

# AI Readiness Diagnostic Findings



## Step 1: Aware Recommendations



educate  
enthusse  
excite

### Step 1 Overview

To find out how **you** can benefit from examining your institution through a '**data and AI lens**', contact our **AI & Data Science team** at [hello@educateventures.com](mailto:hello@educateventures.com)

- The **first step** of the 7-step AI Readiness Framework is about **educating, enthusing, and exciting your team and colleagues** so that you can view yourselves and your organisation through a '**data and AI lens**'
- You will develop an '**AI mindset**' that allows you to view the challenges in your educational setting as those which may be solvable using AI. That allows you to see your **rich, complex data** as not just siloed, unconnected, impenetrable repositories of spotty information, but connective tissue that unites the commonalities at school, such as issues around attendance, attainment gaps, budgets, behavioural interventions, essay grading, homework, recruitment and more
- An AI mindset allows you to be open to the possibility that actually, if your data was studied, it might reveal something unexpected that challenged your preconceptions about what otherwise seemed like an **obvious dilemma** at school that you just hadn't got around to **investigating**
- **Key Takeaway:**
  - Talk to your colleagues about **data**. AI is often a nebulous term with broad connotations that either **scares** or is **too vague** to be of meaning to people, but **collecting and connecting** all that disparate **data** in your school could help you and your colleagues immeasurably in the long run

## Recommendation: Ask questions

**SUMMARY:** a good place to *start* is to *think* about the *AI* you use in your *work* and *play* already

- You might use **speech to text**, for example to record a message on WhatsApp. That uses AI in terms of **natural language processing**. Or perhaps you have a **smart home device** that helps you to monitor and manage your **heating and lighting**. Maybe you use a **voice-activated personal assistant**, such as Siri, Alexa, or Google Home
- Is **shopping** a favourite activity? You've probably used lots of online apps to do that. Maybe **fitness tracking**, or **navigation apps**. Maybe you use AI through a **multimedia server** to watch television, or you use a search engine
- When it comes to **education and training**, we can also think of AI being used, perhaps for **grading assignments**, or for helping us to identify students to know whether they have been **attending** a particular course on campus, or visiting a particular department. Maybe we're using **plagiarism-checking software**
- If you are thinking about introducing AI, one of the really important **questions** you need to ask is:
  - How do you know that it's the right AI for you and for your organisation?
  - And you also need to ask yourself:
    - How do you know whether what you're spending is giving you value for money?
  - You need to be **careful** as there's no such thing as a **free lunch**. If you're being offered an AI application for free, you need to be aware that your **data** can often be the price that you're paying; this is not always the case, but it does happen often. For organisations, such as schools, colleges, universities, and training organisations, **the use of student data as a means of paying for something** is extremely problematic, because the organisation is **responsible** for that data, and must ensure the **privacy** of students' data is maintained
  - What do you really need the AI that you're going to buy to do for you? You need to ask:
    - What challenges do you want the AI to help you to address?
    - What kind of AI could help you tackle those challenges? How do you know that the use of AI for such a challenge is likely to work?





## Recommendation: Learn about the history of AI

**SUMMARY:** try to *immerse yourself* in some of the rich history of AI's development. It will help *contextualise* some of its modern features

- In 1964, a system called **ELIZA**, a computer programme that played the role of a psychotherapist, was devised
- A potential patient was asked to type in their symptoms and ELIZA searched for **keywords**, and returned stock phrases to progress the conversation
- This approach was called **production rule-based pattern matching**, and although ELIZA's operation sounds primitive, several systems evolved from this approach became sophisticated enough to accomplish **advanced activities**, such as diagnosis and treatment recommendations from a set of symptoms
- The pinnacle of this pattern-matching approach was IBM's **Deep Blue**, a computer system that beat Grandmaster Gary Kasparov in several games of **chess** in 1997. It did this by analysing its gigantic **library** of possible moves that it could make, all of which had been **preprogrammed** by its development team
- This need to have an **exhaustive** amount of information preprogrammed is precisely the problem with what is known as **Good Old-Fashioned AI (GOFAI)**
- In chess, there are **thousands** of ways a game could look just **two moves** ahead. If you need to predict what the board looks like **twenty moves** ahead, the number of possible configurations stretches into the **quadrillions**
- There is a severe **limit** to the intelligence this style of AI can achieve. Once the knowledge is written into the computer program code, the system cannot be updated without going back and **changing the code**. No matter how many disease cases they diagnosed, or gas pipe fractures they identified, or games of chess they played, **GOFAI systems couldn't improve**
- One of the big **advantages** of these types of systems, however, is that because they're **symbolic**, they have **rules** written in language that **you and I** can understand. What happens inside them is **transparent**. It's much easier to explain the decision made by a production rule-based Good Old Fashioned AI system, such as one that's diagnosing an illness, than it is to explain the decision made by one of the modern **machine learning systems** that you might come across, because the **steps** that have been taken to fire that rule can be explained to a **human**
- There are many disadvantages to old fashioned AI techniques, but they do still have one **significant** advantage over modern systems



# Recommendation: Identify the differences between AI and HI

**SUMMARY:** *examine the differences between artificial intelligence and human intelligence, and ask why those differences matter*

- What do we mean by **human intelligence** and what kinds of things does human intelligence **enable** us to do? It's much more than just being able to learn **knowledge and skills**
- It includes **academic intelligence**: the sorts of things that we learn at school, and as our knowledge resources and problems of the world increase and become more **complex**, that academic intelligence needs to be **interdisciplinary**, because very few of the problems we face can be solved through a deep knowledge and understanding of one discipline **alone**
- We need to at least understand how that discipline about which we have a **deep knowledge** relates to **other disciplines**, so that we're able to work with other experts from those other disciplines
- We then need to think about **meta-knowing intelligence**, and this isn't metacognition, it's **epistemology and personal epistemic cognition**: the ability to understand what knowledge **is**, and **where** knowledge comes from. The ability to understand what **evidence** is and what **kind of evidence** we should demand in order for us to believe something to be true, or not, as the case may be
- This is increasingly important in a world where we have a lot of fake information around us. **Social interventions** are fundamental to being able to work together with other people to solve many of the complex problems that we face today
- With regard to medicine, think about how much has been gained because of the **combination of understanding** of human bodies, human processes, physiology, anatomy, medical understanding, and then physics and nuclear medicine. That's been a huge advantage for cancer **diagnosis** and **treatment**. But it requires those people who have that medical expertise to be able to **work** with people who have an understanding of physics. So we must develop those **social intelligence** skills
- There are a series of other **meta-intelligences**. In addition to meta-knowing, we have **meta-cognitive intelligence**, which is about **understanding** our thinking processes, and being able to **regulate** those processes. So that, for example, if I'm learning something and my focus is **distracted** by something else, I'm **aware** that the distraction is happening, and I'm able to **refocus**
- There is **meta-subjective intelligence**, and this is not just about developing emotional intelligence, it's about understanding the **development** or **lack of development** of emotional intelligence, and the **extent** to which the people with whom we're **interacting** are emotionally intelligent, or developing that emotional intelligence
- There is **meta-contextual intelligence**, which is the intelligence that we **underestimate** the most. As a human. I know that I interact with multiple **environments**, different **people**, different **tools**, and **information**, even if I've never **seen** any of these places, people or tools before. I can get on an airplane, fly to a country that I've never been to before and although I might find the language and signage confusing, I'm sure that I'll be able to get about and meet people and eat. This ability to move seamlessly between different **locations**, and interact with different **people** and **tasks**, is incredibly complex and **far beyond anything that AI can do**
- If we really are developing a whole complex human intelligence – all of these different sorts of intelligent activity – then we've become very good at being accurately **self-effective**. We can have excellent **perception** of our own self-efficacy, which means that we can set appropriate goals for **activities** we know, whether we do or don't know the right information to be able to achieve that goal. We know what evidence we've used to make a **decision** about whether we **know enough** or not. If we **don't know enough**, we know **how to find out**. We know how to **learn**, we know who can **help**. We know what we need to **take into account**, where we might need to go, how well we'll be able to **cope** in that place, even if we've never been before

**Interdisciplinary  
Academic  
Intelligence**

**Meta-Knowing  
Intelligence**

**Social  
Intelligence**

**Meta-Cognitive  
Intelligence**

**Meta-Subjective  
Intelligence**

**Meta-Contextual  
Intelligence**

**Perceived  
Self-Efficacy**

- None of the above suggests human intelligences are **separate**. They are different sides of a **complex whole**, all of which are **essential**, and five of which are about meta-intelligence: the ability to **reflect** on our own thinking
- This ability to reflect, however, is something that is **way beyond current AI systems** and it can be argued, way beyond any AI system
- AI systems can be **relatively** good at the **interdisciplinary academic intelligence**. They can have some success with meta-knowing intelligence, because they can look for good evidence to back up something as true or false, and to some extent, AI can at least help us with **social intelligence**, it can **interact** with us as humans and can help us to interact **as** humans but really, the remaining aspects of our human intelligence are **way beyond AI**
- It's this ability to **reflect** on our own intelligence that sets us aside as humans. The complexity of human intelligence is way more sophisticated than what AI can do at the moment, even if we have AI systems that can be very successful in a particular **narrow area**



## Recommendation: Beware the risks

**SUMMARY:** consider some of the possible risks around the use and development of AI in a school or education and training business

- Imagine a situation in which you're working in a **school** or a **college**. You might have access to a **voice-activated personal assistant**, such as Alexa, and you're helping students learn a language. You think it is appropriate to use Alexa because it could help the students identify if they have pronounced the **words** in their target language **correctly**. If Alexa does not understand the **instruction**, it might tell the students they are not **speaking clearly** in that target language. This sounds like a good use of something like a virtual personal assistant for education
- However, whilst you hope that what you're capturing is the conversation that the student is **attempting** to have with Alexa, when capturing that student audio, you might also be capturing a lot of **outside noise**; perhaps the place where the students are having the conversation is near a busy road, perhaps somebody else is in the room, or perhaps somebody's eating. This is a big problem
- For a start, those noises will **interrupt** and **diminish** the **extent** to which Alexa would be able to understand what the students are saying. That might give students **false feedback** about the **accuracy** of their pronunciation. The students might be using the target language to **structure their commands** perfectly well, but the noise in the environment might prevent Alexa from functioning as it should
- Additionally, the fact that Alexa would tap into all of these extraneous noises means that you can't be sure that you're not capturing audio that reveals **identifiable information** from other students in the environment
- Understanding the risks that come with the **use** and **development** of AI can allow you to **mitigate** them in educational or educational business environments. Such a voice-activated interface could be a useful tool for teachers and learners, but **precautions** would need to be taken in order to maintain **privacy** and perform **appropriate data collection** so that such things as identifiable information is not revealed, and recommendations to use the device in the appropriate setting are emphasised, lest incorrect operation skew **results**



## Recommendation: The different types of AI

**SUMMARY:** *not all AI systems are the same, and it's important to **understand** their key differences*

- Good Old-Fashioned Artificial Intelligence (GOF AI) does not **learn**, and is very poor at dealing with **uncertainty**, so what are the alternatives? **Data** and **machine learning**
- Rather than working out in **advance** what an AI system is **going** to be doing, and what it's **able** to do so that you can write production rules, machine learning systems process data about the **world**. If they are **diagnostic systems** designed to diagnose breast cancer, then their world is the world of breast cancer tumours, **trained** on examples and images of thousands and thousands of tumours and of breast tissue without tumours so that it can learn the **differences**
- If we go back to our GOF AI system, its code must be changed at the source for its operation to change. It can explain its decisions, it is **transparent**, but it is limited in its use. Machine learning on the other hand can reveal unexpected **patterns** in data, even discovering something that its programmers would not think to look for. But this requires **data**
- The nature of this learning behaviour is the difference between **narrow** AI, which is what most of our AI systems are now, where they handle one task such as chess, diagnosing an illness, driving a car, recognising images, and so on, and what we call **Artificial General Intelligence (AGI)**, which would be a machine that can handle **any** intellectual task, as is the case with human intelligence
- If we look at the example of a baby, we can reasonably assume that they will grow into an intelligent adult, and even at birth, they already have matters of intelligence. Perhaps this baby will grow up to be as smart as a great scientist like Alan Turing. Can you imagine a general intelligence system like Alan Turing? It is hard to see. We are nowhere near Artificial General Intelligence at the moment





# Who can help me?

*We are specialists in **ethical AI solutions** for schools and education and training businesses - **contact our team for help***

The EDUCATE AI and Data Science team was formed to consult on and co-design ethical AI solutions to complex problems in data-driven technology ventures and schools. Our team of computer scientists, educationalists, and world-renowned experts can take you from zero AI to a comprehensive evidence-led strategy and beyond, with effective, scalable AI-powered teaching and learning solutions.

To find out how you can benefit from examining your institution through a '**data and AI lens**', and leveraging the transformational power of AI to tackle your challenges, contact the **AI and Data Science Team** at EDUCATE Ventures Research at [hello@educateventures.com](mailto:hello@educateventures.com).

Thanks for reading!

- The EDUCATE Ventures Research Team  
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## Further Reading

*Below you can find a selection of resources, books, podcasts, webinars, and research papers appropriate to your stage of AI Readiness. Good luck!*

- [AI for School Teachers, Byte-Sized Edition](#)

- An easy-to-read 10-page byte-sized summary of the book of the same name, written by Professors Rose Luckin, Mutlu Cukurova, and Headteacher Karine George, members of the senior team actively developing and using the AI Readiness Framework from which these recommendations derive

- [Is AI Set to Change the Way You Teach?](#)

- A 40 minute podcast from Tes Podagogy where Professor Rose Luckin and Headteacher Karine George discuss AI Readiness in schools and educational institutions

- [Working Well with AI](#)

- A wide-ranging set of podcasts featuring guests from across the worlds of work and education speaking to Professor Rose Luckin about how AI and technology has affected their practice and profession

- AI Readiness: Step 1 Webinar for [Educators/Businesses](#)

- Two separate webinars introducing Step 1 of the AI Readiness Framework, one targeted toward educationalists, and the other target to educational businesses

- [Is AI Intelligent?](#)

- An easy-to-read 2-page summary from the EVR Byte-Sized Library on definitions of AI and intelligence from Dr Carmel Kent

- [AI for School Teachers](#)

- The complete book on the AI Readiness Framework, specifically for teachers and headteachers in schools. It will help teachers and heads understand enough about AI to build a strategy for how it can be used in their school. Though it is pitched to teachers and contains familiar examples, the approach should still be used by education and training businesses working with technology

