




# Sea of Faith: In Conversation

The opportunities and challenges of teaching both science and religion in a [G]AI context?


 Paul Hopkins      Jan 19th, 2026



## My Position



- Academic qualifications in Science and Theology
- Rooted in School Based Education
- Research into Technology enhanced learning
- Published on the interface between Science & Religion
- More recently interested in the place of G-AI

Hi, my name is Paul **HOPKINS** - I have been working in the field of technology enhanced learning and RWE for over 30 years. I have become more and more interested in the last 3 years with the potential and pitfalls about Generative AI - some of you may have been here last year when introduced some of the ideas.

## Friend or Foe?

Friend	Frenemy	Foe
Workload	Workload	
Creativity	Creativity	
Freedom	Humanity	
Assessment	Assessment	
Security	Security	
Personalisation	Environment	
Accessibility		




We need to consider the potential pros and cons for the use of G-AI (different to AI) in that classroom (or wider school situation) these are outlined about. We perhaps need to think of the tool as a “frenemy” neither good or bad and this will, of course, also be depending on the ways in which the tool is used.

**Artificial Intelligence for Breast Cancer**  
Data Analysis in science - astro-physics and breast cancer

**PROTEIN PUZZLE**  
Dennis Hassabis AlphaFold2

**HOW AI AND 3D PRINTING ARE REVOLUTIONIZING MATERIALS DESIGN**

**AlphaFold is The Most Important Achievement in AI-Ever**  
Forbes

**Chris McCausland: Seeing into the Future**  
Birticity Comix Dancing champion Chris McCausland is on a mission to discover the future of technology, and what it might hold for film-goers.

Smart glasses and accessibility

AI and more recently G-AI is transforming many of the ways that **science is working** (as well as many other fields) - as a single example the use of **Alphafold** won the 2024 Nobel prize in Chemistry and data analysis and diagnosis in medicine is being transformed along with the growing use of AI and robotics. The development of tools to aid accessibility and assistive technologies is also like to change lives.

**TOP 10 JOBS MOST EXPOSED TO AI**  
ACCORDING TO MICROSOFT

**Global Economic Outlook**  
Exhibit 1 - One-Fourth of Current Work Tasks Could Be Automated by AI in the US and Europe

**The Coming Enshittification of AI**  
Will AI follow internet search and e-commerce down the path of enshittification, or can we finally have nice things?  
by James Ryan  
December 26, 2024  
ISSN: 2995-6971

But there is also no doubt that the technology will also be **disruptive** (as we have seen with other technological changes) and so we do need to think about and manage the social, environmental, educational and ethical questions that have arisen and are arising.

**Nuance**

**Artificial Intelligence in Breast Cancer Diagnosis and Personalized Medicine**  
Abstract  
Breast cancer is a significant cause of cancer-related mortality in women worldwide. Early and precise diagnosis is crucial, and clinical outcomes can be markedly improved. The use of artificial intelligence (AI) has advanced in a variety of ways, leading to more accurate diagnosis, better prognostication, and improved patient care. The role of AI in breast cancer diagnosis, prognosis, and treatment is discussed, along with the potential for AI to improve patient outcomes and reduce healthcare costs.

**AI cognitive scaffold not cognitive crutch**  
The distinction between AI as a cognitive scaffold and AI as a cognitive crutch lies in whether the tool supports the human's learning and skill development or replaces it entirely. A scaffold is temporary and fosters growth, while a crutch is a permanent dependency that can lead to skill atrophy.

**Summer reading list for 2025**  
WIERD GIGO

Can we develop a pathway between the advantages and dangers / concerns?

What place in the discourse (in schools) do science and RE have?

The key word here is **#nuance**. There are some very positive things about the use of the AI (GAI) tools and there are also some serious concerns especially around the LLMs training data (WIERD and GIGO issues) and the recursive **enshittification** (Cory Efram Doctorow) issues. The questions as about navigating pathways and looking at the nature of the discourse we are going to have in schools.

# It's not what you do it's the way that you do it ...

### USING G-AI: A PROCESS MODEL

### Prompt Engineering Frameworks

<b>RTP Framework</b>	<b>Chain of Thought</b>	<b>ROSES</b>	<b>FACTS</b>
<b>Chain of Quality</b>	<b>RODES</b>		

[www.mmiweb.org.uk/gai](http://www.mmiweb.org.uk/gai)

A key function of this is learning how best to use the **tool**, there are a number of key aspects to this and one if the key use of **prompt engineering**. My own model is **PREP** but there are a wide range of frameworks for using G-AI with students (and others) but this does support the old computing adage GIGO - **Garbage In Garbage Out**

### What does the Curriculum and Assessment Review say?

“The rise of artificial intelligence (AI) and trends in digital information demand heightened media literacy and critical thinking, as well as digital skills. Likewise, global social and environmental challenges require attention to scientific and cultural knowledge and skills. (p10)

... Our curriculum must equip young people for a world that is changing quickly. Rapid technological advancements, including the rise of Artificial Intelligence (AI), are likely to significantly change the way we work. (p.34)

Recent advancements in AI and generative AI have made digital literacy even more critical. While the long-term impact of AI remains uncertain, young people should understand how it works, its capabilities and its limitations. They should learn how to use AI effectively, without becoming dependent on it, and be engaged in the developing knowledge about both AI's strengths and limitations (p.38)

Generative artificial intelligence (AI) has further heightened concerns around the authenticity of some forms of non-exam assessment, making it increasingly difficult to ensure that submitted work is the student's own. It is right, therefore, that exams remain the principal form of assessment. However, AI risks must be balanced with the need for assessment methods that are most valid for a subject discipline. We encourage the DfE and Ofqual to continue working together to explore the range of assessment methods available whilst balancing the risks presented by AI (p.136)

Confirmed in the government response

The **Curriculum and Assessment Review** (Nov, 2025) issues some thoughts on the use of AI (G-AI) though interesting the final report was a little toned down compared to the draft. The government have responses and have accepted the findings - one disappointment (for me) was the lack of acknowledge of the need to consider assessment reform and the “battering down of the examination hatches”

## Epistemological Questions

### Religious Education

- Substantive Knowledge!** Knowledge about explicit religious and non-religious worldviews
- Ways of Knowing!** People learn 'how to know' about religious and non-religious worldviews
- Personal Knowledge!** People hold an awareness of their own presuppositions and values about the religious and non-religious worldviews which they study

### Science Education

- Substantive Knowledge!** The 'facts' of scientific theory, concepts, models, theories, laws
- Disciplinary Knowledge!** People learn the 'how' of science, or how scientific knowledge is generated and tested

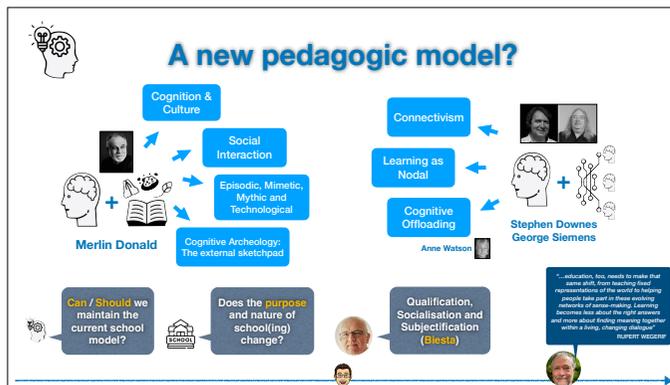
What is the nature of knowledge in an AI world?

- Cognitive Offloading
- Cognitive Avoidance
- Cognitive Deceptitude

Where is the LLM drawing on its 'knowledge' what are the sources (WEB2) and the algorithms that impact on this? What epistemic approaches are driving the algorithm - what philosophical, social and ethical models? What ethical and moral frameworks is this drawing on and what form of critical analysis? How do LLMs and AI work? In what areas of science can AI be useful? What epistemic approaches are driving the algorithm? How is this checked and verified?

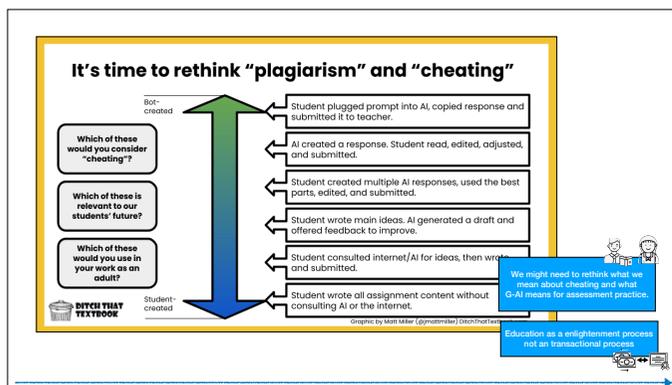
WEB2 = Western, Educated, Industrialised, Rich and Democratic  
 \* These 'types of knowledge' are taken from the Ofsted definitions.

We need to consider some of the deeper **epistemological questions** that the use of G-AI and LLMs throws up - we can consider the definitions of knowledge that are being used by RE and Science (Ofsted models) and how these link to the use of G-AI but the undermining question is “what is the nature of knowledge in an G-AI world” this has been neglected in the information age by schools (you can just Google it!) - we do however, need to consider the impact on cognitive processes (later).

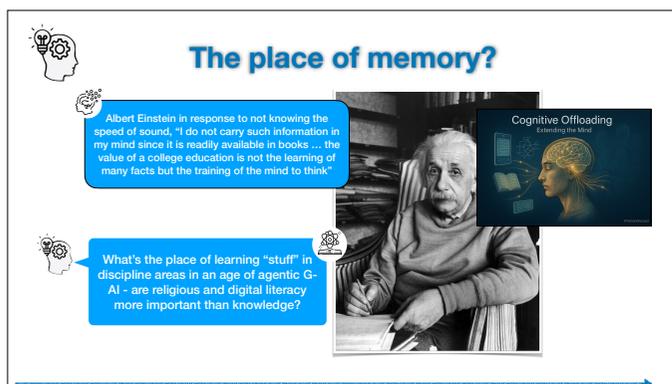


Merlin **Donald** explores the interaction between cognition and cultural artefacts and needs, cognition driven by societal needs e.g. working in groups, working with systems, working with the abstract and “unnecessary”. We can think of four stage: **episodic**: characterised by a reliance on episodic memory, where information is remembered as personal experiences without much abstract or symbolic representation, **mimetic**: characterised by the evolution of the capability for mime or gesture leading to language; **mythic**: the advent of speech and language, allowing for the creation and transmission of complex narratives, myths, and cultural knowledge and **technological or theoretic**: the development of writing, scientific method and technology.

The use of externals as memory and as cognitive devices is essential in human development. **Downes** and **Siemens** see learning as a connected or nodal experience where knowledge is distributed across networks, and learning involves the ability to construct and navigate those networks, emphasising the importance of connections and digital technologies in the learning process. Anne **Watson** talks of the importance of “cognitive offloading” using external tools and strategies to reduce the cognitive load of a task, essentially outsourcing mental processes to external memory or tools - this can be as simple as pen and paper (a book offloads memory), a calculator or more complex technology.

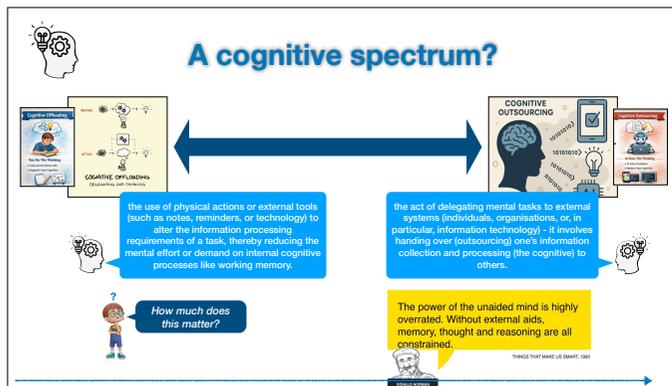


A core challenge that G-AI is offering to education / schooling is to the nature of assessment (and the metrics of success that are supported by this) and in what we might think of as cheating - again this is not new - some (still) think that using a calculator is 'cheating' or a spell-check etc... is collaboration with a colleague / friend cheating? Is looking something up in a book or on-line 'cheating' - how does G-AI change this narrative and what should be the response? It is disappointing as mentioned earlier that the CAS ignored and sidestepped this challenge.

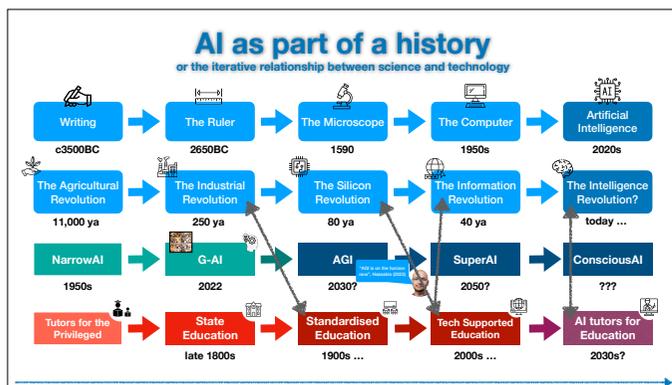


We have seen how Donald sees memory but in the last 20 years there has been an increased focus in education on the place of memory in learning. Willingham says that, **"memory is the residue of thought"** and the interrelationship between environment / stimulus, working memory and long-term memory sit at the heart of what is sometimes called the, **"science of learning"**. G-AI (as did the internet) questions these relationships and we need to consider the place of memorisation in a connected and agentic world.

The question is what is needed in terms of remembering in a technology enabled world - most of us remember only 1 (or a tiny number) of phone numbers - we trust the contacts app on our devices. Few would do long multiplication or division using a mental or even pen and pencil method but would reach for a calculator. We do not need to memorise the capitals or the world, or the winners of the FA cup as we can "Google them". How important is this? Is this damaging or reducing our cognitive abilities? Will this cause an atrophy of the brain in way the lack of exercise causes an atrophy of muscles?



Looking at little deeper as this idea of cognitive decline or atrophy we can think of the use of G-AI (or any technology) on a spectrum of **cognitive offloading** - **cognitive outsourcing**. Discussion around this might be impacted by a range of things including purpose, tool, time, desire, ability, result etc...



We should think of AI as a stage in the **history of the development of scientific thinking** as linked to the development of technology - science has often progressed with technological progression - each of the previous revolutions can be thought of as technology driven: the **agricultural** revolution with the pot and the plough, the **industrial** with the steam engine and electricity, the **silicon** with the semi-conductor and the **information** with the World Wide Web . We can also think of G-AI as a fifth revolution, the “**intelligence**” revolution. We should also keep in mind that G-AI is three years old (!) and we have a number of stages in the AI progression including AGI (human intelligence), SuperAI (all human intelligence) and conscious AI - at the moment only conscious AI is in serious doubt.

### The pace of change

or is progress too quick for morality and reflection?

?? What do I **want** (G)AI to do?

?? What **can** (G)AI do?

?? What **should** (G)AI do?

The allies in liberating the death camps faced the ethical dilemma of what to do with the scientific data that had been collected.

There are concerns that the speed of (G)AI development is too fast for the legal, ethical and governance frameworks.

<https://www.unesco.org/en/artificial-intelligence/recommendation-ethics>

There are questions to ask not just what can AI do but what we should do with it - this has been faced before in science ... for example in artificial insemination, gene manipulation and “curing” of disabilities (deaf community). AI has moved so fast that the frameworks cannot keep up. **UNESCO** talks about four key values:

- Human Rights and Human Dignity,
- Living in Peaceful just and inter-connected societies,
- Ensuring diversity,
- Inclusiveness and Environmental and ecosystem flourishing.

**UNESCO** has ten core principles to the development of AI (Proportionality and do no harm, safety and security, right to privacy, multi-stakeholder governance, responsibility and accountability, transparency and explainability, Human Oversight and Determination, Sustainability, Awareness & Literacy and Fairness and non-discrimination).

### A special place for RE in the discourse?

It's good at issues which involve controversy

There are epistemic questions around human-ness

There are values, ethics & moral questions

It's used to dealing with truth / authenticity claims

?? What do I **want** (G)AI to do?

?? What **can** (G)AI do?

?? What **should** (G)AI do?

Whilst the place of science seems obvious in the disclosure - not just the advantages that (G)AI is offering but also in the terms of the science of AI I would argue that the arrival of G-AI is a significant turning point in education - though maybe not as schools and HEIs have been pretty adapt at ignoring the changes of technology in a way that much of the rest of the world has not. However, I do think that RE and RWE teachers (along with PSHE / citizenship) will have some skills to help CYP navigate this new world order.

(1) RWE has a skill set to deal with issues of controversy

- (2) RWE at its heart deals with the question “what does it mean to be human” (Turing Test) - nature of being - cognitive is not the only state of being.
- (3) RWE has experience at dealing with questions of values, morality and ethicality (all subjects *\*should\** but many do not)
- (4) RWE deals with truth claims and aberrations / distortions from truth claims recognising the nuance in these - vital in a post G-AI world (Finland - fact checking: mis- information, dis- information and mal- information)
- (5) RWE links to the idea of the mythic or truth not being simply factual but narrative or rooting in faith, belief and experience as well as the power of

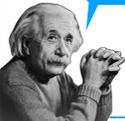
### A complementary relationship?

*The works of the Lord are great,  
sought out of all them that have pleasure therein*

This is the sign over the Cavendish Laboratories in Cambridge (Psalm 111:2)

**“Science without religion is lame, religion without science is blind”**

Science and Religion (1954)



Science and religion are harmonious because they had distinct but complementary tasks: science helps us understand the physical structure of the universe, while religion deals with human values, morals, and meanings

Concept of NOMA (Non Overlapping Magisterium) From Rock of Ages(1998)



The **Einstein and Jay-Gould** quotes are important as they indicate that whilst the do not overlap - the “job” of science is to explore the possible and to measure and understand that possible - however without the temperance of ‘religion’ (and here I think we need to use the term to mean all systems of morality and ethics including those of secular morality) there is the danger of harm, cruelty, inhumanity that we have seen throughout history - there is some truth in the statement “guns do not kill people, people kill people”.

### The Future?

**Where are we headed (maybe)**

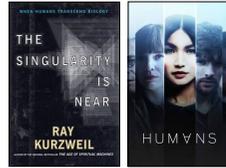
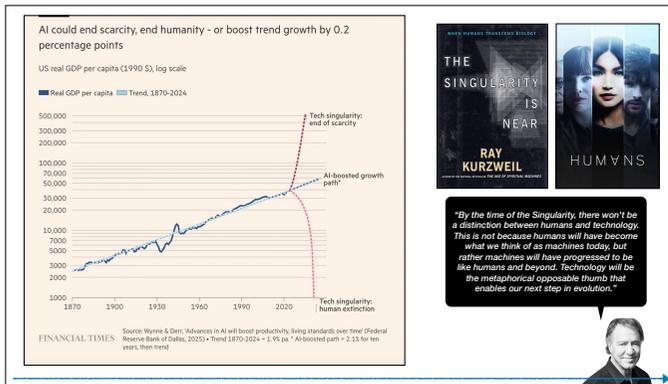
- Autonomous Learning**  
A multimodal approach to learning where the support and information will be provided by the AI model working across video, text and sound.
- Personalised Learning**  
Learning will be tailored to the individual offering both personal and contextual examples but also learning paced to the needs of the individual.
- Individualised Learning Assistant**  
The LA will provide support for assignments, feedback, learning, organisation including reminders and workflow organisation.
- Individualised Teaching Assistant**  
The ITA will provide support and resources as needed and requested but also offer administrative support, organisation and suggestions for progression.



Personal Year Guide		Security Shield
Tutor, Counsellor, Therapist & Life Coach		
Fact / Truth Checker & Researcher		
Personal Assistant		
Data Analyst	World Navigator	
Fiber and Mediator	Medical Diagnostics	

**HCI / The Digital Human**  
What does it mean to be human?

So, where are we headed in terms of schooling? The industrial revolution was responsible for the school model we have today (some would argue that this is a very industrialised model) the silicon and information revolutions have had little impact on school structures or processes - will the intelligence revolution?



"By the time of the Singularity, there won't be a distinction between humans and technology. This is not because humans will have become what we think of as machines today, but rather machines will have progressed to be like humans and beyond. Technology will be the metaphorical opposite thumb that enables our next step in evolution."



Ray **Kurzweil** published the singularity is near in 2005 (and the singularity is nearer in 2024. There are still many questions about the place of AI some utopian, some dystopian - and Science Fiction has been full of such questions for a while.

### Principles for AI usage

The machine is initially uncertain about what those preferences are. This "humility" principle is crucial, as it prevents the AI from aggressively pursuing a single, potentially flawed, interpretation of a human goal (the "genie in the lamp" problem)

The ultimate source of information about human preferences is human behaviour. The AI learns what humans want by observing human actions, asking questions, and learning from past interactions, using methods like inverse reinforcement learning.

The AI system's only objective is to maximize the realisation of human preferences. This implies the machine's sole purpose is the benefit of humanity, rather than its own self-preservation or any other independent goal

Prof. Stuart Russell - professor of AI at Berkeley (California)

Stuart **Russell** - professor of AI at Berkley (California).

The **first principle** says that the machine's only purpose is the realisation of human preferences, so this principle would include the fact that human beings in the long run do not want to be enfeebled. They don't want to be overly dependent on machines to the extent that they lose their own capabilities and their own autonomy and so on. A properly designed machine would only intervene to the extent that human autonomy is preserved. And so sometimes it would say, "No, I'm not going to help you tie your shoelaces. You have to tie your shoelaces yourself" just as parents do at some point with the child.

The **second principle** there as is if machines are certain about the objective, then you get all these undesirable consequences: the paperclip optimiser, et cetera. Where the machine pursues its objective in an optimal fashion, regardless of anything we might say. So we can say, you know, "Stop, you're destroying the world"! And the machine says, "But I'm just carrying out the optimal plan for the objective that's put in me". And the machine doesn't have to be thinking, "Okay, well the human put these orders into me; what are they"? It's just the objective is the constitution of the machine.

The **third principle** is that It's just absolutely completely natural for human beings to interpret our perceptions in terms of purpose. In conversation, you're always trying to figure out "Why is someone saying that"? Are they asking me a question? Is it a rhetorical question? (**Stop the world I want to get off!**) It's so natural, it's subconscious a lot of the time. So there are many different forms of interaction that could take place that would provide information to machines about human preferences.

[https://80000hours.org/podcast/episodes/stuart-russell-human-compatible-ai/#:~:text= The principle says that the,standard model doesn't care](https://80000hours.org/podcast/episodes/stuart-russell-human-compatible-ai/#:~:text=The principle says that the,standard model doesn't care)



So, where does this leave (i) you, (ii) your institution (iii) the Science and RWE communities (iv) all of us?



You can find more (school-based) at this link including some case studies of usage in more details and some further links for reading and support. If you would like to have me come and talk at your institution about this then please contact me.

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