Tools for teaching critical online reading

Carita Kiili – Pirjo Kulju

Foreword

Widespread misinformation on the internet challenges the teaching of critical reading in schools. Evaluating the credibility of texts in the digital world is demanding, and considerable differences in students' skills have been observed. The aim of this publication, which is suitable for both classroom teachers and subject teachers, is to provide research-based information on students' critical online reading skills and concrete tools for teaching these skills.

We summarise what we mean by critical reading and what our recent research has revealed about students' critical online reading skills as well as essential perspectives on teaching these skills. The publication includes links to concrete teaching materials for classroom purposes, and its content is also available as videos. This publication, as well as the teaching materials and videos, is available in the Library of Open Educational Recourses (see the link at the end of this publication).

Researchers in the Educating for Future Literacies research group at Tampere University, Finland, have prepared this publication as well as the videos and teaching materials. We would like to thank the following researchers who contributed to the creation of the material: **Riikka Anttonen**, **Elina Hämäläinen**, **Laura Kanniainen** and **Reijo Kupiainen**. We are also grateful to **Julie Coiro**, who provided valuable feedback on the manuscript.

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Contents

1. What is critical reading?

Critical reading is difficult to define unequivocally because it involves different perspectives. It can be considered an evaluation of the credibility of information or a means of identifying manipulation. Critical reading can also involve considering different perspectives on the issue at hand and can be a tool for social criticism. Moreover, different disciplines bring different nuances to critical reading. For example, historical and geographical knowledge are presented somewhat differently.

In particular, the evaluation of the credibility of online information is important because the internet is full of information, some of which is false or misleading. The model in Figure 1 describes how readers can evaluate the credibility of online information (modified from Barzilai et al., 2020). The model distinguishes two aspects that readers can evaluate: the accuracy of the content and the trustworthiness of the source.

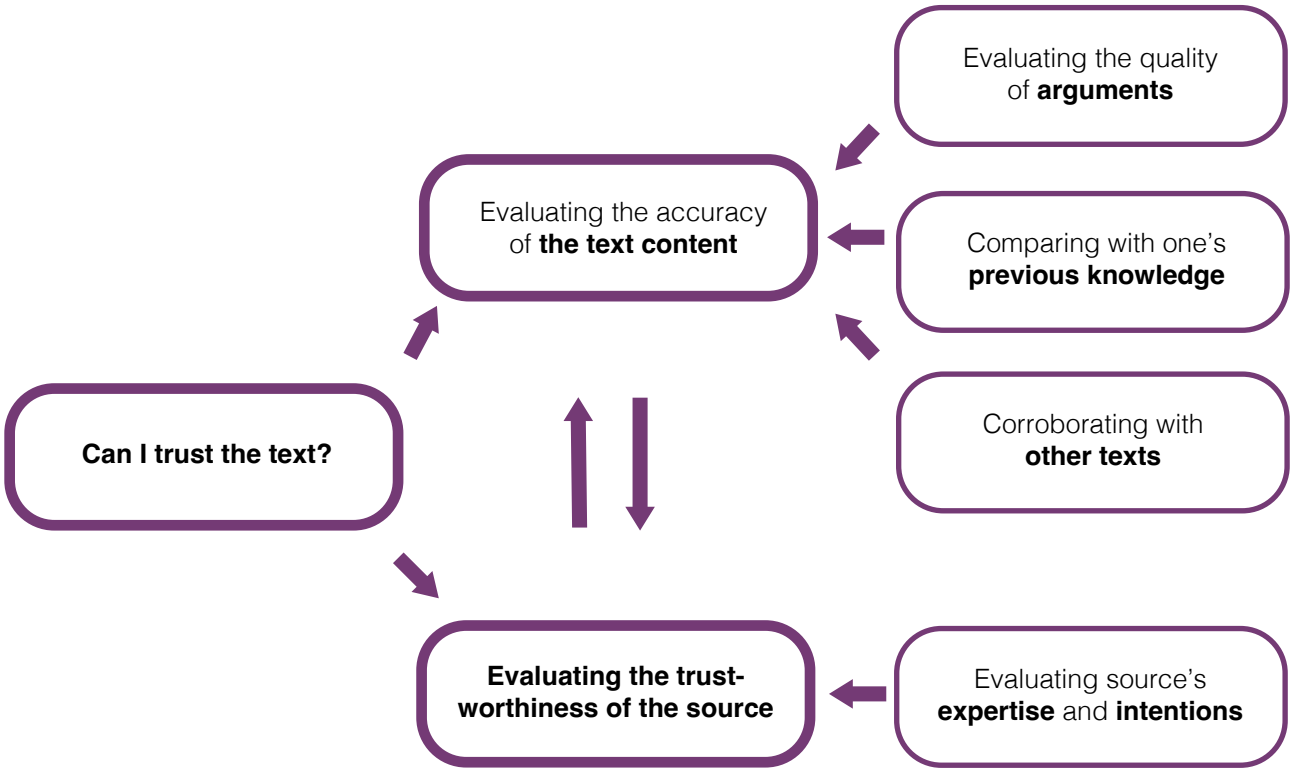


Figure 1. Evaluation of the credibility of online texts (modified from Barzilai et al., 2020).

Readers can evaluate the accuracy of content by considering the quality of its arguments. They can also compare the content with their prior knowledge or with content presented in other credible texts. In the model, the source refers to, for example, the author or the publisher of the text. The trustworthiness of the sources can be evaluated by considering their expertise or intentions.

It is worth noting that evaluating the content and the source is reciprocal. This means that one's judgment about the credibility of the content is reflected in one's evaluation of the source, and judgments about the content are reflected in one's evaluation of the source.

When text is read on the internet, what does its evaluation, and that of the source, look like? The following examples illustrate how skilled sixth graders and upper secondary school students evaluated online texts on the health effects of sugar.

Not many of the Finnish sixth graders paid attention to the source, such as to the author's expertise. In the following example, however, one sixth grader has done this.

Sixth grader:
"The text was written by a researcher in health sciences."

The most skilled upper secondary school students, on the other hand, were able to consider the author's expertise in relation to the topic of the text.

Upper secondary school student:
"She is a researcher in health sciences, so she must have research knowledge on the topic. She also understands the biological function of sugar. The author has specifically focused on the functioning of children's memory."

Nowadays, expertise is differentiated or siloed, making it sometimes difficult to evaluate. Furthermore, people can easily present themselves as experts in any field, especially on social media. In other words, readers should be able to evaluate whether the source's expertise matches the topic of the text.

Another aspect that affects the trustworthiness of the source is their intention. Not many sixth graders have come to recognise commercial intentions, especially if the content they are reading resembles a factual text. Only the most skilled readers will spot advertising and understand the commercial motives behind it.

Sixth grader:
"Because this person just wants to advertise and get more customers into their store."

In the following example, an upper secondary school student skilfully considers how the choice of the topic of online text published by a sweet shop, titled 'How can you improve your memory in an exam?', reflects the publisher's commercial intentions.

High school student:
"He wants to use his knowledge to promote his own business. Since school is a big part of life, especially for children and young people, what better way is there to get a sweets business going than linking it to academic success."

In the evaluation of content, a student's prior knowledge and beliefs are useful resources, as long as they are accurate. However, students sometimes do not know how to make use of their prior knowledge. In one study (Loos et al., 2018), 11–12-year-old students read a hoax web page about octopuses that lived in trees. Almost all students (N = 23) considered this content to be true.

On the other hand, if a student's prior knowledge is inaccurate, it may be difficult for them to question something that supports what they think they understand. This was demonstrated in a study in

which students read online text authored by a layperson who claimed that sugar causes hyperactivity in children.

Sixth grader:
”I have heard many times that children behave more strangely after birthdays.”

This is a widespread belief that, according to current scientific knowledge, is not true.

A critical reader does not rely solely on their own prior knowledge. They also examine the quality of the evidence that the author provides. The following example shows that even a skilled sixth-grader can do this. In the example, the student is evaluating a blog post in which a mother claims that hyperactivity is caused by treats eaten at a birthday party.

Sixth grader:
”The mother has mentioned only one case; hyperactivity can be caused by other things.”

Skilled readers can also compare the information provided by different texts so that they can determine which text can be trusted. In the following example, a sixth grader does just that.

Sixth grader:
”The author [a teenager], to whom this has happened, claims that chocolate causes acne, but in the previous text, the expert had a different view.”

The evaluation of sources and content is reciprocal. The process for each is often automatic, but reciprocity can sometimes be observed in students’ responses when they are asked to justify their evaluations of credibility. In the following example, a student is evaluating commercial content describing the effects of chocolate.

Sixth grader:
”Because it is by a chocolate shop, the text leaves out all the downsides and emphasises only the good sides in order to attract as many new customers as possible.”

In this example, the student recognises that the text has been published by a chocolate shop that has commercial intentions. The student also notices that the author’s commercial intentions are reflected in the text—that is, in the one-sidedness of the argumentation.

Notably, all of these examples are from skilled critical readers. The following section discusses individual differences in critical evaluation skills among Finnish students.

2. How are students able to evaluate the credibility of texts? Are there any differences in their skills?

Finnish students' skills in evaluating the credibility of online texts were investigated in a study involving more than 700 students representing different grade levels (Kanniainen et al., 2023).

In this study, students read four online texts about the health effects of vitamins, two of which were more credible and two less credible (Figure 2). The more credible ones were published in a popular science magazine and a popular science news site. The less credible texts, on the other hand, were a blog post written by a junior ice hockey player and a commercial text.

The four texts, designed by researchers, differed in terms of the authors' expertise and intentions and the quality of the evidence that the authors relied on.

In this study, the students read one text at a time. First, they were asked to identify the author of the text from three options, and then they were asked to evaluate the author's expertise and benevolence and the quality of the evidence on a six-point scale.

To succeed in the task, the students needed to be able to confirm the more credible texts and question the less credible ones.

Figure 2. Screenshots of the online texts.

After evaluating the expertise, benevolence and evidence, the students selected an appropriate justification for their evaluations from four options. Figure 3 provides an example of the evaluation and justification items related to the author's benevolence.

How well did the students identify the author of the text? First, let us look at the answers of the youngest students, the fourth graders (Table 1). Identifying the author of the blog post was the most difficult task for them, with some students confusing the blogger with the provider of the blogging service. Furthermore, the author of the popular science news text—the journalist—was confused with the person interviewed in the article. Some students also chose the publisher as the author. Although the ability to identify the author seemed to improve according to the grade, it is not self-evident that even the older students could identify the author.

How well were the students, representing different grade levels, able to confirm the more credible texts and question the less credible ones? In this study, the students' answers were scored from 0 to 2.

Figure 4 (p. 9) shows that the students performed better when they had to confirm the credibility of the more credible texts. The students did not perform as well, however, when they had to question the credibility of less credible texts.

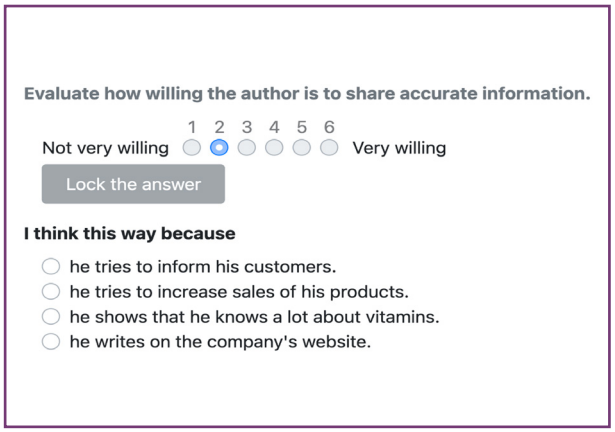


Figure 3. Screenshot of the evaluation and justification items.

Author identification: Percentage (%) of correct answers

	4th grade (n = 139)	6th grade (n = 198)	8th grade (n = 203)	Secondary school (n = 188)
Popular Science Text	58	68	77	84
Popular Science News Text	73	77	83	90
Blog Text	42	61	69	81
Commercial Text	68	70	79	81

Table 1. Percentage of students who correctly identified the author of the text.

Figure 4 also shows the students' ability to question the less credible texts developed during the school path. The younger the students, the harder it was for them to question the credibility of the less credible texts. However, the differences in skill levels were relatively small from grade to grade. Critical reading, especially questioning less credible texts, is therefore truly worth practicing.

Finally, how well did the students justify their credibility evaluations? The total average scores for the justification task are shown in Figure 5. Fourth graders did not complete this task because the requirements were demanding enough for them, even without it.

Even though the students could confirm the credibility of the texts quite well, they were not necessarily able to justify why the texts could be trusted. Therefore, it is important to practice justification skills. The better the student's justification skills are, the better they can evaluate the credibility.

Many factors support the evaluation of a text's credibility. These include prior knowledge of the text topic, basic reading skills, motivational factors and executive function skills.

In particular, reading comprehension skills support the evaluation of a text's credibility. In other words, the better the reading comprehension skills, the better the student can justify credibility (Kiili et al., 2023).

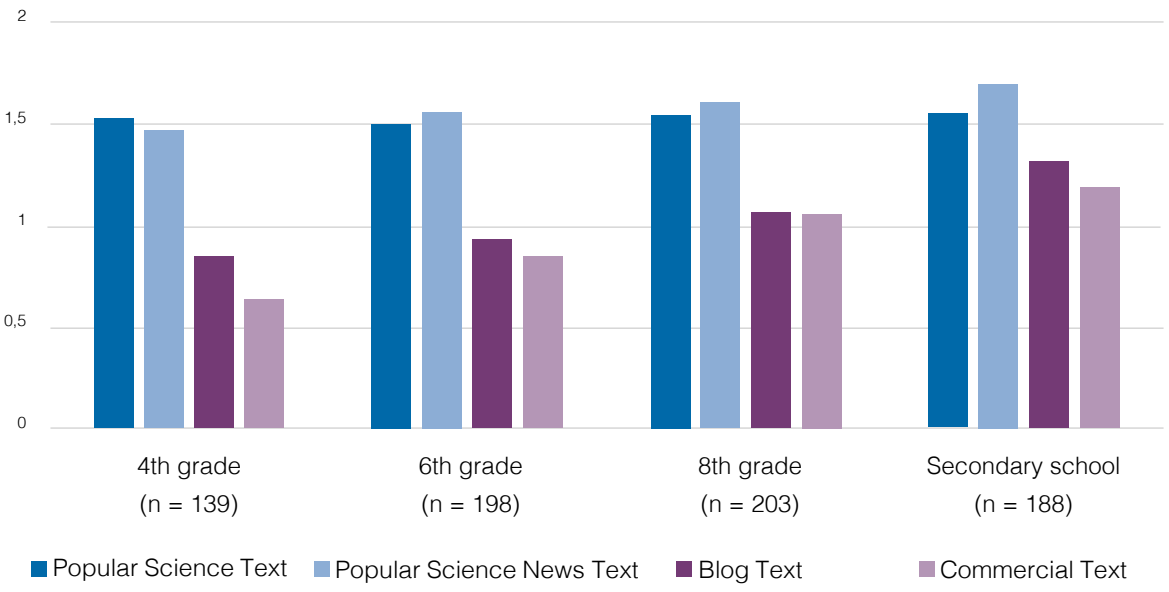


Figure 4. Students' mean scores on tasks requiring confirmation and questioning of the credibility of texts. Note.The maximum score for each task was 2. Approximately half of the students in secondary school were in upper secondary school and the rest were in vocational school.

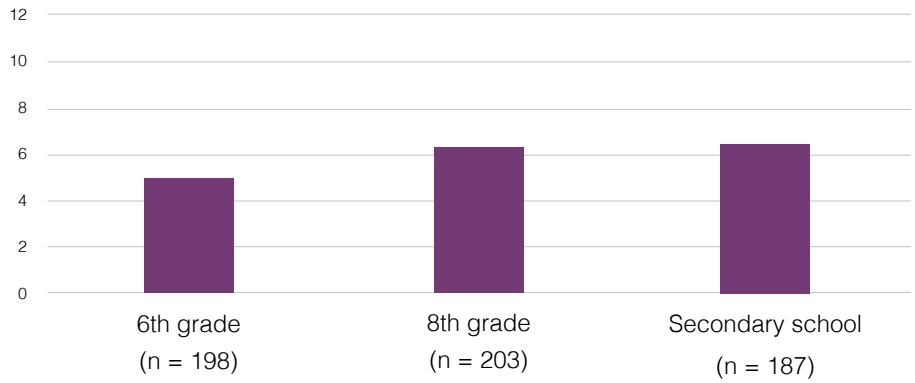


Figure 5. Students' mean scores for the justification task (max. 12 p.)

3. How can critical online reading be taught?

In school assignments, students often search for information online, and various assignments and presentations are based on online information. Thus, practicing critical reading should be embedded in all subjects.

It is important to note that online texts can be processed in two different ways (Figure 6). The first way of processing is fast and automatic. In this case, readers pay little conscious attention to credibility aspects, unless there is something deviant in the text that does not correspond to the reader's prior knowledge.

The second way of processing is slower and more reflective. Both types of processing are needed in everyday life. To ensure that students can move back and forth between these two ways, it is especially worthwhile to practice more analytical and slower processing in school.

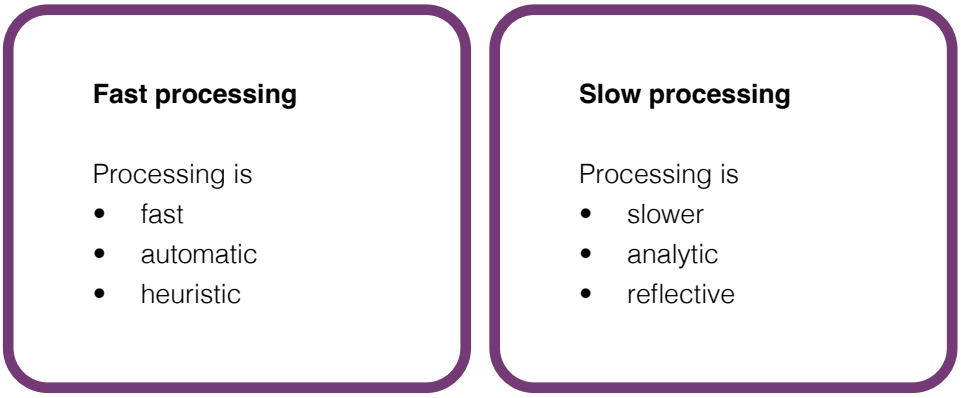


Figure 6. Characteristics of fast and slow processing (Kahneman, 2003).

Structuring instruction

When teaching how to evaluate the credibility of texts, the instruction can be structured so that it focuses on one aspect of credibility at a time. This ensures that teachers do not overwhelm students by covering too much ground at one time. The lessons can be structured according to credibility aspects:

1. **The author's expertise**
2. **The reputation and publishing practices of the publication venue**
3. **The intentions of the author or publisher**
4. **The quality of evidence**

Each credibility aspect can be addressed separately. First, the evaluation of the author's expertise can begin with discussions about what makes someone an expert. Then, students can examine the author's area of expertise and whether it is related to the topic of the text.

With older students, it is worthwhile to consider how individuals develop expertise. In this way, one considers expertise beyond the surface. Some students may think, for example, that researchers are not trustworthy if they write about research that they have not conducted themselves but instead merely report on research carried out by others.

Research has shown that not all students can identify the author of an online text. Sometimes, it can also be difficult to figure out where online text is published, especially if the website includes various elements. Therefore, with the youngest students, it is essential to practice locating authors or publishers before evaluating their expertise.

Second, teachers can discuss with students the publishing practices of different types of publication venues. The ethical responsibilities of a journalist is another issue to consider. Such discussions can include the following questions: What kinds of publication venues have gatekeepers? Where can web users publish relatively freely? What is the difference between a personal blog and an official blog?

Third, in addition to the source's expertise, it is essential to consider authors' and publishers' intentions. Teachers can discuss with their students what kinds of intentions (e.g. commercial or political) can undermine the credibility of online text.

Finally, it is important to practice identifying what authors claim and what kind of evidence they present to support their claims. This requires close reading and careful analysis of the text.

These key credibility aspects may appear in slightly different ways in different disciplines. Therefore, it is important to discuss who the experts are in a particular discipline and what kind of evidence they usually rely on to support their claims.

Readers can evaluate these credibility aspects across different kinds of texts, including social media messages. For example, students can examine so-called factual videos shared on TikTok to determine whether the author is an expert on the topic. Students can also check whether users only share information presented by others without checking the credibility of the original publication.

To sum up, structuring content in this way into smaller units makes it easier to set age-appropriate learning objectives.

Practicing evaluation skills with learning tasks

Searching for and independently evaluating authentic online texts is a demanding task. Task difficulty increases if students are asked to prepare a synthesis of texts, such as an essay. Therefore, credibility evaluation skills should first be practiced with more manageable, restricted tasks. Compared to authentic online spaces, the advantage of restricted tasks is that they make it easier for teachers to give feedback and ensure that learning objectives are achieved.

We have divided learning tasks into four different types according to their difficulty. The task types are presented in Figure 7 (p. 12), from the easiest to the most difficult. For each task type, teaching materials are available. Short descriptions of the materials and a link to them can be found on page 14.

The first task type represents restricted tasks, as these address only one credibility aspect at a time. ***Credibility evaluation tasks***, found in the teaching materials, can be used to practice a specific credibility aspect (e.g., evaluation of the author's expertise).

In the second task type, students evaluate the credibility of texts designed for teaching purposes. In these texts, credibility aspects have been deliberately manipulated so that they can be systemat-

ically considered in teaching. ***Evaluation cards***, ***Argument cards*** and ***Contradictory texts*** are materials that represent the second task type.

After practicing credibility evaluation skills with restricted materials, students can proceed to examine authentic online texts. In the third task type, the teacher selects online texts that are suitable for their subject and their students' age level. The teacher can select texts that differ, for example, in their credibility or perspectives. The selected texts can also include misleading information or argument fallacies, typical of social media posts.

Students can compare two pre-selected online texts on the same topic or order several texts according to their credibility and justify their ordering. These activities support students' critical thinking.

When evaluating texts, students can use an evaluation form that guides them to pay attention to different aspects of credibility. The materials include an example of a credibility evaluation form.

The fourth task type is the most demanding, as it involves synthesising information from self-selected online texts. Synthesising information from multiple online texts representing different perspectives can be supported with the ***Online enquiry tool*** presented in the materials.

Figure 7. Task types supporting critical online reading skills.

Timely support for students

Timely support for students is intertwined with the use of the tasks outlined above. Various designed texts and related tasks support the development of credibility evaluation skills towards the independent evaluation of online texts. In addition to staggered tasks, interactive support and scaffolding are essential.

Interactive support and scaffolding can take many forms. One way to support students is to model effective credibility evaluation practices by thinking aloud. This means that teachers verbalise their thinking while reading and evaluating a text, as shown in the following example.

"This article is about microplastics. It appears to have been published on the Health Hacker blog. Blogging platforms like this don't have much control over what people write.

We can see the author's name is Elena Smith. Let's take a closer look at her profession. It says she's an accountant and that she is interested in exercise and health-related issues; this means that she does not have any special or professional expertise in microplastics in water.

In the article, she claims that microplastics affect human metabolism. What does she base this claim on? She talks about her own metabolism and mentions some hearsay from her friend. Not very convincing! It looks like I need to find out more about microplastics in tap water. Next, I will search for a text written by an expert."

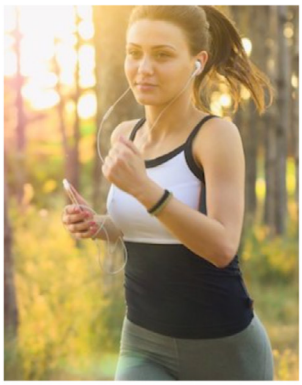
HEALTH HACKER -BLOG

How to get rid of microplastics in tap water?

I read online that tiny bits of plastic, known as microplastics, end up in our bodies. It was said that in a week, this makes as much as the size of a credit card! That's pretty shocking to think about! I don't even want to imagine what that means over a year.

When microplastics get into our bodies, they can cause harm to our metabolism. This is probably why my metabolism does not always work that well. Who knows what else microplastics can cause? A friend of mine told me that they can even increase the risk of cancer.

Microplastics find their way into our bodies from various sources, especially from the water we drink. How can we avoid these microplastics from entering our bodies? We drink several liters of water daily, so it makes sense that tap water must be the biggest source of microplastics. Fortunately, there are different types of water filters out there! Please send me a private message with tips on what kind of filter to consider buying. Let's move toward a healthier life!



I am Elena Smith - a self-taught health hacker. In my work as an accountant, I sit by the computer all day long. In my free time, I channel my energy into fitness and all things related to well-being. On my Health Hacker blog, you can read about my insights on how to nurture the health of body and mind.

Learning can also be supported by feedback during the process, which can be either teacher or peer feedback. Both types of feedback can be supported with the evaluation tool (see Teaching materials).

Studies have shown that encouraging students to work and talk together can be an effective way to teach evaluation skills (e.g. Kiili et al., 2019). Students get support from each other, and there are other benefits; for example, verbalising one's own thinking stimulates reasoning and working together enables more versatile and in-depth evaluations.

Overall, we have considered critical reading and how it can be taught to students of different ages. Yet, this only covers the very basics for getting started. It is clear that critical reading is a much broader issue. For example, texts' contexts and different perspectives can be discussed in more depth with older students.

Teaching materials

Evaluation tasks
With evaluation tasks, students can practise identifying and evaluating either the author's expertise and intentions or the quality of the evidence. These tasks are designed for sixth graders but can also be used at the teacher's discretion in secondary school.

Evaluation cards
The evaluation cards can be used to practice evaluating the author's expertise, the author's intentions and the quality of evidence. They are particularly suitable in primary schools. There are two sets of cards, with both sets containing three short texts. The cards are designed so that the texts differ in their credibility.

Argument cards
Argument cards can be used to practice evaluating expertise and the quality of evidence. They can be used in secondary school and upper secondary school. The health messages on the argument cards are based on Juhani Knuuti's (2020) book Health as a Commodity. The cards have been designed in such a way that the texts differ in terms of credibility.

Conflicting texts
Conflicting texts can be used to practice evaluating the main credibility aspects. The online texts can be used in primary and secondary schools. Four fictional texts on microplastics in tap water differ in their credibility. An evaluation form can be used to support the evaluation of online texts.

Evaluation tool
The evaluation tool can be used to assess secondary and upper secondary school students' evaluation skills. The tool includes five aspects— author, venue, motives, evidence and corroboration—to evaluate the credibility of texts. For example, the tool is suitable for a task in which the student reads and evaluates 3–5 texts, rates their credibility on a five-point scale and justifies this rating in writing. The tool includes authentic examples from upper secondary school students, and it can also be used for peer feedback.

Online inquiry tool
The online inquiry tool allows students to practice different aspects of critical online reading. It can be used to examine a controversial topic from different perspectives, by presenting reasons for and against a claim and evaluating sources. It can also be used to synthesise arguments from multiple texts, and it is thus useful for writing an argumentative essay. This tool includes a palette of perspectives that help students consider which of the perspectives are relevant for the topic at hand.

Teaching materials and videos supporting this publication are available in the Library of Open Educational Resources https://aoe.fi/#/kokoelma/338

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