Bloom's Taxonomy in the Age of GAI

The proliferation of Generative Artificial Intelligence (GAI) tools is reshaping how the world approaches nearly every task, with changes likely to accelerate as these tools become more diverse and powerful. Rightfully, academics are questioning how to most productively deal with the changing technological landscape in higher education. Beyond worries about academic integrity and whether the work students submit is their own, there are legitimate questions about what learning is still foundational to the tasks required of humans in the workplace, and what would be better outsourced and automated. If you are wondering what learning is still relevant, and what has become obsolete, consider this breakdown of GAI and Human Skills associated with Bloom's taxonomy.

Remember

This level of Bloom's taxonomy is associated with the ability to recall informational details, whether it be to list components/options, define terms, or sequence events.

GAI does this very well, limited only by the data used to train it. Because LLMs have access to huge amounts of data, they can quickly recall a seemingly endless array of facts and figures. The main shortcomings to GAI in completing the tasks associated with "Remember" are that GAI output will reflect inaccuracies and biases present in the training material, and the potential for hallucination, or pure fabrication of information, especially for information not included in the training data.

Although GAI may surpass humans at remembering, there is a strong case for continued emphasis on humans gaining basic knowledge at this level. Only with expertise and recall of their own can people fact-check or recognize biases in GAI output. Also, if students are to understand most disciplines, they must internalize the basic concepts and definitions, as it would be impractical to engage in higher order tasks without having fundamental knowledge. In this regard, GAI might be thought of as a crutch—it can help with walking but cannot replace legs.

Understand

This level of Bloom's taxonomy is associated with comprehension of informational details. It allows one to produce an explanation, interpretation, summary, example, illustration, or translation.

GAI can do very well at some tasks associated with this level of Bloom's taxonomy, but it doesn't not "understand" anything as humans would conceive of "understanding." GAI can recognize and replicate patterns in the training data, but as with tasks associated with recall, GAI is limited by shortcomings in training data and inability to distinguish moral or contextual nuance.

Humans have greater ability to contextualize understanding, and attach emotional, moral, and ethical components to that understanding. Because understanding is foundational to other levels in the Bloom's taxonomical hierarchy, this level of learning is still valuable in many disciplines.

Application

This level of Bloom's taxonomy is associated with using knowledge and understanding in novel situations. It inherently involves problem solving, recognition of when, where, why, and how to employ methods and ideas, and demonstrating the use of concepts in real-world scenarios.

GAI tools that are trained with specific processes and procedures can apply them to new data or contexts. However, it requires data and predictability, and is not good at intuitive leaps or engaging in creative problem-solving.

Humans are much more adept at solving unfamiliar. We can recognize when to apply specific methods and ideas, and when those methods or ideas are not working or are not sufficient for a given problem. Being able to solve problems that do not conform to training parameters is a more uniquely human skill.

Analysis

In Bloom's taxonomy, analysis involves understanding the structure of knowledge. It requires breaking complex material into components to reveal patterns and structures. Analysis involves critical thinking to examine what is known from different perspectives, distinguish between facts and opinions, and reveal relationships.

GAI tools are good at analysis, since they can examine extraordinarily large data sets at speed and integrate or compare different data sets. They are able to automate this to identify patterns and trends rapidly, and to answer specific questions about a body of data.

Humans can bring unique emotional and moral dimensions to analysis. They are able to integrate internalized values from affective domain of Bloom's Taxonomy when examining the structure of knowledge. They are better able to combine nuances in their "real" understanding able than GAI, which lacks real understanding. This allows people to identify relevant questions to ask about data.

Evaluation

In evaluation, one applies criteria to judge the value or appropriateness of anything that can be analyzed. It requires ethics, judgement, and contextualized understanding.

GAI does not do well at evaluation, since it is not good with ethics or understanding. Although it can produce something that "sounds" authoritative, it is limited to replicating

forms. It doesn't evaluate well those things it was not trained on. It cannot actually "interpret" the value of various things, just as it cannot technically "understand" concepts.

Humans have the distinctive ability to combine context, ethics, and affective value with analysis allowing them to critique, justify, and evaluate authentic problems and potential responses. These judgements are important in evaluating the work of GAI in all contexts.

Create

In this level of Bloom's taxonomy, the expectation is to put various components together to produce a new and unique functioning whole. Creating is generative, and necessarily draws upon all the knowledge, understandings, and skills that people have acquired through their experience.

GAI cand be highly creative, because it has at its disposal a vast array of possible components to put together. It can rapidly generate a series of choices or possible organizations. However, GAI is limited by patterns and trends in data. Just as it cannot solve novel problems that don't fit previously observed parameters, it cannot make an intuitive leap or juxtapose elements that are not found together in patterns unless provided with a prompt instructing it to do so. Because it doesn't "understand," it can mistake what is essential in any given pattern (witness GAI trying to make human hands), and it lacks judgement to alter "mistakes."

As with GAI, human's ability to do this is related to their training data and existing knowledge. We do not generate something from nothing. Instead, we see ways to repurpose, reuse, slightly chance, those things that we know. Unlike GAI, we have the ability to apply judgement in creation, so our creations are rarely "wrong."

References and Reading

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