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Developing CS pedagogy through shared lesson resources

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International Teacher Education Team

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University of Sunderland

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Senior Lecturer in Education: Programme Leader for PgCert Education (SCITT)

My teaching background began in UK secondary education (ages 11-18). I trained as a teacher of Information Technology in 1999, and spent 14 years in London schools. I have held multiple school leadership roles up to and including sole Deputy Headteacher. Strategic projects that I have worked on include the Specialist Schools programme, Building Schools for the Future (BSF), academy conversion and setting up a new sixth form.

As an accredited Advanced Skills Teacher (AST), Lead Practitioner and Chartered London Teacher, I mentored teachers at all stages of their careers across London in primary and secondary schools. I was also a national TDA Teacher Advocate and part of their first 'Talk to a Teacher' Facebook campaign, as well as being the featured ICT teacher in the national teacher recruitment 'Class of Today' interactive DVD.

I moved to the North East to study full-time for my doctorate at Durham University. I also worked as a post-doctoral Research Associate at Newcastle University on a range of funded international educational technology research projects and taught on Sutton Trust, supported progression, PGCE, MA and doctoral researcher training courses at Durham University and Newcastle University before joining the University of Sunderland's International Teacher Education Team in 2018.

As a Senior Lecturer, I now lead the PgCert Education (SCITT) programme working with School Centred Initial Teacher Training partners in the north of England and I'm Assistant Programme Leader for the international PGCE Education (IDL). I am module leader for EDPM01: Development of Learning, a Level 7 MA module where trainees use case study research design to explore school-based interventions. I am also an assessor on the Assessment-Only Route to QTS.

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She/Her

In this session

1. A curriculum policy change that needed research, because none had been done
2. Questions about policy and practice
3. Key things that the research uncovered
4. Practical application of that research to practice and to teacher education
5. Points to take away

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Computing programmes of study: key stages 1 and 2

National curriculum in England

Purpose of study

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

Department for Education

Computing programmes of study: key stages 3 and 4

National curriculum in England

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Aims

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental
- science, including abstraction, logic, algorithms
- can analyse

IT
Information Technology

DL
Digital Literacy

CS
Computer Science

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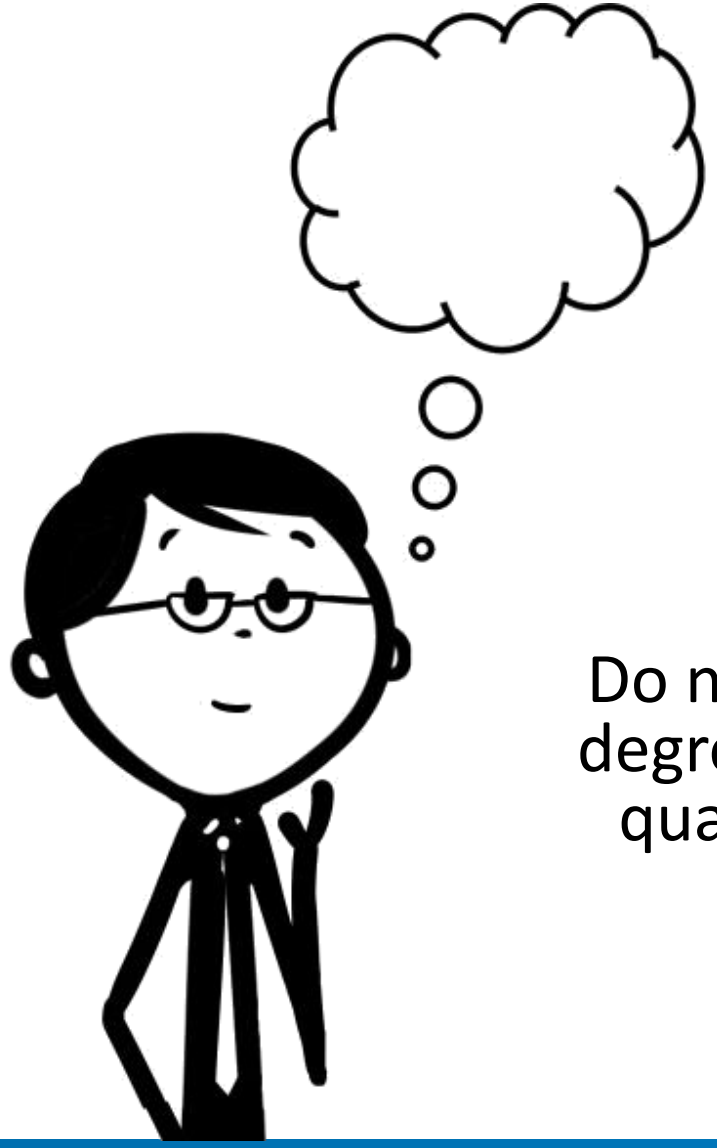
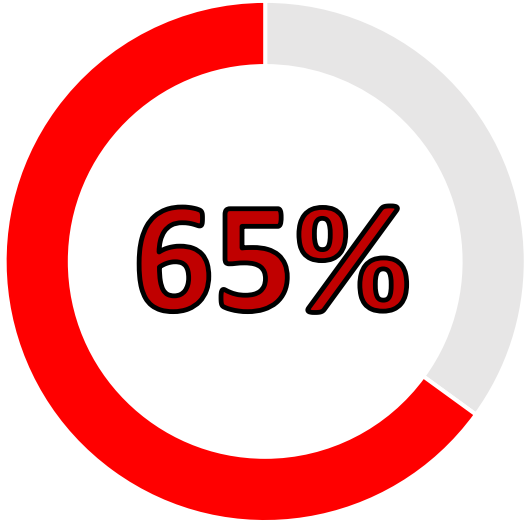


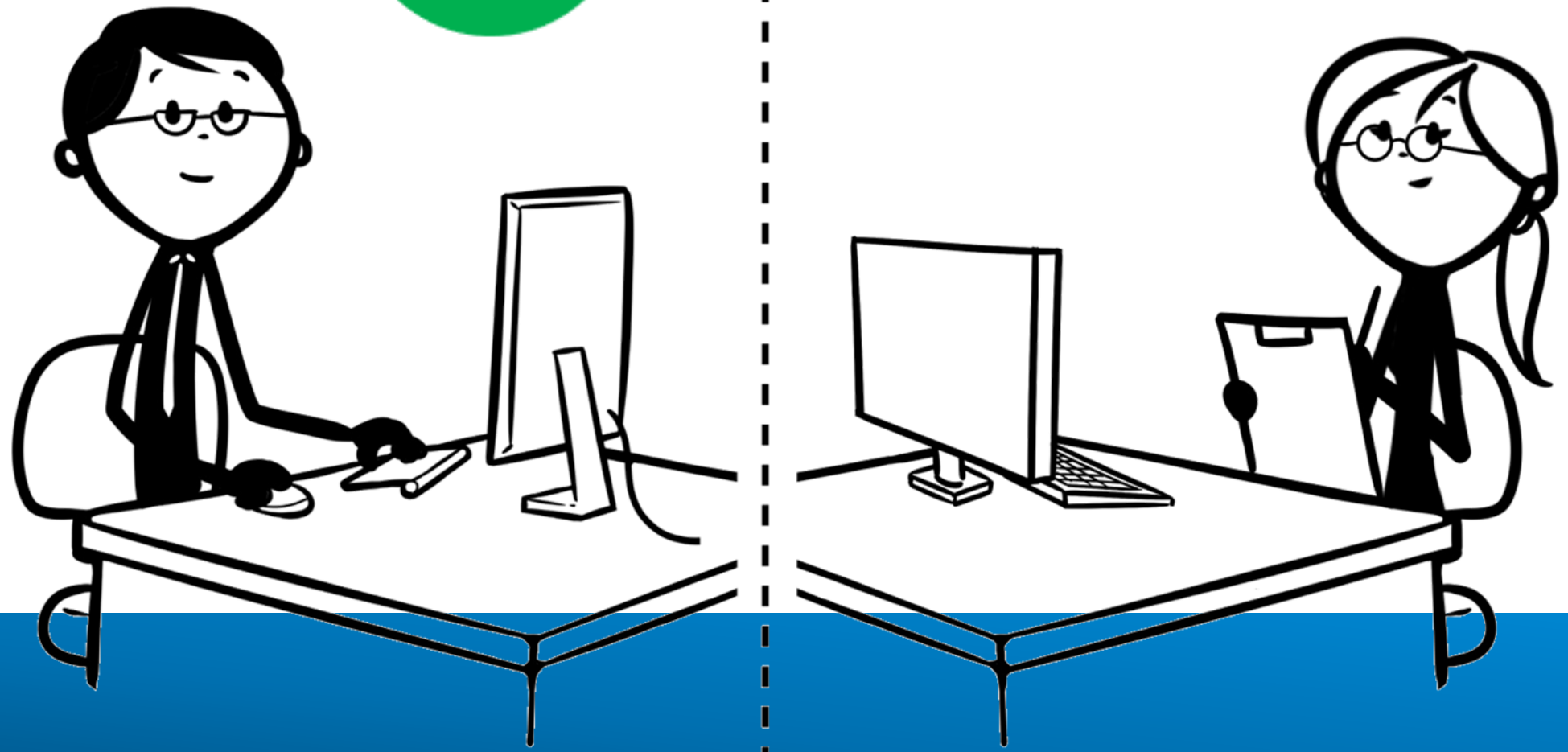
How do these teachers know how to teach Computer Science?

Do not have a relevant first degree and teacher training qualification to teach ICT



Source: Royal Society 2012, p. 71-72

Video-calling and desktop-sharing (Hidson, 2020)



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https://doi.org/10.1163/23644583-00501001

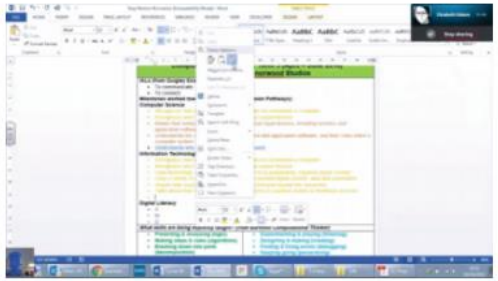
Internet Video Calling and Desktop Sharing (VCDS) as an Emerging Research Method for Exploring Pedagogical Reasoning in Lesson Planning

Profiling Emerging Research Innovations

In: Video Journal of Education and Pedagogy

Author: Elizabeth Hidson[1] View More +

Online Publication Date: 26 Sep 2020



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Feature

Elizabeth Hidson's article comprises two videos, which can be viewed here.

Citation: Video Journal of Education and Pedagogy 5, 1 (2020) ; 10.1163/23644583-00501001

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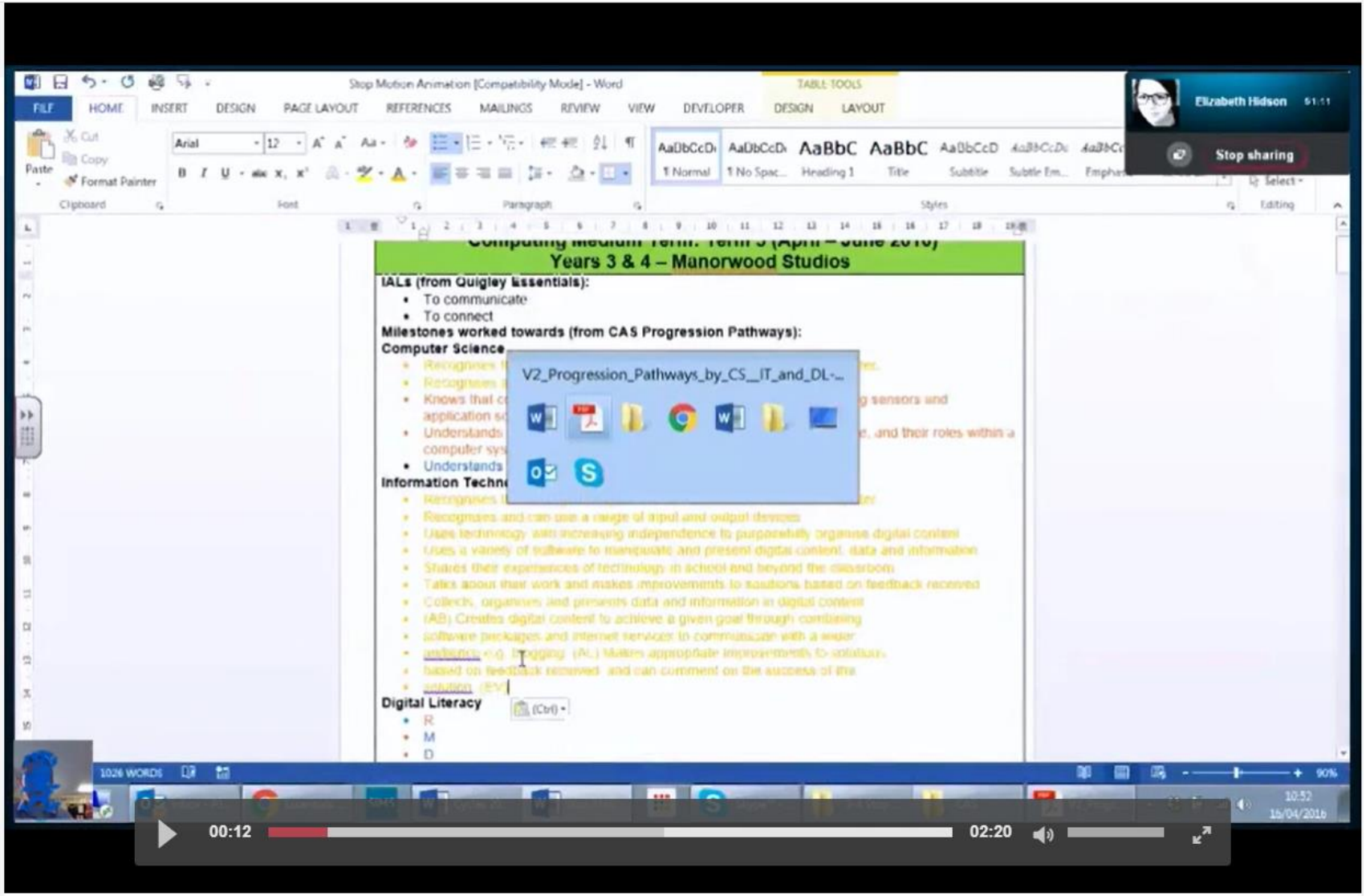

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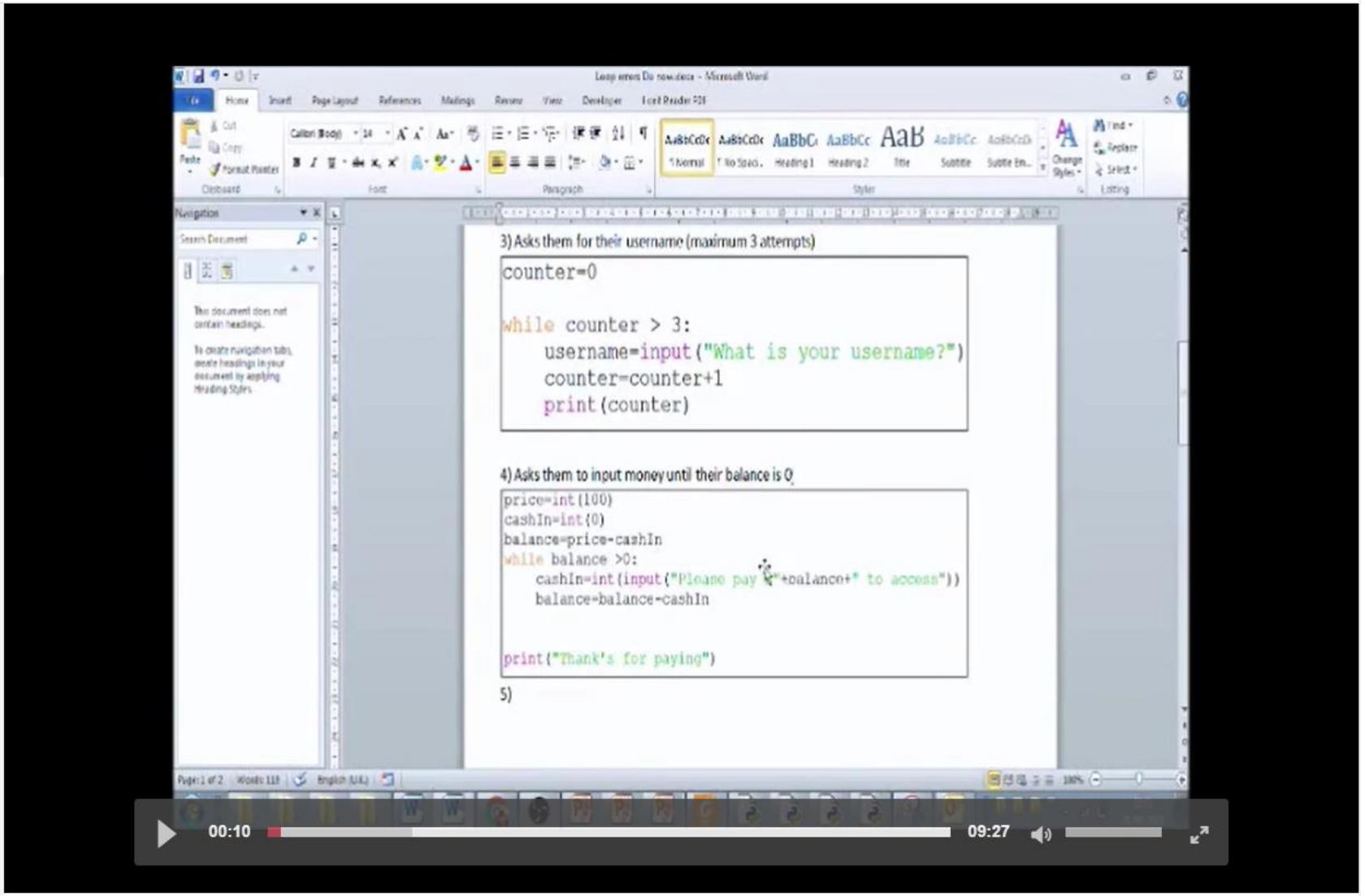

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https://brill.com/view/journals/vjep/5/1/article-p1_2.xml?ebody=figshare-49901

Communities of practice: ‘anytime, anywhere personal learning networks’ (Trust, 2016)

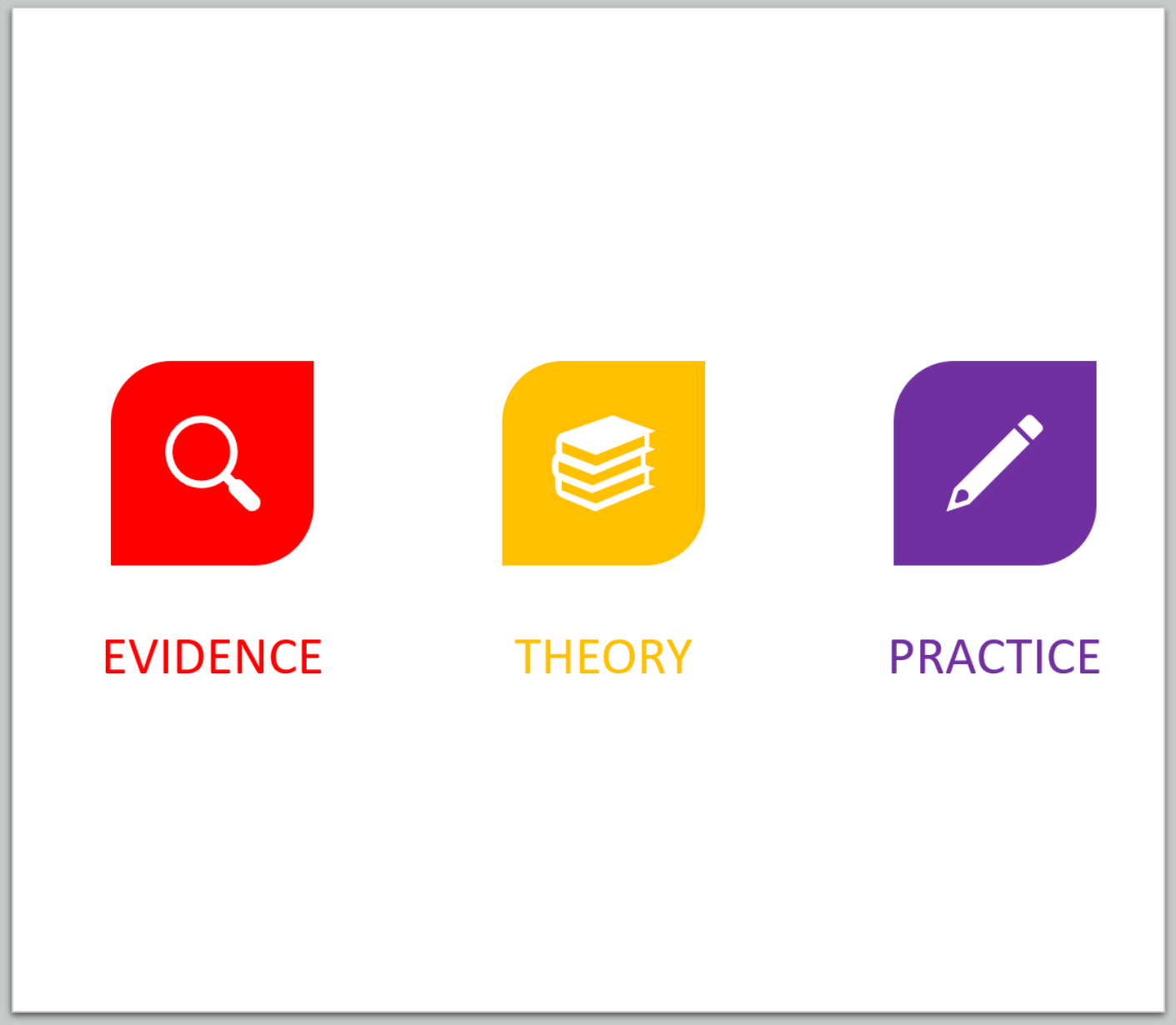
- Internet searching as a starting point
- Online sharing platforms
- Computing At School organisation – face-to-face and online
- Commercial and ‘cottage industry’ providers
- Programming reference sites

Teaching materials

1. **Bespoke** lesson resources, created by teachers for a specific purpose
2. **Gathered**, unmodified resources located and used with little or no change
3. **Repurposed** lesson resources, gathered and modified by the teacher to fit their lesson objectives more effectively

Look to the theory

- We want to know what is going on – we look for **evidence** in **practice**
- We want to look at **specific** things and relate them to **general** things
- This gives us a **theoretical underpinning** so that practice, evidence and theory can be used to move away from '**gut instinct**' towards a situation of **evidence-informed practice**



Representation of Shulman's (1986) three categories of teacher knowledge

Subject Matter Content Knowledge	Pedagogical Content Knowledge (PCK)	Curricular Knowledge
The amount and the organization of knowledge in the mind of the teacher	Subject matter *for teaching*	[educational] programs designed to teach particular subjects and topics
Content can be represented and theorised in various ways	Aspects of content most germane to its *teachability*Representations: analogies, illustrations, examples, explanations, demonstrations	Instructional materials: texts, software, programs, visual materials, films, demonstrations etc.
The teacher's subject matter content understanding in relation to the discipline	Understanding of what makes the learning of specific topics easy or difficult	Understanding of the characteristics of the materials

Subject

PCK

Curriculum

Nascent pedagogies

"Teachers need robust pedagogical frameworks built on verified foundational theories, with clearly identified learning models and effective instructional techniques" (p. 53)

Waite, J., (2017) *Pedagogy in teaching Computer Science in schools: A Literature Review*. (After The Reboot: computing education in UK Schools). The Royal Society. Available at: https://royalsociety.org/-/media/policy/projects/computing-education/literature-review-pedagogy-in-teaching.pdf

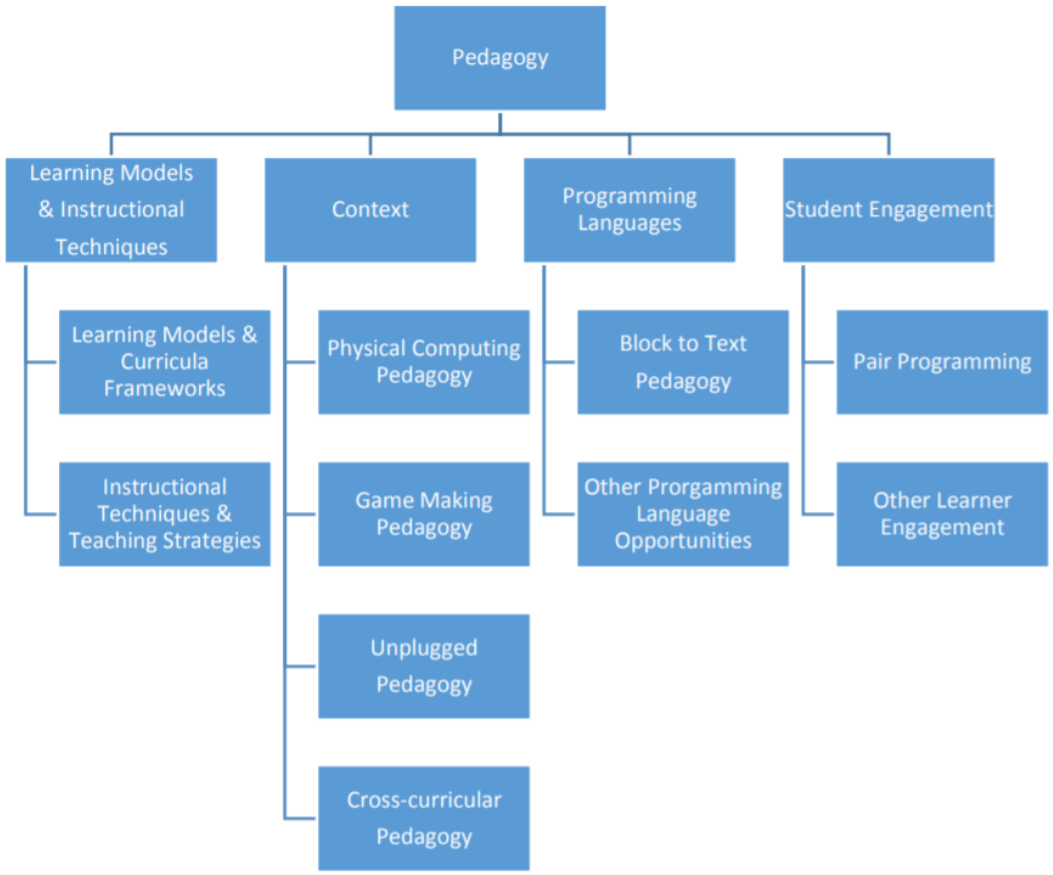


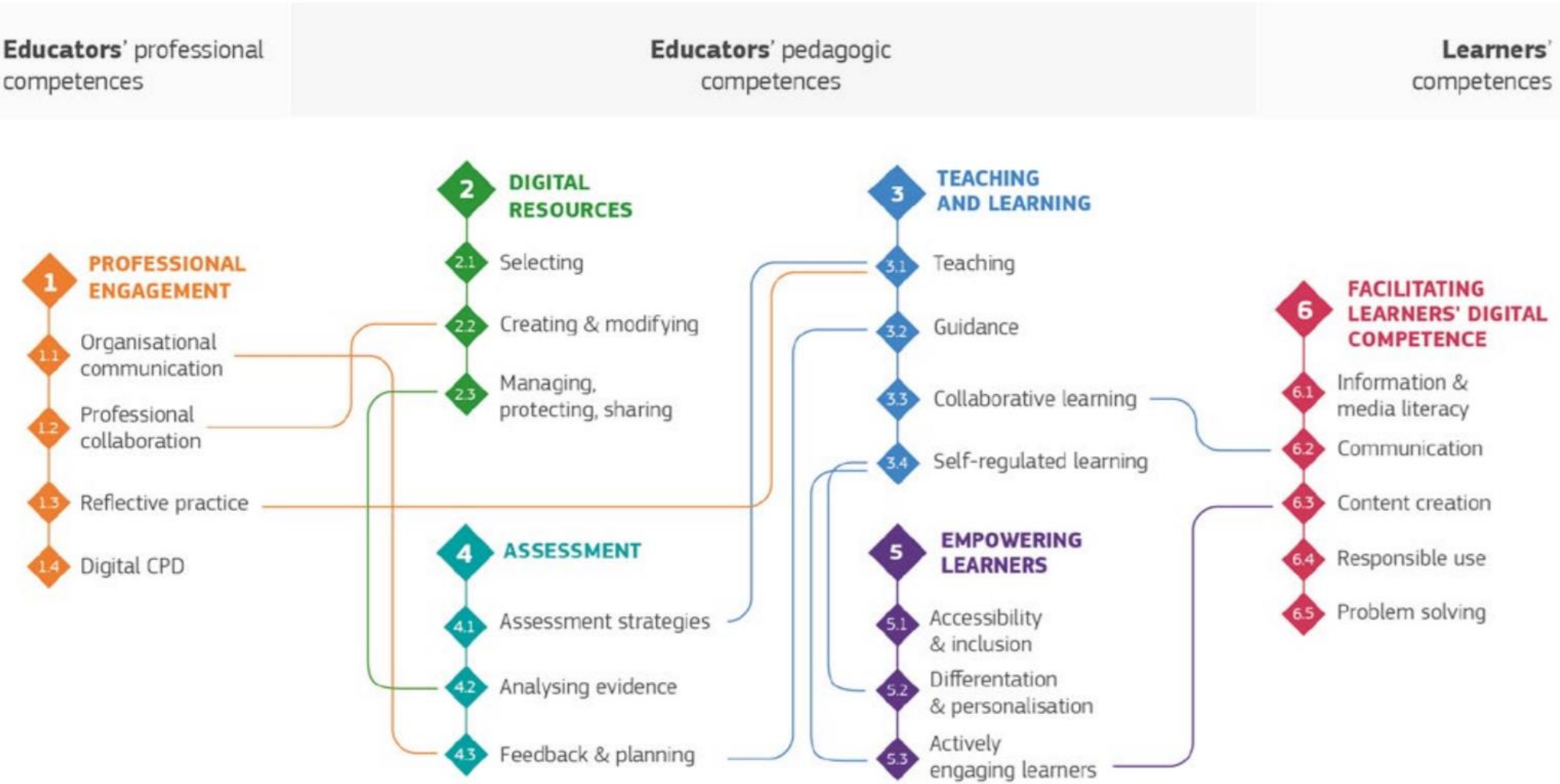
Figure 1 Pedagogy literature review categories

The educative role of resources – "PCK by proxy"

- The **unwritten** / **unheard** commentary that is part of any lesson resource
- This **knowledge** is the key to PCK
- A state of ***transitional*** pedagogical reasoning – scaffolded by a more knowledgeable other
- External knowledge **validation** – resources and support

But weren't these just very tech-savvy teachers?!

ALL teachers need digital competence



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European framework for the digital competence of educators:

DigCompEdu - competences and their connections (Redecker, 2017, p. 16)

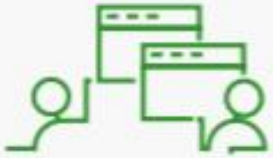
Digital Resources

Selecting digital resources

To identify, assess and select digital resources for teaching and learning. To consider the specific learning objective, context, pedagogical approach, and learner group, when selecting digital resources and planning their use.

Creating and modifying digital resources

To modify and build on existing openly-licensed resources and other resources where this is permitted. To create or co-create new digital educational resources. To consider the specific learning objective, context, pedagogical approach, and learner group, when designing digital resources and planning their use.



Managing, protecting and sharing digital resources

To organise digital content and make it available to learners, parents and other educators. To effectively protect sensitive digital content. To respect and correctly apply privacy and copyright rules. To understand the use and creation of open licenses and open educational resources, including their proper attribution.

TABLE 2: AREA 2 - DIGITAL RESOURCES

(Redecker, 2017, p. 20)

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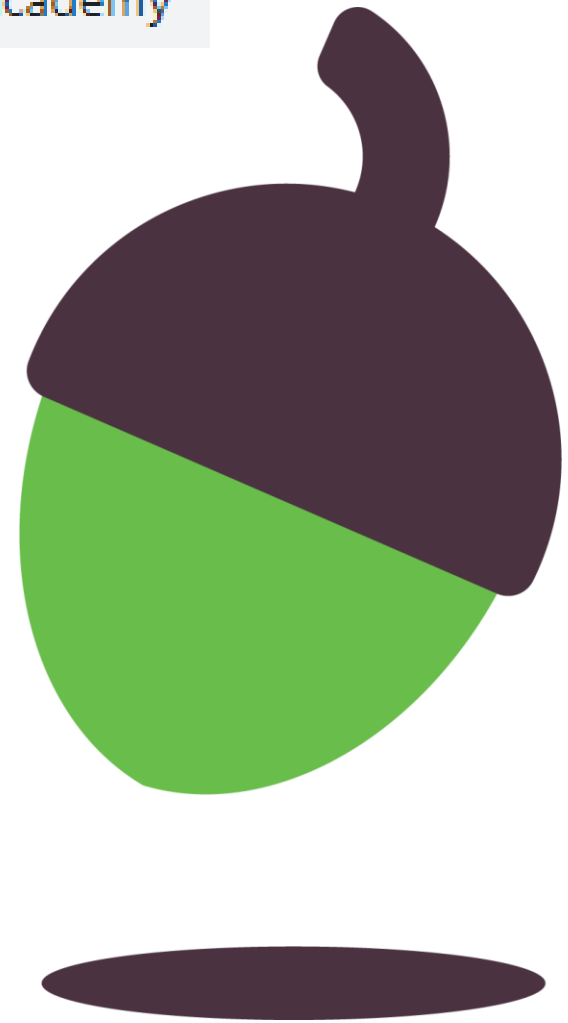

OAK NATIONAL ACADEMY

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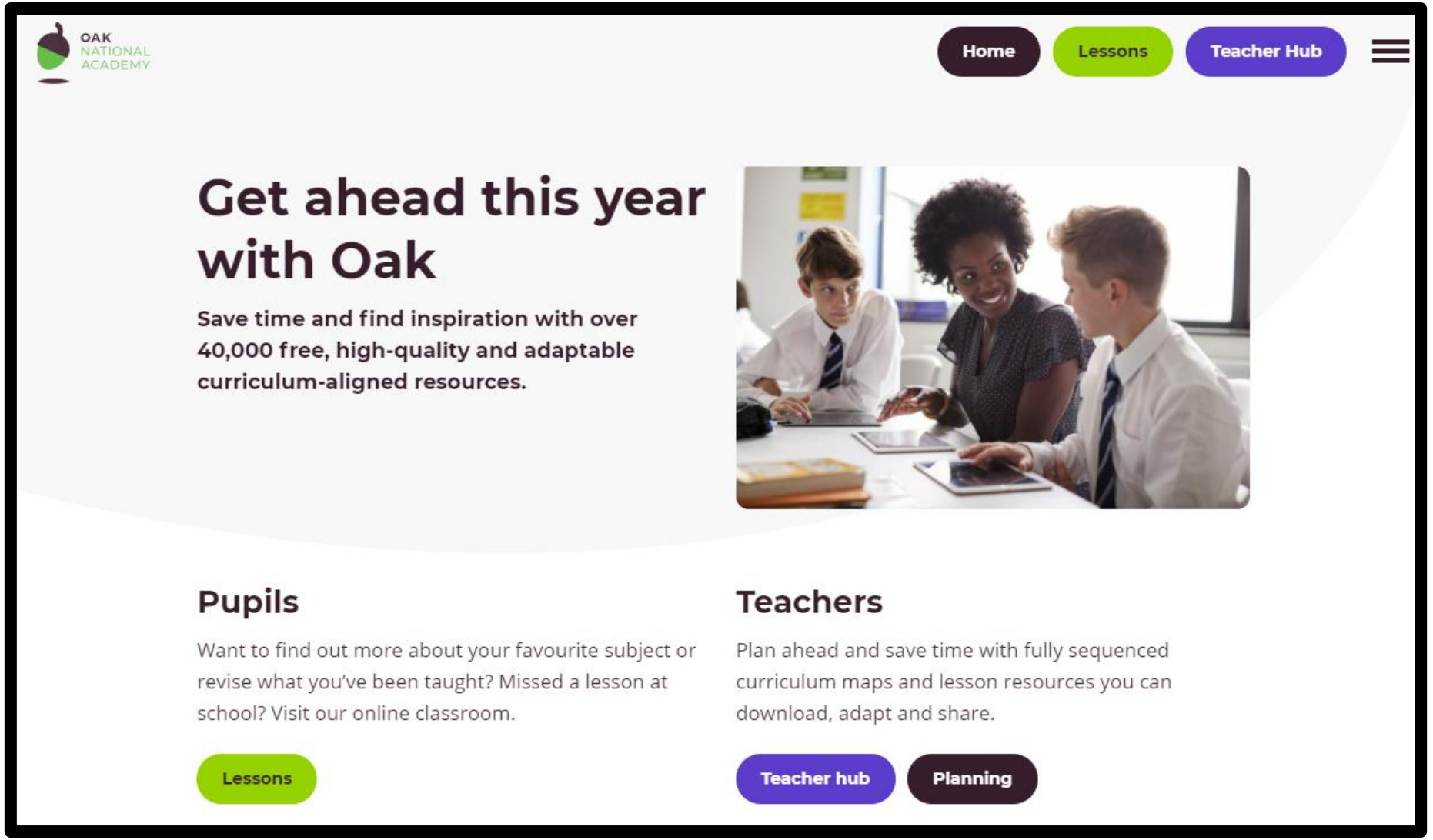
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Lessons
Teachers
Plan ahead and save time with fully sequenced curriculum maps and lesson resources you can download, adapt and share.
Teacher hub
Planning

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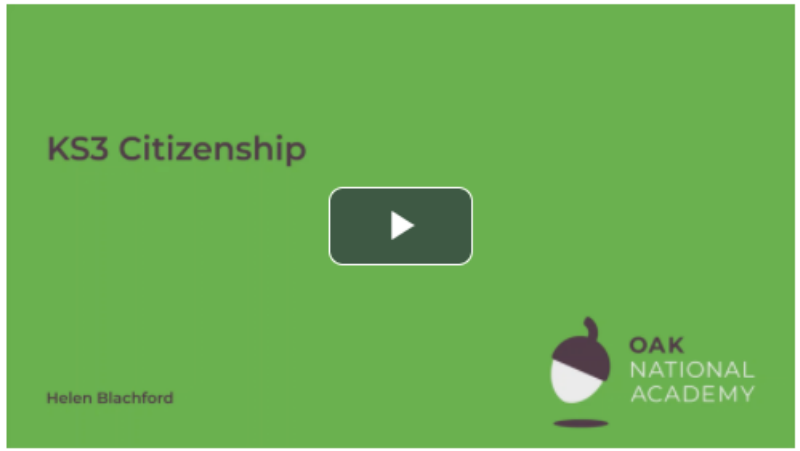
‹ Lessons for ITT

ITT: How do citizens take action?

Secondary Citizenship KS3



Step 1:

Original Oak Lesson

Step 2:

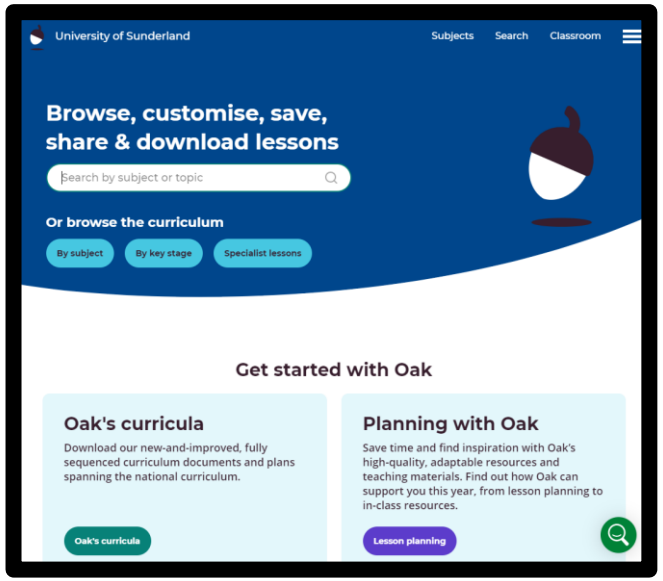
ITT lesson video

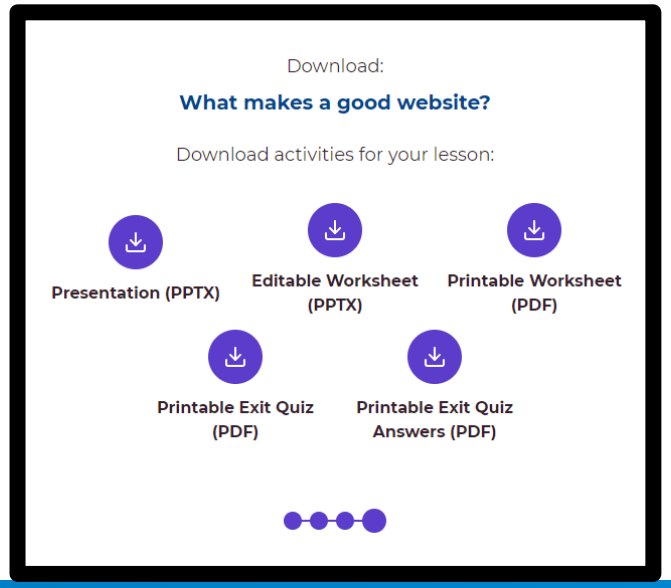
2. ITT lesson video

Here, Helen Blachford provides a perspective on how, as an experienced teacher, they thought about the planning and delivery of this lesson. Watch an explanation of its structure and design and the pedagogical decisions behind it.

01:02 - Prior Knowledge
07:24 - Explanation
11:34 - Check for Understanding
14:53 - Practice
16:54 - Assessment
19:59 - Reflection

Step 1





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Implications for teacher education

- Embrace **communities of** practice to develop **PCK** as part of **evidence-informed practice**
- Recognise that developing **pedagogical reasoning** and **digital competence** are part of initial teacher education and professional development

1. Know **what** you need to be able to teach and **why**
2. Know **how** and **where** to find resources and ideas
3. Know how best to **teach** to your students
4. Know how to **re/purpose** materials and ideas

Pedagogy by proxy: teachers' digital competence with crowd-sourced lesson resources

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(Hidson, 2021)

References

- Hidson, E. (2020). Internet Video Calling and Desktop Sharing (VCDS) as an Emerging Research Method for Exploring Pedagogical Reasoning in Lesson Planning, *Video Journal of Education and Pedagogy*, 5(1), 1-14. doi: https://doi.org/10.1163/23644583-00501001
- Hidson, E. (2021) Pedagogy by proxy: teachers' digital competence with crowd-sourced lesson resources. *Pixel-Bit Journal of Media and Education*, 61 (May 21). pp. 197-229. doi: https://doi.org/10.12795/pixelbit.88108
- Redecker, C. (2017). European framework for the digital competence of educators: DigCompEdu. In Joint Research Center (JRC) Science for Policy report . https://doi.org/10.2760/159770
- Royal Society. (2012). Shut down or restart? The way forward for computing in UK schools. London, UK, Jan. 2012.
- Shulman, L. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4–14.
- Shulman, L. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, 57(1), 1–21.
- Trust, T., Krutka, D. G., & Carpenter, J. P. (2016). "Together we are better": Professional learning networks for teachers. *Computers and Education*, 102, 15–34. doi: https://doi.org/10.1016/j.compedu.2016.06.007
- Waite, J., (2017) *Pedagogy in teaching Computer Science in schools: A Literature Review*. (After The Reboot: computing education in UK Schools). The Royal Society. Available at: https://royalsociety.org/-/media/policy/projects/computing-education/literature-review-pedagogy-in-teaching.pdf