spesifikk type mediekompetanse. Viser til Arke & Primack
Vraga, E. Tully, M. Kotcher, J. E. Smithson, A-B. Broeckelman-Post, M. (2015)	2015	USA	*A Multi-Dimensional Approach to Measuring News Media Literacy*	7	Studie 1: 1481, studie 2: 330	Online spørreskjema, selvrapportering	J	Måling av "news media literacy" vha to skalaer: SPML (selvopplevd mediekompetanse) og VML (verdien av mediekompetanse)	Teoretiske underkomponenter: forfattere og publikum, budskap og mening, representasjon og virkelighet. Studie 1: Media literacy scale (SPML + VML) fra Ashley (2013) Studie 2: Skala med 4 komponenter: News Meda Knowledge, Current Events Knowledge, News Media Skepticism og News Media Literacy Measures	Mål om å utvikle et «mulitdimensjonalt» rammeverk for News Media Literacy.	Studenter (studie 1) og voksne (studie 2) (alder ikke spesifisert)	Validert gjennom faktoranalyse og Cronbachs alpha (mellom .77 og .91). Egen test av begrepsvaliditeten i studie 2	1,2,3,6,15	Viser til Ashley et al (2013), Primack et al (2006). Bygger delvis på Potter (2004). NB: Har også inkludert en del «kontrollvariabler» i tillegg til demografiske faktorer
Eristi, B. Erdem, C. (2017)	2015-2016	Tyrkia	*Development of a Media Literacy Skills Scale*	21	322	Online spørreskjema, selvrapportering	J	Skala utviklet på bakgrunn av en 9-stegs-prosess, inkl litteraturstudie og utvikling av «item pool»	Rammeverk bygget på de fire etablerte media literacy-dimensjonene access, analyze, evaluate, communicate.	Målet er å utvikle og teste et instrument for måling av media literacy skills.	Studenter (alder ikke spesifisert)	Validert gjennom «item discrimination», begrepsanalyse og cronbach alpha (skalaen har a= .919).	1,2,3	Relevant til forstudien siden den syntetiserer ulike skalaer og konstruerer en ny skala på bakgrunn av litteraturstudie.
Sanchez, S. L. C. Rojo, A. F. Martinez, A. R. (2019)	N/A	Colombia, Ecuador, Spania	*Media and information literacy: a measurement instrument for adolescents*	2	167	Online spørreskjema, selvrapportering	J	Rammeverk som bygger på UNESCO sin definisjon av media and information literacy	Indikatorer er a) media access and use, b) språk og kritisk forståelse, c) produksjon og programmering, d) transformasjon gjennom kommunikasjon	Målet er å teste kvalitet (reliabilitet og validitet) i studien, gjennom en pilotstudie.	13-15	Cronbach alpha varierer på de ulike indikatorene og medfører behov for revisjon	1,2,3,5,6,9	Pilotstudie. Måler noe inkonsistens, men fremgangsmåten er relevant for utvikling av index
Holma, B. Krumina, L. Pakalna, D. Avanesova, J. (2014)	2014	Latvia	*Towards Adult Information Literacy Assessment in Latvia: UNESCO Media and Information Literacy*	8	23 (pilot)	Case studie med fokusgruppe-intervju, spørreskjema og praktiske oppgaver.	J	Rammeverk som bygger på UNESCO sin definisjon av media and information literacy,	Indikatorer er access, evaluate og create, som måles i fire nivåer	Målet er å utvikle et instrument egnet for å måle MIK hos voksne.	25-62	N/A	1,2,3,8,9, 10	Tester UNESCO sin MIK-index. Studerer aldersgruppen 25-62. får deltakere, men inkludert pga det interessante designet.

			Competency Matrix in Practice											
Primack, B. A. Gold, M. A. Switzer, G. E. Hobbs, R. Land, S. R. Fine, M. J. (2006)	N/A	USA	*Development and validation of a smoking media literacy scale for adolescents*	111	1211	Spørreskjema, selvrapportering	J	Eget utviklet psykometrisk rammeverk	Indikatorer er 1) sender og mottaker, 2) Budskap og mening, 3) Representasjon og virkelighet	Måler holdninger, normer og kritisk perspektiv knyttet til røyking og mediekompetanse	14-18	Faktoranalyse med sterk l-faktor (a=0.87)	1,2,4,6,	Tematisk litt avvikende, men inkludert fordi den er mye referert og testet i videre studier
Koc, M. Barut, E. (2016)	N/A	Tyrkia	*Development and validation of New Media Literacy Scale (NMLS) for university students*	64	1226	Spørreskjema, selvrapportering	J	Rammeverk for NML (New Media Literacy)	Indikatorer: Functional Consumption, Critical Consumption, Functional Prosumption, og Critical Prosumption, med 35 items	Utvikling av rammeverk, testing og pilotering	18-30	Grundig evaluering av rammeverket, med faktoranalyse, intern konsistens, etc.	1,2,3	Har evaluert andre relevante skalaer. Vektlegger eksplisitt «nye medier»
Jin, K-Y. Reichert, F. Cagasan, L. P. de la Torre, J. Law, N. (2020)	2018-2019	Hong Kong	*Measuring digital literacy across three age cohorts: Exploring test dimensionality and performance differences*	2 (ny)	Tot: 1989 (tre grupper: 715, 705, 569)	DL-test analysert ved item response theory (IRT)	J	DIGCOMP 2.1.	Indikatorer/kompetanseområder: 1. Information, 2. Communication, 3. Content-creation, 4. Safety, 5. Problem solving	Mål om å utvikle en test som kan måle «digital literacy performance» i ulike aldersgrupper	Tre alderskohorter: 1 barneskole, 2 ungdomsskole, alder ikke oppgitt	Test som er validert ved begrepsvaliditet. Testen viser seg reliabel på tvers av tre alderskohorter	1,2,3,9,	Måler digital literacy, men inkl fordi den er «cross-contextual»
Lopes, P. Costa, P. Araujo, L. Ávila, P. (2018)	2018	Portugal	*Measuring media and information literacy skills: Construction of a test*	2	Ca. 500	Spørreskjema, selvrapportering, samt MC*** og oppgaver	J	Eget rammeverk for MIK, basert på Item Response Theory (IRT)	Hoveddimensjoner: 1) Kognitiv og kritisk, 2) Kreativ	Mål å utvikle og konstruere en MIK-skala vha. Item Response Theory (IRT).	18-81	Testen er validert og evaluert i henhold til feilmarginer og eventuelle målefeil. Men fremgangsmåte ikke oppgitt	1,2,3	Undersøkt stort aldersspenn (18-81)
Medietilsynet (2019)	2019	Norge	*Kritisk medieforståelse i den norske befolkningen. En undersøkelse fra Medietilsynet*	N/A	1363	Spørreskjema, selvrapportering og praktiske oppgaver	N	N/A	N/A	Kartlegge nivå av kritisk medieforståelse	16-100	N/A	1,2,3	Måler hele befolkningen.

* **Bakgrunnsvariabler** er kodet fra 1-15: kjønn 1, alder 2, utdannningsnivå 3, utdanningsnivå hos foreldre 4, bosted 5, etnisitet 6, språknivå e.l. 7, yrkesretning 8, skoletype/utdanningstype 9,økonomisk status 10, kulturell status 11, mediebruk 12, IKT-ressurser hjemme, 13, IKT-ressurser skole 14, politisk orientering 15, osv. De seks som regnes med spesifikt hos Haddon et al (se side 39) er alder, kjønn, «personlighetstype», mentale/psykiske helseproblemer, kognitive evner og «stiler» (styles, sjekk hva dette er).

** **SES-IB-16** = Self-Efficacy Scale for Information Searching Behaviour

*** MC = Muliple Choice

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