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Chapter 4 – Critical Evaluation

4.1 Evaluating and Critically Assessing GenAI Responses (FACTS)

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Contents	<p>As you refine your prompting skills, it is equally important to develop the ability to critically evaluate and assess the responses produced by GenAI tools, given their propensity to produce content that may be biased or factually inaccurate. In support of this, the FACTS framework has been developed to guide this critical evaluation and to deepen your understanding of what constitutes a strong argument. By applying this framework, you ensure that the responses you rely on are not only technically sound but also intellectually robust and argumentatively solid.</p> <p>Prompt formulation by Christine Fox, in collaboration with ChatGPT (May 2024).</p> <div><div> F: Focus</div><div>Focus on the AI's response by breaking it down into its main points and arguments.</div></div> <div><div> A: Authenticate</div><div>Authenticate the AI's output by verifying it against current research and empirical data.</div></div> <div><div> C: Critique</div><div>Critique the response's accuracy, relevance, and depth in the context of the topic.</div></div> <div><div> T: Think</div><div>Think about the response from various perspectives and its potential impact.</div></div> <div><div> S: Scrutinise</div><div>Scrutinise the AI's conclusions by critically questioning and exploring alternative hypotheses or interpretations.</div></div> <p>Example prompt</p> <p>"Provide a concise, informative response of no more than 150 words [B]. Assume the perspective of a knowledgeable expert in genetics and biotechnology [R]. The output is intended for graduate students in biomedical sciences, so maintain a professional and educational tone [A]. Include information about CRISPR-Cas9 technology, its application in non-dividing cells, its potential in cancer treatment through the p53 pathway, its role in regenerative medicine using stem cells, and its importance in disease biomarker discovery [V]. The response should aim</p>

to educate and inform about the current state and future potential of this technology [E]."

Example output (ChatGPT 4o June 2024):

"CRISPR-Cas9 technology has revolutionised genetics by enabling precise gene editing. It can introduce specific genetic modifications in non-dividing cells with high accuracy. The technology uses a guide RNA (gRNA) to direct the Cas9 enzyme to a genome location, creating double-strand breaks, which are then repaired by the cell.

CRISPR holds potential for addressing cancer-related mutations, such as modulating the tumour-suppressing p53 pathway. However, therapeutic applications require more research to understand off-target effects and ensure safety.

In regenerative medicine, CRISPR-Cas9 enables gene editing in stem cells, offering potential treatments for degenerative diseases. Despite advancements, ethical and regulatory challenges must be addressed before clinical application.

CRISPR is also crucial in disease biomarker discovery, helping identify key genes involved in diseases. For example, identifying a single gene as a biomarker can streamline diagnostics and enhance precision medicine."

Example use of FACTS:

F: The AI suggests that CRISPR-Cas9 can be used for targeted gene editing in non-dividing cells. Let's focus on and breakdown the mechanisms it describes.

A: To validate the AI's claim about CRISPR efficiency, we should review and authenticate the latest peer-reviewed articles and experimental data.

C: The AI's explanation of the p53 pathway's role in cancer biology is accurate but lacks detail on recent discoveries about its regulatory mechanisms.

T: The AI's perspective on the use of stem cells in regenerative medicine is optimistic. We should also consider ethical and regulatory challenges.

S: While the AI identifies a single gene as a biomarker for a disease, we should challenge this by considering the complexity of genetic interactions in pathogenesis.