Food Science & Nutrition Research

What Makes 'Good Food': Using AI to Coach People to Ask Good Questions

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ABSTRACT

The paper introduces Idea Coach, a new approach to generating questions about a topic. Idea Coach emerged from the need to 'coach' users in Mind Genomics studies, where the requirement is to create four questions which 'tell a story' and then four answers to each question. Many novice users find this requirement onerous, abandoning the project. Idea Coach guides the set-up, making the task easier. Idea Coach was then expanded to a virtually stand-alone process to teach critical thinking. The user need only write the question and some elaboration about the nature of the answer. Idea Coach returns with sets of 15 questions, these sets providing an education on the topic. Afterwards, Idea Coach provides a set of AI-based summarizations on each set of questions, further helping the user think critically about the topic.

Introduction

A great deal of the scientific literature about 'good food' deals with one or another aspect of the subjective evaluation of the food, an evaluation which may be based in any number of disciplines. As long as the word 'good' is used, however, we know that there is emphasis of what economists call the 'utility' of food. It is to understand what it means to be a good food that this paper is addressed. The focus of this paper is on the contribution of artificial intelligence, AI, helping us thinking about this seemingly simple concept. Behind that focus is the realization that AI may be able to help teach critical thinking, even in topics that are seemingly very familiar. The notion of critical thinking is becoming of increasing interest as professionals and others recognize its importance, and that our civilization requires it [1-3]. But how to make it into a system, and bring it to bear on any topic? And thus the topic of 'good food'. The notion of 'good food' is of wide interest, and increasingly so. Table 1 presents a count of the term 'good food' appearing in Google Scholar®. Table 1 shows the clear increase in focus on this topic of 'good food', Figure 1 shows the title of papers from the first page of a Google Scholar® search during the year 2022. Figure 1 shows the varied topics subsumed under the statement 'good food'. What become clear from Table 1 and Figures 1A and 1B is both the degree of interest in this topic of 'good food', but at the same time the large number of different issues subsumed under the name.

Table 1: Good food 'hits' 1990-2023, from Google Scholar.

Years	Mentions of Good Food
1980-1984	40,400
1985-1989	18,800
1990-1994	18,000
1995-1999	25,200
2000-2004	27,500
2005-2009	29,400
2010-2014	31,000
2015-2019	46,800
2020-2023	1,680,000
2020	1,060,000
2021	684,000
2022	290,000
2023	218,000

Faced with the plethora of information hinted at by Table 1 and the 'hits' from Google Scholar over the years starting for example in 1990 (Figure 1 Panel A), and with more hits recently, in 2022 (Figure 1 Panel B), how would someone approach the topic of dealing with this giant of a topic, one with poorly defined borders?.

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Figure 2: Screen shot of Google Scholar page for the query 'AI and Good Food'.

So many different ideas seemed to be subsumed under the topic of 'good food'. Our focus is not so much on answers to questions as on using technology to help those in the world of food learn how to think 'critically', especially in topics which end up being tinged by emotions, political issues, monetary objectives, and health.

Enter AI, artificial intelligence, to help critical thinking regarding what we mean by 'good food.'

During the past decade the scientific world has been increasingly excited by AI, an excitement that might well be likened to a blazing forest fire, rather than a small conflagration somewhere. It is hard to think of any topic today, 2024, where the excitement of AI has not penetrated, often with a raging force from the excitement. Those involved with food, for example, the IFT (Institute of Food Technologists) of the United States have started to offer specialist courses on AI in the food industry [4]. The number of courses dealing with AI and food has increased dramatically [5], and one need only look at the Google® results for the topic 'AI and Good Food' to get a sense of the increasing popularity (Figure 2).

At the same time that AI has entered the world in its many manifestations, there has been an increasing concern about the education of people, specifically the seeming decrease in the ability of young people to 'think critically.' [6]. Although there does not appear to be a consensus about what critical thinking is, there is still the feeling that whatever it may be, students are not learning to think in the way people believe they learned in previous times. Whether or not that conjecture is true is not of concern here. What is of concern is what does this believed drop in critical thinking leave the student and the researcher of the future trying to grapple with an important topic, but one so vast and unstructured as to be formidable. In simple terms, what are the prospects for dealing with such a large, unstructured topic area as 'good food' in a world where people may not be able to think as well. And, to continue to the topic, can AI help?

The emerging science of Mind Genomics as a structure to drive critical thinking

During the 1990's, a new research approach emerged, one based upon critical thinking, although the notion of critical thinking itself was not so apparent. The research approach, first called IdeaMap, then changed to RDE (rule developing experimentation) [7], and finally Mind Genomics [8], focused on understanding how people think about the world of the everyday. The approach required the user to identify a topic, then create four questions which tell a story, and then for each question create four 'answers', these answers in the form of a stand-alone phrase which painted a mental word picture. The rest of the process comprised the computer-assisted mixing of the answers (so-called elements) into small, easy to read vignettes, without connectives, the presentation of these vignettes to test takers (respondents) who rated the vignettes, and then the analysis of the results by statistical means (regression analysis) to determine the 'driving' power of each messages. The Mind Genomics approach found many uses and continues to be used widely today in many fields, ranging from food and beverage [9] to social issues [10] and the law [11] to medicine [12], and so

forth. What is relevant for this paper is the user response to Mind Genomics. Users were both delighted and dismayed. The delight was that it was finally possible to understand how people respond and value the different facets of everyday life, with these Mind Genomics 'experiments' easy to set up, easy and most effective to run, and in turn easy to understand. The chagrin emerged as well, mostly from the realization that it was hard to 'think' in this new manner. It had been easy to ask survey questions, focusing the respondent's mind on a general topic with a simple scale. It was quite different, however, to come up with a way to structure the experience of the everyday by questions, an occasionally fatal difficulty for many novice researchers who found It simply too difficult to think in this manner. Indeed, quite often the novice user, even a professional, was stymied at the thought of having to come up with four questions, which 'tell a story'. More than a handful of aspiring users of Mind Genomics ended up abandoning the effort entirely with the plaint that it was just too hard to think of questions. Other users effectively abandoned the effort by calling endless meetings to 'review' and to 'decide' about the specifics of the study. Despite the difficulties, however, the effort to do studies about the granularity of the everyday succeeded. The effort was still daunting, especially to younger users of school age, but older professionals who continued with the effort ended up succeeding, even in spite the difficulties about which they complained as having experienced.

Some initial efforts to make the task easier involved the collaboration with developers of AI solutions, especially in foods [13]. There was a noticeable ease in perceived difficulty when the user was given a set of phrases. The homework was not done for the user, but the effort focused on finding a reservoir of material. The user was able to work with this material, and generally little real problem selecting what was relevant, although from time to time the effort was bogged down in analysis paralysis as the prospective users lost themselves in meaningless discussions, usually about trivia.

The incorporation of AI through Idea Coach

The last quarter of 2022 saw the introduction of Open AI, and its flagship product, ChatGPT. This easy-to-use, general, largelanguage model allowed the user to ask the AI questions in the form of prompts and receive information in what appeared on the surface to be responses of a sentient human being. Although there were questions about 'how' AI could know what it presented and were there aspects in which AI was not to be believed, the consensus was that for many tasks AI was reasonably suitable. Indeed, AI was seen to be one way to relieve the dullness of a job, by having machines do more intelligent work than they had done, thus freeing up people.

The attraction of AI for critical thinking was immediate, at least for those deep into the world of Mind Genomics. Here was a new technology, which could 'answer' questions. Sometimes the answers were false, but often the answers were intriguing. One might be suspect were one to use AI to provide answers to questions, but it seemed to the authors to be sufficiently safe to

GOODFOODT	Use the BimiLeap Idea Coach to help formulate your four
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For your study, please choose four questions which tell a	product, or whatever you are creating this study for and
story.	click submit. The Idea Coach will return up to 15
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Figure 3: The Mind Genomics process to invoke AI (Idea Coach) for the creation of questions.

bring AI into the picture to formulate questions. When formulating questions there was no concern about falseness of the results because the work product was questions, not (presumably) fact-based answer. It was this first opportunity, to [provide questions, which became the opportunity for Mind Genomics. As noted above, the single most vexing problem surfaced among users and rejecters of Mind Genomics was the daunting issue of how to create a set of questions pertaining to a topic. The use of AI in a systematized format emerged as a clear opportunity. The user had simply to present a topic in a somewhat structured and intelligible manner to the AI, which would be programmed to return with 15 questions.

The actual screenshots used to incorporate AI into the questions appear in Figure 3. The design of the AI interface was created with the objective to have the AI contribution become part of the normal flow. Panel A shows the request for the user to provide four questions, which tell a story. In Panel A the user has a button which says, 'Idea Coach'. Pressing that button brings the user to Panel B, which has a box in which the user can request help for AI to create sets of 15 questions. The user has to write a simple description of the problem as well as write an instructions about the nature of the question (e.g., make it interesting). Panel C shows the initial Panel A showing the request for four questions panel B showing the Idea Coach 'box' wherein the user would write a short paragraph, and then Panel C showing five of 15 questions suggested by AI. Finally, Panel D shows the four questions selected.

The Mind Genomics platform was designed to promote a rapid, simple, almost intuitive experience. Thus the focus was on using natural language, on creating a simple flow, and encouraging the user to edit and to re-submit. Rather than creating a system requiring a lot of thought at the set-up, it seemed more productive to recognize that most users would be 'learning on the job.' Easy editing and thus revising, not perfect the first time, was the objective. The entire process shown in Figure 4 could take no more than 1-2 minutes for each iteration, so that 20 iterations might take as little as 20-30 minutes. It would be this breakthrough with AI, which allowed the user to master Mind Genomics in a short period of time, and essentially become self-educated in a topic.

Putting AI to the test – four sets of questions

The actual effort to create the questions was done in a period of 10 minutes for the involvement of the researcher, with a wait of 10 minutes for full AI-driven analyses of the results. The remainder of this paper is devoted to presenting some of the results for illustration.

The actual work was to come up with understanding the aspects of a food which make people judge it to be good. This specification Table 2: The 15 questions generated about 'good food' from each of four iterations, using only one topic or squib, viz., one specific prompt.

Topic: I am trying to understand the aspects of food, which make people, judge it to be 'good'. I do not know what they mean. Please help me identify what it means to be a 'good food'. Make the questions 15 words or more. Make the questions open a discussion, not just ask for a list. Make the questions interesting and educational. Make the questions fun and lead to deep understanding. Make the questions understandable to someone 10 years old or older.

Question Set #1

- 1. What factors contribute to the perception of a food being "good" or delicious?
- 2. How does the appearance of food affect our judgment of its taste and quality?
- 3. Can we judge the nutritional value of a food solely based on its taste?
- 4. How do cultural background and personal preferences influence our perception of good food?
- 5. Do organic or locally sourced foods automatically make them better or more desirable?
- 6. Is the freshness of ingredients a key factor in determining the quality of food?
- 7. What role does the balance of flavors play in making a dish good?
- 8. Can the texture and mouthfeel of food significantly impact our enjoyment of it?
- 9. Can food presentation and plating enhance our perception of its quality and desirability?
- 10. Does the complexity and depth of flavors make food more enjoyable?
- 11. How do emotions and memories associated with certain foods influence our perception of their goodness?
- 12. Can food be considered good if it is produced through unethical or environmentally damaging practices?
- 13. Should the ethical considerations of food production affect our judgment of its quality and desirability?
- 14. Does the uniqueness and creativity of food preparations contribute to it being perceived as good?
- 15. Is the positive social experience of sharing food with others an important factor in determining its goodness?

Question Set #2

- 1. How does the appearance of food affect our perception of its goodness?
- 2. What role does taste play in determining whether a food is considered good or not?
- 3. Can a person's cultural background influence their judgment of what makes a food good?
- 4. How does the freshness of ingredients impact the quality and goodness of a dish?
- 5. Do cooking methods and techniques contribute to the overall goodness of a meal?
- 6. What does it mean for food to be nutritious, and how does it relate to its goodness?
- Can the story behind a dish or its historical significance affect our perception of its goodness?
- In what ways can food sustainability and ethical practices contribute to a food's overall goodness?
- 9. How does the balance of flavors and textures contribute to the enjoyment and perceived goodness of a meal?
- 10. Do personal preferences and individual tastes play a role in determining whether food is considered good?
- 11. Can food presentation and attention to detail elevate the goodness factor of a dish?
- 12. How does the use of quality ingredients enhance the goodness and overall experience of a meal?
- 13. Can the ambiance and setting in which food is consumed influence our perception of its goodness?
- 14. Are there certain cultural or regional cuisines that are commonly associated with being good food?
- 15. How does the sensory experience of eating, including aroma and texture, contribute to the goodness of food?

Question Set#3

- 1. How does the taste of food contribute to its perception as "good" or "bad"?
- 2. In what ways does the presentation and visual appeal of food influence our judgment of its quality?
- 3. Can the use of fresh and high-quality ingredients truly enhance the overall experience of a dish?
- 4. Do cultural backgrounds and personal preferences affect our definition of "good" food?
- 5. How does the balance of flavors in a meal impact our enjoyment and satisfaction?
- 6. Can food with sentimental value, such as a family recipe, be deemed "good" solely based on emotional connection?
- 7. What role does texture play in our perception of food quality, and what textures are generally regarded as favorable?
- What fore does texture plug in our perception of rood quarky, and what textures are generally regarded
 Does the knowledge of a dish's nutritional value affect our opinion on whether it is "good" or not?
- Boos the knowledge of a dish's harmonial value affect out opinion of whether it is good of not.
 How does the skill and technique of the chef or cook contribute to the judgment of food quality?
- 10. Can the ambience and atmosphere of a dining experience affect our perception of the food being served?
- 11. To what extent does the utilization of sustainable and ethically sourced ingredients contribute to the idea of "good" food?
- 12. Are there certain foods or ingredients that are traditionally associated with being "good," and why?
- 13. Does the cultural significance and history of a dish influence our judgment of its quality?
- 14. Can food that is both nutritious and delicious be considered the epitome of "good" food?
- 15. What role do personal memories and experiences associated with food play in our judgment of its quality?

Question Set #4

- 1. What factors contribute to the overall taste of food and make it enjoyable?
- 2. How does the appearance of food influence our perception of its quality and deliciousness?
- 3. Can you name some ingredients that are commonly associated with a "good food" experience?
- 4. What role does texture play in determining whether a dish is deemed as tasty or not?
- 5. How does the balance of flavors in a dish affect our satisfaction with the food?
- 6. Can you think of any cultural or personal preferences that influence how we judge food?
- 7. Do you believe freshness and the quality of ingredients impact our perception of good food? Why?
- 8. How does the skill and technique of the cook or chef affect the quality of a dish?
- 9. Are there any psychological factors that might influence our judgment of whether food is good or not?
- 10. Can you think of any health or nutritional aspects that contribute to the goodness of food?
- 11. How does the overall dining experience, including ambiance and service, impact our judgment of food?
- 12. Can you explain the concept of umami and its significance in judging good food?
- 13. Are there any specific cultural traditions or rituals associated with good food that you find interesting?
- 14. Can you discuss the importance of locally sourced and sustainable ingredients in judging food quality?
- 15. How can memories and emotions influence our impression of food quality?

Table 3: Themes emerging from the four sets of questions.

Themes - Question Set #1

- 1. Perception of taste and flavor: Factors contributing to the perception of food as "good" or delicious, including flavor balance, complexity, and deep flavors.
- 2. Visual appeal: The influence of food appearance on taste and quality judgment, including the importance of ingredient freshness and food presentation.
- 3. Cultural and personal factors: The role of cultural background and personal preferences in perceiving good food, including the impact of organic or locally sourced foods.
- 4. Nutritional value: The ability to judge nutritional value based solely on taste and the ethical implications of food production.
- 5. Sensory experience: The effects of texture, mouthfeel, and plating on food enjoyment and quality perception.
- 6. Emotional and social aspects: The influence of emotions, memories, and the social aspect of sharing food on perception of food as good.
- 7. Uniqueness and creativity: The contribution of uniqueness and creativity to perceiving food as good.

Themes - Question Set #2

- 1. Perception and aesthetics:
- The appearance of food affects our perception of its goodness.
- Cooking methods and techniques contribute to the overall goodness of a meal.
- Food presentation and attention to detail can elevate the goodness factor of a dish.
- 2. Taste and flavor:
- Taste plays a role in determining whether a food is considered good.
- The balance of flavors and textures contributes to the enjoyment and perceived goodness of a meal.
- 3. Cultural and personal factors:
- Cultural background influences a person's judgment of what makes a food good.
- Personal preferences and individual tastes play a role in determining whether food is considered good.
- The story behind a dish or its historical significance affects our perception of its goodness.
- Certain cultural or regional cuisines are commonly associated with being good food.
- 4. Quality and ingredients:
- The freshness of ingredients impacts the quality and goodness of a dish.
- Nutritious food relates to its goodness and quality.
- The use of quality ingredients enhances the goodness and overall experience of a meal.
- Food sustainability and ethical practices contribute to a food's overall goodness.
- 5. Experience and ambiance:
- The ambiance and setting in which food is consumed influence our perception of its goodness.
- The sensory experience of eating, including aroma and texture, contributes to the goodness of food.

Themes - Question Set #3

- 1. Sensory perception:
- The taste of food affects our perception of its quality.
- Texture plays a role in our perception of food quality.
- The balance of flavors in a meal impacts our enjoyment and satisfaction.
- 2. Visual appeal and presentation:
- The presentation and visual appeal of food influence our judgment of its quality.
- 3. Ingredients:
- The use of fresh and high-quality ingredients enhances the overall experience of a dish.
- Utilization of sustainable and ethically sourced ingredients contributes to the idea of "good" food.
- Certain foods or ingredients are traditionally associated with being "good."
- 4. Cultural and personal influences:
- Cultural backgrounds and personal preferences affect our definition of "good" food.
- Food with sentimental value can be deemed "good" based on emotional connection.
- The cultural significance and history of a dish influence our judgment of its quality.
- Personal memories and experiences associated with food play a role in our judgment of its quality.
- 5. Knowledge and expertise:
- Knowledge of a dish's nutritional value affects our opinion of its goodness.
- The skill and technique of the chef or cook contributes to the judgment of food quality.
- 6. Dining experience:
- The ambience and atmosphere of a dining experience affect our perception of the food being served.
- 7. Concept of "good" food:
- Nutritious and delicious food is considered the epitome of "good" food.

Themes - Question Set #4

- 1. Factors influencing the taste and enjoyment of food
- 2. Influence of sensory factors on perception of food quality
- 3. Cultural and personal preferences in food judgment
- 4. Impact of freshness and ingredient quality on perception of good food
- 5. Influence of cook's skill and technique on dish quality
- 6. Psychological factors affecting judgments of good food
- 7. Health and nutritional aspects contributing to food goodness
- 8. Impact of overall dining experience on food judgment
- 9. Cultural traditions and rituals associated with good food
- 10. Importance of locally sourced and sustainable ingredients in food quality
- 11. Role of personal memories and emotions in food judgment.

Table 4: AI-suggested innovations from each question set.

Innovations – Question Set #1

1. Flavor profiling technology: Develop new technology that can accurately analyze the flavor compounds in food and create personalized flavor profiles based on individual preferences. This could be used by chefs and food manufacturers to create customized flavor experiences.

2. Augmented reality dining experiences: Utilize augmented reality (AR) technology to enhance the visual appeal of food by projecting interactive and visually stunning digital elements onto the plate. This could create a multisensory dining experience that combines both visual and taste sensations.

3. Cultural food exchange programs: Establish programs that promote cultural exchange through food, where individuals from different cultural backgrounds can learn about and taste traditional dishes from various countries. This would foster appreciation for diverse flavors and expand culinary horizons.

4. Transparency in food labeling: Implement policies that require comprehensive and transparent labeling of nutritional information, including the sources of ingredients and the production processes used. This would enable consumers to make well-informed decisions based on taste and ethical considerations.

5. Textural innovation in food production: Develop new technologies and techniques to create innovative textures in food, such as vegetable-based meat substitutes with the same mouthfeel as real meat. This would provide options for individuals who prioritize texture in their food enjoyment.

6. Food memory therapy: Offer therapy or counseling sessions that use the power of food memories to evoke positive emotions and enhance well-being. This could help individuals with emotional struggles find comfort and happiness through reconnecting with positive food experiences from their past.

7. Pop-up gastronomic events: Organize temporary and exclusive dining experiences where chefs can showcase their unique and creative culinary creations. This would allow consumers to appreciate the novelty and ingenuity of creative dishes and expand their gastronomic horizons.

Innovations – Question Set # 2

1. Perception and aesthetics:

- Food photography and styling services that help restaurants and food businesses enhance the appearance of their dishes in marketing materials.

- Innovative techniques and tools that can transform the visual appeal of ingredients, such as edible 3D printing for creating unique shapes and designs.

- Cooking classes and workshops that focus on teaching cooking techniques specifically to enhance the aesthetics of dishes.

2. Taste and flavor:

- Flavor pairing apps or services that provide suggestions on complementary flavors to create well-balanced and delicious meals.

- Unique seasoning blends or condiments that enhance the flavor profiles of dishes.

- Flavor-focused dining experiences, such as tasting menus that guide diners through various flavor profiles and combinations.

3. Cultural and personal factors:

- Specialty food subscription services that curate boxes of regional or cultural-specific ingredients and recipes, allowing individuals to explore different cuisines from around the world.

- Restaurants or food businesses that offer customizable menus to cater to individual preferences and dietary restrictions.

- Food tourism experiences that provide insights into the cultural significance and history of dishes, giving diners a deeper understanding of the goodness behind the food they are consuming.

4. Quality and ingredients:

- Online platforms or apps that provide information on the sourcing, quality, and sustainability of ingredients, allowing consumers to make more informed choices when purchasing food products.

- Food delivery services that prioritize sourcing ingredients from local and sustainable suppliers to ensure the highest quality in their prepared meals.

- Certification programs and labels that highlight environmentally friendly and ethically produced food products.

5. Experience and ambiance:

- Virtual reality dining experiences that transport diners to unique locations, immersing them in a different ambiance while enjoying their meal.

- Restaurants or cafes that emphasize multi-sensory dining experiences, incorporating elements like live music, themed decorations, and interactive displays to enhance the overall goodness of the dining experience.

- Upscale picnic or outdoor dining services that provide luxurious and atmospheric settings for diners to enjoy their meals in nature or unique locations.

Innovations – Question Set # 3

1. Sensory perception:

- New flavor combination kits or seasonings that enhance the balance of flavors in meals.
- Textural additives or techniques that can transform the texture of food, providing innovative dining experiences.
- Virtual reality dining experiences that stimulate all the senses, enhancing the perception of food quality.

2. Visual appeal and presentation:

- Edible food art kits or tools that allow individuals to create visually stunning dishes at home.
- Augmented reality menus or apps that provide interactive visual representations of dishes in restaurants.
- Food photography courses or workshops that teach individuals how to improve their presentation skills.
- 3. Ingredients:
- Subscription services that deliver fresh and ethically sourced ingredients directly to consumers' homes.
- Apps or websites that provide information on the origin and sourcing of ingredients in various food products.
- Community initiatives or policies that promote urban farming and local, sustainable food production.
- 4. Cultural and personal influences:
- Personalized meal planning services that consider individuals' cultural backgrounds and preferences.
- Online platforms or social networks that enable individuals to share their food stories and connect with others who have similar experiences.
- Culinary tours or travel experiences that explore the cultural significance and history of specific dishes.
- 5. Knowledge and expertise:
- Online platforms or apps that provide comprehensive nutritional information and allow users to track their food intake.
- Cooking classes or workshops focused on specific techniques or cuisines, taught by renowned chefs or culinary experts.
- Certification programs for chefs or cooks that emphasize skill development and techniques for creating high-quality dishes.
- 6. Dining experience:
- Restaurants with immersive dining concepts, such as themed pop-up experiences or interactive culinary shows.
- Gourmet food delivery services that bring restaurant-quality meals directly to customers' homes.
- Eco-friendly and sustainable dining initiatives, such as zero-waste restaurants or compostable packaging options.
- 7. Concept of "good" food:
- Food labeling policies or certifications that indicate the nutritional value and quality of products.

- Awareness campaigns or educational programs that promote the importance of balanced and nutritious diets.

- Partnerships between restaurants and local farmers or suppliers to ensure the use of high-quality ingredients.

Innovations - Question Set #4

1. Development of personalized taste profiles and food recommendations based on individual factors such as genetics, microbiome, and lifestyle choices.

2. Integration of virtual reality technology to enhance sensory experiences and simulate different food textures and flavors.

3. Implementation of food labeling systems that provide detailed information about sensory factors such as texture, aroma, and taste to aid consumers in making informed choices.

4. Creation of mobile apps or online platforms that allow users to rate and review the sensory qualities of food products, providing a crowdsourced database for consumers.

5. Introduction of "smart" kitchen appliances that use sensors and artificial intelligence to optimize cooking techniques and enhance the quality of dishes.

6. Incorporation of psychological principles in the design of food packaging to enhance perceptions of food quality and enjoyment.

7. Development of personalized nutrition plans that take into account individual psychological factors and preferences to promote healthy eating habits.

8. Designing restaurant environments that enhance the overall dining experience, such as incorporating interactive elements or themed decor.

9. Promotion of cultural exchange programs that allow individuals to immerse themselves in different culinary traditions and rituals, fostering appreciation for diverse food cultures.

10. Implementation of policies that encourage the use of locally sourced and sustainable ingredients, such as subsidies for farmers or incentives for restaurants to source their ingredients locally.

11. Creation of food experiences that aim to evoke specific emotions or memories, such as immersive dining events that tell a story or recreate nostalgic settings

appears at the top of Table 2. The specification, shown as 'Topic' is exactly that written by the researcher. The specification talks a little about 'good food' as the general topic. The rest of the specification talks about the length of the question, the request to make the question lead to a discussion, make it interesting, edutain, fun, and lead to deep understanding. Finally, make the question understandable even to a young person.

Although one might question the scientific benefit of requesting so much from AI, the reality is that these requests 'shape' the questions, making them vehicles by which to learn, and removing them from the ivory tower, bringing them down to earth. In actuality, one might even admit that AI can produce interesting, easy to understand questions. What could have been a daunting task, boring and intimidating at the same time, turned out to be a more interesting list of questions, all approachable, as well as set up to make people think about the topic.

The questions generated by AI in Table 2 represent four iterations of the same 'squib', viz., the same topic and prompt shown in Figure 4B. The AI process was developed so that each iteration of 15 questions would be entirely independent of every other iteration. The initial results suggest that many, not all, of the questions differ across iterations. What is likely to occur, however, is that increasing numbers of iterations the user will probably cover the 'entire space'. With four iterations taking relatively little time, even more effort can be expended to create a much larger library of questions, a library from which insights can be developed just by reading the 60, 100, even 200 or 300 questions, all generated within the space of an hour.

The search for themes resident among the questions

The initial work on the creation of questions revealed the simplicity of using AI to satisfy the once-daunting requirement of a set of questions. What was missing, however, was a sense of a story,. It proved difficult to integrate the questions into the format of a story. The organizational ability of the AI platform did not lead to the natural progression into a story. Furthermore, early experience with the questions revealed that once the questions were generated by AI almost all users, even young children of grade-school, middle-school and high-school ages were able to select questions which did tell some sort of story [14].

Further exploration led to the discovery that the AI could provide deeper analysis based on the information that it already had provided. That is, the AI could be given prompts to provide what might be called 'new knowledge', despite the often-expressed belief that AI could not provide new knowledge, but only sift among current knowledge [15]. The attempt to generate this new knowledge appears first in Table 3, which shows how the AI based Idea Coach produces different 'themes'. The themes are not under the control of the user, but rather appear at the end of the study setup. Each page of 15 questions has below it a section called 'themes' Table 3 shows this table. It is here that the user's mind can become more educated by seeing the different aspects of the topic, viz., the underlying potential for a story, or at least a description of a topic from several angles.

New knowledge? AI construction of innovation from AI generated questions

Innovations lurking in the questions constitutes the final set of results, as shown in Table 4. It is in the 'innovations' that the AI begins to show its promise of creating so-called 'new knowledge.' The knowledge may not necessarily be new to an individual familiar with the topic, but within the world of 'good food' the emergent innovations may actually have that property. Looking at the innovations suggested in Table 4 may well reveal new ideas, or clearly ideas diverging from the questions into creative new options, almost 'flight of fancy.'

Discussion and conclusions

Today's needs often come down to efficiency, cost, and value. Those needs may seem superficial, especially for many who have been raised on the demand to carefully consider, think, weigh the alternatives, and then decide. Indeed, a well-known phrase is 'we must crawl before we walk, walk before we run.' Or in other words, go slow and then go fast, if we ever get to going fast. Those words of wisdom lead to the wonderful words 'measure twice, cut once', and often to the all-too-frequent result of 'analysis paralysis.' It was to the foregoing, the words of wisdom, that the Idea Coach was developed. Too often people embrace the need to be perfect, in which case 'the perfects becomes the enemy of the good', attributed to French Enlightenment philosopher Voltaire.

It was to move the effort forward that the Idea Coach was developed. What emerged at first were the questions, initially a set of 30 questions, later cut down to 15 questions with a simple change in the computer program. The results were interesting to say the least, with the effort to do Mind Genomics studies by creating questions becoming so easy that even grade school students as well as high school students could do powerful, published studies [14]. Experience showed that a grade school student who 'learned' what to do would find the creation of the questions fun. Moving beyond the creation of the questions required guidance, but it was clear that students enjoyed having the answers pop up, and even more so having a plethora of 15 questions emerge. There seemed to be something very special about 15 questions popping up to a question, and something even more intriguing when the user could change the prompt slightly in the Idea Coach 'box' and ended with rather different types of questions.

The final issue here is whether or not something 'new' emerged from the questions. The answer is no. The questions make sense, as do the themes. What is interesting, however, is the list of innovations. Many of these seem to be new and emerge quite clearly from the topic. The 'jury is still out', however, on whether or not these innovations are to be considered new, or simply less than obvious extensions of the ideas. If the former, then the Idea Coach presented here constitutes an easy-to-use aide for thinking. If the latter, however, then the Idea Coach presents a new dimension to AI and to human thought.

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