DIGITAL NAVIGATOR

DRONE Handbook for Teachers

The DRONE Handbooks are designed for use by parents or carers, teachers, school heads, and trainers. Their primary purpose is to foster Digital Literacy and counter disinformation. The handbooks are flexible and can be adapted to suit various contexts and individual needs. For some users, they serve as an accessible introduction to the fundamentals of Digital Literacy and Disinformation, presenting essential concepts and practices in straightforward language. For others, the handbooks offer practical guidance on integrating Digital Literacy and Disinformation topics into learning activities for young people, whether in formal classrooms or non-formal educational environments. Additionally, the handbooks are valuable resources for those planning Digital Literacy and Disinformation Education programs or courses for other educators or trainers. In schools and similar formal educational settings, it is recommended to coordinate with the institution's data protection officers when using these handbooks.

TABLE OF CONTENTS

This handbook is a professional learning tool, designed to help you deepen your digital literacy, strengthen your teaching practice, and confidently guide students and their families through the challenges of the digital age.

It blends research, practical strategies, case studies, and classroom-ready tools drawn from the DRONE project and wider international evidence.

Whether you are new to digital literacy or already confident, the handbook is designed to support ongoing development.

How to get the most out of it

1. Start with self-assessment: Understanding your own digital strengths and gaps is essential. Use the competency checklists to identify your baseline and guide your professional growth.

2. Use chapters independently: You can read cover to cover, but each section (e.g., misinformation, resilience, bullying) is also a stand-alone resource you can return to when specific issues arise.

Each chapter stands alone, making it easy to consult when specific issues arise:

- A rumour enters the classroom: go to Misinformation

- A student is targeted online: go to Bullying & Cyberbullying

- You need to model better habits: go to Digital Resilience

- You want to develop decision-making lessons: go to Problem-Solving

3. Bring chapters into your teaching: Many activities, prompts, and strategies are classroom-ready. Try them in lessons, tutorials, group work, or even brief "teachable moments."

4. Reflect and model: The handbook encourages modelling openness, curiosity, and responsible digital behaviour. Students learn as much from how you think as what you say.

5. Collaborate with colleagues: Share insights, run small CPD sessions, and build a consistent digital culture across subjects. Teachers learn best when learning together.

6. Use the case studies: They are designed to mirror real school dilemmas. Adapt them for training sessions, group discussions, or scenario-based learning with students.

7. Revisit over time: Digital challenges evolve. Misinformation, cyberbullying, and new platforms will require ongoing professional reflection.

This handbook supports you not only in teaching students but in protecting yourself, your colleagues, and your learning community. It is a practical guide, a reflective resource, and a foundation for confident, ethical, and empowered teaching in a complex digital world.

If You Want to Go Deeper

Use the DRONE online training modules or in-person training to build stronger expertise in areas such as misinformation, cybersecurity, problem-solving, or resilience.

Access the DRONE website here: https://mydroneproject.eu/

How to Use This Handbook

The DRONE resources — a collection of training modules and three handbooks — were designed as a comprehensive, interconnected collection of tools that support digital literacy, resilience, responsible online behaviour, and the prevention of digital harm across the whole school community. Each resource plays a different role, but together they provide a 360-degree support system reaching students, families, teachers, and leadership teams. The purpose of this collection of resources is simple but powerful: to build a digitally confident, critically aware, and emotionally resilient learning community.

You may use the resources individually or as a cohesive system — whichever best fits your needs. Every resource — from full chapters to short guides — is a step toward that goal.

What is included?

1. Three Full Handbooks

Each handbook is tailored to a different audience:

- DRONE Handbook for Parents
- DRONE Handbook for Teachers
- DRONE Handbook for School Leaders

Although the structure is shared, each book includes audience-specific case studies, strategies, and responsibilities.
Parents focus on home practices; teachers focus on pedagogy; school leaders focus on policy and whole-school systems.

2. Training modules for teachers, school leaders, and parents

Each training module is available in three different formats. An online version is developed for independent online learning, and downloadable resources are available for organising an in-person or a synchronous online training session.

Each of the three target groups has a choice of training modules that can be used independently from other modules on the following topics:

- Information literacy
- Disinformation, misinformation, and fake news
- Resilience building
- Problem-solving
- Critical thinking
- Bullying and cyberbullying
- Cybersecurity
- Building alliances

How the Pieces Fit Together

Parents

- Begin with your Parent Handbook for full understanding.

- Use the Quick Cybersecurity Guide, Bullying Toolkit, and Conversation Guide for everyday support.

- Explore the reading lists to build long-term digital awareness at home.

- If you want to dig deeper and you haven't done training on a topic before, check the relevant training module to learn more.

- If you feel that teachers need to know more, recommend the teacher resources to them.

Teachers

- Start with the Teacher Handbook to build your own digital competence.

- Keep the Teacher Quick Reference Guide in your classroom or staffroom.

- Use student-facing tools (Digital Survival Guide, etc.) in lessons or tutor sessions.

- Refer to case studies and toolkits during incidents involving misinformation, bullying, or online conflict.

- If you want to dig deeper and you haven't done training on a topic before, check the relevant training module to learn more.

- If you think parents of your students need more support, recommend the parent resources to them.

School Leaders

- Use the School Leader Handbook to shape policy, risk assessment, and digital culture.

- Share the Quick Guides with staff and parents to build consistent understanding.

- Use the toolkits to support staff training and community engagement.

- Refer to reading lists, research summaries, and the teacher resources when designing school-wide CPD.

- If you want to dig deeper and you haven't done training on a topic before, check the relevant training module to learn more.

- If you think parents of your students need more support, recommend the parent resources to them.

WHERE TO FIND WHAT IN THIS HANDBOOK

Find your path through this handbook (click to access the desired section)

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INTRODUCTION: THE TEACHER'S ROLE IN DIGITAL LITERACY AND DISINFORMATION

Digital Literacy and Disinformation: Why Teachers Matter

In every classroom today, whether primary or secondary, digital environments shape what students know, how they learn, and who they become. A history lesson may be disrupted when a student challenges the teacher with information found on TikTok. A maths group chat can collapse into hostility because of a viral rumour. A science project might flourish thanks to an open-source online tool.

Teachers are at the frontlines of these shifts. They are not only educators but also digital mentors, guiding students through a world where information can empower or mislead. Digital literacy is not confined to ICT lessons; it permeates all subjects. A geography teacher needs to address climate misinformation. An English teacher must help students evaluate online sources for essays. Even a physical education teacher may need to counter harmful "fitness trends" spreading through social media.

The DRONE research shows that teachers are consistently the first adults confronted with disinformation in action. Students often test new claims in class before bringing them home, and teachers are expected to respond confidently. This positions teachers as critical defenders of truth, resilience, and ethical digital engagement.

Why Digital Literacy Matters for Teachers

Being digitally literate as a teacher means more than knowing how to operate digital tools or use a learning management system. It means:

- Understanding how digital tools affect learning: from collaborative opportunities in online projects to the risks of distraction, screen fatigue, and inequity when access differs among students.

- Recognising risks: such as misinformation about health, misleading statistics in news media, online grooming or exploitation, and harmful viral trends that can spill into school life.

- Taking advantage of opportunities: like virtual exchanges with partner schools, high-quality open educational resources (OERs), or creative student projects using video, coding, and design tools.

- Acting as a role model: modelling critical questioning, transparency, ethical online communication, and safe use of personal data.

Digital literacy is therefore both a professional competence and a teaching responsibility. Without it, teachers risk leaving students vulnerable to manipulation, bullying, or disengagement. With it, they empower students to become informed, confident, and resilient digital citizens.

The Role of Teachers in Fostering Digital Literacy

Teachers do more than deliver content. They model how to approach content. When a teacher demonstrates curiosity about a source, or calmly dismantles a false claim, students learn not only subject knowledge but also digital habits.

A digitally literate teacher helps students to:

- Question sources: Who created this? What was their purpose? How reliable is it?

- Build resilience: How do I handle upsetting or misleading content without panic?

- Recognise disinformation: Can I spot when someone is deliberately trying to mislead?

- Develop problem-solving skills: If I encounter a confusing or conflicting claim, how can I resolve it?

Teachers become, in effect, co-learners with their students. They don't need to know every trend or every platform, but they need to show how to approach them with openness, caution, and critical thinking.

COMPETENCE DEVELOPMENT AND INSIGHTS FROM THE DRONE RESEARCH

The DRONE project found that teachers frequently feel underprepared for the pace and complexity of digital change. They recognise their responsibility but lack the training, time, or emotional support to meet it fully.

The research highlights three areas of pressing need:

1. Continuous professional development

• One-off workshops are not enough. Teachers need ongoing opportunities to refresh their digital skills, learn about emerging trends, and practice classroom strategies.

• Professional development should cover not only technical skills but also pedagogical and ethical dimensions: how to handle misinformation in sensitive areas (politics, health, history), how to discuss online harm, and how to integrate digital literacy across subjects.

2. Practical classroom strategies

• Teachers want ready-to-use activities, such as checklists for evaluating sources, classroom debates on viral claims, and step-by-step guides for digital investigations.

• They also need strategies for time-sensitive moments: how to respond when a student brings misinformation into a lesson, or when an online rumour starts disrupting classroom trust.

3. Emotional support for teachers themselves

• Teachers are not immune to online harassment or misinformation. Some face criticism from parents or the community for teaching "controversial" topics. Others are personally targeted through social media.

• DRONE findings stress that teachers need institutional backing, clear policies for handling harassment, and supportive peer networks.

The Teacher as Co-Learner

One of the most important insights from the DRONE research is that teachers often struggle with digital literacy much more than their students or parents. Teachers cannot be expected to know everything about digital environments. Platforms evolve rapidly. Trends appear and disappear in weeks. Even fact-checkers struggle to keep pace.

The key is not omniscience, but modelling how to learn in uncertain digital spaces. A teacher who says, "I'm not sure if that's true. Let's check together" demonstrates humility, critical thinking, and openness. This collaborative approach transforms the classroom into a safe testing ground for digital literacy.

PRACTICAL DIMENSIONS OF TEACHER DIGITAL LITERACY

1. Classroom Management of Misinformation

Teachers need strategies for when students bring unverified claims into lessons. Instead of confrontation, teachers can:

- Redirect the claim into a classroom inquiry: "Let's look at the source together."

- Demonstrate fact-checking using reliable tools.

- Encourage respectful debate, showing that disagreement can be constructive.

2. Cross-Curricular Integration

Digital literacy should not be isolated in ICT. Teachers in all subjects can integrate it:

- Science: analysing misleading health claims.

- History: examining propaganda and historical disinformation.

- Languages: exploring translation errors or manipulation in multilingual content.

- Art: discussing manipulated images or AI-generated works.

3. Teacher Self-Reflection

Teachers must also assess their own digital habits. Do they fact-check before sharing with colleagues? Do they model healthy digital balance (e.g., taking screen breaks)? Students notice and imitate these behaviours.

Case Study 1: "The Viral Claim"

During a biology class, a student insists that a viral video proves vaccines are dangerous. The teacher resists the urge to dismiss the claim outright. Instead, she asks the class:

• Who created the video?

• What evidence is used?

• Are there reliable sources with different perspectives?

Together, they look at trusted medical websites and news sources. They compare the techniques used in the viral video (emotional music, lack of references) with the evidence based explanations from health authorities.
Outcome: Students leave not only better informed about vaccines, but also better equipped to evaluate any future viral claim. The teacher transforms a potential disruption into a powerful learning moment.

Case Study 2: "The Rumour About the Teacher"

In a secondary school, a false rumour spreads online that a teacher favours certain students and gives them higher grades. The rumour begins in a private group chat but quickly spills into the classroom. The teacher addresses it openly, explaining the grading process and showing anonymised examples of marking criteria.
The school leadership backs the teacher publicly, issuing a statement to parents about fairness and transparency. The teacher also uses the incident to discuss with students how rumours spread and why they can damage reputations.
Outcome: The crisis becomes an educational opportunity, strengthening both the teacher's credibility and the students' understanding of disinformation.

Opportunities and Risks for Teachers

Opportunities

- Collaborative tools: shared documents, online discussion boards, and project management platforms can empower group learning.

- Access to resources: teachers and students have unprecedented access to global knowledge, academic materials, and creative tools.

- New pedagogies: digital platforms allow for flipped classrooms, blended learning, and personalised education.

Risks

- Information overload: without guidance, students drown in sources of varying quality.

- Harmful trends: viral challenges, health misinformation, or extremist narratives can infiltrate school spaces.

- Online exploitation: grooming, scamming, and data misuse threaten student safety.

- Teacher vulnerability: staff can be targeted by online abuse, misrepresentation, or surveillance.

A digitally literate teacher recognises both dimensions, maximising opportunities while mitigating risks.

Building Teacher Competence

The DRONE project recommends several approaches for teacher competence-building:

- Regular self-assessment: Teachers can use digital literacy checklists to measure their strengths and areas for growth.

- Peer learning communities: Schools should encourage teachers to share resources, experiences, and strategies.

- External partnerships: Collaborating with universities, NGOs, and fact-checking organisations can provide professional development.

- Safeguarding policies: Teachers must feel supported when handling online harassment or digital controversies.

CONCLUSION: TEACHERS AS THE BACKBONE OF DIGITAL RESILIENCE

Teachers occupy a unique position. They are daily role models for young people on how to engage with information. They are trusted guides when students are confused or misled. And they are often the first responders when disinformation disrupts learning.

To succeed in this role, teachers must:

- Develop their own digital literacy continuously.

- Integrate critical thinking and source analysis across all subjects.

- Treat misinformation not as a nuisance, but as an opportunity for learning.

- Seek support from colleagues, leadership, and the wider community when facing challenges.

By embracing these responsibilities, teachers help create a generation of students who are not only knowledgeable, but resilient, ethical, and critically aware digital citizens.

A DIGITALLY LITERATE TEACHER HELPS STUDENTS TO:

QUESTION
SOURCES ●

● BUILD
RESILIENCE

DEVELOP ●
PROBLEM-
SOLVING
SKILLS

● RECOGNISE
DISINFORMATION

CHAPTER 1

INFORMATION LITERACY
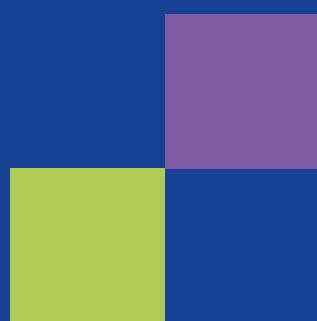
WHAT IS INFORMATION LITERACY?

Information literacy is more than the ability to use Google or find a video on YouTube. It is the competence to find, evaluate, interpret, and use information effectively. For teachers, this skill is fundamental not only for their own professional practice but also for how they prepare students for life.

In practical terms, information literacy means asking questions such as:

- Who created this content?
- Why was it published?
- What evidence supports it?
- How reliable is the source?
- What perspectives are missing?

When teachers master these habits, they can model them in the classroom. Students learn that information is not all equal – some is credible and evidence-based, while other content is misleading, biased, or outright false.

Why Teachers Need Strong Information Literacy

Teachers are daily curators of knowledge. Students look to them for guidance in distinguishing fact from fiction. When teachers themselves lack confidence in evaluating information, two risks emerge:

1. Passively reinforcing misinformation – for example, by sharing resources without checking credibility.

2. Missing teachable moments – ignoring or dismissing students' questions about viral claims instead of turning them into opportunities for critical engagement.

Teachers with strong information literacy can:

- Confidently select high-quality resources for teaching.
- Integrate fact-checking exercises into their lessons.
- Model respectful scepticism and open inquiry.
- Support students in building lifelong critical habits.

Developing Your Information Literacy Competences

The DRONE research highlights that many teachers feel underprepared to deal with the flood of digital content their students bring into class. Building your own competence is the first step.

Practical Steps for Teachers

1. Practice Fact-Checking Regularly

- Use fact-checking sites (Snopes, Full Fact, EU vs Disinfo).

- Try a "daily 5-minute fact-check" habit: pick a trending claim and trace its source.

2. Evaluate Your Own Sources

- When using a worksheet, video, or online article in class, apply the same questions you want students to ask: Who produced this? What's their goal? How credible is it?

3. Diversify Inputs

- Avoid over-reliance on a single source (e.g., Wikipedia or one news outlet). Model triangulation by showing how different sources compare.

4. Model Transparency

- If you're not sure about something, say so. Then show students how you check. This builds trust and demonstrates lifelong learning.

5. Stay Professionally Informed

- Follow educational organisations, fact-checkers, and research groups.

- Use teacher networks to share reliable resources.

Supporting Students' Information Literacy

Teaching information literacy is not about giving students a checklist once a year. It requires embedding critical habits into everyday classroom practice.

Classroom Strategies

1. Source-Spotting Exercises

• Present students with a set of sources on the same topic (e.g., climate change). Include a scientific report, a news article, a blog, and a meme. Ask: Which are credible? Why?

2. The 3-Question Rule

Train students to ask three questions about every source:

• Who created this?

• What's their purpose?

• How can I verify it?

3. Fact-Check Fridays

• Dedicate a short slot once a week to analysing a claim or headline students bring in. Encourage them to research as a group.

4. Headline Comparisons

• Take the same news event covered by three outlets. Compare language, tone, and framing. Discuss how media choices shape interpretation.

5. Integrate Across Subjects

• In history, examine propaganda.

• In science, test health claims.

• In literature, compare original texts to online summaries.

When Things Go Wrong

Even with good teaching, students will sometimes fall for misleading content. Teachers may also feel caught off-guard. Knowing how to respond calmly is key.

Warning Signs in Students

- Repeating extreme claims without evidence.

- Sharing harmful or conspiracy-style content.

- Confusion about whether something is "real" or "fake."

- Hostile behaviour when a claim is challenged.

Teacher Response Strategies

1. Stay Calm and Neutral

- Avoid shaming. If you ridicule a student for believing something, they may double down instead of rethinking.

2. Use the Moment as a Learning Opportunity

- Shift from confrontation to inquiry. Ask: "How could we check this claim?"

3. Model Fact-Checking Together

- Walk through the process step by step: search for the original source, look for expert commentary, compare evidence.

4. Escalate if Needed

- If misinformation is harmful (e.g., hate speech, medical falsehoods), address it formally with leadership or safeguarding teams.

Case Study 1: The "5G Conspiracy" in Physics Class

A student insists that 5G towers cause illness. Instead of dismissing it, the teacher asks the class to investigate:

- Where did this claim originate?

- What does the World Health Organization say?

- How does peer-reviewed science test radiation safety?

Outcome: Students practice evaluating scientific evidence. They learn to see the difference between rumours and expert consensus.

Case Study 2: The Homework from Wikipedia

A teacher notices multiple students copied information from Wikipedia without attribution. Instead of punishing them, she runs a mini lesson:

- How does Wikipedia work? Who edits it?

- What are the strengths and weaknesses of crowd-sourced knowledge?

- How can we cross-check Wikipedia with other sources?

Outcome: Students recognise Wikipedia as a starting point, not an endpoint, and learn to cite responsibly.

Case Study 3: The Local Rumour

A false rumour spreads online that the school will cancel sport's day. Students arrive upset. Teachers use the moment to discuss:

- How rumours spread digitally.

- Why it is important to check official sources.

- How to respond when misinformation affects a community.

Outcome: The crisis turns into a practical lesson on community trust and information literacy.

TOOLS AND RESOURCES FOR TEACHERS

Building a Whole-Class Culture of Information Literacy

- Encourage Curiosity: Reward students for asking "Is this reliable?"

- Normalise Doubt: Treat scepticism as a strength, not defiance.

- Value Process Over Product: Praise the effort of checking, even if conclusions are imperfect.

- Create a Safe Space: Let students explore claims without fear of ridicule.

Teacher Self-Care in the Information Age

Teachers can feel overwhelmed by the sheer volume of misinformation – especially when students look to them as authorities on everything. Remember:

- You are not expected to know every answer.

- It's okay to say, "I don't know, let's find out."

- Share the responsibility: encourage peer-learning among students.

- Protect your own mental health – step back from doomscrolling or online arguments outside of teaching.

Other resources and tools:

- CRAAP Test (Currency, Relevance, Authority, Accuracy, Purpose) – a simple framework for students.[1]

- SIFT Method (Stop, Investigate, Find, Trace) – developed for quick online fact-checking.[2]

- News Literacy Project (Checkology platform).[3]

- Common Sense Education (lesson plans and activities).[4]

- SAILS Project Toolkits (integrated checklists for teachers and students).[5]

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1 https://guides.lib.uchicago.edu/c.php?g=1241077&p=9082343#:~:text=The%20CRAAP%20Test&text=CRAAP%20stands%20 for%20Currency%2C%20Relevance,the%20information%20that%20you%20find.

2 https://guides.lib.uchicago.edu/c.php?g=1241077&p=9082322

3 https://get.checkology.org/

4 https://www.commonsense.org/education/digital-citizenship

5 https://sails.deusto.es/

Conclusion

Information literacy is the foundation of digital literacy. For teachers, it is both a personal skill and a professional responsibility. By strengthening your own competence and embedding critical habits into daily classroom life, you empower students to become not just consumers of information, but evaluators, creators, and responsible citizens.

In the face of misinformation, teachers are not powerless. Every viral claim, every dubious headline, every classroom rumour is an opportunity to build resilience and critical thinking. By modelling inquiry and providing tools, teachers prepare students not just to pass exams, but to thrive in a complex digital world.

TEACHER RESPONSE STRATEGY FOR STUDENTS FALLING FOR MISLEADING CONTENT

STAY CALM AND NEUTRAL
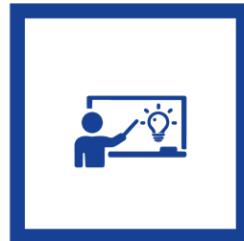
USE MOMENTS AS A LEARNING OPPORTUNITY

ESCALATE IF NEEDED

MODEL FACT-CHECKING TOGETHER

CHAPTER 2

DISINFORMATION, MISINFORMATION AND FAKE NEWS
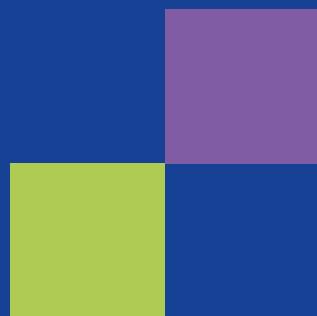
UNDERSTANDING THE CONCEPTS

In everyday conversations, the terms disinformation, misinformation, and fake news are often used interchangeably. Yet they describe distinct challenges, each of which affects students and classrooms differently.

- **Misinformation**: Misinformation is false or inaccurate information.

Example: A student shares a health tip they found on social media, believing it is true.

- **Disinformation**: false information which is deliberately intended to mislead—intentionally misstating the facts. It is deliberate misinformation.

Example: A fabricated news story claiming an ethnic group is to blame for a local problem, created to stir division.

- **Fake News**: A broad, popular label often applied to any content perceived as untrustworthy. It can cover both misinformation and disinformation, but it is often weaponised in political debates.

Understanding these distinctions helps teachers respond with nuance. Not every incorrect claim by a student is disinformation. Sometimes, it is an honest mistake – a chance to teach.

Why This Matters for Teachers

Every day, students consume information from TikTok, YouTube, Snapchat, gaming forums, and WhatsApp groups. Research shows that young people struggle to distinguish credible sources from misleading ones. In fact, one European study cited in the DRONE project found that more than half of adolescents could not reliably tell whether an online headline was fact-based or opinion.

For teachers, this creates multiple challenges:

1. Classroom Disruption

Viral claims can spark heated debates, distract lessons, or create mistrust.

2. Student Vulnerability

Misleading health information (e.g., about vaccines, diets, or mental health remedies) can put students at real risk.

3. Community Tension

False rumours can damage parent-school relations or erode confidence in teachers.

4. Professional Pressure

Teachers themselves may be accused of spreading "fake news" if parents disagree with what is taught in class.

Teachers must therefore develop not only the skills to evaluate information personally but also pedagogical strategies for guiding students through a landscape filled with half-truths and deliberate lies.

DEVELOPING YOUR UNDERSTANDING AND SKILLS

Teachers cannot prevent misinformation from entering the classroom – but they can decide how to respond.

Key Skills for Teachers

1. Source Evaluation

Always check: Who produced this? What organisation stands behind it? What evidence is provided?

2. Spotting Manipulation Tactics

Look for emotional language, scapegoating, conspiracy framing, or doctored visuals.

3. Lateral Reading

Instead of staying on one site, open multiple tabs to cross-check claims. This is the method used by professional fact-checkers.

4. Context Awareness

Understand that students are exposed to different online "echo chambers." What feels implausible to one group may feel obvious to another.

5. Modelling Digital Humility

Teachers do not need to know everything. Acknowledging uncertainty while demonstrating verification builds credibility.

TEACHING STUDENTS TO IDENTIFY MISINFORMATION AND DISINFORMATION

The most effective approach is to embed critical engagement across the curriculum rather than treating it as a one-off lesson.

Classroom Strategies

1. Misinformation Show-and-Tell

Invite students to bring in a claim they saw online. As a class, evaluate it together. This empowers them to practise checking in a safe environment.

2. Compare and Contrast

Take one news story reported by three outlets. Analyse differences in framing, tone, and evidence. Ask: Why do these variations exist?

3. Spot the Trick

Teach students to recognise manipulation tactics: fake experts, cherry-picked data, misleading graphs, emotional appeals, or conspiracy framing.

4. Role-Playing Exercises

Divide students into groups: journalists, fact-checkers, and audience members. Give them a viral claim and ask them to handle it from their perspective.

5. Use Fact-Checking Tools

Show students how to reverse image search, use sites like Snopes or FactCheck.org, and cross-reference official data sources.

WHEN THINGS GO WRONG

Teachers will inevitably face moments when misinformation or disinformation has taken hold. Handling these situations requires balance: addressing falsehoods without humiliating students.

Warning Signs

- Students repeat extreme or conspiratorial claims as fact.

- A group of students targets others based on false information.

- Parents confront teachers with online rumours.

- Students become anxious or fearful because of alarming misinformation.

Response Strategies

1. Stay Calm and Respectful

Avoid ridicule or anger. Dismissing students outright can entrench their belief.

2. Use the Opportunity for Inquiry

Say: "That's interesting – how can we check if it's accurate?"

3. Redirect to Trusted Sources

Provide tools for verification: government websites, scientific journals, reputable media outlets.

4. Escalate When Necessary

If the misinformation involves hate speech, incitement, or health risks, involve school leadership and safeguarding staff.

Case Study 1: The "Flat Earth Debate"

In a geography lesson, a student insists the Earth is flat, citing a YouTube documentary. Instead of shutting down the discussion, the teacher invites the class to:

- Analyse the documentary's techniques.

- Compare its claims with NASA imagery and physics experiments.

- Discuss why conspiracy theories appeal to some people.

Outcome: Students not only reinforce scientific knowledge but also learn about the psychology of conspiracy theories and the importance of evidence.

Case Study 2: The False Health Trend

Several students in a PE class begin following a "miracle diet" promoted by influencers. The teacher notices changes in their eating habits. Rather than ignore it, she collaborates with the science teacher to create a cross-disciplinary lesson:

- Evaluate the influencer's credentials.

- Compare claims with nutritional science.

- Discuss why social media trends spread and who profits.

Outcome: Students learn to question authority figures online and understand the risks of unverified health advice.

CASE STUDY 3: THE PARENT RUMOUR

A rumour spreads on WhatsApp that the school will no longer allow parents to attend assemblies. Parents arrive upset. The teacher collaborates with school leadership to:

• Issue a clear statement correcting the rumour.

• Hold a short workshop for parents on recognising misinformation in community groups.

Outcome: Trust is restored, and parents feel empowered to spot falsehoods in the future.

TOOLS AND RESOURCES FOR TEACHERS

Teacher Self-Protection Against Misinformation

Teachers themselves can be targeted by misinformation or false claims online. To protect yourself:

- Keep communication transparent: Share lesson content and goals openly with parents.

- Document incidents: Save screenshots if you are misrepresented online.

- Seek support: Involve school leadership if false claims escalate.

- Set boundaries: Avoid engaging in online arguments with students or parents.

Building a Culture of Inquiry

Ultimately, the goal is not to shield students from every falsehood but to prepare them to question, analyse, and respond critically. Teachers can foster this by:

- Normalising scepticism in all subjects.

- Celebrating curiosity when students ask, "How do we know this is true?"

- Embedding cross-curricular projects where students fact-check real-world issues.

- Creating safe spaces where students can admit confusion or mistakes without shame.

Other resources and tools:

- SIFT Method: Stop, Investigate the source, Find better coverage, Trace claims to their origin.[6]

- News Literacy Project (Checkology): interactive modules for students.[7]

- First Draft News: resources on spotting manipulation tactics.[8]

- European Digital Media Observatory: updates on disinformation campaigns.[9, 10]

- SAILS Project Checklists: ready-to-use classroom tools.[11]

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6 https://guides.lib.uchicago.edu/c.php?g=1241077&p=9082322

7 https://get.checkology.org/

8 https://firstdraftnews.org/long-form-article/understanding-information-disorder/

9 https://digital-strategy.ec.europa.eu/en/policies/european-digital-media-observatory

10 https://edmo.eu/

11 https://sails.deusto.es/

CONCLUSION

Misinformation, disinformation, and fake news are not peripheral challenges. They are central realities of modern teaching. Every viral video, every WhatsApp rumour, every trending conspiracy that reaches the classroom is an opportunity:

- An opportunity to model critical thinking.

- An opportunity to strengthen resilience.

- An opportunity to prepare students for a future where credibility, truth, and trust are constantly contested.

Teachers cannot prevent falsehoods from circulating, but they can equip students with the tools to face them. By building their own competences and fostering a culture of inquiry, teachers turn misinformation from a threat into a teaching moment – and help shape a generation of informed, critical digital citizens.

DISINFORMATION, MISINFORMATION AND FAKE NEWS: KEY SKILLS FOR TEACHERS

SOURCE EVALUATION

SPOTTING MANIPULATION TACTICS

LATERAL READING

CONTEXT AWARENESS

MODELLING DIGITAL HUMILITY
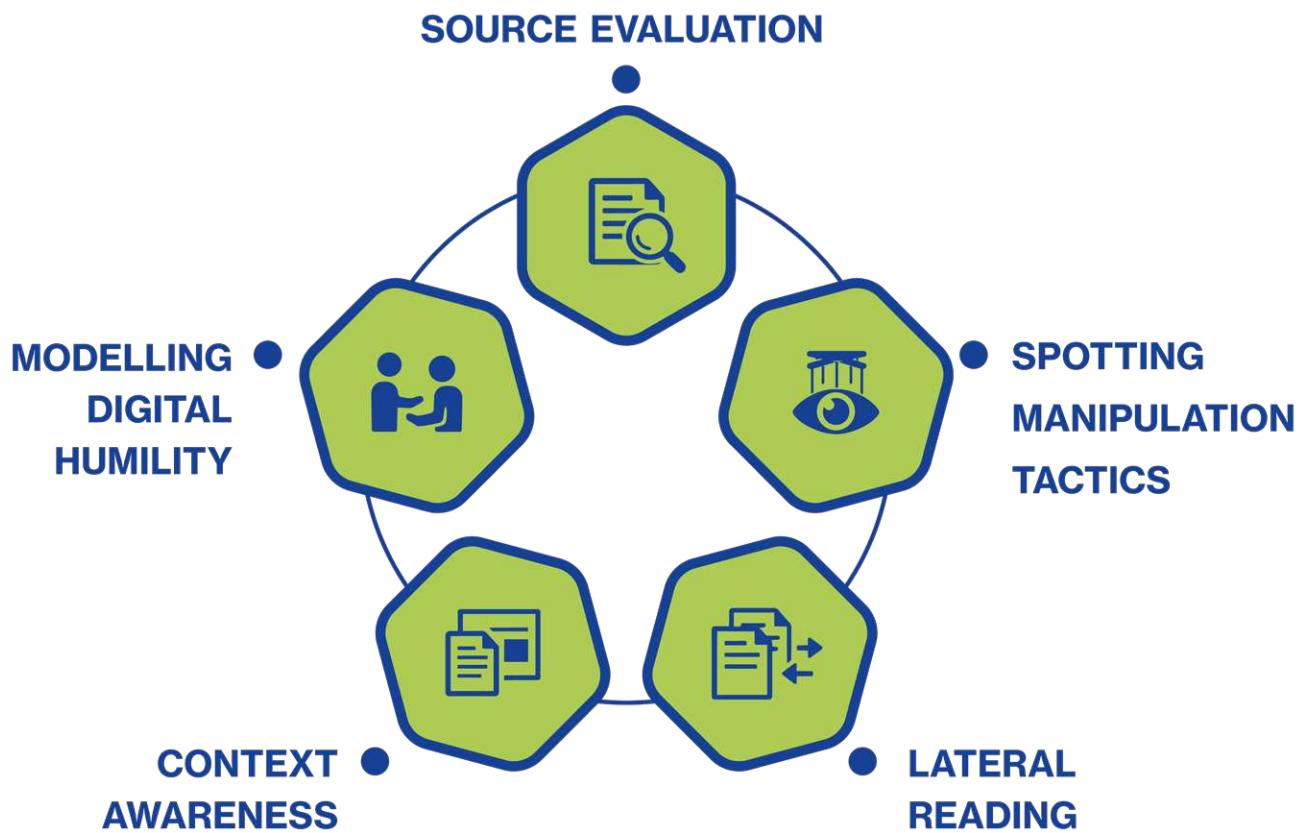
CHAPTER 3

RESILIENCE BUILDING
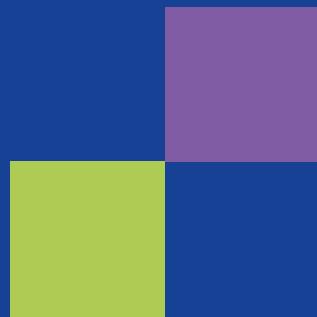
Why Digital Resilience Matters

Resilience in the digital age is the ability to cope with, recover from, and adapt to negative online experiences. Unlike information literacy, which is about what we know, resilience is about how we respond when things go wrong.

Teachers play a dual role here:

1. Building their own resilience in a world where teachers themselves are subject to digital stress, scrutiny, and sometimes harassment.

2. Supporting students to handle cyberbullying, misinformation, online exclusion, or emotional distress triggered by digital interactions.

The DRONE research underlines that resilience is not just a student skill – it is a whole-school responsibility, and teachers are at the heart of it.

Teacher Resilience in the Digital World

Teaching has always been a demanding profession. The digital era adds new pressures:

• Online harassment: Teachers may be criticised or mocked online by students, parents, or anonymous accounts.

• Constant connectivity: Expectations to respond to emails, messages, or learning platforms outside work hours.

• Information overload: Continuous exposure to misinformation, digital rumours, or negative online news.

• Boundary challenges: Blurred lines between personal and professional digital identities.

STRATEGIES FOR TEACHER RESILIENCE

1. Set Digital Boundaries

• Establish "offline hours." Make clear to students and parents when you are available and when you are not.

• Use separate accounts for personal and professional communication.

2. Develop a Support Network

• Share experiences with trusted colleagues.

• Participate in professional learning networks that address digital challenges.

3. Document and Report Harassment

• Keep screenshots if you experience online abuse.

• Follow school protocols to escalate rather than handling it alone.

4. Practise Digital Wellbeing

• Limit doomscrolling or constant monitoring of social media.

• Use mindfulness or resilience techniques (breathing exercises, short breaks).

5. Seek Training and Guidance

• Attend workshops on managing online stress and building resilience.

• Engage in CPD (continuing professional development) focused on teacher wellbeing in digital spaces.

BUILDING STUDENT RESILIENCE

Students face constant exposure to online risks: cyberbullying, social exclusion, harassment, fake news, scams, and harmful trends. While prevention is important, resilience ensures that when harm occurs, students have the skills, support, and confidence to recover.

What Resilient Students Can Do

- Recognise harmful digital behaviour.

- Seek help without fear of blame.

- Manage their emotional responses.

- Learn from mistakes rather than being defined by them.

- Support peers facing similar challenges.

Practical Classroom Strategies

Teachers can integrate resilience-building into lessons, discussions, and classroom culture.

1. Normalise Talking About Mistakes

- Encourage students to share when they believed something false online. Frame mistakes as learning opportunities.

2. Role-Play Scenarios

- Act out situations: What do you do if you see a mean comment? If a friend shares a false rumour? Role-playing builds problem-solving confidence.

3. Build Digital Coping Strategies

- Teach students practical steps: block/report abusive accounts, use privacy settings, save evidence.

4. Encourage Emotional Expression

- Create safe spaces for students to discuss how online experiences affect them. Journaling or anonymous "worry boxes" can help.

5. Promote Positive Digital Practices

- Encourage students to share positive online interactions (supportive comments, helpful communities) to balance narratives of harm.

When Things Go Wrong

Even resilient students will face crises. Teachers need to recognise early signs and act quickly.

Warning Signs in Students

- Sudden withdrawal from digital activities.
- Anxiety or reluctance to attend school.
- Visible distress after checking their phone.
- Repeating harmful content or rumours.
- Expressing hopelessness about online experiences.

Teacher Response

1. Listen Without Judgment

Create a safe environment where students feel heard. Avoid immediate blame ("Why did you post that?").

2. Acknowledge Their Feelings

Validate emotions: "It sounds like that was really hurtful."

3. Problem-Solve Together

Discuss practical steps: blocking, reporting, seeking adult support.

4. Involve Support Systems

Turn to school safeguarding teams, counsellors, or parents when appropriate.

5. Follow-Up

Check in regularly. Resilience is built through ongoing support, not a one-time conversation.

Case Study 1: The Group Chat Exclusion

A student is excluded from a class WhatsApp group and the rumour circulating the school reaches the teacher. The student feels isolated and distressed. The teacher uses the situation as a trigger to:

- Discuss with the class why digital exclusion is a form of bullying.

- Encourage inclusive digital behaviour.

- Provide the student with emotional support and alternatives.

Outcome: The incident becomes a teaching moment, building empathy and resilience across the group.

Case Study 2: Teacher Harassment

A teacher discovers that students created a meme mocking her teaching style. Instead of reacting with anger, she documents the incident and reports it through school channels. Later, she uses a general lesson on digital respect (without naming the case) to teach about online harm. Outcome: The incident is handled professionally, and the teacher models resilience in action. Students learn about accountability and empathy.

Case Study 3: Viral Scare

A false rumour circulates online that a violent incident will happen at school. Anxiety spreads among students. Teachers work with school leaders to:

- Share verified information with parents and students.

- Provide space for students to express fears.

- Discuss how viral scares spread and why people share them.

Outcome: The crisis is de-escalated, and students gain insight into the psychology of digital fearmongering.

TOOLS AND RESOURCES FOR BUILDING RESILIENCE

Teacher Self-Care: A Non-Negotiable

Teachers cannot build resilience in students if they are running on empty themselves. Prioritising your own wellbeing is not selfish – it is professional.

Self-Care Checklist

- Do I have digital boundaries in place?
- Do I know who to contact if I face online harassment?
- Do I have trusted colleagues to share experiences with?
- Do I make time for offline hobbies and recovery?
- Do I model healthy digital behaviour for my students?

Building a Whole-School Culture of Resilience

Resilience should not depend solely on individual teachers. School leaders, parents, and communities all play a role. Teachers can advocate for:

- Policies that protect both staff and students from online harm.
- Training that equips all staff to recognise and respond to digital distress.
- Curriculum Integration that embeds resilience into everyday lessons.
- Collaboration with Parents to ensure consistent support at home.

Other resources and tools:

- Resilience Frameworks: Many NGOs offer resilience-building toolkits for schools.
- Childline/helplines: Promote these as resources students can access outside school.
- Mindfulness Apps: Introduce age-appropriate digital wellbeing tools.
- DRONE Project Resources: Provide checklists for handling online harm.

CONCLUSION

Resilience is not about avoiding harm – it is about developing the confidence, strategies, and support systems to cope when harm occurs.

For teachers, resilience is both personal and professional:

- Personally, they must set boundaries, seek support, and protect their wellbeing.

- Professionally, they must guide students through crises, model healthy coping, and embed resilience-building practices into the classroom.

Every online conflict, every exclusion, every viral scare is an opportunity. If teachers respond with empathy and strategy, they transform harm into growth. In this way, resilience becomes not just a defensive shield, but a positive capacity for thriving in a digital world.

TEACHER RESPONSE TO STUDENTS FACING CRISES

JUDGMENT

FOLLOW-UP

ACKNOWLEDGE THE FEELINGS

INVOLVE SUPPORT SYSTEMS

PROBLEM-SOLVE TOGETHER
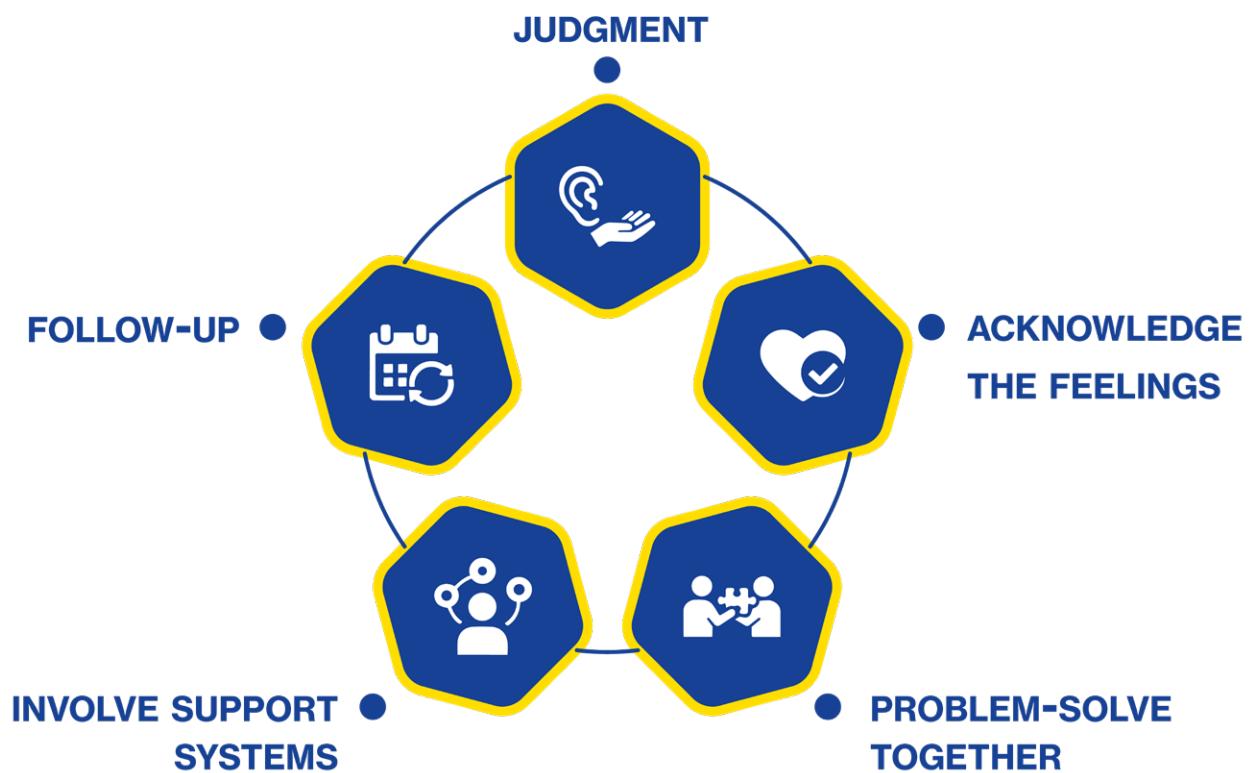
CHAPTER 4
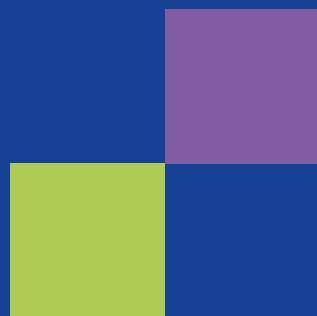
PROBLEM-SOLVING

Why Digital Problem-Solving Matters

Digital technologies have changed not only what we teach but also how we teach. Every day, teachers and students encounter challenges unique to online environments:

- A student can't log into a platform during an assessment.
- Parents misinterpret a digital message and become upset.
- A misleading viral claim enters the classroom discussion.
- Students misuse digital tools, creating classroom disruptions.

In these moments, the teacher's role is not just to solve the problem quickly but to model effective problem-solving strategies for students.

The DRONE research emphasises that problem-solving is one of the core competences of digital literacy. It combines technical skill, creativity, resilience, and collaboration. Teachers who are strong problem-solvers empower students to approach digital dilemmas with confidence rather than fear.

The Teacher's Own Problem-Solving Competence

Before teachers can guide students, they need to strengthen their own capacity. Problem-solving in the digital world means more than technical troubleshooting – it requires critical thinking, communication, and adaptability.

Core Competences for Teachers

1. Technical Troubleshooting

Navigating common platform errors, device glitches, or network issues.

2. Adaptive Thinking

Recognising when to switch tools or approaches if something isn't working.

3. Collaborative Problem-Solving

Engaging colleagues, IT staff, or online communities for solutions.

4. Risk Awareness

Anticipating problems (cybersecurity risks, misuse of tools) and acting preventively.

5. Pedagogical Flexibility

Adjusting lesson plans or methods when digital challenges disrupt teaching.

SUPPORTING STUDENTS IN DIGITAL PROBLEM-SOLVING

Students often experience digital frustration: apps that crash, assignments lost online, or misunderstandings in communication. Teachers can turn these frustrations into learning opportunities.

Strategies for Supporting Students

1. Teach a Structured Approach

*   Introduce a "pause–think–try–ask" model:

*   Pause to stay calm.

*   Think about the problem.

*   Try one or two possible fixes.

*   Ask for help if needed.

2. Normalise Trial and Error

*   Emphasise that it's okay to experiment with solutions – mistakes are part of learning.

3. Encourage Peer Support

*   Create classroom routines where students first consult each other before going to the teacher.

4. Promote Creativity

*   Present digital challenges as puzzles rather than barriers. Ask: "How else could we approach this?"

5. Build Reflection

*   After resolving a digital issue, discuss: What worked? What could we do differently next time?

WHEN THINGS GO WRONG

Not all digital problems can be solved easily. Teachers need strategies for when problems escalate or have wider consequences.

Common Escalated Scenarios

- Technical failure: A platform crashes during an exam.

- Conflict escalation: Online disagreements among students spill into the classroom.

- Community misunderstandings: Parents misread a message or believe a rumour.

- Student error with consequences: A student accidentally shares personal information publicly.

Teacher Response

1. Stabilise the Situation

Calm the class. Communicate clearly what is happening.

2. Provide Transparency

Explain the problem in simple terms. Avoid hiding or minimising issues.

3. Offer Temporary Solutions

Switch to offline tasks, reschedule assessments, or redirect focus.

4. Escalate Appropriately

Report to school leadership, IT, or safeguarding staff when necessary.

5. Debrief and Reflect

Use the experience as a case study for students: What can we learn?

Case Study 1: The Exam Platform Crash

During a timed online exam, the platform freezes. Students panic, worried their answers will be lost.

• The teacher reassures students that their work will be protected.

• Switches students to a paper-based backup.

• After the class, explains how technology sometimes fails and why backup plans are essential.

Outcome: Students complete their assessment, and they see the teacher modelling calm, flexible problem-solving.

Case Study 2: The Rumour Online

A parent hears from another parent that a new classroom app collects children's private data. Concern spreads in a parents' WhatsApp group.

• The teacher investigates, confirming the app is GDPR-compliant.

• Shares an official statement with clear information.

• Holds a Q&A session to reassure parents.

Outcome: Trust is restored, and the episode becomes a lesson in verifying claims before sharing.

Case Study 3: The Group Conflict

Two students argue in a shared Google Doc, leaving insulting comments visible to the class. The teacher intervenes:

• Stops the activity to address digital respect.

• Uses the incident to role-play appropriate online communication.

• Follows up individually with the students to rebuild relationships.

Outcome: The incident reinforces digital etiquette and problem-solving through dialogue rather than punishment alone.

TOOLS AND FRAMEWORKS FOR TEACHERS

Building a Problem-Solving Culture

Problem-solving thrives when it is part of classroom and school culture. Teachers can nurture this by:

- Embedding problem-solving in every subject: Encourage students to use digital resources creatively, not just passively.

- Celebrating persistence: Praise students who keep trying rather than those who solve problems instantly.

- Sharing failures as lessons: Model vulnerability by admitting when things don't work and showing how you adapt.

- Cross-disciplinary projects: Involve real-world digital problems (fake news analysis in history, data interpretation in science).

Teacher Self-Reflection

Problem-solving starts with awareness of your own strengths and weaknesses.

Self-Check Questions

- Do I panic or stay calm when a digital issue arises?

- How confident am I in troubleshooting basic technical problems?

- Do I model creative and flexible thinking for my students?

- When do I escalate a problem to IT or leadership, and when do I solve it myself?

Teachers can also use digital literacy self-tests (from DRONE and SAILS projects) to identify growth areas.

Preventing Digital Problems Before They Arise

While resilience is key, prevention reduces the frequency of crises.

- Plan backups: Always have an offline option for lessons or assessments.

- Set expectations: Teach students clear rules for online collaboration.

- Communicate proactively: Keep parents informed about new tools or digital platforms.

- Update regularly: Ensure devices and apps are kept secure and functional.

- Train continuously: Stay updated with professional development in digital pedagogy.

Other resources and tools:

- The SAILS Problem-Solving Framework: Structured checklists for digital dilemmas.

- "What If?" Classroom Cards: Scenarios that students solve in small groups.

- IT Helpdesk Guides: Quick troubleshooting steps for common technical problems.

- Peer Learning Models: Assign "digital buddies" to support classmates.

CONCLUSION

Problem-solving in the digital age is not about always having the right answer – it's about modelling the right approach.

Teachers who demonstrate calm, creative, and structured responses show students that digital dilemmas are not roadblocks but opportunities to think critically and adapt.

- For teachers, this means strengthening their own competences, setting realistic expectations, and knowing when to seek support.

- For students, it means learning structured methods, practising trial and error, and gaining confidence in tackling challenges.

Every failed login, every group conflict, every viral rumour is a chance to teach problem-solving skills that will serve students for life.

Teachers are not just digital troubleshooters – they are coaches of resilience, creativity, and adaptability. By embedding problem-solving into everyday teaching, they prepare students not just to survive, but to thrive in the unpredictable digital world.

TEACHER RESPONSE TO DIGITAL PROBLEMS

STABILISE THE SITUATION

DEBRIEF AND REFLECT

PROVIDE TRANSPARENCY

ESCALATE APPROPRIATELY

OFFER TEMPORARY SOLUTIONS

CHAPTER 5
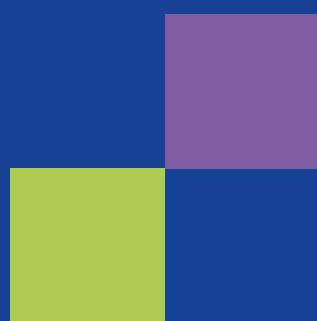
CRITICAL THINKING

WHY CRITICAL THINKING MATTERS

In a world where anyone can publish anything online, critical thinking is the compass that helps us navigate oceans of information. It is not enough for students to consume information; they need to question it, test it, and compare it before deciding what to believe or share.

For teachers, critical thinking is both a personal skill and a teaching responsibility. A teacher who critically engages with digital information sets the example for students. A teacher who avoids it leaves students vulnerable to manipulation, exploitation, and disinformation.

Critical thinking is also closely tied to democratic values. The ability to question, analyse, and reason protects not only individuals but also communities from harmful propaganda and polarisation.

What is Critical Thinking?

Critical thinking is the ability to analyse, evaluate, and synthesise information before forming a judgment. In the digital context, this means asking questions like:

- Who created this content?
- What is the source's purpose?
- What evidence supports the claim?
- How does this align (or conflict) with other sources?
- Am I reacting emotionally, or thinking carefully?

The DRONE research highlights that critical thinking is not an "extra" skill but an essential foundation of digital literacy. Without it, students – and teachers – are more likely to accept harmful content at face value.

TEACHERS' OWN CRITICAL THINKING COMPETENCES

Before teachers can cultivate critical thinking in students, they must reflect on their own practices. Many teachers admit that they sometimes skim headlines, share content without checking, or struggle to evaluate complex online debates.

Key Teacher Competences

1. Analytical Reading

Going beyond surface-level skimming to examine argument quality and supporting evidence.

2. Source Evaluation

Recognising trustworthy vs. dubious outlets; identifying bias, sponsorship, or hidden agendas.

3. Cognitive Awareness

Understanding personal biases and emotional triggers when evaluating information.

4. Questioning Habits

Regularly asking: "What's missing? Who benefits from this message?"

5. Metacognition

Reflecting on one's own thinking process: How did I arrive at this conclusion?

SUPPORTING STUDENTS IN CRITICAL THINKING

Teaching critical thinking requires both explicit instruction and implicit modelling. Students learn not only from what teachers say but from how they see teachers interact with information.

Strategies for Teachers

1. Model the Process

When discussing a news story in class, openly share your thought process: "This source looks credible, but I want to check if another reliable outlet confirms it."

2. Use Everyday Examples

Analyse a viral TikTok, YouTube clip, or Instagram post to show that critical thinking applies beyond textbooks.

3. Teach Lateral Reading

Encourage students to open multiple tabs to compare claims across different sources.

4. Encourage Debate

Set up structured discussions where students argue different perspectives based on evidence.

5. Connect to Emotions

Ask students to notice when they feel angry, excited, or fearful about digital content. Strong emotions are often signs of manipulative content.

CLASSROOM ACTIVITIES

1. The Headline Game

Present students with several headlines. Some are factual, others exaggerated or false. Ask them to decide which are trustworthy and explain their reasoning.

2. Source Scavenger Hunt

Give students a claim (e.g., "energy drinks are banned in schools worldwide"). Their task: find three sources that confirm or refute the claim, and rank them by reliability.

3. Emotion Check

After watching a viral video, ask: "How did this make you feel? Why might the creator want you to feel that way?"

4. Fact-Check Relay

Divide the class into groups. Each group fact-checks a different claim, then presents their process and conclusion to the class.

5. Bias Mapping

Show students two articles on the same event (from different political perspectives). Ask them to highlight bias, framing, and missing details.

WHEN THINGS GO WRONG

Critical thinking challenges often become visible when students repeat false or harmful claims. Teachers must balance correction with respect, so that students do not feel shamed for believing misinformation.

Warning Signs

- Students repeating conspiracy theories with strong conviction.

- Students dismissing all media as "fake."

- Students citing unreliable influencers as their main sources.

- Students showing polarised views that shut down dialogue.

Teacher Response

1. Stay Calm

Avoid ridicule or confrontation. A defensive student will not think critically.

2. Ask Questions

Use Socratic questioning[12] : "Where did you hear that? Why do you think the source might say that?"

3. Show Alternatives

Present verified information without forcing immediate agreement.

4. Encourage Curiosity

Frame the moment as a puzzle rather than a battle: "Let's explore this claim together."

5. Address Emotions

Recognise if the claim is tied to fear, identity, or family beliefs. Critical thinking is both cognitive and emotional.

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12 Socratic questioning is a disciplined dialogue of open-ended questions used to stimulate critical thinking, uncover assumptions, and explore complex ideas by challenging others to think deeply about their beliefs. Rooted in the Socratic method of ancient Greek philosopher Socrates, this questioning technique is used in education and psychotherapy to promote self-reflection, active learning, and problem-solving, helping people to gain new perspectives and understand themselves better. Read more here: https://positivepsychology.com/socratic-questioning/

Case Study 1: The Conspiracy Theory

In a history class, a student insists that the Moon landing was faked. The teacher avoids dismissing the claim outright. Instead, she:

- Asks the student to present their evidence.
- Assigns the class to fact-check both pro- and anti-Moon landing claims.
- Guides students in evaluating sources (NASA, academic papers, conspiracy blogs).

Outcome: Students see how critical thinking dismantles weak evidence. The discussion strengthens their evaluative skills.

Case Study 2: The Emotional Reaction

During a lesson, students see a viral video claiming climate change is a hoax. Some laugh, while others become visibly upset. The teacher:

- Asks students to describe their emotional reactions.
- Explains how manipulative content often plays on emotions.
- Leads an activity comparing scientific data with the video's claims.

Outcome: Students learn to recognise emotional triggers as warning signs for disinformation.

Case Study 3: The Fake Profile

A student is excited about a new online friend who claims to be a professional gamer. The teacher uses this as a teachable moment:

- Guides the class in analysing the profile for red flags (few photos, inconsistent details).
- Explains why people create fake identities.
- Reinforces critical thinking in evaluating digital relationships.

Outcome: Students learn to apply critical thinking beyond news stories, in personal online safety.

TOOLS AND RESOURCES

Building a Critical Thinking Culture

Critical thinking is not a one-off lesson – it is a culture. Teachers can help build it by:

- Integrating across subjects: From analysing historical documents to checking statistics in science.

- Rewarding questioning: Praise students who ask thoughtful questions, not just those who give correct answers.

- Collaborating with colleagues: Share strategies across departments to create consistency.

- Engaging parents: Provide guidance for families to discuss news and digital content at home.

Teacher Self-Reflection

Critical thinking starts with teachers reflecting on their own habits.

Self-Check Questions

- Do I double-check digital information before sharing with students?

- Am I aware of my own biases, and how they may shape classroom discussions?

- Do I model openness to being wrong or changing my mind?

- Do I create space for students to question me respectfully?

Other resources and tools:

- News Literacy Project (NLP): classroom resources for evaluating sources.

- Common Sense Education: ready-made critical thinking lessons.

- SAILS Framework: teacher self-assessments for critical literacy.

- Fact-Checking Sites: Snopes, PolitiFact, FullFact – demonstrate real-world verification.

- Infographics: quick reference "red flags" for fake news.

Conclusion

Critical thinking is the cornerstone of digital literacy. Teachers who embody and promote it do more than prepare students for exams – they prepare them for life in a world where truth is contested, and manipulation is constant.

- For teachers, this means practising their own critical evaluation daily.
- For students, it means building habits of questioning, checking, and reflecting.

By modelling curiosity, encouraging open dialogue, and teaching structured approaches, teachers equip students not just to resist disinformation, but to thrive as thoughtful, resilient citizens in the digital age.

CRITICAL THINKING STRATEGIES FOR TEACHERS

MODEL THE PROCESS

CONNECT TO EMOTIONS

USE EVERYDAY EXAMPLES

ENCOURAGE DEBATE

TEACH LATERAL READING
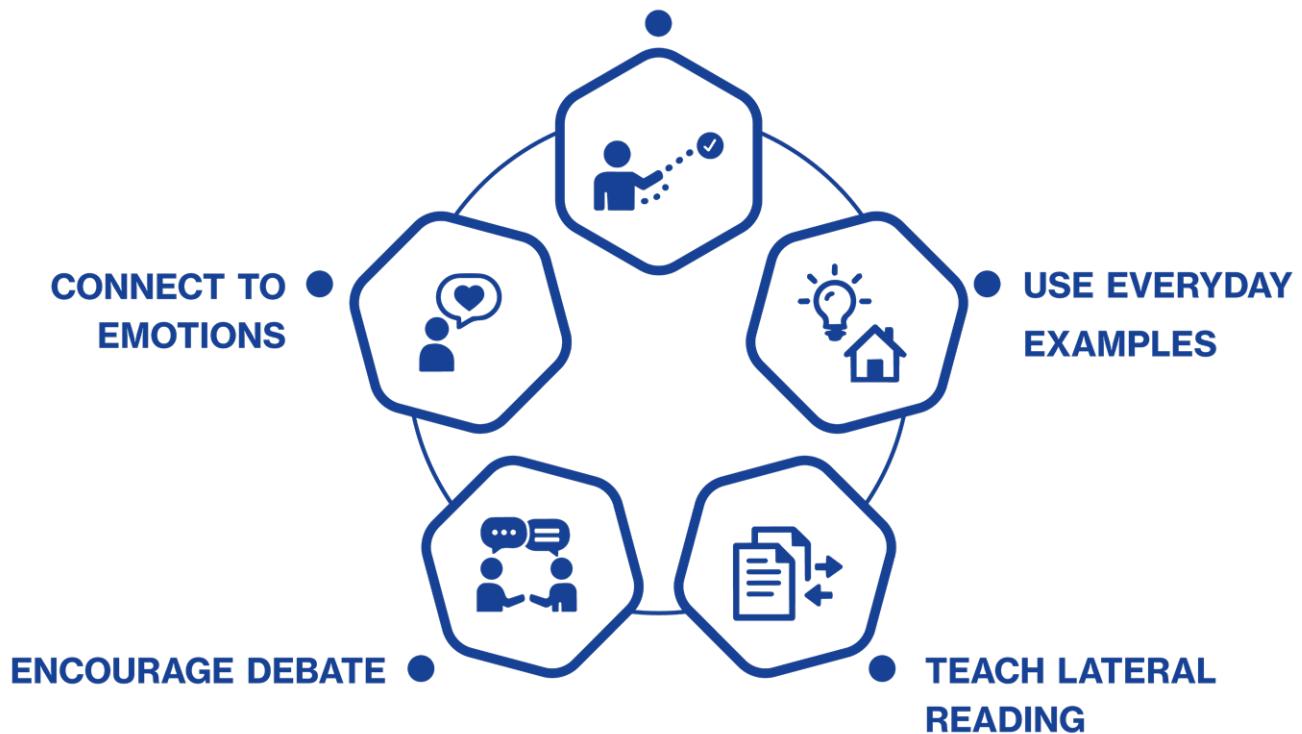
CHAPTER 6

**BULLYING AND
CYBERBULLYING**
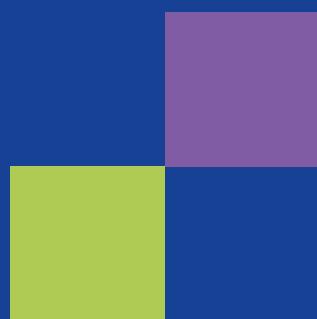
Why Bullying and Cyberbullying Matter for Teachers

Bullying – whether in the classroom, the staffroom, the family home, or online – is one of the most damaging experiences a child can endure. It undermines learning, erodes trust in adults, and can leave lasting psychological scars.

Cyberbullying adds an extra layer of complexity. Unlike traditional bullying, it can happen 24/7, reach a wide audience instantly, and leave a permanent digital footprint. Teachers must be equipped not only to recognise and respond to cyberbullying but also to understand that students are not always bullied by peers. Research from DRONE and other projects shows that:

- Students are most likely to experience bullying from teachers or school staff, often under the guise of "discipline" or "teasing."

- Family members can also bully children, sometimes through digital means (public shaming, surveillance, manipulation).

- Peer bullying does occur, but less frequently than many believe – yet it tends to dominate public awareness campaigns.

For teachers, this requires a shift in mindset: rather than viewing bullying only as a "student issue," we must accept that adults and authority figures can also be perpetrators. Teachers have a duty to break the silence and foster environments where all forms of bullying are acknowledged and addressed.

Understanding Bullying and Cyberbullying

What Bullying Is

Bullying involves repeated, intentional harm – physical, verbal, psychological, or digital – where there is a power imbalance between the perpetrator and the victim.

Forms of Bullying

- Verbal/psychological: insults, humiliation, threats.

- Physical: hitting, pushing, damaging property.

- Relational: exclusion, manipulation of friendships.

- Digital (cyberbullying): spreading rumours online, sending threats, posting humiliating images, impersonating others.

When Teachers Are the Bullies

Bullying by teachers can include:

- Public humiliation of students.

- Sarcasm or belittling comments about ability, appearance, or family.

- Unfair targeting with discipline or grades.

- Using digital tools (class apps, email, public platforms) to shame students.

When Family Members Are the Bullies

Examples include:

- Parents or carers mocking or belittling a child online.

- Siblings harassing or spreading rumours through social media.

- Excessive surveillance or "outing" private information.

Teachers' Role: Safeguards and Responsibilities

As teachers, your responsibility is twofold:

1. Prevent bullying and cyberbullying in your classroom and wider school environment.

2. Acknowledge and act when the perpetrator is not a peer – including when concerns are raised about teachers or family members.

This requires:

- Vigilance for warning signs.

- Safe reporting systems.

- Courage to speak up even when colleagues or family members are involved.

- Commitment to restorative and protective approaches.

Warning Signs in Students

- Sudden withdrawal, anxiety, or reluctance to attend school.

- Decline in academic performance.

- Physical complaints (headaches, stomach aches) with no medical explanation.

- Secrecy about online activity, deleting accounts suddenly.

- Signs of humiliation (mocking nicknames, repeated "jokes" at their expense).

Strategies for Teachers

Preventive Actions

1. Create a Respectful Classroom Culture

• Explicitly state that all forms of bullying – from anyone – are unacceptable.

• Model respectful communication yourself, especially under stress.

2. Teach Digital Etiquette

• Discuss online respect, consent in sharing images, and consequences of digital harm.

3. Establish Clear Policies

• Ensure students know how to report bullying safely.

• Advocate for policies that explicitly address teacher and family bullying, not only peer incidents.

4. Promote Bystander Empowerment

• Encourage students to support peers who are targeted, while providing safe avenues for reporting.

Interventions When Bullying Occurs

1. Listen and Believe

• When a student discloses bullying, avoid minimising or dismissing their experience.

2. Act Promptly

• Document incidents, preserve digital evidence (screenshots, messages), and report according to safeguarding procedures.

3. Ensure Safety First

• Protect the student from further harm, including adjusting classroom seating, communication channels, or teacher assignments.

4. Engage Parents Thoughtfully

• When families are perpetrators, proceed with caution. Involve safeguarding officers rather than confronting the family directly.

5. Use Restorative Practices (when appropriate)

• Focus on rebuilding trust, repairing harm, and ensuring accountability – but only if the victim feels safe.

WHEN TEACHERS BULLY STUDENTS

This is one of the most sensitive but critical areas. A culture of silence often prevents open acknowledgement. However, ignoring teacher-perpetrated bullying legitimises it and causes long-term harm.

Signs of Teacher Bullying

- Students consistently singled out for negative attention.
- Humiliating comments made publicly.
- "Jokes" or sarcasm that leave a student distressed.
- Inconsistent grading or unfair discipline.

Teacher Responsibilities

- Reflect on your own behaviour – unintentional sarcasm or frustration can cross into bullying.
- Intervene if you witness a colleague bullying. Silence makes you complicit.
- Use reporting channels: safeguarding officers, unions, or school leadership.

Case Study: "The Harsh Joke"

In a maths class, a teacher frequently jokes about a student being "too slow." Other students laugh. The student withdraws, stops participating, and their grades drop.

A colleague raises the issue with leadership. The school initiates coaching and supervision for the teacher. A restorative meeting allows the student to express their experience. The teacher apologises and adjusts their practice.

Outcome: The harm is acknowledged, the student regains confidence, and the teacher develops new strategies.

WHEN FAMILY MEMBERS BULLY STUDENTS

Bullying at home may be harder to detect, but it often surfaces in school.

CASE STUDY: "THE SHAMING POST"

A parent posts a video online of their child being punished for poor grades. The video circulates locally, and the child faces humiliation at school.
The teacher notices the student's distress and brings the matter to the safeguarding team. The school works with child protection services to address the issue.

Outcome: The harmful behaviour is stopped, and the child receives emotional support.

When Peers Bully (In Person or Online)

Although less frequent than adult-perpetrated bullying, peer bullying still occurs and requires a firm response.

Teacher Strategies

- Encourage students to screenshot and report harmful messages.

- Intervene quickly when conflicts spill into the classroom.

- Avoid "zero tolerance" that punishes victims as much as perpetrators; focus on protection and restoration.

Case Study: "The Fake Account"

Students create a fake social media profile mocking a classmate. The teacher gathers evidence, informs leadership, and facilitates a restorative process with parental involvement.
Outcome: The profile is taken down, the students reflect on harm caused, and the victim feels supported.

TOOLS AND RESOURCES FOR TEACHERS

Building a Whole-School Anti-Bullying Culture

Teachers cannot tackle bullying alone – it requires systemic commitment. School leaders and teachers together must:

- Include teacher and family bullying explicitly in anti-bullying policies.

- Provide training for all staff on respectful communication and power dynamics.

- Establish confidential channels for students to report harm from adults.

- Engage parents in education about respectful digital behaviour.

- Monitor the school's digital footprint (e.g., unofficial group chats, local social media).

Teacher Self-Reflection

- Do I sometimes use humour or sarcasm that might hurt students?

- Have I ever ignored bullying because it was easier than intervening?

- How do I respond if a student or parent raises concerns about my behaviour?

- Do I support colleagues in addressing bullying, or stay silent?

Honest self-reflection is the first defence against teacher-perpetrated bullying.

Other resources and tools:

- SAILS Project Checklists: Recognising digital harm and response protocols.[13]

- StopBullying.gov: Guides for preventing and intervening in bullying.[14]

- Anti-Bullying Alliance: Resources for schools, including training modules.[15]

- UNICEF Child Rights Resources: Framing bullying as a rights violation.[16]

- School Reporting Systems: Encourage anonymous reporting to reduce fear of retaliation.

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13 https://sails.deusto.es/

14 https://www.stopbullying.gov/

15 https://anti-bullyingalliance.org.uk/tools-information

16 https://www.institut-fuer-menschenrechte.de/fileadmin/Redaktion/Publikationen/GANHRI_UNICEF_-_Children_s_Rights_in_National_Human_Rights_Institutions.pdf

CONCLUSION

Bullying and cyberbullying undermine everything schools strive to achieve. Teachers must be vigilant not only to protect students from peers, but also to confront the difficult truth: adults can be bullies too.

By acknowledging this reality, modelling respectful communication, and acting decisively when harm occurs, teachers create safe, supportive environments where students can learn and thrive.

The teacher's responsibility is not just to teach content, but to ensure that every child feels valued, safe, and free from harm – whether that harm comes from classmates, family, or even authority figures.

INTERVENTION WHEN BULLYING OCCURS

LISTEN AND BELIEVE

ACT PROMPTLY

ENSURE SAFETY FIRST

ENGAGE PARENTS THOUGHTFULLY

USE RESTORATIVE PRACTICES (WHEN APPROPRIATE)
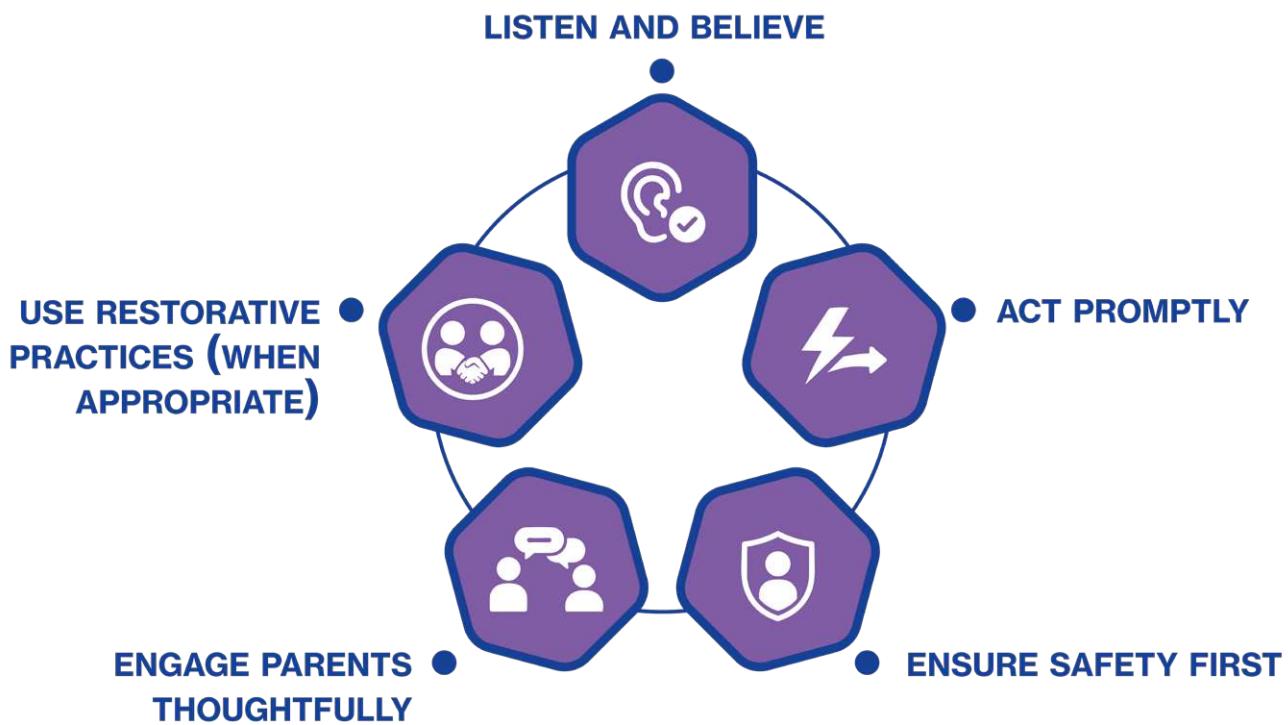
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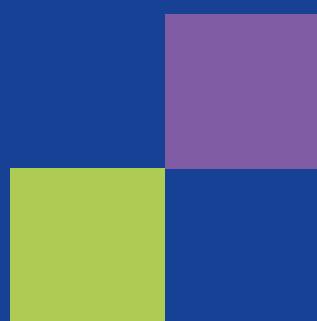
CYBERSECURITY

WHY CYBERSECURITY MATTERS FOR TEACHERS

In modern classrooms, teaching happens not only with books and whiteboards but also through tablets, learning management systems, email, and video calls. Every one of these digital channels is a potential doorway for risks.

Cybersecurity is often viewed as a technical issue – passwords, firewalls, or software patches. But for teachers, it is also a pedagogical and ethical responsibility. Students depend on teachers to protect their data, model safe online practices, and respond effectively when security is compromised.

The DRONE research confirms that teachers are often targeted directly: e.g. in the form of phishing emails sent to school accounts, fake parent messages, or malicious links hidden in student submissions. At the same time, students' personal safety is jeopardised when teachers lack the skills to safeguard digital spaces.

Teachers' Own Cybersecurity: Building Competence First

Before teaching students, teachers must build their own baseline cyber hygiene. Many of the most common breaches occur because adults neglect simple steps.

Essential Teacher Practices

1. Strong, Unique Passwords

- Use long passphrases or a password manager.

- Never reuse school and personal account passwords.

2. Two-Factor Authentication (2FA)

- Enable it on email, school platforms, and financial accounts.

3. Device Updates

- Regularly update laptops, tablets, and phones – many cyberattacks exploit outdated systems.

4. Email Awareness

- Be cautious of attachments or urgent messages.

- Verify before clicking: hover over links to check destinations.

5. Data Protection

- Store sensitive student data securely.

- Avoid using personal accounts for school-related communication.

6. Backups

- Back up lesson plans, grades, and key files regularly, preferably to an encrypted school system.

Teacher Self-Check

- Do I use unique passwords for all my accounts?

- Could I explain what phishing looks like to a colleague or student?

- If my laptop was stolen, would sensitive data be safe?

- Do I update my phone and school laptop regularly?

Teaching Cybersecurity to Students

Once teachers establish their own security, they can model and teach it in accessible ways. Students are not "digital natives" when it comes to safety – they may be comfortable using apps but often lack awareness of risks.

Strategies for the Classroom

1. Relatable Analogies

- Passwords are like toothbrushes: don't share them and change them often.

- Updates are armour: they keep devices strong against new attacks.

2. Practical Demonstrations

- Show a phishing email and walk students through identifying red flags.

- Use online games and simulations to teach safe browsing.

3. Student-Led Investigations

- Have students analyse app permissions on their phones.

- Task them with identifying privacy risks in popular games.

4. Integrating Across Subjects

- Science: explore how viruses spread in biology vs. digital viruses.

- History: compare propaganda techniques with modern phishing.

5. Ethical Dimension

- Teach not only self-protection but also respect: don't hack accounts, don't spread harmful files.

Best Practices in the Classroom

Teachers have added responsibilities when it comes to students' digital safety.

1. Use School Systems Properly

- Upload work through official platforms, not personal accounts.

- Report suspicious emails or access attempts to IT staff immediately.

2. Protect Student Privacy

- Avoid posting identifiable student photos or details online without consent.

- Use anonymised examples for student work shown publicly.

3. Supervise Digital Platforms

• Monitor chats or forums used for schoolwork.

• Teach etiquette for shared online spaces (e.g., Google Docs, Teams).

4. Respond Quickly

• If a breach occurs (e.g., inappropriate content in a shared folder), act immediately to remove and report.

WHEN THINGS GO WRONG

Even with preparation, breaches happen. Teachers need confidence in responding swiftly.

Common Incidents

1. Phishing Attack

• Teacher clicks on a link, and their school email is compromised.

• Response: Change password immediately, report to IT, alert colleagues about possible scam messages.

2. Student Data Leak

• A shared spreadsheet with student grades is accidentally made public.

• Response: Lock access, report to leadership, inform students and parents as appropriate, review procedures.

3. Cyberbullying via Accounts

• A student's school account is hacked and used to send harmful messages.

• Response: Secure the account, support the student emotionally, investigate source of breach.

4. Ransomware Attack

• School systems are locked down by malicious software.

• Response: Follow institutional emergency plan; do not attempt payment; rely on IT recovery protocols.

Case Study 1: The Phishing Email

A teacher receives an email appearing to be from the school head asking for urgent transfer of school funds. The teacher hesitates and decides to verify in person. The email is fake.

Lesson: Pause, check sender addresses, and never act under digital "pressure."

Case Study 2: The Insecure App

A teacher downloads a free quiz app to use in class. Students are asked to log in, and later their data is used for targeted advertising. Parents complain.

Lesson: Always check apps' privacy policies and use approved platforms.

Case Study 3: The Compromised Account

A student shares their password with a friend "as a joke." The friend logs in, changes settings, and posts embarrassing messages. The teacher uses this as a class-wide teachable moment, exploring why privacy matters.

Lesson: Normalise the seriousness of digital safety early.

TOOLS AND RESOURCES

Building a Cybersecurity Culture

Cybersecurity is most effective when embedded in school culture. Teachers can help by:

- Collaborating with IT staff to report threats and share updates.

- Promoting student digital ambassadors: train students to support peers in safety practices.

- Involving parents: run workshops on secure use of apps, devices, and home Wi-Fi.

- Encouraging openness: ensure students feel safe reporting mistakes or breaches.

Teacher Self-Reflection

- Do I practise the habits I expect my students to follow?

- Am I modelling caution and transparency when something goes wrong?

- Have I built relationships with IT staff to ensure quick support?

- Do I create opportunities for students to "teach back" cybersecurity knowledge?

Other resources and tools:

- Common Sense Education: classroom cybersecurity lessons.[17]

- Google's Be Internet Awesome: child-friendly games on online safety.[18]

- UK Safer Internet Centre: resources for both teachers and parents.[19]

- Checklists: practical guides for assessing personal and classroom cyber hygiene.

17 https://www.commonsense.org/education/articles/teachers-essential-guide-to-cybersecurity
18 https://beinternetawesome.withgoogle.com/en_us
19 https://better-internet-for-kids.europa.eu/en/sic/united-kingdom

CONCLUSION

Cybersecurity is not only about preventing hacks – it is about protecting trust. Students need to know that their teachers safeguard their information, model safe behaviour, and take quick action when things go wrong.

For teachers, this requires:

- Building their own strong cybersecurity habits.
- Integrating practical lessons into everyday teaching.
- Fostering a culture of openness, protection, and resilience.

A secure digital environment is not optional. It is the foundation of safe, ethical, and effective teaching in the digital age.

ESSENTIAL TEACHER PRACTICES FOR CYBERSECURITY

STRONG PASSWORDS

TWO-FACTOR AUTHENTICATION (2FA)

BACKUPS

DEVICE UPDATES

DATA PROTECTION

EMAIL AWARENESS

CHAPTER 8

BUILDING ALLIANCES
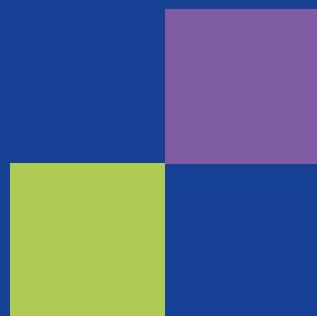
EVALUATING DIGITAL RELATIONSHIPS

Teachers are often asked to pilot new apps, sign up for online platforms, or introduce digital resources. Before agreeing, teachers should critically assess partnerships.

Questions to Ask Before Using a Digital Tool

- Data protection: What data is collected? Who owns it? How is it stored?

- Cost: Is it truly free, or are students "paying" with their data?

- Transparency: Are terms of service clear and age-appropriate?

- Accessibility: Does the tool exclude students without devices or connectivity?

- Alignment: Does it support educational goals, or is it a distraction?

- Exit strategy: What happens if the school stops using the service?

Teacher Role

- Advocate for privacy and equity in discussions with school leaders.

- Share feedback from classroom use honestly – both benefits and drawbacks.

- Avoid adopting tools simply because they are "trendy."

PROMOTING ETHICAL DIGITAL RELATIONSHIPS

Teachers can model and promote ethical engagement with digital alliances in two main ways:

1. As Professionals

- Choose tools that respect privacy and inclusivity.

- Refuse to promote products in ways that exploit trust with students.

- Document concerns and escalate to leadership when necessary.

2. As Educators

- Teach students to critically assess apps and digital services.

- Include lessons on terms of service, data privacy, and digital consumer rights.

- Encourage students to reflect: "What do I give in exchange for this free service?"

WHEN THINGS GO WRONG

Despite best intentions, some alliances create harm. Teachers need to recognise early warning signs and respond.

Red Flags

- Sudden increase in advertising targeting students after using a new app.

- Pressure from companies to display logos in classrooms.

- Student complaints about unfair treatment in digital platforms.

- Parents raising concerns about data use or hidden costs.

Case Study: "The Free Quiz App"

A teacher introduces a free quiz platform to make lessons more engaging. Within weeks, parents notice students are receiving targeted ads linked to the app. Concerns escalate.

Response: The teacher reports the issue, the school discontinues the app, and leaders consult IT staff before approving new tools. A lesson on "why free isn't always free" helps students reflect on the experience.

BUILDING POSITIVE ALLIANCES

While there is a lot of fear about them, most alliances are not problematic. Many are powerful opportunities for teachers and students.

Examples of Strong Alliances

- With Parents: Co-hosting digital literacy workshops.

- With Local Libraries: Sharing access to research databases.

- With NGOs: Delivering workshops on resilience and critical thinking.

- With Tech Providers: When contracts ensure transparency, safety, and equal access.

Teacher Contribution

Teachers can:

- Share classroom insights with partners to improve resources.

- Connect students to community resources (libraries, youth clubs).

- Help school leaders build balanced, diverse partnerships rather than relying on one provider.

Case Study 1: NGO Collaboration

An NGO focused on online safety runs workshops in schools. Teachers co-facilitate sessions, linking them with curriculum topics.

Outcome: Students develop both practical safety habits and critical thinking. Teachers gain new strategies and resources.

Case Study 2: Parent Partnership

Parents express concern about online disinformation. A teacher organises a joint parent-student workshop where families fact-check viral claims together.

Outcome: Families leave with practical strategies, and students see their parents model critical inquiry.

Case Study 3: Corporate Sponsorship with Risks

A local business offers free tablets for classrooms but insists on their logo being displayed prominently and requests student data for "marketing purposes." Teachers raise concerns, and the school rejects the offer.

Outcome: Teachers demonstrate ethical leadership, protecting students from exploitation.

Practical Strategies for Teachers

In the Classroom

- Teach "digital consumer awareness." Have students compare apps based on privacy and terms of service.

- Discuss with students why alliances exist and who benefits.

- Use role-play: assign roles (school, company, parents) and debate a proposed partnership.

With Colleagues

- Share feedback openly about digital tools.

- Support each other in resisting pressure from companies.

- Participate in school decision-making processes about alliances.

With School Leaders

- Advocate for transparent procurement policies.

- Request professional development on evaluating digital contracts.

- Encourage leadership to involve teachers in alliance decisions.

TOOLS AND RESOURCES

Teacher Self-Reflection

- Do I understand the terms of service for the apps I use in class?

- Have I ever promoted a tool to students without questioning its impact?

- Am I comfortable raising concerns about alliances to leadership?

- Do I model ethical decision-making about digital tools to my students?

Other resources and tools:

- Council of Europe Guidelines for Equitable Partnerships between Schools and Companies.

- SAILS Project Resources: Checklists for evaluating digital services.

- Common Sense Media App Reviews: Independent evaluations of apps' privacy and educational value.

- UNICEF Guidelines on Children's Digital Rights: Standards for ethical digital engagement.

- EU GDPR Education Guides: Framework for data protection in schools.

CONCLUSION

Alliances are inevitable in the digital education ecosystem – but whether they empower or exploit depends on vigilance, ethics, and critical engagement.

Teachers, as the bridge between students and the wider digital world, must evaluate partnerships carefully, model ethical choices, and speak up when alliances put students at risk.

By building constructive relationships with parents, community organisations, and responsible companies, teachers can expand opportunities for students. By challenging exploitative practices, they safeguard trust and dignity in education.

The ultimate goal is balance: alliances that serve learning, respect rights, and leave schools – not companies – in control of the educational mission.

ETHICAL DIGITAL RELATIONSHIPS - RED FLAGS

(1)
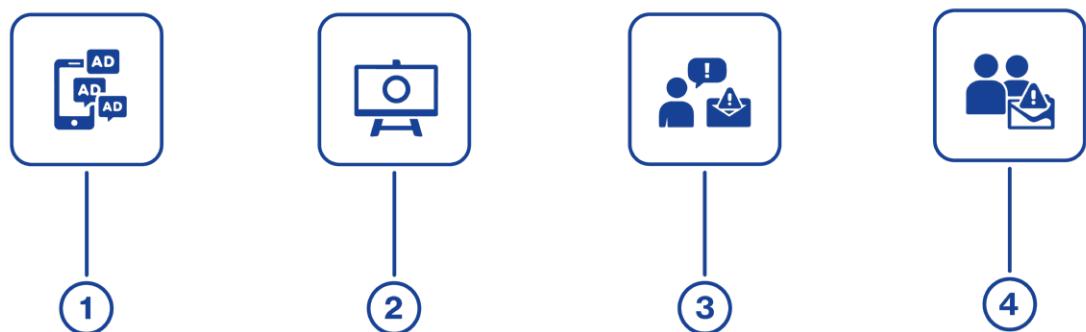
INCREASE IN ADVERTISING AFTER USING A NEW APP

(2)

**PRESSURE FROM COMPANIES TO DISPLAY LOGOS**

(3)

COMPLAINTS ABOUT UNFAIR TREATMENT ON THE PLATFORM

(4)

PARENTS' CONCERNS ABOUT DATA AND COSTS

DRONE LESSON PLAN TOOLKIT FOR TEACHERS
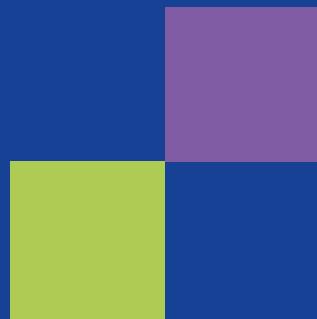
Lesson 1: Spotting Fake News

Objective

Students will learn to identify signs of misinformation and disinformation, and practice fact-checking strategies.

Materials

- Examples of real and fake news headlines (printed or projected).
- Access to internet-enabled devices for fact-checking (optional).

Activities

1. Warm-up (5 min)

Ask: "How many of you have seen something online that turned out not to be true?" Share a personal example.

2. Mini lecture (10 min)

Explain the difference between misinformation, disinformation, and fake news. Provide a checklist of "red flags": sensational or exaggerated headlines, lack of credible sources or missing citations, emotional or inflammatory language, poor spelling, grammar, or formatting, no author or anonymous publication, unusual website URLs or unfamiliar news outlets, urgent calls to action (e.g., "Share now!"), one-sided or overly biased arguments, outdated or fabricated images and data, inconsistency with reputable news coverage.

3. Activity (15 min)

In pairs, students receive two news headlines (one credible, one fake). They must:

- Check the source.
- Look for publication date.
- Cross-check on another site.
- Decide which is real, which is misleading, and explain why.

4. Discussion (10 min)

Each pair shares their reasoning. Emphasise the importance of "pausing before sharing."

5. Reflection (5 min)

Ask students to write one strategy they will use before sharing news online.

6. Assessment

Participation in activity + clarity of reasoning during discussion.

LESSON 2: BUILDING DIGITAL RESILIENCE

Objective

Students will learn strategies for managing negative online experiences and supporting peers.

Materials

- "Digital First Aid" poster (Stop – Breathe – Talk – Report – Recover).
- Scenario cards

Negative Comment

Someone posts a mean comment on your photo, calling you names. What should you do?

Group Chat Exclusion

You discover your classmates made a group chat without you. How do you feel and what can you do?

Disturbing Video

A friend sends you a video that makes you uncomfortable or scared. How do you respond?

Rumour Spread

A false rumour about you is being shared on social media. What steps can you take?

Fake News Link

You come across an article with a sensational headline you suspect is fake. What actions do you take before sharing?

Stranger Message

A stranger sends you a friend request and asks for personal information. What's the safest response?

Inappropriate Meme

Someone shares a meme that targets a specific group unfairly. What should you do if others are laughing about it?

Online Exclusion

Your friends discuss an event online that you weren't invited to. How do you handle your feelings?

Peer Pressure to Share

A friend keeps pressuring you to share your password or an embarrassing photo. What's the best way to respond?

Seeing Cyberbullying

You witness someone being harassed in a group chat. Do you intervene, and if so, how?

Activities

1. Warm-up (5 min)
Ask: "What do you do if someone posts something mean online?" Collect a few responses.

2. Mini lecture (10 min)
Introduce the idea of digital resilience. Show the "Digital First Aid" steps.

3. Activity (20 min)
Divide class into groups. Give each group a scenario card. They must role-play how to respond using the Digital First Aid framework.

4. Discussion (5 min)

5. Debrief: What strategies felt most helpful? How could we support classmates better?

6. Reflection (5 min)
Students write one strategy they can use if they encounter negativity online.

Assessment

Engagement in role-play and ability to suggest constructive responses.

Lesson 3: Critical Thinking Online

Objective

Students will practise questioning digital content and analysing different perspectives.

Materials

Short article or video clip with a clear bias (e.g., advertising disguised as information).

Activities

1. Warm-up (5 min)

Ask: "What does it mean to think critically?" Write ideas on the board.

2. Mini lecture (10 min)

Explain critical thinking: asking about evidence, recognising bias, separating fact from opinion.

 Give examples.

3. Activity (20 min)

Students read/watch the biased material. In groups, they answer:

- Who created this?

- What is their goal?

- What evidence do they use?

- What is missing?

Groups present findings briefly.

4. Discussion (5 min)

Whole-class talk about how bias appears online and why it matters.

5. Reflection (5 min)

Students in groups write three questions they will always ask when reading online content and share them on the board/post-its.

Assessment

Group presentations and reflection notes.

LESSON 4: CYBERSECURITY BASICS

Objective

Students will understand basic cybersecurity practices to protect their accounts and data.

Materials

- Sample phishing email (fabricated for classroom).

Example: Subject: Urgent: Verify Your Account Now!

Dear User,

We've detected unusual activity on your account. To keep your account secure, please verify your information immediately by clicking the link below:

[Verify Your Account]

Failure to do so may result in suspension of your account.

Thank you for your prompt attention.

Sincerely,

The Security Team

- Poster with "Top 5 Cybersecurity Tips."

- Use strong, unique passwords.

- Enable two-factor authentication.

- Beware of suspicious emails and links.

- Keep software updated.

- Protect your personal info online.

Activities

1. Warm-up (5 min)

Ask: "Who has ever had their account hacked or knows someone who has?"

2. Mini-lecture (10 min)

Introduce password security, two-factor authentication, and phishing awareness.

3. Activity (20 min)

Show a fake phishing email. Students work in pairs to identify red flags.

Each pair then creates a "Top 3 Cybersecurity Rules" poster.

4. Discussion (5 min)

Display posters and compare rules.

5. Reflection (5 min)

Students commit to one new habit (e.g., changing a weak password).

Assessment

Poster activity and student reflections.

LESSON 5: DIGITAL DILEMMAS – PROBLEM-SOLVING WORKSHOP

Objective

Students will develop problem-solving and decision-making skills for common digital dilemmas.

Materials

1. Scenario cards (e.g., stranger message, fake profile, friend sharing harmful content).

•   Stranger Message
You receive a message from someone you don't know asking to be friends and wanting personal info. What do you do?

•   Fake Profile
You discover someone has made a fake profile pretending to be you. How do you respond?

•   Friend Sharing Harmful Content
A friend shares a post or video online that spreads hate or bullying. How should you react?

•   Oversharing Personal Information
You notice a classmate posting too much private info, like address or phone number. What advice would you give?

•   Unfriending Without Explanation
A friend suddenly unfriends or blocks you online without telling you. How do you handle your feelings?

•   Pressure to Post
Friends pressure you to post photos or videos you're uncomfortable sharing. What's the best way to say no?

•   Deleting Posts
You regret posting something controversial or personal. Should you delete it or leave it? Why?

•   Tags Without Consent
Someone tags you in a photo or post you don't like. What steps can you take?

•   Misunderstood Message
A message you sent was misunderstood and caused conflict online. How can you clear things up?

•   Online Reputation
You find out a teacher or other school staff can see your social media. What should you do to protect your reputation?

Activities

1. Warm-up (5 min)
Ask: "What's the hardest decision you've had to make online?"

2. Mini-lecture (10 min)
Present a framework: Identify the problem, List options, Consider consequences, Choose, Reflect.

3. Activity (20 min)
Groups receive scenarios. They apply the framework and present their solutions.

4. Discussion (5 min)
Compare different groups' solutions and highlight best practices.

5. Reflection (5 min)
Students write how they could use this framework outside school.

Assessment

Group problem-solving process and ability to explain reasoning.

1. Extension Activities (Optional)

• Debate Club Topic: "Should social media platforms be responsible for fact-checking all content?"

• Project-Based Learning: Students create an infographic or short video teaching younger pupils about fake news.

• Peer Mentoring: Older students run short workshops for younger ones on cybersecurity.

These lesson plans are plug-and-play: teachers can run them as is, or adapt them for subject-specific contexts (history, science, language arts, etc.).

TOOLBOX GUIDES
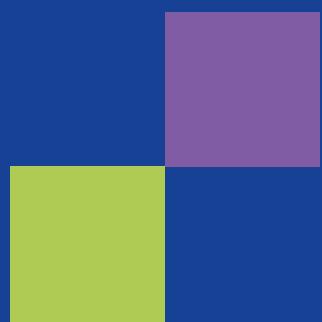
Teacher's Quick Reference Guide

Supporting Digital Literacy, Resilience, and Safe Classrooms

1. Spotting Fake News and Misinformation

Red Flags to Look For

- Sensational, shocking, or emotionally charged headlines.

- No clear author or organisation behind the content.

- Poor grammar, spelling, or strange formatting.

- Outdated or missing publication dates.

- Sources that can't be verified or traced.

- Content that appears only on one site or social media feed.

Quick Classroom Prompt

Ask students:

- Who created this?

- Why do you think it was posted?

- Can we find it in another trusted place?

- How does it make you feel?

2. Digital Resilience: First Aid for Online Challenges

Steps for Teachers and Students

- Stop – Pause before reacting.

- Breathe – Create emotional space.

- Talk – Share the issue with someone trusted.

- Report – Use platform tools or school systems.

- Recover – Focus on offline wellbeing (friends, hobbies, routines).

Classroom Strategy

- Role-play digital dilemmas to practise healthy responses.

- Normalise mistakes: everyone can fall for misinformation or have negative experiences online.

3. Cybersecurity Habits for Teachers and Students

Top 5 Practices

- Use strong, unique passwords (12+ characters).

- Turn on two-factor authentication wherever possible.

- Keep devices and apps updated.

- Be wary of phishing emails: check sender, links, and urgency.

- Review and tighten privacy settings regularly.

Classroom Tip

- Show students a fake phishing email and let them highlight the "red flags."

4. Preventing Bullying and Cyberbullying

Recognising Warning Signs

- Sudden drop in participation or attendance.

- Emotional withdrawal or anxiety during class.

- Reluctance to use devices or participate online.

- Suspicious or secretive online communication between peers.

Bullying by Teachers (Self-Check)

- Do I use sarcasm or ridicule in class?

- Do I ever single out students publicly?

- Are my discipline measures fair and consistent?

- Would I be comfortable if my words were recorded and shared?

Immediate Steps if Cyberbullying Occurs

- Listen to the student and take them seriously.

- Document the evidence (screenshots).

- Report to school leadership and involve parents if needed.

- Provide support for both victim and (if applicable) perpetrator.

- Review policies to prevent recurrence.

5. Promoting Critical Thinking

Quick Questions to Ask in Any Lesson

- What is the evidence?

- Who benefits from this message?

- What perspective might be missing?

- Is this fact, opinion, or advertisement?

Simple Classroom Exercise

Give students two different articles on the same issue. Ask them to identify differences in tone, facts, and perspective.

6. Problem-Solving in Digital Dilemmas

Framework to Teach Students

- Identify the problem.

- List possible options.

- Consider short- and long-term consequences.

- Choose the best option.

- Reflect afterwards – would you do the same again?

Tip: Model the framework yourself when dealing with digital classroom issues.

7. Building Alliances and Safe Partnerships

When evaluating a digital platform or service

- Does it clearly explain how data is collected and used?

- Does it meet national or EU child protection and privacy standards?

- Is the school community (teachers, parents, students) consulted?

- Are there clear opt-out or review mechanisms?

Golden Rule: If you don't fully understand the terms, seek clarification before use.

8. Quick Access Resources

- Fact-Checking Tools: Snopes (https://www.snopes.com/), Full Fact (https://fullfact.org/), EUvsDisinfo (https://euvsdisinfo.eu/)

- Google Images (https://images.google.com/), TinEye (https://tineye.com/).

- Digital Resilience: Common Sense Education, EU Kids Online reports.[17]

- Cybersecurity: National Cyber Security Centre (NCSC https://www.ncsc.gov.uk/section/education-skills/cyber-security-schools), Europol Safe Online (https://www.europol.europa.eu/cms/sites/default/files/documents/global-parent-online-safety-advice-esafety-europol.pdf).

- Bullying Prevention: UNESCO "Behind the Numbers: Ending School Violence," Childnet International.[18]

This Quick Guide can be printed, pinned in staff rooms, or saved on teacher devices. It works as a fast-access toolkit for busy classrooms while reinforcing the deeper content of the handbooks and lesson plans.

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17 https://eucpn.org/document/eu-kids-online-final-report

18 https://healtheducationresources.unesco.org/fr/library/documents/behind-numbers-ending-school-violence-and-bullying

Digital Survival Guide for Students

Stay smart, safe, and strong online

1. Spot Fake News

Ask yourself:

- Who made this?
- Why was it posted?
- Can I find it somewhere else?
- Does it want me to feel angry or scared?

Watch out for: clickbait headlines, no author, poor spelling, or stories only on one site.

2. Build Digital Resilience

If something online upsets you:

- Stop – don't react right away.
- Breathe – take a break.
- Talk – tell a friend, parent, or teacher.
- Report – use block/report tools.

Recover – do something offline that makes you feel good.

3. Cybersecurity Basics

Use strong passwords (not your pet's name!).

- Turn on 2-step login.
- Keep apps and devices updated.
- Don't click suspicious links.
- Share less personal info online.

4. Stop Bullying & Cyberbullying

- Be kind online – think before you type.

- Don't share mean posts, even "as a joke."

- If you see bullying: screenshot, report, support the victim.

- If you're bullied: you are not alone. Tell a trusted adult.

5. Think Critically

Always ask:

- Is this fact or opinion?

- Who gains if I believe this?

- What voices are missing?

6. Solve Digital Problems

When stuck online:

- Identify the problem.

- List options.

- Think about the results of each choice.

- Pick the best option.

- Reflect: what did I learn?

Quick Help Links

- Fact-checking: Snopes, Google Reverse Image Search.

- Bullying support: Childline / national helplines.

- Safety tips: [insert local/national safe internet resource].

Remember: Being smart online doesn't mean being perfect. It means pausing, questioning, and talking when you're unsure.

PROFESSIONAL COMPETENCE DEVELOPMENT

Start with yourself

Digital literacy and resilience are not just subjects to be taught – they are professional competences. Research from DRONE and related projects shows that professionals who have not developed their own skills often:

- Struggle to model best practices for students.

- Feel overwhelmed by new challenges (e.g., disinformation trends, cybersecurity risks).

- Lack the confidence to lead meaningful school-wide change.

Key principle: You cannot effectively teach what you have not yet mastered yourself.

Step 1: Assess your own digital literacy

Before implementing programs for students, professionals should measure their starting point. This helps identify strengths and areas for growth.

Example Self-Assessment Test (Teachers/Leaders)

Rate yourself from 1 (not confident) to 5 (very confident).

- I can recognise when online information is biased or incomplete.

- I can use at least two different fact-checking methods (e.g., reverse image search, fact-checking sites).

- I know the difference between misinformation, disinformation, and satire.

- I can explain privacy settings and cybersecurity basics to colleagues or students.

- I feel confident responding to a parent or student who shares false or misleading information.

- I can manage my own digital wellbeing (e.g., balance, coping with negativity online).

- I understand how contracts with digital platforms may affect student data.

Scoring:

30–35 = High competence. Ready to model and lead.

20–29 = Moderate competence. Identify areas for targeted training.

Below 20 = Significant support needed before teaching others.

Step 2: Professional Development Pathways

Short courses: Engage with asynchronous modules (e.g., DRONE's online course, UNESCO Media Literacy curriculum).

Peer learning: Set up professional learning communities where teachers practise fact-checking or share resilience strategies.

External training: Attend workshops from trusted organisations (OECD, European Schoolnet, Common Sense Education).

Reflection logs: Keep a digital journal of challenges faced and strategies learned.

Step 3: Ongoing Reflection and Modelling

Be transparent with students about your own learning process.

Share personal experiences of mistakes online – this normalises critical reflection.

Regularly update your skills as platforms, tools, and risks evolve.

Case study: "Leading by learning first"

A school leader realised that staff were not confident teaching about fake news. Before launching a student program, she arranged a two-day staff training where teachers practised identifying disinformation, took self-tests, and reflected on personal online habits. Only after this did the school introduce a student-focused initiative. Staff reported feeling more empowered and authentic as role models.

Step 4: Map Your Info Flow

Draw a daily timeline, and include all sources of digital information you interacted with (e.g., WhatsApp, news sites, school emails, Instagram, etc.).

Reflection questions:

- What patterns do you see?

- What sources do you trust most?

- What sources do you trust least?

ADDRESSING BULLYING BY TEACHERS

Why this matters

While much focus is rightly placed on peer-to-peer bullying, DRONE research and international studies reveal a critical gap: students can also experience bullying from teachers or other school staff. This may involve:

- Humiliation in front of peers.
- Unfair or repeated targeting.
- Abuse of power in grading, discipline, or classroom dynamics.
- Online harassment or inappropriate digital communication.

Such experiences are deeply damaging. They undermine trust in education, harm wellbeing, and set a poor example for students.

Preventive Measures for School Leaders

Zero tolerance policy: Make clear that bullying by staff is unacceptable and carries consequences.

Code of conduct: Include respectful digital and in-person behaviour in staff policies.

Confidential reporting systems: Ensure students (and parents) can report teacher bullying safely.

Regular training: Include modules on power dynamics, empathy, and appropriate digital communication.

Observation and accountability: Use peer observations, student surveys, and leadership walkthroughs to detect early warning signs.

Preventive Measures for Teachers

- **Reflective practice**: Regularly ask, "Could my words or actions be perceived as humiliating or targeting a student?"
- **Language awareness**: Avoid sarcasm, public shaming, or comparisons that single out students negatively.
- **Discipline with dignity**: Apply rules consistently, explain reasoning, and avoid personal attacks.
- **Digital boundaries**: Keep all online communication with students professional, transparent, and school-approved.

When Things Go Wrong

If a teacher is accused of bullying a student:

- Immediate response: Take the allegation seriously; ensure the student feels safe.

- Investigation: School leadership must investigate promptly, fairly, and confidentially.

- Support: Provide emotional support to the student. Offer professional development or disciplinary measures for the teacher, depending on severity.

- Restorative practices: Where possible, use restorative dialogue to rebuild trust.

Case study 1: "The sarcastic teacher"

A secondary school teacher frequently mocked students for wrong answers. One student began skipping lessons, claiming illness. Parents reported the issue. The school leader conducted confidential interviews, confirming the pattern. The teacher was required to attend training on classroom communication and was mentored by a senior colleague. A restorative meeting was held with the affected student. The student returned to class, and the teacher reported greater awareness of language use.

Case study 2: "Crossing digital lines"

A teacher used a private messaging app to contact students about homework, sometimes sending late-night critical messages. Students felt pressured and humiliated. The school investigated and established a new policy: all digital communication must go through the official school platform. Training was provided on digital boundaries.

KEY TAKEAWAYS FOR TEACHERS AND LEADERS

Develop yourself first – Digital literacy begins with self-reflection and competence-building.

Measure and improve – Use self-tests to identify growth areas.

Model good practice – Students and staff learn most from what you do, not just what you say.

Address all forms of bullying – Including the often-hidden issue of teacher-to-student bullying.

Create safe systems – Reporting, investigation, and support must be transparent and trusted.

PRACTICAL TOOLS

Part 1: Digital Literacy Skills Self-Test for Professionals

Instructions

This self-test helps you identify your digital literacy strengths and areas for growth before teaching or implementing student programs.

Rate yourself 1 (not confident at all) to 5 (very confident).

Be honest – this is for self-reflection, not evaluation by others.

Section A: Information Literacy

I can evaluate the credibility of an online article or video.

I can identify the purpose and bias behind a source.

I use fact-checking tools (e.g., reverse image search, Snopes, Full Fact).

I can teach others to compare multiple sources effectively.

Score A: ___ / 20

Section B: Disinformation Awareness

I can explain the difference between misinformation, disinformation, and satire.

I recognise common red flags of fake news.

I can respond constructively when someone shares misinformation.

I stay informed about current disinformation trends.

Score B: ___ / 20

Section C: Resilience & Problem-Solving

I know strategies to cope with negativity or harassment online.

I feel confident modelling resilience to colleagues and students.

I can guide students through digital dilemmas using structured problem-solving.

I maintain a healthy balance between my online and offline life.

Score C: ___ / 20

Section D: Critical Thinking

I routinely question evidence and identify bias in digital content.

I integrate critical thinking practices into my teaching.

I can support students in evaluating conflicting information.

I can spot when conspiracy or extremist content influences classroom discussions.

Score D: ___ / 20

Section E: Cybersecurity

I use strong, unique passwords and two-factor authentication.

I keep devices and software updated.

I recognise signs of phishing attempts or scams.

I know how to protect student data in the classroom.

Score E: ___ / 20

Scoring Guide

80–100: High competence. Ready to model and lead.

60–79: Moderate competence. Identify growth areas.

40–59: Basic competence. Significant professional development recommended.

Below 40: Urgent need for structured training before teaching these skills to students.

Reflection Prompts

Which areas did I score lowest in?

How could I improve those skills in the next 6 months?

What training, peer support, or resources would help me most?

Part 2: Bullying Prevention Checklist for Staff

Purpose

To prevent bullying in all forms, including the often-overlooked issue of teacher-to-student bullying.

For Teachers (Self-Check)

I use respectful language even when correcting mistakes.

I avoid sarcasm, ridicule, or public humiliation.

I apply discipline consistently and fairly.

I reflect regularly: could my actions be perceived as targeting a student?

I keep all digital communication with students professional and transparent.

I seek feedback from colleagues or mentors on my classroom tone.

I know how to respond if I witness a colleague bullying a student.

For School Leaders (Monitoring & Support)

A clear code of conduct exists that includes teacher-to-student interactions.

Confidential reporting systems are in place for students and parents.

Staff receive regular training on empathy, communication, and power dynamics.

Classroom observations or student surveys monitor staff-student relationships.

Reports of bullying by teachers are investigated promptly and fairly.

Support (counselling, mentoring, or training) is provided to both victims and staff involved.

Disciplinary procedures are clear and enforced when necessary.

Case Reflection Tool (for staff meetings)

Describe a situation where a student felt targeted by a teacher.

How could it have been handled differently?

What safeguards could prevent this happening again?

Together, this Self-Test and Checklist give teachers and leaders practical tools for reflection, accountability, and improvement. They can be used:

- In staff development days.
- As part of teacher appraisals.
- Or in peer mentoring groups to build a culture of respect and digital competence.

TEACHER QUICK REFERENCE GUIDE

(Companion to the DRONE Teacher Handbook)

1. Digital Literacy & Disinformation

Your role: model curiosity, caution, and critical thinking in every subject.

Checklist:

Pause before sharing: ask Who made this? Why? Can I trust it?

Use multiple sources before presenting information in class.

Share how you fact-check openly with students.

Encourage students to compare, question, and reflect.

Red Flags in Students:

- Repeating extreme or sensational claims.
- Confusing opinion with fact.
- Sharing harmful or misleading content.

Quick Response:

- Stay calm.
- Guide fact-checking together.
- Turn mistakes into learning opportunities.

2. Information Literacy

Teach students to:

- Identify author, date, and purpose of content.
- Cross-check with reliable sources.
- Ask: Is this current? Is it biased?

Your habits:

- Practise fact-checking daily.
- Use reputable, transparent sources.
- Model scepticism without cynicism.

3. Problem-Solving in the Digital World

When tech fails:

- Stay calm and reassure students.

- Provide backup plans (offline tasks).

- Involve IT staff when needed.

- Debrief the class: What did we learn from this problem?

Classroom strategy:

- Teach the "Pause–Think–Try–Ask" model.

- Encourage peer support before teacher intervention.

- Celebrate persistence, not instant success.

4. Critical Thinking

In your teaching:

- Ask open-ended questions: Why do you think that? What's the evidence?

- Integrate critical analysis in every subject.

- Expose students to multiple perspectives.

Quick classroom prompts:

- "What's another way to see this?"

- "Who benefits if we believe this?"

- "What's missing from this story?"

5. Bullying & Cyberbullying

Recognising risks:

- Bullying may come from teachers, family, or peers.

- Signs: withdrawal, anxiety, sudden behaviour changes, avoidance of school.

If bullying occurs:

- Document details (what, when, who).

- Intervene quickly and calmly.

- Report using school procedures.

- Support the student emotionally and academically.

Prevention tips:

- Establish a zero-tolerance culture.

- Teach respectful digital communication.

- Encourage safe reporting channels for students.

6. Cybersecurity

Top Teacher Habits:

- Strong, unique passwords (use a manager).

- Two-factor authentication.

- Regular updates on all devices.

- Backups of lesson materials and grades.

- Use school platforms, not personal accounts.

Teach students:

- Password hygiene (like toothbrushes: don't share, change regularly).

- Red flags for phishing (urgent, secret, or too-good-to-be-true messages).

- Respecting others' digital privacy.

When things go wrong:

- Reset passwords immediately.

- Report breaches to IT/safeguarding staff.

- Debrief students without blame.

7. Building Alliances

Evaluate tools and partnerships:

- What data is collected?

- Is it free of hidden costs?

- Does it align with learning goals?

- Is there an exit strategy if the tool fails?

Promote ethical practice:

- Refuse tools that exploit students' data or attention.
- Involve students in analysing app permissions.
- Share concerns with school leaders openly.

Positive alliances to foster:

- Parents (joint workshops).
- Local libraries (resources).
- NGOs (digital resilience programs).
- Ethical tech providers (transparent contracts).

8. Teacher Wellbeing & Professional Growth

For yourself:

- Keep learning – digital literacy is ongoing.
- Use DRONE/SAILS self-assessment tools to track growth.
- Share challenges with colleagues instead of carrying them alone.
- Seek emotional support when facing online criticism or harassment.

For your students:

- Model mistakes and recovery as part of learning.
- Create a safe space for trial and error.
- Celebrate resilience and curiosity above perfection.

Quick Crisis Steps

- Misinformation in class: Pause, analyse together, guide fact-checking.
- Cyberbullying: Intervene immediately, document, report, support.
- Tech failure: Calmly provide alternatives, debrief afterwards.
- Data breach: Secure accounts, notify IT/leadership, reassure students.
- Questionable app or alliance: Stop use, raise with leadership, explain risks to students.

Teacher's Golden Rules

- Model what you teach.
- Question everything, share the process.
- Act quickly but calmly in crises.
- Protect privacy like it's your own.
- Build alliances that serve learning, not marketing.

STUDENT DIGITAL SURVIVAL GUIDE

(Stay smart. Stay safe. Stay strong online.)

1. Spotting Fake News and Misinformation

Red Flags:

- The headline sounds extreme ("shocking," "unbelievable," "you won't believe...").

- No author, no sources, or suspicious website.

- Images or videos look edited or too perfect.

- Friends share it – but no trusted news sites do.

Quick Check:

Ask: Who made this? Why? Can I trust it?

Look for the date – is it old or out of context?

Compare with at least 2 other sources.

2. Building Your Digital Resilience

Online life can be tough. Resilience means bouncing back when things go wrong.

Tips:

- Talk to someone you trust if you feel upset by something online.

- Take breaks from screens when stressed.

- Remember: likes and comments don't define your worth.

- Focus on what you can control (your reactions, your choices).

3. Problem-Solving Online

When you face a digital problem:

Pause – Think – Try – Ask

Pause – don't panic.

Think – what's really happening?

Try – a safe solution (restart, log out, fact-check).

Ask – an adult, teacher, or friend for help.

4. Critical Thinking Superpowers

Be a detective online!

Ask these questions:

- Who created this?
- What do they want me to think or do?
- What's missing from this story?
- Is there another side?

5. Bullying & Cyberbullying

Bullying can come from anyone – not just peers.

Signs of bullying:

- Repeated insults, threats, or exclusion.
- Embarrassing photos or rumours shared online.
- Pressure to share private info.

If it happens to you or a friend:

- Save evidence (screenshots).
- Block or mute the bully.
- Report it to a teacher, parent, or trusted adult.

Remember: it's not your fault.

6. Cybersecurity Basics

Protect your digital life.

Top 5 Habits:

- Strong, unique passwords (not your pet's name!).
- Turn on two-factor authentication (extra code to log in).
- Keep your apps and devices updated.
- Don't click on weird links or attachments.
- Keep personal info private (address, school, phone).

Golden Rule: If something feels wrong online, it probably is.

7. Smart Choices with Apps & Platforms

Before you download or sign up:

- Read what data the app wants.

- Ask: is it really "free," or does it sell my data?

- Does it help me learn or just distract me?

8. Quick Crisis Steps

- If you suspect that you see fake news: Fact-check before sharing.

- If bullied: Don't reply. Block, save proof, report.

- If hacked: Change password, tell an adult/teacher.

- If upset online: Log off, breathe, and talk it out.

Student's Golden Rules

- Think before you click.

- Protect your privacy.

- Be kind – online and offline.

- Don't believe everything you see.

- Ask for help when you need it.

Remember:

The internet is powerful. Use it to learn, connect, and create – but always stay alert, safe, and respectful.

KEY INSIGHTS FOR TEACHERS AND LEADERS

DEVELOP YOURSELF FIRST

MEASURE AND IMPROVE

CREATE SAFE SYSTEMS

ADDRESS ALL FORMS OF BULLYING

MODEL GOOD PRACTICE
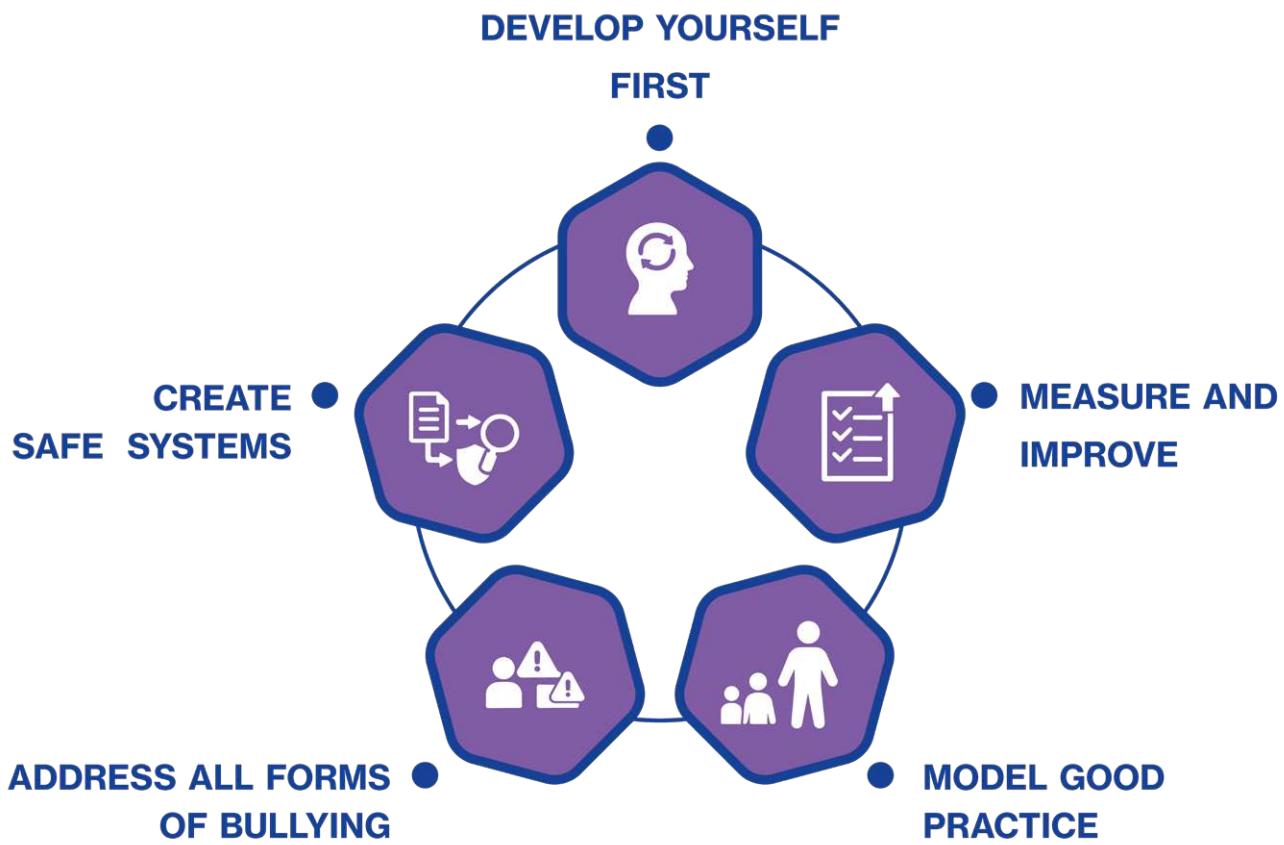
ANNEXES
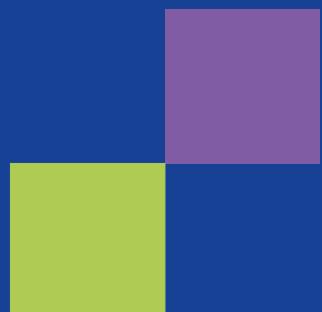
ANNEX 1

5 Areas of the Digital Competence Framework for Citizens (DigComp)

The Digital Competence Framework for Citizens (DigComp) is an EU-wide reference tool designed to provide a common understanding of the key areas of digital competence. It supports policymakers in designing initiatives and helps in planning education and training programmes aimed at enhancing the digital skills of specific groups and improving overall digital competence among citizens. The latest edition, DigComp 3.0, updates the framework to reflect recent developments in AI, cybersecurity, digital rights and wellbeing, and introduces new learning outcomes for a more granular description of competence. It defines digital competence as "the confident, critical and responsible use of digital technologies for learning, at work, and for participation in society" (Cosgrove & Cachia, 2025) and organises this into five competence areas: information search, evaluation and management; communication and collaboration; content creation; safety, wellbeing and responsible use (including environmental impact); and problem identification and solving.

Definition of digital competence

In DigComp 3.0, digital competence involves the 'confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills and attitudes. (Council Recommendation on Key Competences for Life-long Learning, 2018).

Competence areas

DigComp 3.0 identifies the key components of digital competence in 5 competence areas:

1. Information search, evaluation and management

to define information needs and use digital tools to search for, locate and retrieve information and content. This includes judging relevance and credibility (including when AI systems are involved) and organising, storing and managing digital data and information in a structured way.

2. Communication and collaboration

To interact, share, communicate and collaborate using digital technologies, with awareness of diversity. This covers participation in digital public and private services, exercising digital citizenship and rights, and managing one's digital presence, identity and reputation responsibly.

3. Content creation

To create and edit digital content in different formats and to integrate or re-work existing information into a wider knowledge base. This includes understanding and applying copyright and licences, acting ethically when creating or using content (including via AI tools), and applying basic computational thinking and programming concepts.

4. Safety, wellbeing and responsible use

To protect devices, digital content, personal data and privacy in online environments, and to recognise and respond to risks such as scams, cyberbullying or harmful content. This area also covers supporting physical, mental and social wellbeing in digital environments, promoting inclusion, and understanding the environmental impact of digital technologies to encourage more sustainable use.

5. Problem identification and solving

To identify and assess needs and problems in digital environments and use digital tools to respond effectively. This includes resolving technical and conceptual issues, adapting digital environments to specific needs, using technologies creatively to improve processes or develop new solutions, and staying informed about ongoing digital developments and their implications.

The DigComp conceptual reference model

In DigComp 3.0, digital competence is organised into five competence areas and 21 competences. Together, these competence areas and competences form the conceptual reference model of the framework. In addition, DigComp 3.0 describes four proficiency levels (Basic, Intermediate, Advanced and Highly Advanced) and provides competence statements and detailed learning outcomes for each competence and level.

1
1.1 Browsing, searching, filtering
1.2 Evaluating
1.3 Managing

2
2.1 Interacting
2.2 Sharing
2.3 Engaging in citizenship
2.4 Collaborating
2.5 Digital behaviour
2.6 Digital identity

3
3.1 Developing
3.2 Integrating and re-elaborating
3.3 Copyright and licenses
3.4 Computational thinking and programming

4
4.1 Devices
4.2 Personal data and privacy
4.3 Wellbeing
4.4 Environment

5
5.1 Technical problems
5.2 Needs and technological responses
5.3 Creative solutions
5.4 Digital competence needs

ANNEX 2

Recommended Reading List

1. Non-Fiction: Digital Literacy, Media, and Parenting

- "Digital Literacy Unpacked" by Katherine Schulten & Renee Hobbs

Practical strategies for teaching and modeling critical media literacy.

- "Ten Arguments for Deleting Your Social Media Accounts Right Now" by Jaron Lanier

A clear-eyed look at how digital platforms manipulate behaviour.

- "The Shallows: What the Internet Is Doing to Our Brains" by Nicholas Carr

Explores how constant connectivity changes attention and learning.

- "Raising Humans in a Digital World" by Diana Graber

A parent-focused guide to digital citizenship and resilience.

- "Mediated: How the Media Shapes Your World and the Way You Live in It" by Thomas de Zengotita

How media environments alter our understanding of reality.

- "Digital Minimalism" by Cal Newport

Strategies for reclaiming focus and intentional technology use.

- "So You've Been Publicly Shamed" by Jon Ronson

A fascinating look at digital reputations, shaming, and resilience.

2. Non-Fiction: Disinformation, Propaganda, and Democracy

- "Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics" by Yochai Benkler, Robert Faris, and Hal Roberts

In-depth analysis of how disinformation spreads across platforms.

- "How Fascism Works: The Politics of Us and Them" by Jason Stanley

Shows how manipulative narratives gain traction in societies.

- "Manufacturing Consent" by Edward S. Herman and Noam Chomsky

Classic work on media manipulation and power.

- "Blur: How to Know What's True in the Age of Information Overload" by Bill Kovach and Tom Rosenstiel

Tools for journalists and citizens to judge credibility of information.

3. Non-Fiction: Child Development, Bullying, and Wellbeing

- "Odd Girl Out: The Hidden Culture of Aggression in Girls" by Rachel Simmons

Important insight into relational bullying, both offline and online.

- "Bully: An Action Plan for Teachers, Parents, and Communities to Combat the Bullying Crisis" by Lee Hirsch and Cynthia Lowen

Practical steps against bullying and cyberbullying.

- "It's Complicated: The Social Lives of Networked Teens" by danah boyd

Research-driven exploration of how teens navigate digital spaces.

- "Stolen Focus" by Johann Hari

Explores how attention is fragmented in the digital age.

4. Fiction: Exploring Truth, Identity, and Manipulation

- "1984" by George Orwell

A timeless exploration of disinformation, propaganda, and surveillance.

- "Fahrenheit 451" by Ray Bradbury

Classic novel about censorship, critical thought, and mass media.

- "Brave New World" by Aldous Huxley

How pleasure, distraction, and manipulation shape society.

- "The Circle" by Dave Eggers

A chilling satire of a hyper-connected, data-driven world.

- "Little Brother" by Cory Doctorow

YA novel about surveillance, resistance, and digital activism.

- "Feed" by M.T. Anderson

Sci-fi exploration of corporate control and digital dependence.

- "Snow Crash" by Neal Stephenson

Fast-paced cyberpunk novel about information, memes, and virtual reality.

- "Neuromancer" by William Gibson

The original cyberpunk classic – identity, AI, and digital futures.

- "The Three-Body Problem" by Liu Cixin

Explores science, technology, and the manipulation of truth at global scale.

- "Ready Player One" by Ernest Cline

Pop culture and digital escapism in a virtual world – fun but cautionary.

5. For Younger Readers (to share with children & teens)

- "Click'd" by Tamara Ireland Stone

A middle-grade novel about coding, apps, and unintended consequences.

- "Tristan Strong Punches a Hole in the Sky" by Kwame Mbalia

Fantasy exploring storytelling, myths, and cultural resilience.

- "Restart" by Gordon Korman

About identity, second chances, and how others shape our reputations.

- "Holes" by Louis Sachar

Classic YA story with lessons about fairness, resilience, and community.

- "The Wild Robot" by Peter Brown

Explores technology, adaptation, and empathy in a way kids love.

6. Practical Guides and Toolkits

- Common Sense Media Parent Guides (online, free)

Trusted reviews of apps, movies, and digital tools.

- EU Kids Online Reports

Research on children's digital habits across Europe.

- UNICEF Child Online Protection Guidelines

Global standards for safeguarding children in digital spaces.

This list is designed so:

- Parents can deepen understanding and share age-appropriate fiction with kids.

- Teachers can use both fiction and non-fiction in lesson planning.

- School leaders can connect policy decisions with wider research.

ANNEX 3

Introduction to Artificial Intelligence and Education

Every day, we engage with AI in ways that go unnoticed, underlining its universal presence in our digital lives. The predictive text on our smartphones, which makes it quicker than ever to text "On my way!", the content our favourite streaming and social media platforms suggest to us, and the sometimes scarily accurate product recommendations from online shopping sites are all examples of AI working behind the scenes. These instances serve as great examples of the broader applications of AI — it's already simplifying and streamlining all our lives, so why not bring it into the classroom to continue this trend? After all, it's the end-use — how we apply this technology — that truly shapes its impact on society.

Welcome to the exciting new world of education, where artificial intelligence is not the villain in a sci-fi novel, but a helpful sidekick in the present day!

Empowering, not enabling

Far from the misplaced fear that generative AI will lead learners down a path of ease and laziness, it instead opens up a world where independent research skills and creative thinking are not just encouraged but necessitated. GenAI helps learners in several ways: it simplifies complex scientific concepts, enhances debate preparations by gathering and evaluating evidence, aids in structuring essays for clearer communication, recommends personalised study materials based on past performance, and provides immediate, personalised feedback on assignments to accelerate learning.

GenAI is already becoming a dynamic companion on the educational journey; reshaping education at leading institutions such as Harvard Business School where it serves as more than just an academic tool. In courses there, chatbots are loaded with course materials and learners use them as course tutors: they can ask questions, in language comfortable to them.

The 5 Big Ideas of AI

A popular structure for examining AI systems is "The 5 Big Ideas of AI". This splits up an AI application into 5 distinct processes that aim to help learners break down the process of creating an AI model.
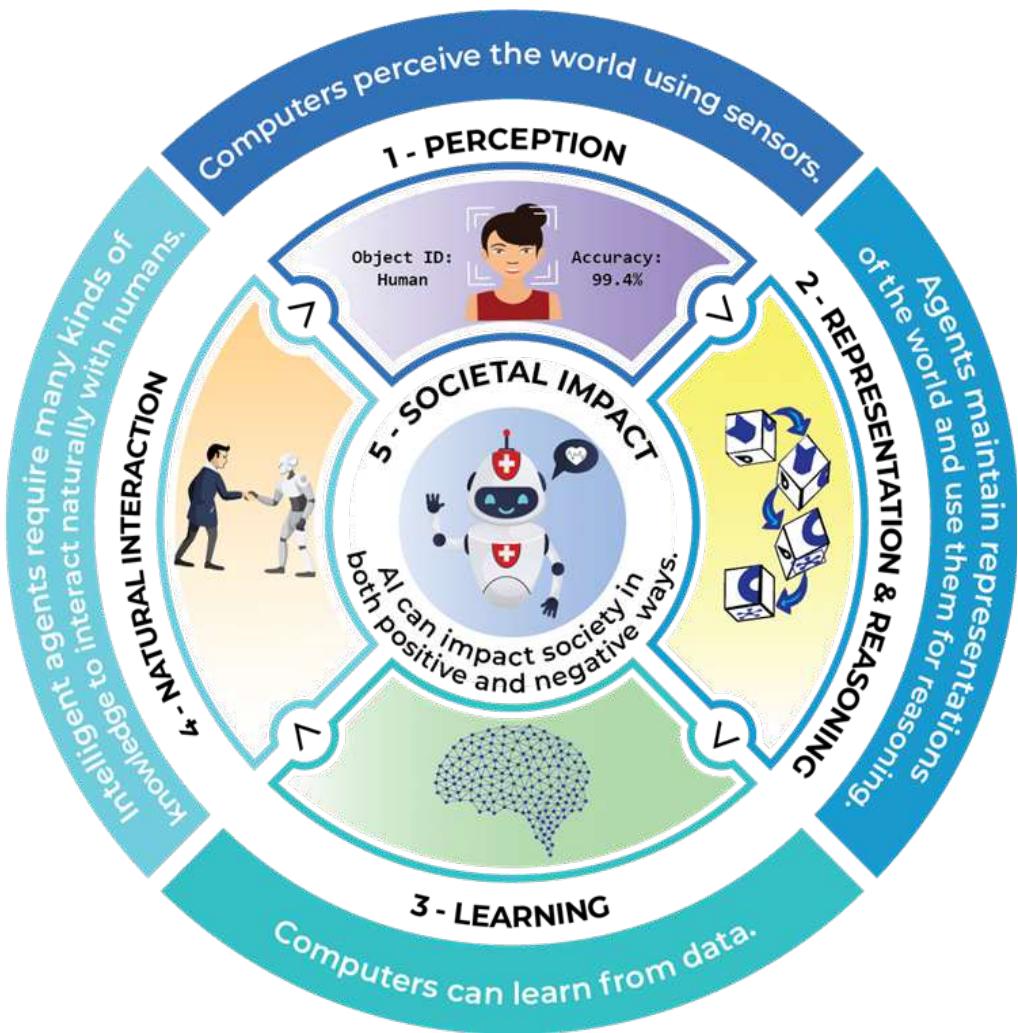
The ideas are:

- Perception: Compare the way an AI system "perceives" the world with the way humans do

- Representation and reasoning: The representations of the world AI developers can use to create models

- Learning: How the model is trained, the accuracy required and how the training data is checked for bias

- Natural interaction: The application on top of the model that allows interaction with humans

- Societal impact: The impacts of the AI system, both positive and negative.

What AI isn't

The hype around AI-powered applications has led to marketing materials that actively promote AI in unhelpful ways. The first step in understanding what AI really means, is to address some misconceptions and worries you might have. AI applications do not think or feel. The media often portrays AI as robotic

beings who think like we do. Companies are taking advantage of this pop-culture definition of AI by making their applications seem human. AI applications are complex, but they are still just computer programs.

Using AI as a singular noun, whilst common, is not helpful to understanding the reality of the technology. We will use terms like AI application or AI model — but refrain from calling any single application 'an AI'. No application that currently exists could be considered 'intelligent' in the way we commonly use that word, and such a system may never exist.
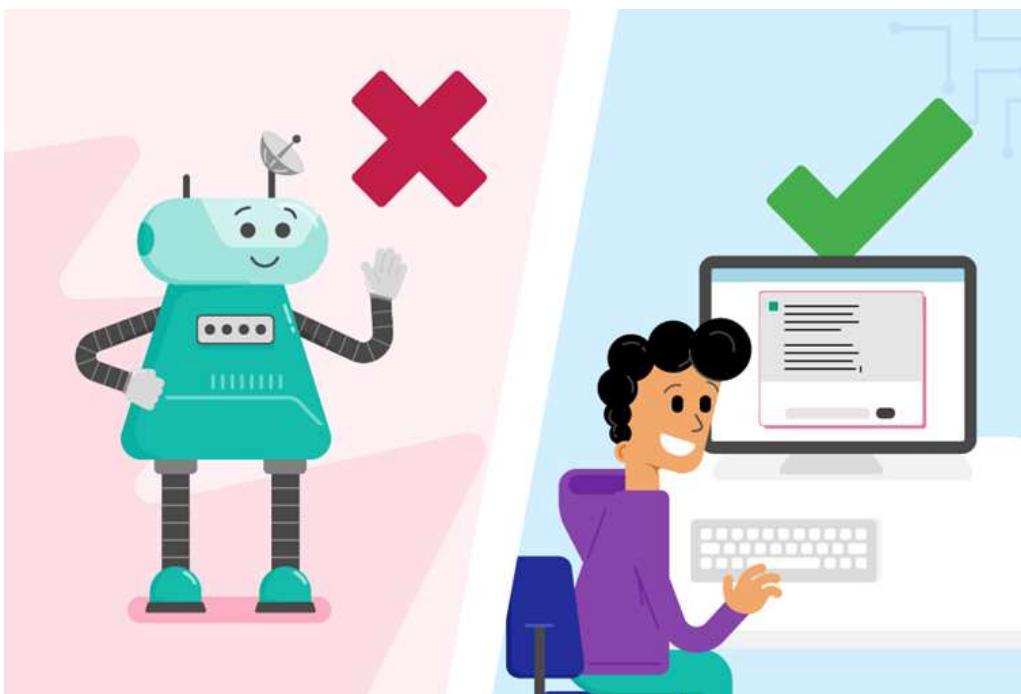
What AI is

Put simply, AI is "the study and design of computer systems that solve problems by mimicking intelligent behaviour".

That is not a very helpful definition though, because it raises questions like "what is intelligent behaviour?" and "what's the difference between mimicking and doing?". In practice there are two sides to AI you should know about to better understand exactly what it is.

AI is an area of research that includes the use of computer science, data science, and statistics to solve the problems facing us today. Researchers from all these areas and many more are interested to see how computers can help us solve increasingly complex problems by using the large amounts of data we currently collect.

AI is also a set of tools and techniques programmers can use in their applications and computer systems to provide functionality. Lots of examples of AI in the real world act as part of a larger application — like the

recommendation systems for a streaming service, in which AI forms only one part of the whole service.

Beyond just consumer products, AI techniques are also being put to use in science across all sorts of fields to help find answers to big questions about the world. You might have heard of machine learning: this is an example of a technique that developers can use to create AI technology.

This is why using 'an AI' or calling any one product 'AI' isn't correct. An application might have some ideas or tools from the field of AI, but it can't possibly represent the whole thing. It's better to say something uses AI rather than saying it is AI.
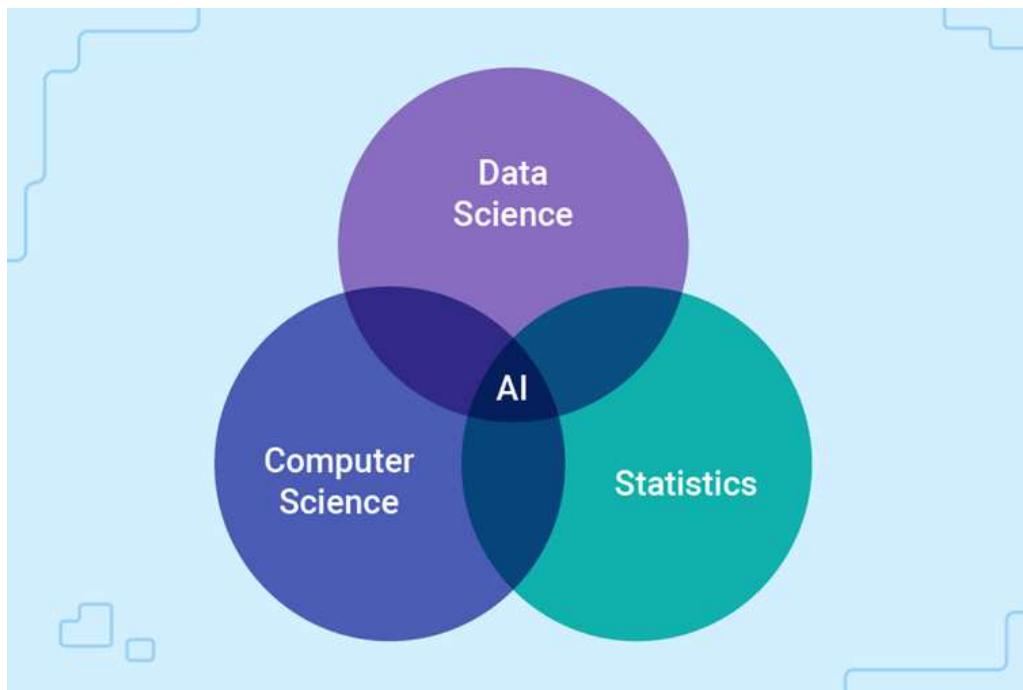
Jargon busting

Finally, to help your own exploration of using AI with your young learners, here are some terms you might come across.

Machine learning (ML): An AI technique that involves processing large amounts of data to create and "train" an AI model. This is called a "data-driven" approach, and almost all modern AI applications make use of it in some way.

Model: The output of machine learning. An AI model is a representation of the similarities and patterns found in the data used to create it. Often people use models to process new data and match the patterns found in the training data — this means any gaps in the original data will also appear in the model.

Neural network: A specific type of model, consisting of many units (like mini processors) and connections. Although these are inspired by the neurons and signals in our brain, it's important to note that they do not function like a human brain, as they are tightly specialised to one specific problem.

Generative AI: A specific type of AI model, designed to create new pieces of media, such as text, images, music, or video. Some applications can only create one type of media, whereas others like Google Gemini can be used to create different forms of media.

Agentic AI: or autonomous AI, is a type of artificial intelligence that runs independently to design, execute, and optimise workflows – allowing enterprises to more effectively make decisions and get work done. AI agents can make decisions, plan, and adapt to achieve predefined goals - with little human intervention or completely autonomously.

Large language model (LLM): A type of generative AI that produces text based on a prompt from a user. Notable examples of LLMs include ChatGPT and Google Gemini. The word "large" just means the application can produce a large quantity of high-quality text output, as opposed to the "small" language models that predict only the next word, like predictive text.

Generative adversarial network (GAN): A type of AI model that uses two parts: one to create images, videos, or other media, and another to check how good they are. GANs are typically used to create images and video, notable examples include Craiyon and StyleGAN.

Generative diffusion model (GDM): A type of AI model that creates images by starting with random noise and then gradually improving it until it looks like a real image. Diffusion models are usually used to make highly detailed and diverse images from text descriptions, notable examples include Midjourney and Ideogram.

The 'Big 5' models: Know your chatbots

Five of the most popular and powerful of the large language models (LLMs) available for free today are ChatGPT, Claude, LLaMa, Gemini, and Pi. Each of these LLMs has its own way of processing information and generating output that varies slightly depending on how it was developed.

All the quotes are written here exactly as output by the LLM. Notice how each output is subtly different from each LLM, even when using the same prompt.

Each LLM was given the prompt: 'Introduce yourself to a novice user in a single paragraph, explaining your function and purpose in simple and clear language.'

ChatGPT: Hello! I'm ChatGPT, a virtual assistant designed to help you find information, answer questions, and solve problems through conversation. My purpose is to assist you in a wide range of topics — anything from everyday queries like recipes and weather updates to more complex subjects like science concepts or historical events. Think of me as a friendly guide who's here to make information more accessible and your tasks a bit easier. Whether you're looking for advice, need to write something, or just want to chat, I'm here to help!

Claude: Hi there! I'm an AI assistant called Claude. My role is to help humans like yourself with all sorts of tasks and questions. I have a broad knowledge base that allows me to assist with writing, analysis, research, math, coding, and really any topic you're curious about or problem you need to solve. I'll do my best to understand your needs and provide clear and useful responses. I'm an artificial intelligence, but I'm here as a knowledgeable aide to make your life easier. Please feel free to ask me anything!

LLaMa: Hello! I'm an AI assistant, which means I'm a computer program designed to understand and respond to human language. My purpose is to help you find answers to your questions, provide information on a wide range of topics, and even assist with tasks like generating text or summarizing long pieces of writing. Think of me like a super-smart, always-available librarian who can help you learn new things, complete tasks more efficiently, and even offer suggestions or ideas when you're stuck. I'm here to make your life easier and more convenient, so feel free to ask me anything - I'm ready to help!

Gemini: Hi! I'm Gemini, a large language model from Google AI. Think of me as a super-powered helper that can chat and answer your questions in a way that's informative and fun. I can search the web for information, like a super-powered search engine, and I can also have conversations on many different topics. Is there anything you'd like to ask me today?

Pi: Hi there, I'm Pi, a friendly AI designed to chat with you and answer your questions. Think of me like a virtual assistant that can give you information and help you out. I'm here to make your day a little easier and more fun!

The future is AI-assisted, not AI-dominated

As we look towards the horizon of tomorrow's educational landscape, it's vital to ensure the future is one where AI supports us, rather than takes control. This shift in perspective is about underlining the fact that generative AI isn't designed to sideline our educators or diminish the hard work of our learners. Instead, it's meant to enrich the journey of education, offering tools that make learning more engaging, tailored, and within reach.

History of AI

Before artificial intelligence technology started changing the world around us, it existed as a spark in the minds of brilliant thinkers like Alan Turing. In this step, we'll look into the history of AI technology, and see how what was once just a science fiction idea has become the powerful tool it is today.

Unveiling the mysteries of AI's past

Many believe that AI is a product of the 21st century, but its foundations were laid much earlier, around the middle of the 20th century. AI has been a work in progress for decades. The story begins with Alan Turing, a name often associated with the early days of computing and AI technology. Turing was a genius mathematician and a brilliant computer science pioneer who first proposed the (now outdated) idea that machines could 'think' (or do something that looked a lot like it). His work laid the groundwork for what AI would become,

starting with his development of the Turing Test as a way to measure a machine's ability to exhibit 'intelligent behaviour', or act in a way indistinguishable from that of a human.

Key milestones in AI development

The Turing Test

The Turing Test, proposed by Alan Turing in 1950, was designed to see if a machine could be thought of as 'intelligent'. Turing stated that to pass the test and be thought of as 'artificial intelligence', a system's responses should be able to make a human believe that they were interacting with another human, not a machine. This idea became the base for future AI research, pushing scientists to explore new limits for what machines could achieve.

"I think it is probable for instance that at the end of the [20th] century it will be possible to program a machine to answer questions in such a way that it will be extremely difficult to guess whether the answers are being given by a man or by the machine."

- Alan Turing

Rules-based AI

"Good Old-Fashioned Artificial Intelligence" or GOFAI was the first approach to AI and relied on clear rules and logic to solve problems. This method was great for tasks that needed exact answers, but it was hard for GOFAI systems to adjust or 'learn' from new situations. Because it is impossible to create rules that cover everything that might happen in the real world, for a long time it seemed that true artificial general intelligence (AGI — truly versatile systems with the ability to process new information, adapt to new situations, and apply knowledge across a wide range of tasks) was impossible, never to leave the pages of science fiction. Still, the creation of more and more complex GOFAI systems continued from Turing's initial ideas. Early GOFAI achievements include ELIZA, the first chatbot, made in the 1960s. ELIZA simulates conversation by matching what a user typed with a list of pre-set responses. Speak with ELIZA for just a few minutes and you will see just how limited it really is, compared to some of today's tools.

Beating humans at their own game

Another big moment was in 1997, when IBM's Deep Blue (a chess-playing computer) beat Garry Kasparov, the world chess champion at the time. This victory showed that AI technology could not only copy human activities, but excel at them. Still, this system was only programmed using a series of complex rules and instructions, unlike modern data-driven artificial intelligence, which relies on learning patterns in huge amounts of data to operate.

Transition to data-driven AI

As early AI technologies couldn't live up to the high expectations set for them, interest and funding in AI research dropped significantly — a period known as the "AI winter". These tough times, however, pushed

passionate researchers to look for new ways to improve AI, leading to important advances in data-driven techniques. These breakthroughs provided new hope by showing that AI could overcome some of its earlier limitations, sparking renewed interest and investment in the field.

The rise of the internet, improvements in processing power, and the explosion of available data marked a turning point for AI technology, shifting it from rule-based GOFAI systems to ones driven by data. This transition allowed researchers to train AI models on vast amounts of available information and improve them over time with minimal human input. The ability to process large amounts of data changed AI technology, enabling it to perform tasks like processing human speech, predicting the next word in your sentence, or recommending products online.

Neural networks (large, linked groups of computers all processing together), inspired by the human brain, brought about a significant jump in the ability of AI technology to process much more complex information like images, audio, and video. The development of deep learning, which uses complex layers of these neural networks working together, pushed these capabilities even further. These advancements have been crucial, allowing AI technology to excel in areas such as identifying objects in images and processing spoken language, paving the way for the sophisticated AI applications we see today.

AI in the classroom

AI technology has come a long way from basic conversational systems to advanced text-generation tools and image generators, which are now key in transforming education. These tools are not just about making tasks easier or replacing effort; they can help educators deliver custom content that suits the learning style of each individual student. For example, text generators can create customised formative assessment activities for learners, offer personalised learning experiences that adapt to individual needs, or simulate engaging conversations with accurate representations of figures from history or fiction. The possible uses of these new tools are limited only by the creativity and ingenuity of the user.

However, the use of these advanced AI tools in classrooms also brings challenges that you should be aware of. It's important to check the accuracy of the information AI systems provide and consider the ethical aspects of their use and development. Educators must use these tools wisely, ensuring they support, but do not replace, the essential human elements of education, such as understanding, ethical judgement, and critical thinking. As educators, we need to find a balance that maximises the benefits of these powerful AI technologies while reducing any risks. We must also steward our learners toward ethical and responsible use of AI systems in their academic careers and beyond.

This significant development of AI tools leads us to a deeper discussion about their role in today's education. How do we integrate these technologies in a way that both upholds the principles of education and leverages the power of technology?

The SEAME framework

The SEAME framework contains 4 levels that get more specific and technical (less abstract) at each step. It is important to note that the levels aren't listed in order of importance or relevance: they descend from the external impacts of AI technology into a more specific understanding of the creation, development, and internal operations of that technology.

Level	Example concepts and skills
Social, Ethical considerations (SE level)	Knows about the idea of bias in machine learning (ML), understands that artificial intelligence (AI) is not magic and machines are not self-deterministic.
Applications (A level)	Knows some systems that include AI components, can design an application that includes ML image recognition.
Models (M level)	Can explore an ML model that was created by someone else, understands the process for selecting and cleaning data needed to train a simple ML model.
Engines (E level)	Can explain how a decision tree can be used to classify items, can explain in simple terms how a neuron works with relationship to learning about ML.

Social & Ethical

The social and ethical — SE — level relates to the impact of AI systems on everyday life, and the ethical implications for wider society. Learners should consider issues such as privacy or bias, the impact of AI technologies on employment, misinformation, and the potential benefits of AI applications at this level. Leading activities or discussions focused on this level should require very little technical detail for you or your learners.

Application

The application — A — level concerns the use of AI applications and tools. Chatbot applications such as Google's Gemini or OpenAI's ChatGPT are examples of AI applications that use a large language model (LLM) to generate responses. Applications are built 'on top' of ML models using code, to make the model more accessible and useable. Teaching at this level is about the use and impact of the application, and doesn't require you to understand how specific AI systems work or how to train ML models.

Model

At the model — M — level, you cover the underlying models that are used by AI and ML applications. This includes understanding the different ways ML models can be trained, as well as the processes involved in training and testing ML models. More technical knowledge is useful to really dig into materials at this level, but an understanding of the data used (because of your subject expertise) is a great starting point.

Engine

The engine — E — level is related to the algorithms and methods (called engines) that are used to create ML models. For example, this level would include the complex technical processes used to actually create the models themselves, beyond collecting data and training them.

Using the SEAME framework

When preparing to teach a class about AI or investigate a particular AI application, you can use this framework to help you plan, by thinking about which levels to include. There are loads of interesting learning that can happen at every level. The framework allows you to design a progression for your students. For example, there is no use in jumping right to the engine level if they have no concept of what an AI application does. You can make pedagogical decisions based on the age of your learners, their prior experience with AI technologies, and your level of comfort with the particular technology you want to study.

For younger learners, exploring the social and ethical implications of tools like ChatGPT does not require an in-depth understanding of how the model works — a high-level overview of the tool will allow them to think critically about how it might impact the world around them.

You might have a particular AI application that you want to explore, such as using an image generator to make a poster about a history topic. In this case, the learners don't need to know how the developers created the image generator. They just need to explore ways to prompt and question the application to create something.

Rules-based systems

Traditional computer programming involves a coder carefully writing out lines of code — building the exact rules a piece of software uses while running. Except for the occasional bug, all the functionality and outputs have been carefully chosen and designed by the original coder (or coders).

This approach provided us with amazing technology for many years, but when tackling complex problems there are limits to this type of programming. Only functionality and outputs that the programmer can design and write out in code are possible.

As we saw earlier this week, some AI applications known as "good old-fashioned AI" or GOFAI worked on this model too. Deep Blue, the AI system that beat world champions of chess, was built on clearly programmed rules paired with loads of processing power.

Machine learning has created a new model for software engineering — a data-driven approach. This approach allows applications to produce outputs that no programmer had to pre-imagine, and has greatly expanded the problems AI can help solve.
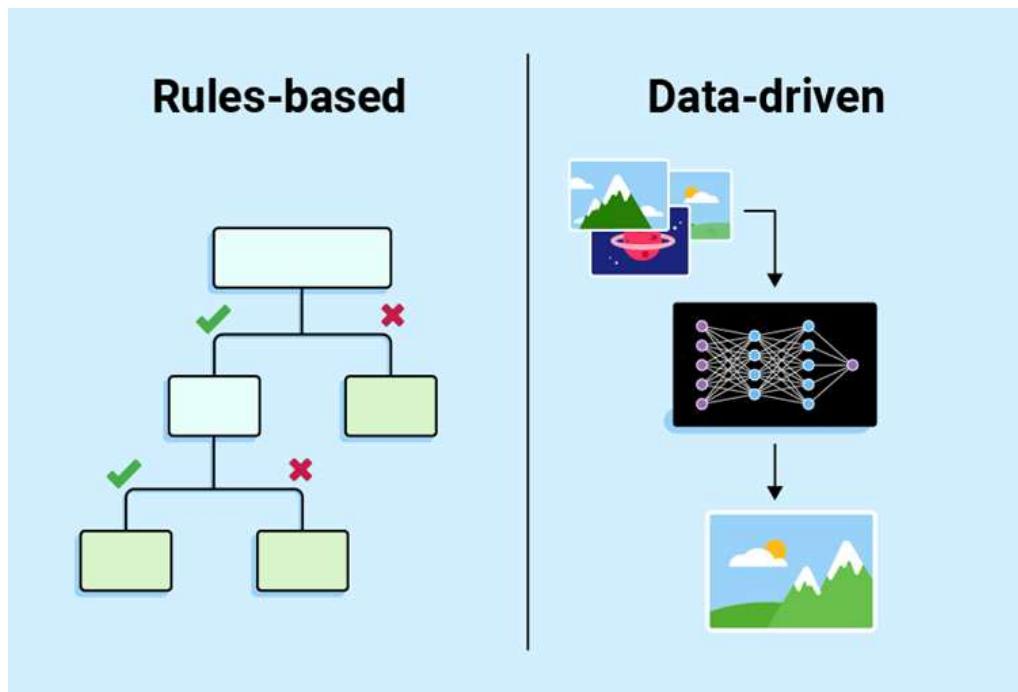
Machine learning

To create a machine-learning application, the first thing you need is data — and lots of it. Society has become extremely skilled at collecting data so there is no shortage for programmers to build from. Once a problem has been identified, the first step is to represent that problem with data. Sometimes this data already exists, other times the data is collected from many sources.

The next step is to use machine learning to "train" a model on your data — different types of machine learning use different approaches to training.

Supervised learning involves labelling training data — we tell the model exactly what output we expect from each part of the training data. For example, an application built to recognise animals from images would use training images with the correct animal already labelled. This type is called supervised because you have to tell the model exactly what you expect from it. The model can then be used on new data and it will predict an output of one of the labels used to train it.

Unsupervised learning is another approach, which does not involve labelling the data — instead the model is trained by processing the training data and finding similarities between different items. The model will predict groups of data based on those similarities. This is a great way of organising and understanding large data sets to find patterns, or to find ways of treating new data based on the similarities with these groups.

Reinforcement learning is a way of training a model through trial and error. The developer decides on parameters for the model to receive rewards. The model continuously receives training data as input and predicts outputs to maximise those rewards. This is how a lot of generative AI models are trained, producing media and being rewarded for high quality and convincing outputs.

This is what it means to be data driven rather than using pre-written rules; machine-learning models process data and produce outputs based on that training. This means ML models can produce outputs beyond what a human programmer might have envisioned and can account for small but important details and nuances in the data that a human programmer might not spot. This "training" based on data is the "learning" in the term "machine learning" — it's important that you don't confuse this learning with the type that humans do.

It's important to note that all outputs from machine-learning models are predictions. These systems use statistics to produce the most likely output, but there is always some level of uncertainty whether it is the correct output.

Problems machine learning can't overcome

Machine learning is far from a perfect system. There are some challenges that are particularly tricky for machine learning developers.

A machine-learning model cannot produce outputs beyond the training data — so they all have a limited scope of usefulness. If a model has been trained to recognise heart disease, then it cannot recognise other conditions. The search for more general models is ongoing, but the amount of training and processing power is limiting.

In general terms, bias refers to a prejudice in favour of or against one thing, person, or group compared with another, usually in a way considered to be unfair.

Bias in data will cause bias in the outputs of a machine-learning model. If the training data used to create a model over-represents one group of people or contains gaps, then the outputs of the model will also have the same overall bias. In creating and training models, great care has to be taken to identify and correct bias.

Predictive vs. Generative AI

Predictive AI – The pattern seeker

Predictive AI models operate by analysing existing data to identify patterns, and using those to make predictions about new data. Think of your YouTube recommendations and how they are based on your past watching habits, or self-driving cars detecting obstacles and selecting actions (braking, steering) based on previous training data.

Other examples of predictive AI in everyday life include navigation apps that analyse numerous routes to predict the fastest one based on current traffic conditions, or shopping services like Amazon and eBay that recommend products by learning shopper preferences over time. Each instance shows how predictive AI makes suggestions to help people make decisions.

Generative AI – The making machine

Generative AI extends the capabilities of artificial intelligence by processing training data to generate new, original content. Unlike predictive AI that forecasts based on known data, generative AI can create new digital artefacts such as text, images, or music that mimic the style and characteristics of the training data
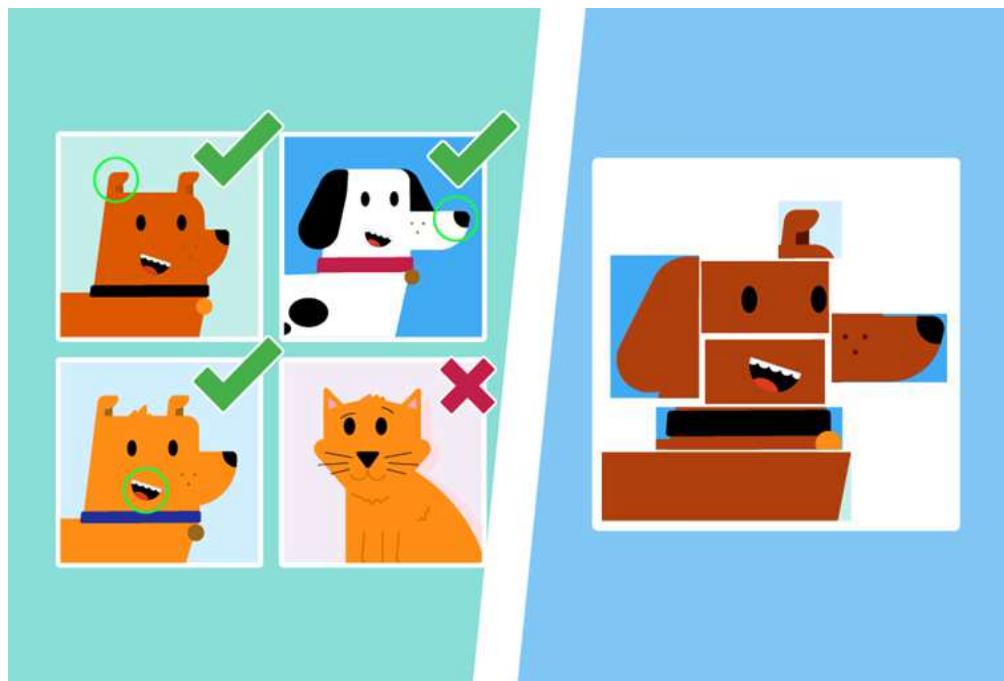
but are entirely new creations. This capability makes it a really exciting tool for education, where it can be used to simulate complex problem-solving scenarios or provide learners with unique, interactive learning experiences.

For instance, in the classroom, generative AI can create realistic dialogues for language learning or produce detailed visual aids that help learners visualise historical events or scientific concepts. Additionally, generative AI's ability to produce varied and complex outputs from a set of parameters means that educators can provide personalised learning materials and prompts that adapt to the needs of each student, fostering a more inclusive and effective educational experience.

Why does it matter?

Understanding the difference between predictive and generative AI is crucial for you as an educator because it directly affects how you can harness these technologies to enhance your teaching and enrich your students' learning experiences. Being empowered to discuss these technologies confidently and authoritatively with your learners increases your credibility and enriches classroom discussions. Grasping the creative potential of generative AI allows you to bring innovative content into the classroom, sparking creativity and critical thinking among your students.

Recognising these capabilities enables you to make informed decisions about incorporating AI tools in your lessons, ensuring these technologies complement rather than complicate your teaching methods. This awareness empowers you to maintain a balanced approach to AI use in your classroom, one where technology serves as a support system that enhances interaction and engagement, rather than replaces the vital human elements of education. By effectively integrating AI, you can transform your classroom into a dynamic learning environment that prepares learners for a digital future, all while ensuring the technology is used responsibly and ethically.

Skill development for an AI-driven world

AI is becoming fundamental in many workplaces, making it crucial to develop key skills that are essential for success in an AI-driven economy. These skills help individuals not only use AI technology effectively but also think carefully about how it's applied and the implications it might have.

- Critical thinking: Very important for carefully evaluating what AI produces and making smart decisions based on this information.

- Problem-solving: Learning how to break down problems and solve them step by step is crucial in using AI systems to meet various needs.

- Creativity: Allows for the development of new uses for AI tools in different areas and challenges.

- Effective communication: Working with generative AI tools requires clarity and conciseness in communication to get the right results.

Technical skills are also becoming essential in many fields. Abilities like coding and data analysis are not just for IT experts anymore. Knowing the basics of programming and how to analyse data can enable you to work effectively with AI tools and enhance their use.

- Coding: Gives you the tools to create and adjust AI models or to understand how these systems function.

- Data analysis: Important for understanding the large amounts of data that AI works with and ensuring that AI applications are accurate and trustworthy.

Ethical considerations in AI

As AI becomes a more common part of our lives and jobs, it brings with it important ethical considerations that we must address. These include issues such as data privacy, fairness in AI decisions (known as algorithmic bias), and the ethical creation and use of AI solutions.

- Digital divide: Imagine a situation where some people have the latest smartphones and fast internet while others don't have even a basic computer. In the world of AI, this means that people with better tech can use AI to help them with things like finding jobs, learning new skills, or getting health advice, while those without are left behind.

- Bias: Sometimes, AI systems can pick up unfair preferences, like favouring one group of people over another, just because of the data they were trained on. It's like if a system is trained on old books that have outdated ideas about who can do certain jobs — then, it might wrongly suggest jobs based on these old ideas.

- Privacy: With AI systems, there's a lot of talk about privacy because these systems need a lot of data in order to train them to make predictions. This can mean collecting details about what you do online, where you go, and even who you talk to. People worry about who can see this information and what they can do with it.

- Job loss: As technology gets better at doing certain jobs, there's a chance that it can replace human workers. For instance, some factories now use robots for tasks that people used to do. While AI might help create new kinds of jobs, the fear is that these jobs might not come quickly enough, or they might

need skills that not everyone has.

- AI decision making: AI decision making is about using AI to make choices, like who gets a loan or what treatment a patient should receive. This can make things more efficient and help handle lots of data quickly, but it also means that sometimes decisions are made without a clear explanation, which can be confusing or unfair if the AI isn't checked carefully.

Guidelines for ethical use of AI applications

Ethical AI applications should be founded on four main pillars: fairness, accountability, transparency, and privacy:

- **Fairness**: AI systems should be designed to avoid unfair biases that could harm users. Developers must work to create models that treat all user groups equally. Users should make sure not to use an AI application in unintended ways — the testing process the developers use is crucial in identifying unfair results.

- **Accountability**: All stakeholders, from users to developers, must hold themselves responsible for the use of an AI system, working to maximise benefits whilst mitigating risks.

- **Transparency**: Developers should work to ensure AI systems are clearly explained and documented. A user should be able to find out where the training data came from, intended uses for a system, and how accurate that system is. As users, we should be transparent in our use of AI tools so anyone impacted can report unfair outputs to the developers.

- **Privacy**: Protecting user data is most important. AI systems must be designed to safeguard personal information and use it only in ways that users have explicitly agreed to.

Data privacy

It's not always clear exactly how training data will influence a model's output, or whether it will be replicated exactly in an output. Developers have a legal and ethical obligation to protect user data — both during training and afterwards.

Users also need to make sure they are taking steps to reduce any data privacy risks. When supplying data to AI models, we must be aware that some developers might use this data to train and improve their systems. It is crucial not to provide personal information to generative AI models. Users need to hold AI developers accountable for making their terms and conditions easy to understand; this includes providing clear ways to opt-out of data collection to protect privacy.

Using AI ethically

The young people you are educating are growing into a world that will be shaped by AI tools; this carries with it responsibilities to use these tools ethically.

Producing high-quality media has gotten easier, and so existing issues of consent are vital when using images or videos of someone else. Young people should be told to explicitly get consent before using image or video generators to make videos — even of friends.

They also need to ensure their consent is needed to access pictures of them. All too easily a young person's likeness can be taken from publicly available pictures and videos of them. Young people need to revisit their security settings to ensure only people they know can access images and videos of them.

AI applications are tools — it is how you use them that shapes the impact on people around you. Holding AI developers accountable does not mean all responsibility is taken from us. AI applications can't cause harm without people using them. Just like how we reiterate safety briefings before using chemicals in science labs — issues of ethics should always accompany lessons on AI tools.

Addressing education-related fears and challenges

Overcoming the fear of AI-enhanced cheating
Challenge: There's a common concern that learners might use AI tools to sidestep traditional learning paths, turning to technology to complete assignments unethically.
Opportunity: This challenge presents a unique chance to reinvent how we assess student understanding and creativity. Instead of traditional tests and essays, think about assigning projects that require a personal touch, like video essays, podcasts, and live presentations. These formats not only make cheating difficult, but also encourage learners to use AI as a tool for researching and enhancing their own original ideas rather than replacing them.
Example: Consider a history class where learners are tasked with creating a documentary about a historical event using AI tools to gather information and create initial scripts, but then must personalise their narrative, critique their sources, and present their unique viewpoint. This method evaluates critical thinking, creativity, and the ability to engage with technology ethically and effectively.

Addressing concerns about AI replacing educators

Challenge: Concern is being raised in the media that AI might make educator's roles redundant, fearing a future where technology overtakes the human touch that is essential in teaching.

Opportunity: Rather than viewing AI as a competitor, it should be seen as a complement to the teaching process. AI applications can help with time-consuming tasks like creating quizzes and generating diverse instructional materials, allowing educators more freedom to focus on what really matters — interacting with students, providing personalised feedback, and developing innovative teaching strategies.

Example: Teachers at King Ecgbert School exemplify how AI tools can tailor educational materials, such as creating precise visuals for language lessons. More broadly, a UK Department for Education report reveals that many educators are using AI to reduce administrative tasks like grading, freeing up more time for interactive teaching.

Encouraging responsible AI use among students

Challenge: There's a risk that learners might become overly reliant on AI, using it as a crutch rather than a tool, which could potentially undermine their learning process.

Opportunity: This is an excellent moment to teach digital literacy and ethics. Educators can design activities where AI tools are used as a starting point for assignments that still require significant student input and critical thinking to complete. This encourages learners to interact with AI critically, recognising its limitations and learning to value their own insights and contributions.

Example: You could implement a class session where learners use AI to generate a draft for a research project, but then must evaluate the AI application's work, identify any biases or errors, and refine the final product with their analysis. This not only teaches them about the technology's capabilities and limitations but also enhances their analytical skills.

Transforming challenges into opportunities

As we navigate these challenges, the focus should not be on what AI can replace, but on how it can enrich and expand the educational experience. By shifting our perspective from fear to opportunity, we can ensure that AI serves as a bridge to more innovative, engaging, and personalised learning environments.

Sources: HP AI Teacher Academy, Teach Teens Computing: Understanding AI for Educators course by the Raspberry Pi Foundation (open source)

ANNEX 4

Glossary of Terms

1. AI – artificial intelligence — the field of technology focused on creating computer systems that can perform tasks that normally require human intelligence, such as understanding language, recognising patterns, solving problems, or making decisions.

2. AI-generated image – a picture created or modified by artificial intelligence, typically using machine-learning models that produce visuals from text descriptions or other input data.

3. Bias – an unfair or unbalanced preference or prejudice that affects judgment, decisions, or outcomes, often without conscious awareness.

4. Clickbait – online content — usually headlines or thumbnails — designed to attract attention and entice users to click, often by using sensational, misleading, or exaggerated claims.

5. Clickjacking – Tricking users into clicking on malicious content.

6. Cybersecurity – Protecting computers, networks, and data from digital threats.

7. Data Privacy – Protecting personal and student information.

8. Data Protection – Keeping information safe according to privacy laws.

9. Deepfake – synthetic media — usually videos, images, or audio — created or altered using AI to convincingly mimic a real person's appearance or voice.

10. Digital Footprint – The trail of information you leave online.

11. Doxing – the act of publicly revealing someone's private or identifying information online without their consent, often with harmful intent.

12. Educator – anyone who supports learning and development — not only teachers, but also parents, coaches, scout leaders, mentors, and other adults who guide, teach, or influence young people.

13. Encryption – Turning data into a code to prevent unauthorised access.

14. Fake news – false or misleading information presented as legitimate news, often created to influence opinions, deceive audiences, or generate clicks.

15. Firewall – A system that blocks unauthorised access.

16. Gaslighting – a form of psychological manipulation where someone causes another person to doubt their own memory, perception, or sanity in order to gain control or avoid accountability.

17. GDPR – General Data Protection Regulation — a European Union law that sets rules for how

organisations collect, use, store, and protect people's personal data, giving individuals strong rights over their own information.

18. Generative AI – a type of artificial intelligence that can create new content — such as text, images, audio, or code — based on patterns it has learned from data.

19. Grooming – the process in which someone builds trust with a minor or vulnerable person, often online, with the intent to exploit or harm them, typically for sexual or other abusive purposes.

20. Incident Response – Steps taken to manage and recover from a cyberattack.

21. LLM (Large Language Model) – a type of AI system trained on massive amounts of text data to understand and generate human-like language, allowing it to answer questions, write content, and engage in conversation.

22. Malware – Malicious software like viruses or ransomware.

23. Manipulation – the act of influencing or controlling someone's thoughts, emotions, or actions in a deceptive or unfair way, often for personal gain.

24. Manipulation – the act of influencing or controlling someone or something in a deceptive, unfair, or hidden way — usually to serve one's own interests at the expense of others.

25. Misinformation – Misinformation is false or inaccurate information. For example, a relative might share a health "tip" on social media, believing it to be helpful, even though it is not based on evidence.

26. Disinformation – false information which is deliberately intended to mislead — intentionally misstating the facts. It is deliberate misinformation. This includes conspiracy theories, manipulated videos, or propaganda campaigns.

27. Parent – any primary caregiver responsible for a child's wellbeing and development, including biological, adoptive, and foster parents, as well as guardians, stepparents, and other adults who take on a parental role in a child's life.

28. Password Hygiene – Best practices for creating and managing strong passwords.

29. Patch/Software Update – Updating software to fix security problems.

30. Phishing – Tricking people into giving up private information via fake communications.

31. Post-truth – a situation where emotional appeal and personal belief have more influence on public opinion than objective facts, making truth less central in shaping views and decisions.

32. Predictive AI – artificial intelligence designed to analyse data and forecast future outcomes or behaviours, such as trends, risks, or user actions.

33. Ransomware – Malware that locks your files and demands payment.

34. Safe Browsing – Avoiding dangerous websites and downloads.

35. School leader – anyone who holds a leadership role in a school — such as heads, principals, directors, deputy leaders, department heads, or coordinators — responsible for guiding the

school's vision, policies, and overall environment.

36. Social Engineering – Manipulating people into giving up confidential information.

37. Spam – Unwanted digital messages, often containing scams or malware.

38. Spyware – Software that secretly collects your information.

39. Two-Factor Authentication (2FA) – Requiring two types of verification to log in.

40. VPN (Virtual Private Network) – A secure internet connection that protects your data.

41. Whole school approach – a strategy where everyone in a school — students, teachers, staff, leadership, families, and the wider community — works together to promote a shared goal, such as wellbeing, safety, or learning improvement. It integrates policies, practices, and culture across the entire school.

42. Zero-Day Attack – A cyberattack that exploits a brand-new vulnerability.

The DRONE Consortium

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