Developing Critical Thinking Skills in Nutrition Education Using Current Dietary Trends

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Abstract
Active learning provides an opportunity for educators to assist students in evaluating the quality of sourced information while developing critical thinking skills. The process of researching, analyzing, synthesizing, and communicating information is known as critical thinking. This article will explore a current dietary trend to develop critical thinking skills in college students enrolled in a nutrition education course at a Historically Black College or University. Seven steps of critical thinking were used to design the semester's project. A written paper and an oral presentation served as the final artifact. Overall, students reported having more confidence to communicate science to educate individuals about dietary trends. (word count 104)

Keywords: Dietary trends; Nutrition education Coconut oil; Critical thinking

Introduction
In this technologically savvy generation, information is readily available at the fingertips of today’s college students [1]. College students are quick to source information but essentially fail to evaluate the quality. Therefore, lacking the skills to apply and communicate evidenced-based facts to others effectively. The process of researching, analyzing, synthesizing, and sharing information is known as critical thinking [2].

College classrooms are shifting towards active learning to promote engagement of students [3]. Active learning provides an opportunity for educators to assist students in evaluating the quality of sourced information while developing critical thinking skills [4]. Incorporation of real-world situations or problems facilitates students to reflect on what they are learning - in part, fostering lifelong independent learning.

Nutrition science is an evolving field as researchers strive to gain a better understanding of how food impacts health. Nutrition is an applied science based on chemistry, biology, and physics. Students often struggle with finding evidence-based or credible nutrition sources. Additionally, students often lack the confidence to communicate factual nutrition information effectively to the intended audience. As future nutrition educators, students will be tasked with applying scientific knowledge and principles to dietary trends. The application of scientific knowledge will be used to educate individuals in a variety of settings from different educational backgrounds.

Therefore, this article will explore a current dietary trend to develop critical thinking skills in college students enrolled in a nutrition education course at a Historically Black College or University (HBCU). The objective of this project was to provide food and nutritional sciences students enrolled in a nutrition education course an opportunity to apply basic science, critical thinking and analysis skills to the evaluation of a current dietary trend – the use of coconut oil for heart health and weight loss.

Coconut oil
Coconut oil has a variety of applications, from cosmetics to baking. Recently, coconut oil has emerged as a heart-healthy alternative to butter. As a plant-based fat, the health claims for coconut oil and media attention has led consumers to believe that it will prevent heart disease, promote weight loss and aid or improve many other ailments. Coconut oil contains 92% saturated fatty acids, with 70% as medium-chain triglyceride (45-56% lauric acid C12:0). In the current literature there is little evidence to support the health benefits of coconut [5]. Additionally, the benefits of pure medium-chain triglyceride oil are not evident in coconut oil, despite 70% medium-chain triglyceride...
composition. The absence of the benefits in coconut oil might be due to the presence of the longer chain triacylglycerol.

Research on pure medium-chain triglyceride oil for its health benefits is limited as compared to numerous studies using olive oil [5]. Research has shown that olive oil is associated with an overall risk reduction of all-cause and cardiovascular mortality as well as cardiovascular events and strokes [6]. The heart-healthy benefits are due to the primary composition of olive oil being a monounsaturated fat (oleic acid C18:1 cis n-9).

Application

In the fall of 2017, an assistant professor in the Department of Family and Consumer Sciences, created an assignment to develop students’ critical thinking skills. Four seniors were majoring in Human Nutrition, and two graduate students (one Biology and one Food and Nutritional Sciences) were enrolled in the Nutrition Education course. The course met twice per week for one and a half hours from August to December. The assignment was based on the current dietary trend of substituting coconut oil for other dietary fats in cooking and eating for heart health. This assignment was designed to help improve the students’ ability to question and research current nutritional trends. The final product of the project was a written paper and an oral presentation.

In the Nutrition Education Course, we used the seven steps of critical thinking to design our semester’s critical thinking project [1] (Table 1). The first step was, “What am I being asked to believe or accept?”. The statement provided does not have to be based on scientific evidence. Current trends or popular beliefs afford good discussion topics for nutrition students. The statement provided in the Nutrition Education course was: Coconut oil is heart-healthy and helps promote weight loss. Students were then asked to record their initial thoughts on the topic and saved those to a file for future use in the project.

Table 1: Seven Steps to Critical Thinking (Kraus, Sears & Burke, 2013) and Application to Nutrition Education. Developing Critical Thinking Skills in Nutrition Education Using Current Dietary Trends.

<table>
<thead>
<tr>
<th>Step One</th>
<th>“What am I being asked to believe or accept?”</th>
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<tr>
<td></td>
<td>Make a statement to the class based on a current nutritional fad</td>
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<td></td>
<td>Record initial assumptions or biases</td>
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<td></td>
<td>i.e., Nutritional health claim</td>
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<tr>
<td>Step Two</td>
<td>“What evidence is available to support the claim?”</td>
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<td></td>
<td>Conduct a basic Google search and compare to an evidence-based search</td>
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<tr>
<td></td>
<td>i.e. class discussion on antidotal evidence versus research based</td>
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<td></td>
<td>i.e., Through the University library have students learn how to conduct evidence-based literature searches</td>
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<tr>
<td>Step Three</td>
<td>“What alternative ways are there to interpret the evidence?”</td>
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<td></td>
<td>Look for other subtopics that may support</td>
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<td></td>
<td>i.e., related to or an opposite of initial topic</td>
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<tr>
<td>Step Four</td>
<td>“Rate the evidence/alternatives on 0-10 scale based on validity/strength”</td>
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<tr>
<td></td>
<td>Using a referencing tool and develop definitions for the 0-10 scale</td>
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<tr>
<td></td>
<td>i.e., Type of research study design</td>
</tr>
<tr>
<td>Step Five</td>
<td>“What assumptions or biases came up when doing the above steps?”</td>
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<tr>
<td></td>
<td>Revisit initial assumptions or biases</td>
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<tr>
<td>Step Six</td>
<td>“What additional evidence would help us evaluate the alternatives?”</td>
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<td></td>
<td>Write a five to ten-page paper synthesizing the findings</td>
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<td></td>
<td>Break the paper into four sections using evidenced-based research</td>
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<tr>
<td>Step Seven</td>
<td>“What conclusions are most reasonable or likely?”</td>
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<td></td>
<td>Five-minute oral presentation on findings and opinion</td>
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<td>i.e., Figure 1 rubric</td>
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</table>

The second step was, “What evidence is available to support the claim?”. The students were divided into two groups. The groups were given ten minutes to conduct a general Google search using the terms ‘coconut oil and heart health’ and ‘coconut oil and weight loss.’ Cell phone use, tablets, and/or computers were allowed in the classroom for this step of the project. The instructor used a SMARTboard to lead the students in a discussion on what evidence the searches found and whether the sources were credible or not. The students then attended a library-based training given by the librarian on how to find evidence-based literature using search
engines such as PubMed.gov, Google Scholar, and the University Library. Similar search terms were used to conduct a review of the literature on coconut oil and the above health claims. Each student saved their literature searches to an EndNote library to be used for future steps.

The third step was, "What alternative ways are there to interpret the evidence?" Despite the abundance of antitodal information, there is a lack of scientific evidence to support the health claims for coconut oil. Students found through literature searches that coconut oil is comprised of 70% medium-chain triglycerides. Therefore, students were asked to conduct literature searches using the terms 'medium-chain triglycerides oil and heart health' and 'medium-chain triglycerides oil and weight loss.' For comparison, students were asked to research olive oil due to the abundance of scientific evidence to support the heart healthy and weight-loss claims. Students saved the new searches to the same EndNote library from step two.

Step four was to "Rate the evidence/alternatives on 0-10 scale based on validity/ strength". For this step, each student opened their EndNote library to rank each article. The following classification was used to rate validity/ strength of each article:

0 = sparse scientific evidence available to support the health claims for each oil
5 = fair amount of research but lacked controlled research trials
10 = strong evidence based on randomized controlled human studies

The students found coconut oil and medium-chained triglyceride oils were rated either a zero or a five. Students concluded that the evidence did not support the health claim of coconut oil being heart-healthy or promoting weight loss, whereas the literature for olive oil was mostly rated as a ten. Thus, supporting the claim that olive oil is heart-healthy and may help promote weight loss.

The fifth step was, "What assumptions or biases came up when doing the above steps?". Biases were initially explored in step one. The class revisited their initial assumptions that were saved regarding the statement 'coconut oil is heart-healthy and helps promote weight loss'. An entire class period was devoted to a lead student discussion related to their initial bias, personal experience of the project, and how the project may or may not have changed their opinion on consuming coconut oil.

Step six was, "What additional evidence would help us evaluate the alternatives?". Students were asked to synthesize their findings into a five to ten-page paper. The paper was divided into four sections: introduction, review of literature, conclusion, and references. Within the introduction, students briefly introduced the health claims in relation to the three oils as well as presented the chemical composition. The second section reviewed the health claims for each oil using evidence-based research in relation to heart health and promoting weight loss. In conclusion, the students summarized their findings and were asked to give their opinion on the topic. Lastly, all statements and claims were referenced using APA style, and a reference list was generated.

The final step was, "What conclusions are most reasonable or likely?". Each student during the last class of the semester gave a five-minute oral presentation on their findings and their opinion of the statement 'coconut oil is heart-healthy and helps promote weight loss'. The purpose of the presentation was designed to develop oral communication skills without the aid of PowerPoint, papers, props, or visual aids. Students were asked to dress professionally and were graded using a simple oral presentation rubric (Table 2).

Table 2: Oral Presentation Rubric. (adapted from http://hpl engr. engr. wisc. edu/Rubric_Presentation. doc).

<table>
<thead>
<tr>
<th>PRESENCE</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>LANGUAGE SKILLS</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ORGANIZATION</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>MASTERY OF THE SUBJECT</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>OVERALL IMPRESSION</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Conclusion

The incorporation of a real-world problem into a semester-long project in a Nutrition Education course improved students’ ability to search for evidence-based literature and distinguish between credible and non-credible sources. Additionally, students learned how to use referencing software while gaining experience in writing and communication through a written paper and an oral presentation.

Overall, students reported having more confidence to communicate science to educate individuals about dietary trends. Using a current dietary trend and applying the students’ knowledge of chemical composition and metabolism was found to provide a unique and innovative approach to helping students better understand how to communicate current dietary trends through nutritional education.

Acknowledgement

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References


