

**CRITICAL EVALUATION OF ONLINE READING AND COMPREHENSION  
AND ITS RELATIONS TO GENDER, INTERNET USE, INTERNET SELF-EFFICACY,  
AND ATTITUDES AMONG FINNISH 6<sup>TH</sup> GRADERS**

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VALLI, SARA: Critical evaluation of online reading and comprehension and its relations to gender, Internet use, Internet self-efficacy and attitudes among Finnish 6<sup>th</sup> graders

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This study examined how students' average Internet use, Internet self-efficacy, and attitudes predicted 6<sup>th</sup> graders' performance in critical evaluation. The study also examined, how boys and girls differed in their critical evaluation, and how student-related variables differed in questioning and confirming credibility. The study was part of *Collaborative problem-solving and online inquiry: Skills, processes and neural basis* (CoPSOI) -research project examining Finnish 6<sup>th</sup> graders' collaborative problem-solving skills, cognitive processes, and the neural basis of online inquiry (Leppänen, Häkkinen, Pöysä-Tarhonen, Hautala, Loberg, & Otieno, 2019), funded by the Academy of Finland. The CoPSOI-questionnaire was administered to 243 6<sup>th</sup> grade students in five elementary schools in the region of Jyväskylä. 194 students were further selected to participate in the second part of the study designed to measure their critical evaluation in a simulated Web environment called NEURONE. The critical evaluation was assessed by focusing on students' skills in evaluating both the reliability and unreliability of three predetermined Web pages (*a blog, news, a bulletin*). Students' Internet use, Internet self-efficacy, and attitudes, as well as the texts students read online, were measured using the CoPSOI-questionnaire, and the scoring for critical evaluation followed the guidelines created by Hämäläinen, Kiili, Marttunen, Räikkönen, González-Ibáñez, and Leppänen (2020). Factor analyses for Internet self-efficacy, and attitudes were executed before completing further analyses. The results revealed that 6<sup>th</sup> graders' Internet use, Internet self-efficacy, and attitudes did not correlate with the performance in critical evaluation among Finnish 6<sup>th</sup> graders. However, students' Internet use, texts read online, Internet self-efficacy, and attitudes correlated significantly with each other. Even if the results are consistent with previous findings reporting associations between the aforementioned background factors in the critical evaluation of online reading and comprehension, the study also suggests refining the assessment of critical evaluation for future studies.

Keywords: new literacies, online reading comprehension, critical evaluation, Internet use, Internet self-efficacy, attitudes, adolescents

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Tässä tutkimuksessa tarkasteltiin 6. luokkalaisten kriittisen nettilukemisen arvioinnin tasoa, ja kuinka oppilaiden keskimääräinen Internetin käyttö, Internetiä koskeva minäpystyvyys ja asenteet ennustavat sen vaihtelua. Kriittisen nettilukemisen tasoa tutkittiin sekä tyttöjen ja poikien että luotettavuuden kyseenalaistamisen ja varmentamisen välillä. Tutkimus oli osa laajempaa *Yhteisöllinen ongelmanratkaisu ja nettioppiminen* -tutkimushanketta (*Collaborative problem solving and online inquiry*, CoPSOI), jossa tutkittiin suomalaisten 6. luokkalaisten yhteisöllisiä ongelmanratkaisutaitoja, kognitiivisia prosesseja sekä nettilukemisen neuraalista perustaa (Leppänen, Häkkinen, Pöysä-Tarhonen, Hautala, Loberg, & Otieno, 2019). Tutkimuksen kysely jaettiin viiteen eri Jyväskylän alueen peruskouluun, joista 243 kuudesluokkalaista vastasi kyselyyn. Näistä vastanneista oppilaista 194 valittiin tutkimuksen toiseen vaiheeseen, jossa heidän kriittisen nettilukemisensa tasoa mitattiin simuloitussa verkkoympäristössä (NEURONE). Oppilaiden kriittisen nettilukemisen arviointitaitoja arvioitiin kolmen eri ennalta valitun verkkotekstin avulla (*blogiteksti, uutiset, yliopiston tiedote*), jossa oppilaiden tehtävänä oli arvioida niiden luotettavuutta ja epäluotettavuutta. Oppilaiden Internetin käyttöä, Internetiä koskevaa minäpystyvyyttä ja asenteita sekä verkossa luettuja tekstejä kartoitettiin CoPSOI-kyselyn avulla, ja oppilaiden kriittisen nettilukemisen arviointitaitojen pisteytys seurasi Hämäläisen ja kollegoiden (2020) laatimaa ohjeistusta. Faktoriansalyysit Internetiä koskevalle minäpystyvyydelle ja asenteille toteutettiin ensin ennen myöhempiä analyyskejä. Tulokset paljastivat, että suomalaisten 6. luokkalaisten Internetin käyttö, Internetiä koskeva minäpystyvyys ja asenteet eivät olleet yhteydessä kriittisen nettilukemisen arvioinnin tason kanssa. Tutkimuksessa havaittiin kuitenkin oppilaiden Internetin käytön, verkossa luettujen tekstien, Internetiä koskevan minäpystyvyyden ja asenteiden korreloivan merkittävästi keskenään. Tulokset antavat tukea aiemmille tutkimuksille, jotka ovat raportoineet nettilukemisen taustalla vaikuttavien tekijöiden välisistä yhteyksistä, sekä suosittelee kriittisen nettilukemisen arviointiin keskittyvien mittareiden kehittämistä tulevaisuuden tutkimuksissa.

Avainsanat: uudet lukutaidot, nettilukeminen, kriittinen arviointi, Internet, minäpystyvyys, tunteet, nuoret

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## 1. INTRODUCTION

Today, the Internet is broadly used for educational purposes, and consequently, students increasingly rely on online sources for their schoolwork (Lenhart, Simon & Graziano, 2001; Metzger, Flanagin & Zwarun, 2003). For example, daily use of the Internet is a common practice in classrooms, since already a decade ago, 95% of teachers in the United States reported assigning online research, or search of information as a typical school task (Purcell, Rainie, Heaps, Buchanan, Friedrich, Jacklin, Chen & Zickuhr, 2012). Children as early as 4<sup>th</sup> grade are already active users of the Internet and are exposed to various types of texts throughout their school and learning activities (Leino, Nissinen, Puhakka & Rautopuro, 2017). However, as almost anyone can publish material on the Internet, readers face a challenge to critically evaluate and use credible information correctly from all the information they are exposed to (Fabos, 2008; Forzani, 2016; Wineburg, McGrew, Breakstone & Ortega, 2016).

Being able to critically evaluate online information has become more essential than before since critical evaluation has been observed to relate to successful learning in an online-based inquiry, whereas lacking skills in critical evaluation might have severe political, social, health, or economic consequences (Flanagin & Metzger, 2008; Leu, Coiro, Castek, Hartman, Henry & Reinking, 2008; Wiley, Goldman, Graesser, Sanchez, Ash & Hemmerich, 2009). If a reader can discern reliable information from unreliable, it provides them with opportunities to focus on the information best suited for their information needs and therefore enhance their understanding and learning (Saracevic, 1996; Maglaughlin & Sonnenwald, 2002). The importance of critical evaluation was highlighted during the COVID-19 pandemic regarding public debates between beliefs and scientific knowledge, as it challenged people's accurate evaluations of health-related online information (e.g., Sinatra & Lombardi, 2020). As most Internet searches concern health-related issues, people's misconceptions and trust in inaccurate information can harm their health, and use of healthcare services (Chen, Li, Liang & Tsai, 2018; Freeman, Caldwell & Scott, 2020).

Even if the ability to critically evaluate online information has been argued to be one of the most important literacy skills in modern society, less is known about the pivotal individual-related variables leading to successful critical evaluation. Thus, this study aimed to examine how student-related variables are associated with the performance in critical evaluation among Finnish 6<sup>th</sup> graders. As the Internet and ICTs (*information and communication technologies*) continuously expand into schoolwork and society in general, teaching sufficient reading and learning skills in online environments is urgently needed (Kanniainen, Kiili, Tolvanen, Aro & Leppänen, 2019; OECD,

2019). However, without understanding the individual differences in critical evaluation, developing effective instructional programs, and preparing students for their future studies becomes challenging (Kiili, Laurinen & Marttunen, 2008; Forzani, 2016).

### **1.1. Online reading comprehension**

Offline reading skills remain necessary but not sufficient for reading online texts to complete assignments, since “*reading in digital environments typically means navigating through multiple sources of text, selecting relevant information, and assessing the quality of information*” (Coiro & Dobler, 2007; Leu, Zawilinski, Castek, Banerjee, Housand, Liu & O’Neil, 2007; Afflerbach & Cho, 2009; Castek & Coiro, 2010; OECD, 2021, p. 38). For example, skilled offline readers may face challenges dealing with the new demands of using search engines, understanding search results, or critically evaluating biased information (Eagleton & Guinee, 2002; Henry, 2006; Fabos, 2008). Therefore, new literacy skills and strategies are needed to read, comprehend, and learn from online-based information (Leu, Kinzer, Coiro & Cammack, 2004; Hartman, Morsink & Zheng, 2010; Leu, Kiili & Forzani, 2016).

As literacy is linked to the continuously changing nature of the Internet and other ICTs, literacy, and learning are also in a constantly changing state - thus demanding the theory of New Literacies to fully utilize the potential of the Internet as a site for learning (Leu et al., 2004; Coiro, Knobel, Lankshear & Leu, 2008). The broad view of New Literacies focuses on examining the cognitive and social processes that occur in comprehending online texts in general (Leu et al., 2004). It forms a combined collaborative approach for other lowercase theories such as social networking, online communication, and the new literacies of online reading and comprehension, which aims to describe what happens when people use ICTs to read online texts in order to learn from them (Leu et al., 2004; Coiro et al., 2008; O’Byrne & McVerry, 2009; Leu, Forzani, Rhoads, Maykel, Kennedy & Timbrell, 2014). Despite other theories focusing on the development of ICTs and literacy skills such as information literacy (Doyle, 1994; Bruce, 2002; Hobbs, 2006), network literacy (McClure, 1994), and digital literacy (Gilster, 1997; Martin, 2006), the theory of new literacies of online reading and comprehension is best suitable to examine adolescents, as it can be applied to classroom settings (Coiro, 2011).

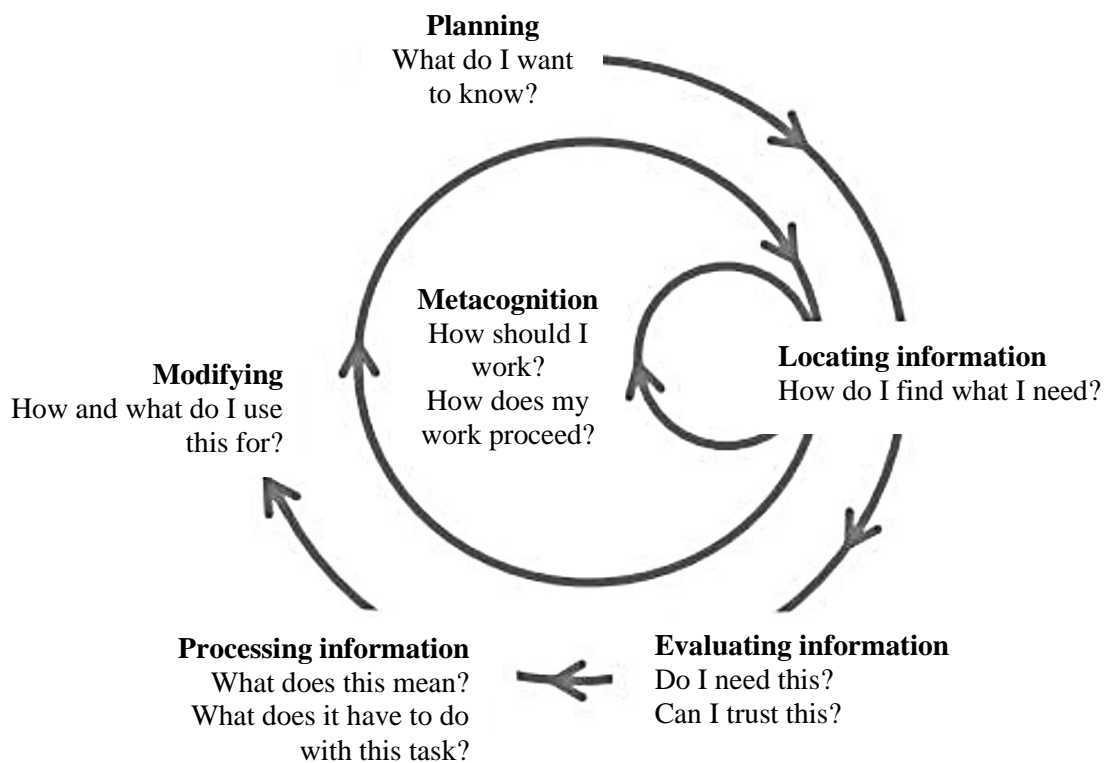
The theory of online reading and comprehension (also known as *online research and comprehension* by Kingsley & Tancock, 2014) has been defined as a self-directed text construction process including skills, strategies, dispositions as well as social practices needed for solving

problems and answering questions in a problem-based online inquiry (Coiro et al., 2008). It involves five different recursive processes such as 1) *asking questions and defining the information need*, 2) *locating information with a search engine*, 3) *evaluating information and its credibility*, 4) *synthesizing information*, and 5) *communicating results to others* (Leu, Kinzer, Coiro, Castek & Henry, 2013), needed to navigate through the ill-structured and un-scrutinized domain. Previous studies have argued online reading and comprehension require higher-level thinking skills, such as critical evaluation of a source, as it forms a complex, interrelated, and repetitive process of navigating through the unrestricted information space, necessitating constant monitoring to achieve successful online reading comprehension (Coiro & Dobler, 2007; Coiro, 2011; Goldman, Braasch, Wiley, Graesser & Brodowinska, 2012; Leu et al., 2016).

The skills and strategies needed for this reading process resemble metacognitive strategies, which have been defined as strategies and skills for goal setting, planning, monitoring, and evaluation of one's cognitive processes (Spiro, Coulson, Feltovich & Anderson, 2004; Veenman, 2015). The significance of metacognition has long been acknowledged for reading and has been recognized as the most important predictor of learning outcomes (Baker & Brown, 1984; Wang, Haertel & Walberg, 1990; Veenman, 2008). Metacognition has also been acknowledged in the theory of cognitive flexibility and could be exploited in a theory of online reading and comprehension, as it defines reading comprehension as an active, constructive process where the comprehension requires the selective application of cognitive and metacognitive reading strategies as well as prior knowledge of online text structures and topics (e.g., Bransford, Barclay & Franks, 1972; Kintsch, 1988; Spiro, Feltovich, Jacobson & Coulson, 1991; Pearson, Roehler, Dole & Duffy, 1992; Kintsch & Kintsch, 2005).

Previous studies have supported the importance of self-regulatory and metacognitive strategies in online reading, as it is mostly reader-oriented activity requiring readers to decide what to read and how to proceed within a text (Palincsar & Ladewski, 2006; Coiro & Dobler, 2007; Kiili, Laurinen & Marttunen, 2009b, see Figure 1). For example, according to Coiro's article published in 2011, students' "*level of metacognitive awareness about which strategies are best suited to locate, critically evaluate, and synthesize diverse online texts is likely to foster a deeper understanding of the texts they encounter on the Internet*" (Coiro, 2011, p. 108). In addition, self-regulation is needed in online environments to avoid disorientation and cognitive overload, and previous studies have described skilled online readers as *metacognitively aware* or *metacognitively competent*. As a result, they can focus on relevant cues, apply, and adjust a variety of strategies flexibly depending on the purpose of the task, as well as plan, observe, and regulate their actions while reading online texts (Pressley, 2000; Nachmias & Gilad, 2002; Coiro, 2008; Kiili, Laurinen & Marttunen, 2009a; Kiili & Laurinen, 2015).

On the contrary, less skilled readers have been observed to repeat their inefficient strategies of searching for information without being able to change them (Kiili & Laurinen, 2015). However, even though this study did not examine metacognition or metacognitive strategies per se, it is important to note it as a background factor in online reading and comprehension.



**FIGURE 1.** The cyclic process of online reading by Kiili, Laurinen, and Marttunen (2009b).

According to the theory of cognitive flexibility, the comprehension of online texts is dependent not only on the self-regulation of reading strategies but also on individual characteristics, such as generating inferences, and drawing connections between texts and prior knowledge (Dole, Duffy, Roehler & Pearson, 1991; Pressley & Afflerbach, 1995). For example, prior knowledge has been observed to assist readers to navigate through online texts, support intertextual inference, locate relevant sources, evaluate online information, and construct the meaning of the text (e.g. Rouet & Levonen, 1996; Yang, 1997; Balcytiene, 1999; Calisir & Gurel, 2003; Salmerón, Cañas, Kintsch & Fajardo, 2005; Amadiou, Tricot & Mariné, 2009; Strømsø & Bråten, 2009; Cromley, Snyder-Hogan



& Luciw-Dubas, 2010; Tarchi, 2010; Bråten, Ferguson, Anmarkrud & Strømsø, 2013; Forzani, 2016). However, the results of online reading comprehension and prior topic knowledge have turned out to be contradictory. For example, in a study by Kanniainen et al. (2019), prior topic knowledge did not independently contribute to online research and comprehension performance, but Coiro's study (2011) suggested that prior topic knowledge might function as a compensatory construct for online reading comprehension, where higher levels of online reading skills compensate lower topic-specific prior knowledge.

Though prior topic knowledge remains important in generating effective keywords to search and narrow down information, the prior knowledge of the Internet structures and readers' familiarity with them could also be associated with online reading comprehension, as students are likely to encounter unfamiliar topics while searching information for their school assignments (e.g., Guinee, Eagleton & Hall, 2003; Coiro & Dobler, 2007; Dwyer, 2013). It has been argued, for example, that more time spent online appears to assist students to obtain a better knowledge of the Internet and thus, lead to better online skills (Hargittai, 2002). In addition, prior knowledge of search engines and the structure of websites, as well as prior experiences in browsing websites, assist proficient readers to narrow down the information to effectively access the relevant information and make effective choices about their further reading (Lawless, Brown, Mills & Mayall, 2003; Coiro & Dobler, 2007). Interestingly, students' lack of prior knowledge of Internet text systems, compared to topical prior knowledge, impaired the application of metacognitive strategies during online reading (Hill & Hannafin, 1997).

## **1.2. Critical evaluation and its challenges**

As various amounts of online information can be questionable or saturated with hidden social, economic, and political agendas, higher-level thinking skills such as critical evaluation are required to determine reliable information and thus to ensure learning (Cope & Kalantzis, 2000; Britt & Gabrys, 2002; Fabos, 2008; Leu et al., 2016). Consequently, critical evaluation has become one of the main online reading skills impacting one's overall online reading ability, requiring a successful evaluation of the accuracy, reliability, and possible bias of online information (Leu, McVerry, O'Byrne, Kiili Zawilinski, Everett-Cacopardo, Kennedy & Forzani, 2011; Goldman et al., 2012; McVerry, 2013; Leu et al., 2013).

Previous studies have indicated that critical evaluation happens constantly during different phases of online inquiry where strategies such as locating and exploring websites require a reader to evaluate the relevance of the information before assessing its credibility (Rieh, 2002; Gerjets, Kammerer & Werner, 2011; Leu et al., 2004; 2013; Forzani, 2020). Evaluation of the relevance refers to the importance and currency of information, and it assists readers to distinguish essential from non-essential information (Judd, Farrow & Tims, 2006; Kiili et al., 2008), whereas the evaluation of credibility refers to a source's believability and is further divided into trustworthiness and expertise (Judd et al., 2006; Flanagin & Metzger, 2008).

Paying attention to more aspects of credibility assists readers to form an accurate evaluation of the online source (Kiili, Leu, Utriainen, Coiro, Kanninen, Tolvanen, Lohvansuu & Leppänen, 2018; Forzani, 2020). The definition of *expertise* refers to a source's knowledge, experience, and competence, whereas trustworthiness refers to well-intentioned, truthful, and unbiased information (Tseng & Fogg, 1999). Source features such as document type, authors affiliations, and qualifications, the contact information of an author, as well as time and reason why the document has been published, are often of interest when evaluating expertise (Metzger, 2007; Paul, Macedo-Rouet, Rouet & Stadtler, 2017; Bråten, Stadtler & Salmerón, 2018). While evaluating *trustworthiness*, content features such as objectivity, currency, bias, and depth of information become important (Walton, 1991; Metzger, 2007; Kiili, Leu, Marttunen, Hautala & Leppänen, 2018).

Critical evaluation of online reading has proven to be a challenging task at different age levels (Grimes & Boening, 2001; Lorenzen, 2001; Connor-Greene & Greene, 2002; Leu et al., 2008; Walraven, Brand-Gruwel & Boshuizen, 2009; Forzani & Maykel, 2013). Consequently, there is a great variation in students' abilities to critically evaluate online information (e.g., Kiili et al., 2008; Leppänen, Kiili, Hautala, Kanninen, Aro, Loberg & Lohvansuu, 2017; Kiili et al., 2018a). Recent findings among college students suggest that critical evaluation skills vary, since nearly 40% of college students demonstrate high evaluation skills, whereas nearly one-third have very poor or limited evaluation skills (Kiili, Coiro & Rääkkönen, 2019; Hämäläinen, Kiili, Rääkkönen & Marttunen, 2021). Similar results have also been reported on younger students: while some are well equipped in critical evaluation, others lack abilities to critically evaluate any type of online information (Eastin, 2008; Flanagin & Metzger, 2008; Kiili et al., 2018a).

Overall, the application of critical evaluation has been observed to be difficult. While some students might acknowledge that not all information online is true, they do not necessarily know how to evaluate it (e.g., Flanagin & Metzger, 2010; Hogan & Vernhagen, 2012; Paul et al., 2017; Freeman et al., 2020). Thus, critical evaluation tends to be one-sided, insufficient, and coincidental, resulting in superficial and irrelevant evaluations (e.g., Scholz-Crane, 1998; Grimes & Boening, 2001; Metzger

et al., 2003; Eastin, Yang & Nathanson, 2006; Kiili et al., 2008; Walraven, Brand-Gruwell & Boshuizen, 2008; Coiro, Coscarelli, Maykel & Forzani, 2015). Additionally, as students tend to evaluate content relevance over the credibility of information, questioning credibility appears to be more difficult than confirming it (Kiili, Laurinen & Marttunen, 2007; Kiili et al., 2008; Coiro et al., 2015; Kiili et al. 2018a; Pérez, Potocki, Stadtler, Macedo-Rouet, Paul, Salmerón & Rouet, 2018; Kiili et al., 2019). Previous work by Kiili et al. (2018b) identified a two-part structure for critical evaluation indicating different skills needed for questioning and confirming credibility depending on the readers' text type at a certain time. Studies have reported, for example, that different text types (*academic or commercial*) activate students' critical evaluation differently; while academic texts have been observed to require confirmation of credibility, commercial sites appear to require questioning instead (e.g., Kiili et al., 2008; Kiili et al., 2018a; Pérez et al., 2018; Kiili et al., 2018b). In addition, confirming the credibility of texts that are biased or lacking in expertise has been observed to be more difficult for adolescents compared to texts with relevant expertise (Kiili et al., 2018a; Pérez et al. 2018). Likewise, questioning the credibility of a commercial site has been observed to be difficult for 6<sup>th</sup> graders despite commercial elements being highly visible (Kiili et al, 2018a).

The variation among students at different age levels might derive from the differences in metacognition. For example, Walraven et al. (2009) have supposed that the lack of critical evaluation might derive from insufficient metacognitive skills. In turn, Veenman (2008) has highlighted the significance of metacognitive skills as they have been observed to explain 40% of students' learning outcomes. Similarly, skilled online readers as metacognitively competent, and as a result, they can plan, observe, evaluate, and adjust their actions during an online inquiry (Pressley, 2000; Nachmias & Gilad, 2002; Coiro, 2008; Kiili, Laurinen & Marttunen, 2009a; Coiro, 2011; Kiili & Laurinen, 2015). Skilled readers are more proficient in discriminating reliable information and applying multiple cognitively demanding evaluation strategies to precede their successful learning, whereas less skilled readers are more likely to lack appropriate and effective online reading strategies thus resulting in poorer online reading comprehension and difficulties in determining the relevance and the credibility of the information (Wiley et al., 2009, Cho, 2014; Kiili & Laurinen, 2015).

Although the importance of critical online reading has been highlighted in the 21st century, less is known about students' characteristics and their relation to critical evaluation (Forzani, 2018). However, the previous research literature has reported that the use of the Internet, Internet-related self-efficacy, attitudes, and gender have an impact on the performance in online reading and comprehension, and therefore, similar associations might be expected with critical evaluation. (e.g., Torkzadeh, Thomas & Dyke, 2002; Wu & Tsai, 2006; Coiro, 2012; Prior et al., 2016; Sormunen et al., 2021).

### 1.3. Internet use, self-efficacy, attitudes, and gender in online reading comprehension

Research on finding specific student-related individual factors contributing to successful online reading comprehension has been generally scarce. Thus, variables possibly associated with online reading and comprehension such as readers' self-efficacy, should be noted. Previous studies have observed, for example, the use of the Internet to positively correlate with self-efficacy regarding the Internet, as well as students' self-efficacy to further predict online reading performance (Joo, Bong & Choi, 2000; Liang & Tsai, 2008; Cheng & Tsai, 2011; Coiro, 2012; Chang, Liu, Sung, Lin, Chen & Cheng 2014; Prior, Mazanov, Meacheam, Heaslip & Hanson, 2016). The concept of self-efficacy refers to one's perceived capabilities for learning or performing certain actions at designated levels (Bandura, 1997). Students' self-efficacy has an impact on students' achievement behaviors, such as choice of effort, persistence, tasks, and achievement (Schunk, 2001; Schunk & Pajares, 2009) - thus applicable to an active, reader-oriented, and usually problem-based activity of reading online. In digital environments, self-efficacy is more precisely divided into *computer* and *Internet-related self-efficacy*, where the latter refers to the individual's confidence and expectations about one's abilities to successfully utilize the Internet to complete tasks, such as an online inquiry (Tsai & Tsai, 2003; Wu & Tsai, 2006; Sun, 2008; Papastergiou, 2010). As observed by researchers, the higher the Internet self-efficacy, the greater the chance to complete Internet-related tasks (Oliver & Shapiro, 1993; Tsai & Tsai, 2003).

However, self-efficacy can be affected by physiological and emotional states, which is why students' feelings and attitudes regarding the Internet should also be considered (Bandura, 1997). An attitude has been defined as "*a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor*" (Eagly & Chaiken, 2007, p. 598). Therefore, students' attitudes stem from values linked to a phenomenon of interest (Prior et al., 2016). For example, according to Liaw's (2002) study, students' attitudes toward new technologies have an impact on accepting and using them. Similarly, attitudes toward the Internet might increase or decrease students' motivation to learn how to use the Internet (Coffin & McIntyre, 1999). According to previous studies, students who have had more Internet experiences also tend to express more positive attitudes toward the Internet (Tsai, Lin & Tsai, 2001; Hong, Ridzuan & Kuek, 2003; Wu & Tsai, 2006). Thus, the importance of attitudes regarding the Internet and its impact on motivation and learning in online reading and comprehension should be considered.

Based on the proposition of a three-component attitude model by Katz and Stotland (1959), attitudes can be observed as *affect* (an emotion that charges the idea, a feeling that may be good or bad when thinking about the attitude object), *behavioral intention* (the individual's predisposition to action concerning the attitude object), and *cognition* (the beliefs and ideas a person has about the attitude object) (Joyce & Kirakowski, 2015, p. 507). On the other hand, according to the *General Internet Attitude Scale* (GIAS) developed by Joyce and Kirakowski (2015), Internet attitudes consist of four components: *Internet Affect*, *Internet Exhilaration*, *Social Benefit of the Internet*, and *Internet Detriment*. However, in other studies regarding Internet attitudes, Wu and Tsai (2006) conducted a factor analysis on *Internet Attitudes Survey* (IAS) and observed Internet attitudes to also include four factors: *perceived usefulness*, *affection*, *perceived control*, and *behavior*. Thus, as the construct of Internet attitudes varies among the research literature, more research on Internet attitudes and online reading comprehension is needed.

Internet-related self-efficacy, attitudes, and familiarity with computers have also been observed to interact. For example, the more students are familiar with the Internet, the more positive attitudes toward the use of the Internet for learning purposes tend to be (Hong, Ridzuan & Kuek, 2003). Similarly, according to the study by Wu and Tsai (2006), Internet attitudes are significantly associated with students' weekly average time spent online: the more students had Internet experiences per week, the more positive feelings and lower anxiety, as well as better Internet self-efficacy, were observed. Furthermore, Wu and Tsai (2006) have reported higher confidence in independent control of Internet use, perception of the usefulness of the Internet, high use of the Internet, and positive feelings toward the Internet being connected to higher Internet-related self-efficacy.

Internet attitudes and self-efficacy have also been observed to be associated with the precision of Internet use and online reading performance. For example, according to a study by Tsai and Tsai (2003), students with high Internet self-efficacy utilized computers and the Internet more correctly thus expressing better online information-searching strategies compared to those with weaker Internet self-efficacy. Previous studies regarding attitudes and self-efficacy have also revealed that students' attitudes predict online reading performance, that Internet attitudes are highly correlated with Internet self-efficacy, and better Internet self-efficacy appears among those who share more positive attitudes toward computers (Torkzadeh, Thomas & Dyke, 2002; Wu & Tsai, 2006; Coiro, 2012; Prior et al., 2016; Sormunen, Erdmann, Otieno, Mikkilä-Erdmann, Laakkonen, Mikkonen, Hossain, González-Ibáñez, Quintanilla-Gatica, Leppänen & Vauras, 2021). Also, both active school- and free-time-related use of the Internet are observed to predict positive attitudes toward an online inquiry, and students' Internet-related attitudes are observed to possibly influence their motivation and interests in learning using the Internet (Coffin & McIntyre, 1999; Sormunen et al., 2021).

Finally, the effect of gender should also be considered since girls have been observed to outperform boys in digital reading tasks (Naumann & Sälzer, 2017; Salmerón, García & Vidal-Abarca, 2018; Kanniainen et al., 2019; OECD, 2021). Gender has also been reported to have an influence on the average time spent online, as well as attitudes and self-efficacy toward the Internet. For example, males tend to consume the Internet more extensively compared to women, and males have been reported to have a higher estimated weekly amount of Internet use (Durdell & Haag, 2002; Joiner, Gavin, Duffield, Brosnan, Crook, Durdell, Maras, Miller, Scott & Lovatt, 2005; Peng, Tsai & Wu, 2006; Wu & Tsai, 2006; Helsper, 2010; Dufour, Brunelle, Tremblay, Leclerc, Cousineau, Khazaal, Légaré, Rousseau & Berbiche, 2016; Leino, Ahonen, Hienonen, Hiltunen, Lintuvuori, Lähteinen, Lämsä, Nissinen, Nissinen, Puhakka, Pulkkinen, Rautopuro, Sirén, Vainikainen & Vettenranta, 2019). In addition, even if males have been reported to have more positive attitudes and lower anxiety toward the Internet compared to their female counterparts, more recent studies have not observed differences in Internet-related attitudes which is why the topic needs more investigation (e.g. Jackson, Ervin, Gardner & Schmitt, 2001; McIlroy, Bunting, Tierney & Gordon, 2001; Schumacher & Morahan-Martin, 2001; Durdell & Haag, 2002; Hong et al., 2003; Koohang & Durante, 2003; Peng et al., 2006; Kim, Lehto & Morrison, 2007; Joyce & Kirakowski, 2015). As for gender differences in Internet self-efficacy, male students have reported better Internet self-efficacy compared to women, however, some studies have proven these associations insignificant (Joo et al., 2000; Wu & Tsai, 2006).

#### **1.4. Internet use, self-efficacy, attitudes, and gender in critical evaluation**

Even if girls outperform boys in overall online reading comprehension tasks, the role of gender in critical evaluation has turned out to be contradictory. While some studies have reported girls perform better in critical evaluation compared to boys, others have not been able to confirm it (Forzani, 2016, 2018; Hämäläinen, 2017; Taylor & Dalal, 2017; Naumann & Sälzer, 2017; Salmerón et al., 2018). Instead, prior knowledge of Internet structures might explain variations in critical evaluation. Previous studies have observed that prior knowledge and experiences with Internet text systems assist skillful readers to narrow down irrelevant information, accessing relevant information, and directing their further reading based on their observations (Lawless et al., 2003; Coiro & Dobler, 2007). Similarly, it has been reported that the experiences and skills of using the Internet positively impact

the application of analytic strategies of credibility assessment, and how accurately the trustworthiness of sources is evaluated (Sundar, 2008; Flanagin & Metzger, 2010). For example, as observed by Meola (2004), the more students are familiar with online texts, the more they compare them to other texts, consequently, the better their assessment of high-quality information becomes.

Familiarity with the Internet has also been associated with Internet attitudes and self-efficacy. Previous studies have indicated that students' more active use of the Internet correlates with positive attitudes toward using the Internet for learning purposes, and the more Internet is consumed, the better the Internet self-efficacy is (Joo et al., 2000; Hong et al., 2003; Liang & Tsai, 2008; Cheng & Tsai, 2011; Coiro, 2012; Chang et al., 2014; Prior et al., 2016; Sormunen et al., 2021). Therefore, self-efficacy and attitudes interact strongly with each other, as they have been observed to predict online reading performance (Torkzadeh et al., 2002; Wu & Tsai, 2006; Coiro, 2012; Prior et al., 2016; Sormunen et al., 2021). Similar associations have been found regarding critical evaluation: among those students who express low Internet self-efficacy, accepting information is more prevalent compared to those with high Internet self-efficacy, who tend to question and criticize the reliability of information or websites (Tsai & Tsai, 2003). However, straightforward associations between Internet attitudes and critical evaluation have not yet been found.

## **1.5. Present study**

As the Internet has become the defining technology for information, learning, and reading comprehension in modern times, being able to critically evaluate information has become crucial (Leu et al., 2008). However, critical evaluation has been observed to be difficult for students, and lacking sufficient skills in critical evaluation may lead to the use of misinformation, and thus, weakened learning (Flanagin & Metzger, 2008; Wiley et al., 2009; Forzani & Maykel, 2013).

Previously observed challenges in critical evaluation and the need for more detailed research on individual variables and critical evaluation have reinforced the importance of this study (Wallace & Wray, 2006; Forzani & Maykel, 2013; Leppänen et al., 2017; Forzani, 2018; Kiili et al., 2018). Even though younger students are known to be more vulnerable to misinformation due to their fewer life experiences and insufficient abilities to consume information effectively, most of the research on online reading and comprehension has focused on college and university students (Flanagin & Metzger, 2010). In addition, there have not been many studies focusing on individual differences

between students' average Internet use, Internet attitudes, and self-efficacy, and their connections to a critical evaluation, which is why more research on the matter is needed. Without understanding the individual differences in critical evaluation, developing effective instructional programs, and preparing students for their future studies becomes challenging (Kiili et al., 2008; Forzani, 2016).

The purpose of this study is to determine how students' self-reported attitudes and self-efficacy toward the Internet and the use of the Internet predict critical evaluation performance in different online texts among Finnish 6<sup>th</sup> graders. Gender differences in the critical evaluation are also examined. Sixth graders were selected as a focus group since children that age have been observed not to be concerned with the credibility of online information, some of them believe that the Internet is the most credible information source regarding schoolwork, and their skills of evaluating the relevance have been observed to be amid development (Flanagin & Metzger, 2010; Keil & Kominsky, 2013). However, some students might already have abilities for self-directed and -regulated minds, have more effective and extensive information processing, as well as be able to think abstractly which could have an impact on the critical evaluation of online reading and comprehension (Keating, 2004; Steinberg, 2005; Sanders, 2013). Therefore, it is of great importance to chart the preparedness in critical evaluation among 6<sup>th</sup> graders for their future studies.

**Thus, the research questions were formed as the following:**

**RQ1:** Are students' average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet related to their performance in critical evaluation?

**RQ2:** Do girls and boys differ in their performance in critical evaluation?

**RQ3:** Do average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet differ between confirming and questioning credibility?

**Furthermore, the hypotheses for the research questions were formed as the following:**

**H1:** As previous research has indicated, the more students have weekly Internet experiences, the more positive attitudes, and better Internet self-efficacy are observed (Wu & Tsai, 2006). It has been previously reported that familiarity and more experiences with the Internet positively affect the accuracy of evaluating trustworthiness and the analytic strategies used (Sundar, 2008; Flanagin & Metzger, 2010). Furthermore, as Internet attitudes and self-efficacy have been reported to predict online reading performance, it would be assumed that they would function similarly with critical evaluation. For example, middle school students who have few experiences with Internet inquiry tend



to make unconsidered choices concerning their evaluation of online information, and those with low Internet self-efficacy tend to accept information without further questioning (Eagleton, 2001; Tsai & Tsai, 2003). Therefore, it was hypothesized that the more students use the Internet on average, the more they express positive attitudes and high self-efficacy toward the Internet, and the better their performance in critical evaluation is.

**H2:** As previous results have indicated, gender differences regarding critical evaluation have turned out to be contradictory, even if girls have been observed to outperform boys in online reading comprehension tasks (Naumann & Sälzer, 2017; Salmerón et al., 2018; Kanninen et al., 2019; OECD, 2021). Thus, to better understand the role of gender in critical evaluation, possible differences in the performance of critical evaluation between boys and girls were examined. Gender has been observed to be associated with how much the Internet is used, as well as with Internet-related attitudes and self-efficacy (e.g., Durndell & Haag, 2002; Wu & Tsai, 2006). For example, boys have been reported to consume more Internet and ICTs, expressing more positive attitudes toward online inquiry and confidence in their evaluation skills compared to girls, which is why it would be assumed that boys would perform better in critical evaluation compared to girls (Dufour et al., 2016; Leino et al., 2019; Sormunen et al., 2021). However, gender has been observed to be associated with self-efficacy, where boys tend to have more confidence in their abilities to evaluate search results (Sormunen et al., 2021). Girls on the other hand tend to estimate their skills differently, where their real performance and their self-perceived performance are more similar (Hakkarainen, Ilomäki, Lipponen, Muukkonen, Veermans, Tuominen, Lakkala & Lehtinen, 2000). Eventually, as gender seems contradictory in the previous research literature on critical evaluation, no hypothesis was set.

**H3:** Thirdly, the possible differences between confirming and questioning credibility with the same student-related variables (*average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet*) were examined. Previous studies have observed that different texts (*for example academic or commercial, pragmatic, or opinionated*) activate credibility assessments differently, and that questioning credibility is more challenging compared to confirming it among 6<sup>th</sup> graders (Kiili et al., 2008; Kiili et al., 2018; Pérez et al., 2018; Kiili et al., 2018b; Kokkola, 2019). Additionally, as readers with low self-efficacy are more likely to accept system-generated online information instead of questioning it, and high Internet self-efficacy has been supposed to precede success in Internet-related tasks, it was thus assumed that the level of Internet self-efficacy would be the strongest predictor in confirming and questioning the credibility of presented texts (Oliver & Shapiro, 1993; Tsai & Tsai, 2003).

## 2. METHODS

### 2.1. Data collection

The current study was part of a larger-scale assessment study of *Collaborative problem-solving and online inquiry: Skills, processes and neural basis* (CoPSOI) focusing on collaborative problem-solving skills, cognitive processes, and the neural basis of online inquiry among Finnish 6<sup>th</sup> graders (Leppänen et al., 2019). Data collection for this study was conducted in elementary schools in Jyväskylä during the years 2019 and 2020.

In the first part of the study, students filled in a CoPSOI-questionnaire concerning their Internet use, Internet attitudes, self-efficacy, feelings toward cooperation, learning beliefs, as well as general questions about their reading and writing. After completing a CoPSOI-questionnaire, students' critical evaluation was assessed via NEURONE, a simulated Web environment that assesses online reading comprehension and online inquiry skills, including information search and locating, evaluating, synthesizing, and communicating information (e.g., Hämäläinen et al., 2020). The critical evaluation was examined by focusing on students' abilities to evaluate both the reliability and unreliability of three different texts (*a university bulletin, news, and a blog*), and students were required to rate both the reliability and unreliability of the three texts with a scale from 1 to 5 and justifying their evaluations with a short description.

### 2.2. Participants

The participants were Finnish 6<sup>th</sup> graders from five elementary schools in Jyväskylä. Initially, the study included 243 participants, however, 49 (20.2%) students were excluded because they did not take part in the second part of the study (NEURONE). Therefore, the final sample of participants included 194 students, of whom 103 (53.1%) were girls and 89 (45.9%) were boys. 2 of the participants (1.0%) who reported their gender as other were included in the study. The students' age ranged from 11 to 13 years, most of them being 12 years old (87.1%). More specifically, 8.2% of the

participants were 11 years old, and 1.5 % were 13 years old. All students returned a signed parent’s consent.

Students’ access to ICTs and the Internet are depicted in Table 1 below. Nearly all students could utilize the Internet and other ICTs in lessons (90.2%). Most of the students had a computer (89.7%) or a tablet (83%) at home, and almost every participant owned a smartphone (96.4%). Also, nearly all the students had access to the Internet either via a computer (93.3%) or a smartphone (95.9%). The data were assumed to be balanced regarding students’ socioeconomic backgrounds as the study included five different elementary schools in Jyväskylä. Also, as gender and age distributions were relatively even, and nearly all the students had access to the Internet, the data can be seen as a representative sample of Finnish 6<sup>th</sup> graders.

**TABLE 1.** Students’ access to the Internet and other ICTs (n = 194).

	n	%
1. At school we can use computers or tablets on lessons.	175	90.2
2. We have a computer at home that I can use.	174	89.7
3. We have a tablet at home that I can use.	161	83.0
4. I have a smartphone that I can use.	187	96.4
5. At home I have access to the Internet with a computer.	181	93.3
6. I have access to the Internet with a smartphone.	186	95.9

## 2.3. Measures

### 2.3.1. Students’ Internet use

First, students filled in a CoPSOI-questionnaire (*Collaborative problem solving and online inquiry: Skills, processes, and neural basis*) concerning their use of the Internet, learning beliefs, attitudes, and self-efficacy toward the Internet, as well as feelings toward cooperation and general questions regarding their writing and reading. In this study, the following sub questions were of interest (see Appendix H).

**Internet use.** Students' use of ICTs and the Internet was examined with two sub questions. The first sub question addressed the purposes of students' Internet use (*for entertainment, reading emails, messaging, searching for information, sharing material, or something else*) either with a computer, a tablet, or a smartphone with a 6-item questionnaire using a 7-point Likert scale (*1 = never, 2 = hardly ever, 3 = seldom (once or twice a month), 4 = once or twice a week, 5 = nearly every day, 6 = every day under 2 hours, 7 = every day over two hours*). The total amount of time students spent on the Internet for different purposes indicated weak consistency as measured with Cronbach's alpha ( $\alpha = .50$ ; Metsämuuronen, 2006).

**Internet texts.** Questioning and confirming credibility were addressed with the second sub question of the texts student read on the Internet (*newspapers, webpages, blog texts, e-books, forums, others*) with a 6-item questionnaire using a 5-point Likert scale (*1 = hardly ever, 2 = seldom (once or twice a month), 3 = once or twice a week, 4 = nearly every day, 5 = every day*). Students' total amount of time spent with different types of Internet texts indicated small consistency measured with Cronbach's alpha ( $\alpha = .55$ ; Nunnally & Bernstein, 1994; Kirves, 2013).

**Internet self-efficacy.** Students' self-perceived confidence and expectations on Internet use were examined with a 13-item questionnaire "*How well can you use the Internet?*" using a 5-point Likert scale (*1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree*). Originally adopted from the SORAB (*Survey of Online Reading Attitudes and Behaviors*), validated among fifth and sixth graders by Putman (2014), and further modified and successfully applied by Sormunen et al. (2021), the questionnaire in this study was used as such. The Cronbach's alpha for the Internet self-efficacy questionnaire's consistency was good in this data ( $\alpha = .89$ ; Nunnally & Bernstein, 1994; Kirves, 2013).

**Internet attitudes.** Students' attitudes toward Internet use were examined with a 20-item questionnaire "*How does it feel to use the Internet?*" using a 5-point Likert scale (*1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree*). Similarly, as this part of the questionnaire was originally adopted from the SORAB survey by Putman (2014) and further used by Sormunen et al. (2021), the questionnaire for Internet attitudes was utilized as such. The Cronbach's alpha for the Internet attitude questionnaire's consistency was considered adequate in this data ( $\alpha = .59$ ; e.g., Nunnally & Bernstein, 1994; Kirves, 2013).

### 2.3.2. Critical evaluation

The second part of the study required students to evaluate three Web pages (*a blog, news, a bulletin; see Appendix E-G*) and to evaluate their reliability and unreliability in a simulated Web environment called NEURONE. Students' performance in the critical evaluation followed the guidelines by Hämäläinen et al. (2020) and was measured using two main categories of credibility: Source features and Quality of content. They were further divided into the following four categories: 1) **expertise of the source** (*including subcategories of affiliation, expertise, attention to author or publisher, author's experience, trust in expertise, credentials*), 2) **other source features** (*including subcategories of the look of the site, date, type of text, contact info, references*), 3) **argumentation in the text** (*including subcategories of research basis, quality of evidence, argumentations and justifications of the text, purpose of the text, trust in the content/method*), 4) **other aspects of the content** (*including subcategories of correspondence to own experience, prior knowledge, amount of text/knowledge, writing style*) (see Appendix A).

Students were given 1 point for each subcategory mentioned in their justifications. For example, one student's justification such as "*The text was written by a pediatrician*" was scored with 1 point on subcategories of *attention to author or publisher* and *credentials* concerning the expertise of the source, whereas a justification "*A real special education teacher has shared his/her opinions*" received 1 point on *credentials* but 0 on *attention to author or publisher* since the text was not written by the special education teacher. However, the following justification "*For example, violent games can indeed change one's behavior, and this is surely the reason why age limits exist. Additionally, as the study has continued for four years, the information is supposed 'precise'*" was scored with 5 points, as it included five subcategories of *text's research basis, quality of evidence, argumentations and justifications of the text, purpose of the text* as well as *trust in the content or method* in a category of argumentation in the text.

Compared to previous research on critical evaluation and its scoring (see Hämäläinen et al., 2020), the scoring categories for critical evaluation did not include *Unknown online resources* since it was interpreted as irrelevant for evaluating website reliability. Additionally, the *Balance of argumentation* was expanded into *Argumentation and justifications of the text*, where students' justifications of a webpage including consideration of both the negative and positive sides of an argument, for example, received a point.

### 2.3.2.1. Interrater reliability

Interrater reliability (IRR) for critical evaluation was established by choosing 15% of randomly selected participants ( $n = 30$ ) that the thesis writer independently scored. The scoring followed the guidelines of Hämäläinen et al. (2020) with the assistance of research assistant P. Ronkainen. The IRRs were calculated by using intraclass correlation coefficients (ICC) for students' reliability evaluations using sums of the following subcategories: *expertise of the source*, *other source features*, *argumentation in the text*, and *other aspects of content* (Appendix B). ICC(3,1) with an Agreement definition and 95 % confidence interval indicated moderate agreement in *other aspects of the content* (0.594), *good in other source features* and *argumentation in the text* (0.849; 0.875), and excellent in the *expertise of the source* (0.990) (Koo & Li, 2016).

The ICCs were also calculated for students' unreliability evaluations by using the same categories apart from the expertise of the source (see Appendix B). ICC(3,1) with an Agreement definition and 95% confidence interval indicated moderate agreement in argumentation in the text (0.721) and excellent in other source features (0.914) (Koo & Li, 2016). Unfortunately, calculating IRR for *other aspects* of the content of unreliability was not possible due to the lack of variation in scores. Therefore, the interrater value was calculated using percentages and it yielded a result of 96.7% similar answers between raters.

## 2.4. Data analyses

Preliminary analyses included creating sum variables for students' critical evaluation scores, Internet use, and Internet texts, as well as conducting factor analyses on Internet self-efficacy and attitudes. All analyses were performed using IBM SPSS 26.0 -software.

To describe the students' overall critical evaluation scores of reliability in a blog text, news, and a bulletin, a sum variable was formed by adding scores on the following subcategories: *expertise of the source*, *other source features*, *argumentation in the text*, and *other aspects of the content*. Similarly, scores in subcategories of *other source features*, *argumentation in the text*, and *other aspects of the content* were summed together since all texts students evaluated in NEURONE were reliable content-wise and therefore did not contribute to the unreliability. The Cronbach's alphas for sum variables of reliability ( $\alpha = .51$ ) and unreliability ( $\alpha = .48$ ) evaluations remained poor in this data

(see Nunnally & Bernstein, 1994; Kirves, 2013).

After forming sum variables for critical evaluation scores, mean sum variables were created for students' Internet use and Internet texts. A mean sum variable for Internet use was created to describe the total amount of time students consumed the Internet for different purposes, but Cronbach's alpha in this data remained small ( $\alpha = .50$ ; Nunnally & Bernstein, 1994; Kirves, 2013). For different Internet texts, a mean sum variable described the amount of time and exposure to different online text types, but Cronbach's alpha remained small in this data as well ( $\alpha = .55$ ; Nunnally & Bernstein, 1994; Kirves, 2013).

To explore the factor structure of Internet attitudes and self-efficacy, exploratory factor analyses (EFA) were conducted for both Internet self-efficacy and attitudes. As the Internet self-efficacy was observed to be approximately normally distributed and a theorized construct (Tsai & Tsai, 2003; Wu & Tsai, 2006), an exploratory factor analysis (EFA) with principal axis factoring (PAF) extraction method using Promax rotation was applied to explore the factor structure. The same factor analysis was conducted also for Internet attitudes as it was also approximately normally distributed and a theorized construct (e.g., Wu & Tsai, 2006; Joyce & Kirakowski, 2015).

After preparing the data for further analyses, Pearson correlation coefficients were calculated for the first research question to examine associations between students-related variables and critical evaluation scores to determine their adequacy for hierarchical regression analysis. The second research question was examined by observing boys' and girls' differences in means of critical evaluation scores with a t-test for independent samples. The last research question focused on finding differences between questioning and confirming credibility, and Pearson correlation coefficients were utilized to clarify the adequacy for hierarchical regression analysis.

### 3. RESULTS

#### 3.1. Students' average use of the Internet

**Internet use.** Students' Internet use is depicted in Table 2 below. Most of the students utilized ICTs (a computer, tablet, or smartphone) for entertainment ( $M = 5.92$ ,  $SD = 1.03$ ) and chatting with friends ( $M = 5.71$ ,  $SD = 0.89$ ) almost every day. Searching for information ( $M = 4.33$ ,  $SD = 1.05$ ) and sharing content on the Internet ( $M = 3.81$ ,  $SD = 1.66$ ), in turn, happened mostly once or twice a week. The least common activity was reading and writing emails ( $M = 2.70$ ,  $SD = 1.33$ ) which happened only once or twice a month. The option for other purposes included students mentioning making presentations, playing video games, watching movies or series, shopping online, and watching or creating content for TikTok, and these activities were quite common among students.

**TABLE 2.** Different Internet activities among 6<sup>th</sup> graders.

<b>How often do you use a computer, a tablet, or a smartphone?</b>	<b>M</b>	<b>SD</b>	<b>n</b>
for entertainment (e.g., playing, watching videos, listening to music)	5.92	1.03	188
to read or write e-mails	2.70	1.33	187
to chat with friends (e.g., Snapchat, WhatsApp, Facebook, Skype)	5.71	0.89	186
for searching information for personal use on the Internet (e.g., hobbies, music, fashion, etc.)	4.33	1.05	186
to share on the Internet texts, photos, or videos (e.g., Instagram, Youtube, Snapchat, Facebook, blog, Twitter)	3.81	1.66	187
for some other purposes	4.70	1.88	46

M = mean; SD = standard deviation



**Internet texts.** The Internet texts read by students are presented in Table 3 below. The most common texts students read online were websites on different topics ( $M = 2.50$ ,  $SD = 1.06$ ) including topics of interests, hobbies, sports, resorts, and other goods, for example. These types of websites were read between once or twice a month, and once or twice a week. Reading Internet chat forums ( $M = 1.92$ ,  $SD = 1.14$ ) and news online ( $M = 1.97$ ,  $SD = 1.17$ ) were more common compared to reading e-books ( $M = 1.44$ ,  $SD = 0.83$ ) or blogs ( $M = 1.34$ ,  $SD = 0.72$ ) that were the least read text types. Students read chat forums and news approximately once or twice a month, but e-books and blogs were hardly ever read. The option of something else included reading messages from friends, seeking lyrics or notes, and reading comics and store websites. 26 participants who reported reading something else on the Internet read these types of texts quite often and had the greatest mean of 2.77 indicating almost daily use, but also the greatest standard deviation of 1.53.

**TABLE 3.** Different texts 6<sup>th</sup> graders read online.

<b>How often do you read different texts on the Internet?</b>	<b>M</b>	<b>SD</b>	<b>n</b>
websites of newspapers (e.g., KeskiSuomalainen, Iltalehti)	1.97	1.17	187
websites about different kinds of topics (e.g., topics of interests, hobbies, sports, resorts, goods)	2.50	1.06	188
blog texts	1.34	0.72	186
e-books	1.44	0.83	186
Internet chat forums (e.g., discussions of games, artists, hobbies)	1.92	1.14	187
something else	2.77	1.53	26

M = mean; SD = standard deviation

### 3.2. Factor analysis on Internet self-efficacy and attitudes

**Internet self-efficacy.** The subjects/items ratio (10:1) for Internet self-efficacy factor analysis was acceptable and the factors are thus considered to be stable (Yong & Pearce, 2013). Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was 0.88 for Internet self-efficacy indicating that correlations are suitable for exploratory factor analysis (KMO > 0.6; Metsämuuronen, 2006). The initial result indicated a two-factor solution explaining 56.12% of the total Internet-related self-efficacy sample variation. However, as one factor had an Eigenvalue close to 1 (0.921), the factor analysis was run again lowering the threshold value from 1 to 0.920. The new initial result yielded a three-factor solution explaining 63.20% of the total Internet-related self-efficacy sample variation. However, further examination of the pattern matrix revealed that one item (I feel confident that if I see a new word on a Web page, I can find out what it means) loaded on two factors with values 0.369 and 0.331. Therefore, this item was removed, and the previously mentioned analysis was executed again to achieve more distinct factor loadings.

The final factor result indicated a 3-factor solution now explaining 64.63% of the total Internet-related self-efficacy sample variation. Eventually, this factor result was selected as a final EFA solution, as it consisted of three distinct factors that were each associated with one online inquiry subtask (Table 4). Likewise, the Scree plot supported the three-factor solution. The first factor was named *SE Synthesize* since items associated with it described combining and summarizing online information. It consisted of four items (SE10 to SE13, Cronbach's  $\alpha = .83$ ) explaining 42.40% of the variance with factor loadings ranging from 0.875 to 0.593. Items representing searching information on the Internet were named *SE Search* and it included three items (SE1, SE2, and SE4, Cronbach's  $\alpha = .75$ ) explaining 14.56% with factor loadings ranging from 0.858 to 0.550. Lastly, the third factor was named *SE Evaluate* and it consisted of five items (SE3 and SE6-9, Cronbach's  $\alpha = 0.81$ ) explaining 7.67% of the variance with factor loadings from 0.775 to 0.493. The self-efficacy factors correlated significantly from moderately to strongly with each other ( $r = 0.38-0.75$ ). Correlations between the extracted factors have been presented in Table C (Appendix C).

**TABLE 4.** Internet self-efficacy factor structure (Promax rotation).

Item	Factor			Communality
	1 SE Synthesize	2 SE Search	3 SE Evaluate	
<b>SE12.</b> I feel confident that I can combine information from more than one Web page in a way that makes sense to other people.	<b>0.875</b>	-0.024	-0.045	0.712
<b>SE13.</b> I feel confident that I can compare information presented on more than one Web page.	<b>0.780</b>	0.168	-0.121	0.602
<b>SE11.</b> I feel confident that I can make a summary of the main points of several Web pages.	<b>0.601</b>	-0.112	0.256	0.534
<b>SE10.</b> I feel confident that I can write in my own words about what was said on the Web page.	<b>0.593</b>	0.012	0.076	0.415
<b>SE2.</b> I feel confident that I can locate information on the Internet using a search engine (e.g., Google).	0.012	<b>0.858</b>	-0.058	0.682
<b>SE4.</b> I feel confident that I can find information on Wikipedia.	0.073	<b>0.625</b>	-0.027	0.402
<b>SE1.</b> I feel confident that I can gather information for my school assignments using the Internet.	-0.034	<b>0.550</b>	0.223	0.488
<b>SE6.</b> I feel confident that I can identify the best search results.	0.027	-0.011	<b>0.775</b>	0.614
<b>SE8.</b> I feel confident that I can determine if information on a Web page is trustworthy.	-0.003	0.062	<b>0.708</b>	0.558
<b>SE7.</b> I feel confident that I can find useful information on an open Web page.	0.061	0.210	<b>0.517</b>	0.497
<b>SE3.</b> I feel confident that I can choose good search terms to search for information on the Internet.	-0.099	0.341	<b>0.494</b>	0.509
<b>SE9.</b> I feel confident that I can check the author of a Web page.	0.268	-0.104	<b>0.493</b>	0.392
M	4.08	4.56	3.92	
SD	0.66	0.54	0.63	
Cronbach's $\alpha$	0.83	0.75	0.81	

M = mean, SD = standard deviation

1 SE Synthesize: self-efficacy beliefs in synthesizing information; 2 SE Search: self-efficacy beliefs in searching information; 3 SE Evaluate: self-efficacy beliefs in evaluating information.

**Bold indicates the highest factor loadings.**

**Internet attitudes.** The subjects/items ratio (10:1) for Internet attitude factor analysis turned out to be acceptable and the factors are thus considered to be stable (Yong & Pearce, 2013). Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy for Internet attitudes was 0.78 indicating suitable correlations for EFA (KMO > 0.6; Metsämuuronen, 2006). The initial factor structure resulted in a five-factor solution explaining 55.82% of the Internet-related attitude sample variation. However, one factor had an Eigenvalue close to 1 (0.997) and was therefore included in the analysis by lowering the threshold of Eigenvalues from 1 to 0.995. Further analysis to determine the best factor model for the data, items of the questionnaire with communalities under 0.30 were eventually excluded since they are suggested to be removed (Metsämuuronen, 2006, p. 601). Additionally, at least three measured variables would be needed for the statistical identification of a factor that excluded all the factors with one item loading on them (Child, 2006; Fabrigar & Wegener, 2012; Izquierdo, Olea & Abad, 2014). Finally, a total of eight variables were removed, and the remaining 12 items yielded a three-factor solution explaining 58.02% of the variance of Internet attitude sample variation. Additionally, the Scree plot for Internet attitudes supported the three-factor solution.

In the final EFA result, the first factor included items expressing positive and learning-oriented attitudes toward the Internet and thus was named *AT Positive*. It included five items (AT9, AT11, AT14-15, and AT19. Cronbach's  $\alpha = .75$ ) explaining 29.14% of the variance with factor loadings ranging from 0.764 to 0.547. The second factor had items describing the perceived usefulness of the Internet and was thus named *AT Usefulness*. It consisted of four items (AT2-3 and AT5-6, Cronbach's  $\alpha = .72$ ) explaining 16.06% of the variance, and factor loadings ranging from 0.728 to 0.507. The third factor expressed negative attitudes toward the Internet and was named *AT Negative*, and it consisted of three items (AT16-18, Cronbach's  $\alpha = .69$ ). The third factor explained 12.82% of the variance with factor loadings ranging from 0.716 to 0.607. The final factor model of Internet attitudes explained 58.02% of the total sample variance in Internet attitudes. The Internet attitude factors correlated significantly with each other: positive attitudes (*AT Positive* and *AT Usefulness*) had a positive moderate correlation of 0.50, and negative correlations with *AT Negative* ( $r = -0.35$ -(-0.21)). Correlations between the extracted Internet attitude factors have been presented in Table D (Appendix D).

**TABLE 5.** Internet attitudes factor structure (Promax rotation).

Item	Factor			Communality
	1 AT Positive	2 AT Usefulness	3 AT Negative	
<b>AT9.</b> I like finding and reading new things on the Internet.	<b>0.764</b>	-0.017	-0.054	0.442
<b>AT15.</b> It's important for me to understand, what information I found on the Internet means.	<b>0.716</b>	-0.124	0.120	0.304
<b>AT11:</b> I learn a lot when I search for information on the Internet.	<b>0.618</b>	0.168	-0.174	0.499
<b>AT14.</b> I try to study to be a skilled information seeker on the Internet.	<b>0.549</b>	0.012	0.124	0.468
<b>AT19.</b> I like the Internet because I find various opinions about questions interesting to me.	<b>0.547</b>	0.028	-0.044	0.590
<b>AT2.</b> I would rather complete research on the Internet than use a book or magazine.	-0.264	<b>0.728</b>	-0.005	0.582
<b>AT5.</b> Being able to use the Internet is important to me.	0.123	<b>0.665</b>	0.073	0.297
<b>AT6.</b> I believe that using the Internet is beneficial because it saves time.	0.116	<b>0.629</b>	0.003	0.446
<b>AT3.</b> I believe using the Internet for school assignments makes learning more interesting.	0.082	<b>0.507</b>	-0.015	0.530
<b>AT16.</b> I sometimes worry that other kids do not think I can read on the Internet as well as they can.	-0.132	0.076	<b>0.716</b>	0.382
<b>AT18.</b> I often feel disoriented due to the huge amount of information on the Internet.	0.245	-0.019	<b>0.684</b>	0.471
<b>AT17.</b> I believe it is easy to get lost when I am using the Internet for research.	-0.033	-0.013	<b>0.607</b>	0.324
M	3.69	3.98	1.88	
SD	0.68	0.71	0.79	
Cronbach's $\alpha$	0.75	0.72	0.69	

M = mean, SD = standard deviation

1 AT Positive: positive attitudes toward the Internet; 2 AT Usefulness: perceived usefulness of the Internet; 3 AT Negative: negative attitudes toward the Internet.

**Bold indicates the highest factor loadings.**

### 3.3. Students' average Internet use, level of Internet self-efficacy, positive attitudes toward the Internet, and critical evaluation

The purpose of the first research question was to examine the associations between students' average Internet use, level of Internet self-efficacy, positive attitudes, and critical evaluation scores while evaluating the reliability of the texts. There were no significant correlations between the total score of reliability evaluation and either students' average Internet use, level of Internet self-efficacy, or positive attitudes (see Table 6 below). Thus, the intended objective to conduct a hierarchical regression analysis became unfulfilled. However, it was further examined if the average Internet use, level of Internet self-efficacy, and positive attitudes would be associated with the reliability evaluations of three texts separately. Only one significant correlation was found between the reliability evaluation of news and students' positive attitudes toward the Internet ( $r = .15, p < .05$ ) while other correlations remained non-significant.

**TABLE 6.** Pearson correlations between critical evaluation scores and student-related variables.

Variables	Reliability evaluation				Unreliability evaluation			
	Total score	A blog	News	A bulletin	Total score	A blog	News	A bulletin
1 SE Synthesize	<b>0.12</b>	0.07	0.14	0.06	<b>0.00</b>	0.03	-0.02	-0.01
2 SE Search	<b>0.01</b>	0.01	0.00	0.00	<b>0.01</b>	0.07	-0.02	-0.03
3 SE Evaluate	<b>0.01</b>	0.00	-0.02	0.05	<b>-0.06</b>	-0.01	-0.09	-0.03
4 AT Positive	<b>0.13</b>	0.05	0.15*	0.07	<b>-0.01</b>	0.05	-0.03	-0.04
5 AT Usefulness	<b>0.01</b>	-0.04	0.09	-0.04	<b>0.08</b>	0.09	0.05	0.04
6 AT Negative	<b>-0.01</b>	-0.11	0.08	0.00	<b>0.03</b>	0.09	-0.01	-0.01
7 Internet use	<b>-0.04</b>	-0.07	-0.03	0.02	<b>0.00</b>	0.04	-0.09	0.05
8 Internet texts	<b>0.06</b>	-0.04	0.07	0.10	<b>0.08</b>	0.02	0.05	0.11

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

### **3.4. Gender differences in critical evaluation**

The purpose of the second research question was to examine if boys and girls differed in their critical evaluation scores. Girls' mean score ( $M = 3.19$ ) for reliability evaluation of all three texts was higher compared to boys' score ( $M = 2.69$ ) but the difference was not statistically significant ( $t(190) = -1.61$ ,  $p > .10$ ). However, when comparing the critical evaluation to different texts (*a blog, news, a bulletin*), girls performed statistically significantly better in evaluating a blog compared to boys ( $t(190) = -2.19$ ,  $p < .05$ ) while other differences remained non-significant. As the possible differences were also examined in unreliability evaluations, boys' ( $M = 0.33$ ;  $SD = 0.70$ ) and girls' ( $M = 0.27$ ;  $SD = 0.58$ ) scores in unreliability evaluation did not differ ( $t(190) = 0.58$ ,  $p > .56$ ).

### **3.5. Students' average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet in confirming and questioning the credibility**

The purpose of the third research question was to examine if students' average Internet use, level of Internet self-efficacy, and positive attitudes differed between confirming and questioning credibility (see Table 6). The analyses for the first research question revealed non-significant correlations between the total score of reliability evaluation and average Internet use, level of Internet self-efficacy, or positive attitudes. Similarly, only small, and non-significant correlations were found between the total score of unreliability evaluation and the previously mentioned student-related variables. Thus, the intended hierarchical regression analysis for questioning and confirming credibility became unfulfilled as well. However, similarly to the first research question, further analyses were conducted. It was examined if the students' average Internet use, level of Internet self-efficacy, and positive attitudes would correlate with critical evaluation of unreliability in a blog, news, and bulletin. Further analyses revealed, however, that none of the unreliability evaluation scores correlated with students' average Internet use, level of Internet self-efficacy, or positive attitudes.

## 4. DISCUSSION

The purpose of this study was to gain a better understanding of 6<sup>th</sup> graders' performance in critical evaluation, and their self-reported Internet attitudes, self-efficacy, texts read online, and the use of the Internet to predict critical evaluation scores in three different online texts (*a blog, news, a bulletin*). Results of this study indicated, unfortunately, that the expected results of average Internet use, positive attitudes, and self-efficacy did not correlate with the performance in critical evaluation, nor was critical evaluation associated with gender, nor with questioning, or confirming credibility. However, this study yielded some tentative results (as some of the correlations reached statistical significance or were close to it) mainly focusing on explanatory student-related variables, and these are further discussed.

### 4.1. Students' Internet use, Internet self-efficacy, and attitudes toward the Internet

The first research question (*Are students' average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet related to their performance in critical evaluation?*) revealed only one, yet significant, correlation between the reliability evaluation of news and students' positive attitudes toward the Internet (Table 6). A possible explanation for this might stem from adolescents' Internet use, as well as the factor structure of positive Internet attitudes (see Table 5), as its highest loading items (AT9 "*I like finding and reading new things on the Internet*" and AT15 "*It's important for me to understand, what information I found on the Internet means*") remind of online reading and comprehension as an information-seeking and learning-oriented activity (Leu et al., 2013). Researchers have reckoned positive attitudes from actively using the Internet to possibly influence motivation and interest to learn online (e.g., Coffin & McIntyre, 1999; Sormunen et al., 2021), which could also be true in this data. It could be possible that adolescents' attitudes are mainly positive and learning-oriented due to their active Internet use, and that they interpret the Internet as a tool providing possibilities for learning and finding new information on different topics. Consequently, those students who feel positively about the Internet might read the news to fulfill this need. Therefore, the linkage between the need to learn and reading news would explain why positive attitudes and evaluations of news were observed to correlate significantly.



However, when assessing different online texts that students read, online newspapers were read only once or twice a month, which does not fully support this explanation. Instead, 6<sup>th</sup> graders' Internet use appeared to be more multimedia oriented as students consumed the Internet mainly for entertainment activities (*such as playing, watching videos, listening to music, and chatting with friends*) than solely for reading (see Tables 2 and 3). It might be possible that adolescents find entertainment and chatting as ways to find and read new information interesting to them, which then would have nothing to do with a learning-oriented way to approach the Internet. Instead, it might be that 6<sup>th</sup> graders' have already practiced evaluation of news in classrooms, and consequently, this familiarity with evaluating news is now observed to correlate with positive Internet attitudes. Indeed, it is important to notice that students' familiarity with evaluating different text types was not measured in this study, but their familiarity with reading different texts was. Therefore, these results are needed to be interpreted with caution as the correlation may only be a statistical coincidence.

Even if a correlation was found between the reliability evaluation of news and positive attitudes toward the Internet, many of the expected variables did not correlate with critical evaluation. However, several student-related explanatory variables still correlated with each other and should be further discussed (see Table 7 below). For example, it was hypothesized that the more students use the Internet, the more positive attitudes and higher self-efficacy they would express toward the Internet. In line with previous research (Wu & Tsai, 2006; Eastin & LaRose, 2000; Liang & Tsai, 2008), it was indeed observed that students' use of the Internet and the texts they read online were correlated with positive and useful attitudes toward the Internet, as well as with self-efficacy in synthesizing and evaluating online information.

**TABLE 7.** Students' background information and their Pearson correlation coefficients.

Variables	1	2	3	4	5	6	7	8
1 SE Synthesize	1							
2 SE Search	0.38**	1						
3 SE Evaluate	0.65**	0.75**	1					
4 AT Positive	0.48**	0.32**	0.43**	1				
5 AT Usefulness	0.31**	0.35**	0.40**	0.50**	1			
6 AT Negative	-0.16*	-0.15*	-0.27**	-0.21**	-0.35**	1		
7 Internet purpose	0.15*	0.13	0.18*	0.17*	0.31**	0.02	1	
8 Internet texts	0.22**	0.13	0.26**	0.28**	0.24**	-0.07	0.39**	1

\*\*\* p < .001, \*\* p < .01, \* p < .05

It is possible, that adolescents' way of using the Internet mostly for entertainment and chatting purposes enable familiarity with Internet structures and therefore, adolescents become good users of the Internet. For example, Kuhlemeier and Hemker (2007) have stated that the extent to which 13- to 15-year-olds use writing and chatting-focused activities (*such as e-mail, online chats, and software for word processing*) is more related to their Internet skills rather than gaming and listening to music. These Internet skills and abilities to navigate in online environments could thus lead adolescents to interpret the Internet as a useful, time-saving tool for finding and reading interesting topics for adolescents, which would explain the strong correlations between Internet use, texts, and attitudes of positivity and usefulness. Consequently, adolescents might falsely interpret that their use of the Internet is generally easy and that the feeling of easiness generalizes into perceptions of their self-efficacy in evaluating and synthesizing information. This result may be explained by the fact that especially adolescent boys tend to overestimate their evaluation skills (e.g., Hakkarainen et al., 2000; Sormunen et al., 2021). This could offer a possible explanation for observed results in this study as well as in previous studies regarding Internet self-efficacy and attitudes as mutual dependent constructs (e.g., Eastin & LaRose, 2000; Torkzadeh et al., 2002; Wu & Tsai, 2006; Coiro, 2012; Prior et al., 2016; Sormunen et al., 2021). However, as Bennett, Maton, and Kervin (2008) have reported, adolescents' Internet skills regarding social networking, texting, MP3, or video downloading do not guarantee successful critical evaluation, which could help explain why students' experience with the Internet did not automatically correlate with critical evaluation scores. Eventually, despite these speculations, causal inferences can not be made.

#### **4.2. Gender and critical evaluation**

The second research question (*Do girls and boys differ in their performance in critical evaluation?*) revealed that girls performed statistically better in evaluating the reliability of a blog compared to boys, while other differences remained non-significant. When examined more closely with additional analyses, there were no observable differences in how many blog texts boys and girls read online ( $t(182) = -0.85, p > .39$ ). However, girls were observed to use the Internet for sharing purposes significantly more compared to boys ( $t(183) = -2.03, p < .05$ ; see Table 8) which could explain the results. In the CoPSOI-questionnaire, the option of sharing was defined as "*sharing self-made texts, photos or videos on the Internet, for example in YouTube, Snapchat, Facebook, a blog, Twitter*". It is therefore possible, that girls evaluated the reliability of a blog better due to their own experiences and

prior knowledge of blog structures in making content and sharing it on their own blog (e.g., Lawless et al., 2003; Coiro & Dobler, 2007). As research has indicated, the more experience on the Internet, the more accurate evaluation of trustworthiness becomes, and more analytic strategies are used (Sundar, 2008; Flanagin & Metzger, 2010).

**TABLE 8.** Means for boys and girls in their use of the Internet and texts read online.

Variables	Girls	Boys	t	df	Sig.	
<b>Internet purpose</b>	entertainment	5.76	6.11	2.32	184	0.022*
	reading or writing e-mails	2.45	3.02	3.00	183	0.003**
	chatting with friends	5.82	5.56	-1.95	152	0.053
	searching information	4.40	4.22	-1.15	152	0.253
	sharing self-made texts, photos, or videos	4.03	3.54	-2.03	183	0.022*
	other purposes	4.68	4.60	-0.14	43	0.889
<b>Internet texts</b>	websites of newspapers	1.84	2.10	1.49	183	0.138
	websites about different kinds of topics	2.42	2.61	1.26	184	0.209
	blog texts	1.39	1.30	-0.85	182	0.396
	e-books	1.40	1.51	0.82	148	0.412
	Internet forums	1.73	2.09	2.17	159	0.032*
	something else	2.93	2.30	-1.04	23	0.308

\*\*\* p < .001, \*\* p < .01, \* p < .05

However, boys were observed to use the Internet more for entertainment purposes ( $t(184) = 2.32, p < .05$ ), reading and writing e-mails ( $t(183) = 3.00, p < .005$ ), as well as reading Internet forums ( $t(159) = 2.17, p < .05$ ) compared to girls, yet their overall performance in the critical evaluation remained lower on average compared to girls. One explanation could be that the role on the Internet (whether the user creates content or consumes it) determines how well students can evaluate online materials. Thus, being simply a consumer of the Internet would not automatically guarantee a successful evaluation, whereas the role of an active creator of the content would. This perspective could, however, shed light on previous research that has observed girls to be more friendship-driven, communicative users of the Internet, whereas boys tend to be explorative, interest-driven users (e.g., Tsai & Tsai, 2010; Lahti, Lyyra, Hietajärvi, Villberg & Paakkari, 2021). It was also observed that girls' overall mean for critical evaluation was better compared to boys'. Even if the difference was not statistically significant, the result may stem from differences in developmental factors, such as

metacognition. For example, girls' better knowledge of metacognitive strategies and the usage of metacognitive strategies during reading could explain their better performance in digital reading tasks (Sheorey & Mokhtari, 2001; Wu, 2014; Naumann & Sälzer, 2017; Salmerón, García & Vidal-Abarca, 2018; Kanniainen et al., 2019; OECD, 2021). Based on these results, it could be supposed that evaluating the credibility of information becomes crucial in social contexts, whereas interest-driven activities, such as gaming or making music do not require social aspects to be taken into consideration. However, a study by Wu (2014) observed that the use of social reading activities had a negative influence on knowledge of metacognitive strategies but not electronic reading assessments. Thus, straightforward conclusions cannot be made on how the quality of Internet use is associated with critical evaluation. Instead, more research on the matter is needed.

#### **4.3. Students' Internet use, Internet self-efficacy, and attitudes toward the Internet in confirming and questioning the credibility**

Lastly, as the third research question (*Do average Internet use, level of Internet self-efficacy, and positive attitudes toward the Internet differ between confirming and questioning credibility?*) resulted in nonexistent to small correlations that did not reach statistical significance, it was further examined to clarify the differences between questioning and confirming credibility.

In accordance with previous studies, means and standard deviations of additional analyses verify that questioning credibility remains more difficult for 6<sup>th</sup> graders than confirming it (Kiili et al., 2008; Kiili et al., 2018a; Pérez et al., 2018; Kiili et al., 2018b). For example, the mean for reliability evaluation for all texts was 2.93 points (SD = 2.20) whereas for unreliability it was considerably less, only 0.29 points (SD = 0.64; see Table 9). It is also noticeable how big the standard deviations of critical evaluation are thus supporting previous findings on how polarized students' abilities to critically evaluate online information are (Eastin, 2008; Flanagin & Metzger, 2008; Kiili et al., 2018a). These results are likely explained by the fact that 6<sup>th</sup> graders do not yet possess the metacognitive resources needed to apply critical evaluation diversely, as the level of metacognitive awareness has been associated with the application of effective critical evaluation strategies (Pressley, 2000; Nachmias & Gilad, 2002; Eastin et al., 2006; Coiro, 2008; Kiili, Laurinen & Marttunen, 2009a; Walraven et al., 2009; Coiro, 2011; Kiili & Laurinen, 2015).

It is also possible, that situational variables such as students' motivation to complete critical evaluation tasks have resulted in these differences, as critical evaluation has been observed to be a situational activity (Kiili et al., 2008). Previous research has reported, for example, that motivation

plays a pivotal role in evaluating credibility, and the more meaningful an online activity is, the more likely, frequently and thoroughly critical evaluation happens (Hofman, Wu, Krajcik & Soloway, 2003; Metzger, 2007; Coiro & Fogleman, 2011). Internet readers tend to perform the easiest, opinion-based, and less demanding ways to critically evaluate online information compared to more time-consuming and effortful tasks on critical evaluation (e.g., Metzger, 2005). It is therefore possible that evaluating Web pages outside the classroom did not motivate students enough to complete critical evaluation tasks which then resulted in the use of less demanding evaluation strategies.

**TABLE 9.** Means and standard deviations in questioning and confirming credibility (n = 194).

		M	SD
<b>Reliability evaluation</b>	<b>Total score reliability</b>	<b>2.93</b>	<b>2.20</b>
	A blog	1.06	1.07
	News	0.94	1.06
	A bulletin	0.93	0.97
<b>Unreliability evaluation</b>	<b>Total score unreliability</b>	<b>0.29</b>	<b>0.64</b>
	A blog	0.12	0.35
	News	0.08	0.27
	A bulletin	0.09	0.29

M = mean; SD = standard deviation

Additionally, results also showed that different subcategories in the critical evaluation were differently emphasized (see Table 10). Previous studies have reported that evaluating the *expertise of the source* is the most utilized evaluation strategy among students, and this result gained support in this study (Liu & Huang, 2005; Kiili et al., 2008, 2009a; Hämäläinen et al., 2020). Students were indeed observed to evaluate the *expertise of the source* (M = 1.89) far more often than *other source features* (M = 0.20), *argumentation in the text* (M = 0.49), or *other aspects of the content* (M = 0.36) when evaluating the reliability of the texts. It may be that evaluating the expertise of a site is the topmost known strategy for adolescents and consequently, after one has found ‘supporting evidence’ that confirms that the source is somewhat reliable, adolescents leave their evaluating process there. Supporting this explanation, Kiili et al. (2018b) have also suggested that confirming credibility is more specific to younger students compared to more expert readers. Similarly, Kiili et al. (2018a) have speculated that students have not had enough opportunities to practice critical evaluation from

multiple perspectives or with multiple strategies. As previous research literature has shown, even if students might know that not all information is true online, they might lack the strategies needed to evaluate the source more profoundly (e.g., Flanagin & Metzger, 2010; Hogan & Vernhagen, 2012; Paul et al., 2017; Freeman et al., 2020). This is also presented by Flanagin and Metzger (2010) who have reported 11–12-year-olds tend to evaluate most of the cues online as less important compared to older students when evaluating the credibility of the information (Flanagin & Metzger, 2010).

**TABLE 10.** Means and standard deviations for reliability and unreliability evaluations by categories (n = 194).

		M	SD
<b>Reliability evaluation</b>	<i>Expertise of the Source</i>	1.89	1.89
	<i>Other Source Features</i>	0.20	0.50
	<i>Argumentation in the Text</i>	0.49	0.89
	<i>Other Aspects of the Content</i>	0.36	0.70
<b>Unreliability evaluation</b>	<i>Other source features</i>	0.24	0.57
	<i>Argumentation in the Text</i>	0.05	0.21
	<i>Other Aspects of the Content</i>	0.01	0.10

M = mean; SD = standard deviation

#### 4.4. Limitations and future directions

While interpreting results it is important to consider a few limitations of this study. For example, the scoring of the critical evaluation might have been too strict thus resulting in the lack of variation in students' evaluation scores and low Cronbach's alphas for reliability ( $\alpha = .51$ ) and unreliability ( $\alpha = .48$ ; see Nunnally & Bernstein, 1994; Kirves, 2013). Generally, students scored very low on critical evaluation reliability scores varying from 0 to 9 and unreliability from 0 to 3. If all possible criteria of critical evaluation were correctly identified, the maximum score could have been 60 points for reliability and 42 points for unreliability. To demonstrate the tight scoring, if a student mentioned "This is something from a university" while referring to the bulletin, they were not given any points for recognizing the style of the text. Similarly, if a student evaluated the style of writing with a justification "Knowledge sounds very reasonable", they were given 0 points because the justification

did not include a mention that the text written sounded reasonable. Additionally, when students evaluated three Web pages, they were asked to rate them from 1 to 5 and then give a justification with a question: “*Why do you think so?*” (see Hämäläinen et al., 2020, p. 40). It is possible, that students answered with only one justification and concluded their evaluation process there. It is therefore recommended for future studies to ask students to list as many justifications for their ratings as possible.

In addition, Brassart (1996) has reported that adolescents under the age of 12 or 13 may have difficulties in mastering the argumentative text genre. In this study, evaluating the argumentation in the text included references to research basis, quality of evidence, and trust in the content or method utilized, which might have been too difficult for 6<sup>th</sup> graders. Therefore, future studies could refine the criteria of critical evaluation and add more familiar text types for students, as 6<sup>th</sup> graders might not recognize certain text types (*such as a bulletin*) or know how to justify the research basis of a Web page to back up their credibility evaluations (e.g., Meola, 2004). However, as several researchers have stated, it is essential to include evaluation tasks that are not too demanding for all students, but not too easy for more skillful readers (Zhang & Duke, 2011; Macedo-Rouet, Braasch, Britt & Rouet, 2013; Kingsley, Cassady & Tancock, 2015).

The Cronbach’s alphas remained low as well in this data for sum variables of Internet texts ( $\alpha = .55$ ), and Internet use ( $\alpha = .50$ ; see Nunnally & Bernstein, 1994; Kirves, 2013). It is important to note that even if CoPSOI-survey included already validated and further modified parts of the SORAB-survey (Putman, 2014) concerning Internet self-efficacy and attitudes, sub questionnaires on students’ Internet use and texts should be further improved or included in analyses separately as individual items. The low Cronbach’s alphas indicate that the questionnaire in these parts has not been sensitive enough (e.g., Metsämuuronen, 2006), or that students placed their answers on the wrong sections of the survey. For example, many of the students mentioned playing video games, watching movies or series, making presentations, or watching TikTok, even if they could have been placed in a category of entertainment. Similarly, the option *for something else* in Internet texts included mentions of reading store websites, reading lyrics and notes, even if they could have been placed on reading websites of different topics. However, students also mentioned reading messages from friends as *something else* since there was no option for chatting with friends. Thus, in future studies, it would be reasonable to either utilize validated questionnaires among 6<sup>th</sup> graders or add more variety of options and precision in definitions of Internet use to elevate the internal consistency of the questionnaires.

Lastly, all statistical analyses conducted utilized pairwise deletion of cases when possible. However, both listwise and pairwise deletion have been argued to be default methods and described as inefficient and not recommended (Baraldi & Enders, 2010). Thus, the observed differences between factor structures of Internet self-efficacy and Internet attitudes between this study and previous studies may be a consequence of different extraction and rotation methods (e.g., Wu & Tsai, 2006; Joyce & Kirakowski, 2015; Sormunen et al., 2021). In turn, Baraldi and Enders (2010) have recommended alternative imputation methods utilizing mean, regression, multiple, and maximum likelihood (ML), and these should be noted in future studies. Additionally, as 20.2% of the participants did not participate in the second part of the study (NEURONE), it is thus possible that the bigger sample size could have overcome the previously mentioned statistical limitations. However, further analyses of missing participants indicated that there were no observable differences in the absent participants' age, gender, or Internet use compared to the participants of the study. In sum, a bigger sample size and adequate choices of statistical methods for future studies are highly recommended.



## 5. CONCLUSIONS

The purpose of this study was to increase the knowledge of how students' average Internet use, Internet self-efficacy, and attitudes are associated with the critical evaluation scores among Finnish 6<sup>th</sup> graders. Despite its methodological limitations, the present study contributes to a growing body of evidence suggesting that 6<sup>th</sup> graders' use of the Internet and the types of texts read online, Internet self-efficacy in synthesizing and evaluating information, as well as positive attitudes and attitudes of usefulness toward the Internet are significantly associated with each other. Additionally, it is worrisome that the level of critical evaluation among 6<sup>th</sup> graders remains challenging, especially in questioning the credibility of online information.

While digitalization extends to all areas of life, work, and education, the educational levels have the crucial potential to promote adolescents' skills in critical evaluation of online information (e.g., Kahne & Bowyer, 2017). As individuals form unique pathways of online reading comprehension by choosing different ways to evaluate information to proceed within a text, the challenge and need for measuring student-related variables in critical evaluation remain current (e.g., Leu et al., 2007; Coiro & Dobler, 2007; Leu et al., 2013; Leu et al., 2016). Thus, additional research on critical evaluation and its associations with student-related variables is urgently needed to support and create the best instructional actions for adolescents' evaluation and interpretation skills for their future (e.g., Flanagan & Metzger, 2010; Forzani & Maykel, 2013; Livingstone, Kardefelt Winther & Saeed, 2019).

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## APPENDICES

### Appendix A

Categories of students' justifications in scoring critical evaluation in a blog, news, and a bulletin.

<b>Main category</b>	<b>Subcategory</b>	<b>Description</b>	<b>Example</b>	<b>Interpretation</b>
<b>Source Features</b>	<i>Expertise of the Source</i>	Student justifies his or her credibility rating with authors'/publishers' credentials, affiliation, experience or expertise.	I think this Web page is credible because it includes the ideas of a pediatrician.	Being a pediatrician is a credential of the author/publisher (page is a blog by an expert)
	<i>Other Source Features</i>	Student justifies his or her credibility rating with the date, appearance or type of the Web page, or availability of contact information or references.	The Web page includes new information.	New information refers to the date of the Web page (page was published in 2016)
<b>Quality of Content</b>	<i>Argumentation in the Text</i>	Student justifies his or her credibility rating on research basis, quality of evidence, consideration of both sides (negative and positive) or an issue or argumentative purpose of the text on the Web page.	It tells about the negative effects of games but also recommends a useful game.	Student refers to the consideration of both sides (negative and positive) of an issue on the Web page.
	<i>Other Aspects of the Content</i>	Student justifies his or her credibility rating with correspondence with his/her own experiences or prior knowledge, or amount of the text or writing style on the Web page	Gaming affects one's fitness and health, I have noticed it also myself.	Student refers to the correspondence with his/her own experiences.

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## Appendix B

**TABLE B.** ICC Calculation Using Single-Rating, Absolute-Agreement, 2-Way Mixed-Effects Model.

		Intraclass correlation	95% Confidence Interval		F Test With True Value 0			
			Lower Bound	Upper Bound	Value	<i>df1</i>	<i>df2</i>	Sig.
<b>Reliability evaluation</b>	<i>Expertise</i>	0.990	0.978	0.995	183.733	29	29	0.001***
	<i>Other features</i>	0.849	0.707	0.925	11.966	29	29	0.001***
	<i>Argumentation</i>	0.875	0.735	0.941	17.019	29	29	0.001***
	<i>Other aspects</i>	0.594	0.168	0.809	5.405	29	29	0.001***
<b>Unreliability evaluation</b>	<i>Other features</i>	0.914	0.828	0.958	21.600	29	29	0.001***
	<i>Argumentation</i>	0.721	0.496	0.856	6.357	29	29	0.001***

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

## Appendix C

**TABLE C.** Internet self-efficacy factors and their Pearson correlation coefficients.

	1	2	3
1 SE Synthesize	1		
2 SE Search	0.38**	1	
3 SE Evaluate	0.65**	0.75**	1

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

## Appendix D

**TABLE D.** Internet attitude factors and their Pearson correlation coefficients.

	1	2	3
1 AT Positive	1		
2 AT Usefulness	0.50**	1	
3 AT Negative	-0.21**	-0.35**	1

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

Lastenlääkäri Minna Leppäaro

# Tietokonepelaamisesta hyötyä ja haittaa terveydelle

2016.12.12 Pelaaminen ja terveys

Lastenlääkärinä tapaan usein lapsia, jotka kärsivät liiallisen tietokonepelaamisen aiheuttamista terveyshaitoista. Lapsi tai vanhempi ei useinkaan tunnista pelaamisen yhteyttä terveysvaivoihin. Vanhemmat eivät myöskään aina ole tietoisia lastensa tietokonepelaamisen määrästä tai osaa ajatella sen haitallisuutta.



Liiallisen tietokonepelaamisen haitat voivat näkyä esimerkiksi fyysisinä vaivoina kuten ranne-, kyynärpä-, selkä- tai niskaoireina. Jopa alle 12-vuotiailla lapsilla on havaittu jopa peukalon ylisrasitustiloja pelaamisen seurauksena. Pitkiä aikoja paikallaan istuminen voi myös huonontaa lapsen tai nuoren ryhtiä sekä lisätä ylipainoisuutta.

Toisaalta esimerkiksi suosittu Pokemon Go –peli voi parhaimmillaan lisätä lasten päivittäistä liikunnan määrää heidän "metsästäessään" hahmoja ulkona älypuhelimensa avulla. Mielenkiintoisen pelin avulla lapsi tulee huomaamattaan liikkuneeksi eikä pelaamisen myötä tullutta liikuntaa edes koeta rasittavaksi. Vanhempien tulisi kuitenkin valvoa lastensa juoksemista hahmojen perässä, jotta esimerkiksi liikenneonnettomuuksilta vältyttäisiin.



Toivoisinkin vanhempien olevan tietoisempia lastensa tietokonepelaamisen tavoista, määrästä sekä terveysvaikutuksista. Keskustelkaa siis lastenne kanssa heidän pelaamisestaan ja miettikää yhdessä, millaiset pelit ovat terveydelle hyödyllisiä. Nimittäin pelin valinnalla on terveydellistä merkitystä: liikunnalliset tietokonepelit voivat tuoda myönteisiä terveysvaikutuksia, kun taas paikallaan pelattavat pelit ovat terveyden kannalta haitallisempia.



Minna Leppäaro, Lastenlääkäri



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Takaisin artikkeleihin

## Saman teeman artikkelit

Miksi pelaaminen valvottaa?

Liikuntaharrastus ja videopelit

Lisätty todellisuus peleissä

VR-lasit ja näkövamma

Lue lisää teema-alueesta...

## Avainsanat

pelit

terveys

asiantuntija

neuvo

Takaisin alkuun

## Appendix F: News in NEURONE

**UUTISTEN**  
PÄIVÄLEHTI

Tuoreimmat Aihealueet ▾ Arkisto Toimitus

### Väkivaltaiset tietokonepelit lisäävät vihamielistä käytöstä

*Tietokonepelit ja pelaaminen, psykologia*

toimittaja: Kalle Kiiski | Tampere 12.12.2016



Tietokonepelien pelaamista pidetään usein hieman epäilyttävänä lasten ja nuorten ajanvietteenä. Monia vanhempia mietityttää, millaiset tietokonepelit ovat sopivia ja millaiset pelit olisi syytä kieltää. Tuore tutkimus antaa uutta tietoa väkivaltaisten tietokonepelien pelaamisen vaikutuksista.

Kanadalaisen Brockin yliopiston tutkimuksen mukaan väkivaltaisten pelien jatkuva pelaaminen vaikuttaa nuorten asenteisiin ja toimintaan. Tutkijat havaitsivat, että väkivaltaisia videopelien harrastaneiden nuorten käytös muita ihmisiä kohtaan muuttui vihamielisemmäksi. Paljon pelejä pelanneet nuoret saattavat kokea voimakasta suuttumusta, jos joku vaikka törmää heihin vahingossa.

#### Pelien vaikutus tyttöihin ja poikiin samanlainen

Psykologi Ville Varttila ei pidä tutkimuksen tuloksia mitenkään yllättävänä. Väkivaltaiset videopelit saattavat myös voimistaa nuorten käsitystä siitä, että hyökkäävä käyttäytyminen on sopiva tapa ratkaista erimielisyydet, hän toteaa. Varttila pitää kuitenkin yllättävänä sitä, että väkivaltaisten pelien pelaaminen vaikutti samalla tavalla niin tyttöihin kuin poikiin.



Tutkimukseen osallistui 1492 nuorta, joista puolet oli tyttöjä ja puolet poikia. Tutkimus kesti neljä vuotta ja tutkimuksen alkaessa nuoret olivat 14–15-vuotiaita. Tutkimus on julkaistu *Developmental Psychology* -lehdessä.

Lähde: Developmental Psychology

Kuvat: Pixabay

## Oppimispelitutkijat kokoontuivat Tampereen yliopistossa

Unipress tiedote 01.09.2016

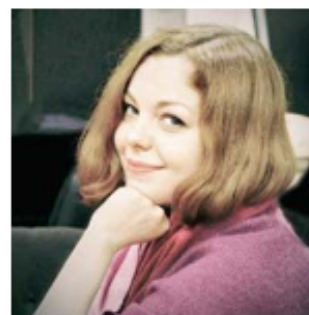
Kun koulutyö on päässyt kesälomien jälkeen taas vauhtiin, on ajankohtaista pohtia, millaiset asiat tukevat ja innostavat oppimista. Muun muassa näitä asioita käsiteltiin, kun lähes sata koulutuksen asiantuntijaa ja kehittäjää maan eri yliopistoista ja ammattikorkeakouluista kokoontuivat *Oppimispeli* –foorumiin Tampereen yliopistoon 20.8.2016.

Suomessa on muun muassa kehitelty pelejä matematiikan oppimiseen. Pelitutkija Kalle Virtanen Turun yliopistosta on esimerkiksi kehittänyt pelin, jossa opetellaan murtolukuja. Virtasen tuore tutkimus osoittaa, että oppilaiden laskutaidot kehittyivät pelaamalla jo melko lyhyessä ajassa. Matematiikan taitojen oppiminen vaatii paljon harjoittelua. Pelatessa tulee huomaamattaan ratkaiseeksi valtavan määrän laskuja, mikä on yksi pelioppimisen tehokkuuden salaisuus, Virtanen painottaa.



Myös vapaa-ajalla pelaaminen voi edistää oppimista monella tapaa. Esimerkiksi englanninkielisten tietokonepelien pelaaminen näkyy erityisesti poikien kielitaidon kehittymisenä, iloitsee tutkija Minna Sirvasti Lapin yliopistosta. Varsinkin roolipeleissä ja seikkailupeleissä puhutaan tai viestitellään englanniksi. Paljon tietokonepelejä pelaavilla onkin varsin rikas sanavarasto. Tutkimukset osoittavat, että englanninkielisten pelien pelaaminen näkyy selvästi myös englanninkielen kouluarvosanoissa, jatkaa Sirvasti.

*Oppimispeli* –foorumissa tutkijat pääsivät itsekkin kokeilemaan monia uusia oppimispelejä, ja huomasimme, että moni heistä olisi jatkanut pelaamista mielellään pidempäänkin, naurahtaa tapahtuman järjestämisestä vastannut Noora Lempinen.



*Further information:*

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email-address: [n.l.lempinen@uta.fi](mailto:n.l.lempinen@uta.fi)

## Appendix H: Sections of CoPSOI-survey used in the study.

### Tietotekniikka ja internet kotona ja koulussa

Valitse seuraavien kysymysten ja väittämien kohdalla itseäsi parhaiten kuvaava vaihtoehto.

Onko sinulla mahdollisuus käyttää tietokonetta, tablettia tai älypuhelinta?	Kyllä	Ei
1. Meillä on kotona tietokone (pöytäkone tai kannettava), jota voin käyttää.	<input type="checkbox"/>	<input type="checkbox"/>
2. Meillä on kotona tabletti (esim. iPad, Samsung), jota voin käyttää.	<input type="checkbox"/>	<input type="checkbox"/>
3. Minulla on käytössäni älypuhelin.	<input type="checkbox"/>	<input type="checkbox"/>
4. Koulussa voimme käyttää tietokoneita tai tabletteja oppitunneilla.	<input type="checkbox"/>	<input type="checkbox"/>
5. Jossain muussa paikassa (esim. kaverin kotona).	<input type="checkbox"/>	<input type="checkbox"/>

Onko sinulla mahdollisuus käyttää nettiä?	Kyllä	Ei
6. Pääsen kotona tietokoneelta (esim. kannettava, tabletti) nettiin.	<input type="checkbox"/>	<input type="checkbox"/>
7. Minulla on käytössäni älypuhelin, jolla pääsen nettiin.	<input type="checkbox"/>	<input type="checkbox"/>
8. Koulussa on tietokoneita (tai tabletteja ym.), joilla on mahdollista päästä nettiin.	<input type="checkbox"/>	<input type="checkbox"/>

Kuinka usein käytät tietokonetta, tablettia tai älypuhelinta seuraaviin tarkoituksiin?	En koskaan	En juuri koskaan	Harvoin (1-2 kertaa kuukaudessa)	1-2 kertaa viikossa	Lähes joka päivä	Joka päivä alle 2 tuntia	Joka päivä yli 2 tuntia
10. Viihdekäyttöön (esim. pelaaminen, videoiden katselu, musiikin kuuntelu)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Sähköpostien lukemiseen tai kirjoittamiseen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Viestittelyyn kavereiden kanssa (esim. Snapchat, WhatsApp, Facebook, Skype)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Tiedon hakemiseen omiin asioihin netistä (esim. harrastukset, musiikki, muoti ym.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Itse tekemieni tekstien, kuvien tai videoiden jakamiseen netissä (esim. Instagram, YouTube, Snapchat, Facebook, blogi, Twitter)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Käytätkö johonkin muuhun? Jos käytät, niin mihin?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mieti seuraavaksi, kuinka usein luet erilaisia tekstejä netissä.	En juuri koskaan	Harvoin (1-2 kertaa kuukaudessa)	1-2 kertaa viikossa	Lähes joka päivä	Joka päivä
19. Sanomalehden verkkosivuja (esim. Keskuomalainen, Iltalehti)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Nettisivuja erilaisista aiheista (esim. kiinnostuksen kohteista, harrastuksista, urheilusta, lomakohteista, tavaroista)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Blogitekstejä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. e-kirjoja (= elektroninen / sähköinen kirja)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Keskustelupalstoja (esim. keskusteluja peleistä, artisteista, harrastuksista)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Muuta, mitä?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Miten hyvin osaat käyttää nettiä?

Lue väittämät ja valitse itseäsi parhaiten kuvaava vaihtoehto.	Olen ...				
	Täysin eri mieltä	Jokseenkin eri mieltä	Ei samaa eikä eri mieltä	Jokseenkin samaa mieltä	Täysin samaa mieltä
1. Luotan siihen, että osaan etsiä koulutehtäviini liittyvää tietoa internetistä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Luotan siihen, että löydän tietoa internetistä käyttämällä hakukoneita (esim. Google).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Luotan siihen, että osaan valita oikeat hakusanat etsiessäni tietoa internetistä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Luotan siihen, että osaan hakea tietoa Wikipediasta.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Luotan siihen, että jos löydän uuden sanan nettisivuilta, pystyn selvittämään mitä se tarkoittaa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Luotan siihen, että pystyn tunnistamaan parhaat hakutulokset.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Luotan siihen, että pystyn löytämään hyödyllistä tietoa avaamaltani nettisivulta.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Luotan siihen, että osaan päättää onko tieto nettisivuilla totuudenmukaista.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Luotan siihen, että pystyn tarkistamaan, kuka on nettisivun laatija.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Luotan siihen, että pystyn kirjoittamaan omin sanoin nettisivuilla kerrotun asian.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Luotan siihen, että osaan tehdä useilta nettisivuilta koostetun yhteenvedon niiden tärkeimmistä asioista.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Luotan siihen, että osaan yhdistää tietoa useammalta kuin yhdeltä nettisivuilta niin, että myös muut lukijat ymmärtävät kirjoittamani.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Luotan siihen, että pystyn vertailemaan useammalla kuin yhdellä nettisivulla esiintyvää tietoa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Miltä internetin käyttö tuntuu?

Lue väittämät ja valitse itseäsi parhaiten kuvaava vaihtoehto.	Olen ...				
	Täysin eri mieltä	Jokseenkin eri mieltä	Ei samaa eikä eri mieltä	Jokseenkin samaa mieltä	Täysin samaa mieltä
1. Uskon, että internetistä löytyy luotettavaa tietoa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Etsin tietoa mieluummin internetistä kuin kirjoista tai lehdistä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Uskon, että internetin käyttö kotitehtävissä tekee oppimisesta mielenkiintoisempaa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. En tunne oloani vapautuneeksi, kun työskentelen netissä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mahdollisuus käyttää nettiä on tärkeää minulle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Uskon, että internetin käyttö on hyödyllistä, koska se säästää aikaa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Tiedonhaku internetissä hermostuttaa minua.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Uskon, että on tärkeää oppia käyttämään nettiä tiedon etsimisessä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Pidän uusien asioiden etsimisestä ja lukemisesta internetissä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Tunnen itseni neuvottomaksi, jos en löydä etsimääni tietoa netistä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Opin paljon, kun etsin tietoa internetistä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Välttelen internetin käyttöä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Koen tiedon hakemisen netistä pelottavaksi.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Yritän opiskella taitavaksi tiedonhakijaksi internetissä.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Minulle on tärkeää ymmärtää, mitä internetistä löytämäni tieto tarkoittaa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Joskus olen huolissani, että muut lapset ajattelevat, etten pystyisi käyttämään internetiä yhtä hyvin kuin he.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Uskon, että tietoa hakiessa internetissä joutuu helposti eksyksiin.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Tunnen itseni hämmentyneeksi, kun internetissä on niin valtavasti tietoa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Pidän internetistä, koska löydän sieltä monia mielipiteitä kysymyksistä, jotka kiinnostavat minua.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Koen jotkut netistä löytyvät asiat epämiellyttäviksi.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>