Understanding Students’ Cognitive Processes While Evaluating Online Sources: A Mixed Methods Study

Julia Lennox
jl687130@wcupa.edu

Follow this and additional works at: https://digitalcommons.wcupa.edu/all_doctoral

Part of the Secondary Education Commons

Recommended Citation
Lennox, Julia, "Understanding Students’ Cognitive Processes While Evaluating Online Sources: A Mixed Methods Study" (2024). West Chester University Doctoral Projects. 237.
https://digitalcommons.wcupa.edu/all_doctoral/237

This Dissertation is brought to you for free and open access by the Masters Theses and Doctoral Projects at Digital Commons @ West Chester University. It has been accepted for inclusion in West Chester University Doctoral Projects by an authorized administrator of Digital Commons @ West Chester University. For more information, please contact wcressler@wcupa.edu.
Understanding Students’ Cognitive Processes While Evaluating Online Sources:

A Mixed Methods Study

A Dissertation

Presented to the Faculty of the

College of Education and Social Work

West Chester University

West Chester, Pennsylvania

In Partial Fulfillment of the

Requirements for

the Degree of

Doctor of Education

By

Julia Lennox

May 2024
Dedication

This dissertation is dedicated to my family. To my husband, who has given me nothing but love and support throughout this whole process. You have encouraged me every step of the way, through my good and bad days, and I could not have done this without you. To my father, who was the first to instill a love of learning in me at a young age. I do not know if I would have ever chosen to pursue a degree in social studies education had you not shared your love of history with me, which ultimately led me on the path I am on today. To my late grandfather, the smartest man I have ever known and the first in my family to earn their doctoral degree. You remain a constant inspiration to me, and I hope that this work makes you proud!
Acknowledgments

I would first like to thank my dissertation advisor, Dr. Mimi Staulders, for your guidance and help throughout this whole process. Your patience, feedback, and commitment were crucial in strengthening my dissertation and helping me feel successful. I especially appreciate you working with me through my most challenging days and thank you for continuing to push me to produce the best academic work that I could. I would also like to thank the other members of my committee, Dr. Heather Leaman and Dr. Adam Rainear, for their expertise, guidance, encouragement, and support, which helped me to achieve this goal. To the members of Cohort 6, thank you! You all have been a constant and much-needed support system throughout this process. Your willingness to help others through personal and academic endeavors is heartwarming, and I am lucky to be a part of this amazing group. Finally, to my husband, who has done nothing but love and support me throughout this process, thank you!
Abstract

Given the substantial time young people spend online and their reliance on social media for information, research supports the importance of understanding how media literacy interventions may impact students’ abilities to process online information. This study employed a case study-explanatory sequential mixed methods research design to investigate the impact a media literacy course may have on students’ cognitive processes while evaluating online information. Twelve high school students \((n=12)\) completed a questionnaire, the first quantitative phase, while nine \((n=9)\) responded to performance tasks assessing their civic online reasoning skills. The sequential phase involved qualitatively analyzing assignments from the students’ media literacy course, performance tasks, and individual, semi-structured student interviews \((n=5)\). Overall, students reported high levels of confidence in their abilities. The quantitative analysis found a moderate statistical relationship between students’ confidence levels and mastery of the performance tasks. Qualitative findings suggested that students engaged with a blend of intuitive and analytical cognitive processes while evaluating online information, with varied accounts regarding their reliance on heuristics and influence of biases. Furthermore, while students reported the course enhanced their civic online reasoning skills, the results of the performance tasks showed that, overall, students did not achieve high levels of mastery across each task. These results highlight the complex nature of cognitive processes involved in evaluating online information and emphasize the need for future research on media literacy interventions to enhance students' abilities in discerning the credibility of online information.

Keywords: media literacy, civic online reasoning, heuristics, biases, cognitive processes
Table of Contents

List of Tables ................................................................................................................. xi

List of Figures ................................................................................................................. xii

CHAPTER 1 ...................................................................................................................... 1

Problem Statement ......................................................................................................... 2

Purpose of the Study ....................................................................................................... 5

Rationale for the Study .................................................................................................. 6

Research Questions ....................................................................................................... 7

Overarching Question ..................................................................................................... 8

Quantitative Questions ................................................................................................. 8

Qualitative Questions ..................................................................................................... 8

Mixed Methods Research Question ............................................................................... 8

Significance of Methods ............................................................................................... 8

Significance of Study .................................................................................................... 11

Definition of Terms ....................................................................................................... 11

Summary ....................................................................................................................... 14

CHAPTER 2 ..................................................................................................................... 16

Challenges of the Digital Landscape ........................................................................... 17

The Struggle for Students to Evaluate the Credibility of Online Information .......... 18

The Importance of Media Literacy Education .............................................................. 20
Media Literacy Initiatives in Education

Challenges in Defining Media Literacy Initiatives in Education

Challenges in Implementing Media Literacy Initiatives in Education

Challenges in Assessing Media Literacy Education

Approaching Media Literacy Education through a Civic Online Reasoning Framework

Challenging Traditional Checklist Approaches

Using Civic Online Reasoning Skills: Lateral Reading and Click Restraint

Validating Civic Online Reasoning Assessments

Civic Online Reasoning Interventions

Using a Dual Process Theoretical Framework to Understand Civic Online Reasoning

Intuitive Thinking

Analytical Thinking

Can Individuals Apply Intuitive Thinking to Civic Online Reasoning?

Summary

CHAPTER 3

Research Design

Description of the Participants

Description of the Setting

Description of the Media Literacy Course Curriculum

Description of Methods and Instruments
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overarching Question</td>
<td>84</td>
</tr>
<tr>
<td>Quantitative Question</td>
<td>84</td>
</tr>
<tr>
<td>Qualitative Questions</td>
<td>84</td>
</tr>
<tr>
<td>Mixed Methods Research Question</td>
<td>85</td>
</tr>
<tr>
<td>Demographics of the Sample</td>
<td>85</td>
</tr>
<tr>
<td>Preliminary Results</td>
<td>86</td>
</tr>
<tr>
<td>Quantitative Analysis of Students’ Regular Online and Social Media Use</td>
<td>86</td>
</tr>
<tr>
<td>Qualitative Analysis of Students’ Regular Online and Social Media Use</td>
<td>89</td>
</tr>
<tr>
<td>Quantitative Analysis on the Influence of Education</td>
<td>94</td>
</tr>
<tr>
<td>Qualitative Analysis on the Influence of Education</td>
<td>95</td>
</tr>
<tr>
<td>RQ2: The Relationship between Confidence and Civic Online Reasoning Skills</td>
<td>98</td>
</tr>
<tr>
<td>Levels of Confidence and Ease in Evaluating Online Sources</td>
<td>98</td>
</tr>
<tr>
<td>Measuring Civic Online Reasoning Skills</td>
<td>98</td>
</tr>
<tr>
<td>RQ3: Students’ Perspectives on the Impact of Media Literacy Education</td>
<td>106</td>
</tr>
<tr>
<td>Students’ Understanding of Media Literacy</td>
<td>107</td>
</tr>
<tr>
<td>Students’ Perceptions of their Media Literacy Skills</td>
<td>109</td>
</tr>
<tr>
<td>Students' Takeaways from the Media Literacy Course</td>
<td>109</td>
</tr>
<tr>
<td>RQ4: Students’ Cognitive Processes While Evaluating Online Information</td>
<td>111</td>
</tr>
<tr>
<td>Quantitative Analysis on the Influence of Biases</td>
<td>112</td>
</tr>
<tr>
<td>Qualitative Analysis on the Influence of Bias</td>
<td>115</td>
</tr>
</tbody>
</table>
Students’ Cognitive Processes Before Learning Civic Online Reasoning Skills .......... 120

Students’ Cognitive Processes While Learning Civic Online Reasoning Skills ............. 122

Students’ Cognitive Processes After Learning Civic Online Reasoning Skills .............. 125

Students’ Perceptions of Confidence and Ease When Evaluating Online Sources .......... 132

RQ5: Integrating Students’ Cognitive Processes and Their Civic Online Reasoning Skills .. 134

RQ1: Impact of Civic Online Reasoning Instruction on Cognitive Processes ................. 136

Summary ........................................................................................................................................ 136

CHAPTER 5 ...................................................................................................................................... 138

Discussion of Findings ............................................................................................................. 138

Discussion of Preliminary Results .......................................................................................... 138

Discussion of RQ2: The Relationship between Confidence and Civic Online Reasoning Skills .......................................................................................................................................................................................... 140

Discussion of RQ3: Students’ Perspectives on the Impact of Media Literacy Education... 142

Discussion of RQ4: Students’ Cognitive Processes While Evaluating Online Information. 143

Discussion of RQ5: Integrating the Quantitative and Qualitative Data .............................. 149

Discussion of RQ1: Impact of Civic Online Reasoning Instruction on Cognitive Processes .......................................................................................................................................................................................... 150

Limitations ...................................................................................................................................... 152

Implications for Practice .......................................................................................................... 154

Recommendations for Future Research .................................................................................. 155
Conclusion................................................................. 157

References........................................................................ 159

Appendix A: Institutional Review Board Approval Letter.................... 173

Appendix B: Questionnaire and Civic Online Reasoning Scenarios........... 174

Appendix C: SHEG’s Civic Online Reasoning Scenario Rubric #1...............186

Appendix D: SHEG’s Civic Online Reasoning Scenario Rubric #2...............187

Appendix E: SHEG’s Civic Online Reasoning Scenario Rubric #3...............191

Appendix F: Semi-Structured Interview Questions.................................192

Appendix G: Letter of Support from Participating School.........................195
## List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Media Literacy Course Curriculum</td>
<td>52</td>
</tr>
<tr>
<td>3.2</td>
<td>Nominal and Ordinal Scales in the Qualtrics Questionnaire</td>
<td>55</td>
</tr>
<tr>
<td>3.3</td>
<td>Numerical Values for Civic Online Reasoning Performance Task Responses</td>
<td>57</td>
</tr>
<tr>
<td>3.4</td>
<td>Student Artifacts from their Media Literacy Course</td>
<td>62</td>
</tr>
<tr>
<td>3.5</td>
<td>Questionnaire Items Measuring Civic Online Reasoning Skills</td>
<td>69</td>
</tr>
<tr>
<td>4.1</td>
<td>Participant Demographics</td>
<td>86</td>
</tr>
<tr>
<td>4.2</td>
<td>Hours Per Day Spent Online</td>
<td>87</td>
</tr>
<tr>
<td>4.3</td>
<td>Top Three Online Activities Students Do Most on an Average Day</td>
<td>88</td>
</tr>
<tr>
<td>4.4</td>
<td>Sources of News and Current Events</td>
<td>89</td>
</tr>
<tr>
<td>4.5</td>
<td>Interviewee’s Online Engagement with Current Events</td>
<td>94</td>
</tr>
<tr>
<td>4.6</td>
<td>Influence of High School Classes on Students</td>
<td>96</td>
</tr>
<tr>
<td>4.7</td>
<td>Questionnaire Civic Online Reasoning Skills Individual Items</td>
<td>100</td>
</tr>
<tr>
<td>4.8</td>
<td>Questionnaire Civic Online Reasoning Skills Summed Score</td>
<td>101</td>
</tr>
<tr>
<td>4.9</td>
<td>Civic Online Reasoning Performance Task Scores</td>
<td>103</td>
</tr>
<tr>
<td>4.10</td>
<td>Correlations of Variables Using Nonparametric Tests</td>
<td>105</td>
</tr>
<tr>
<td>4.11</td>
<td>Students’ Perceptions of Media Literacy</td>
<td>108</td>
</tr>
<tr>
<td>4.12</td>
<td>Family and Friends as Sources of News</td>
<td>113</td>
</tr>
<tr>
<td>4.13</td>
<td>Questionnaire Items Measuring Students’ Perceptions of Their Biases</td>
<td>114</td>
</tr>
<tr>
<td>4.14</td>
<td>Students’ Perspectives on Bias</td>
<td>118</td>
</tr>
<tr>
<td>4.15</td>
<td>Comparing Students’ Reflections to their Civic Online Reasoning Scores</td>
<td>135</td>
</tr>
</tbody>
</table>
List of Figures

Figure 3.1: Case Study-Explanatory Sequential Mixed Methods Research Design……………52
CHAPTER 1

Although some characterize young people as digital natives, implying that they have acquired and perfected digital skills from a lifetime immersed in technology (Prensky, 2001), research indicates that young people actually lack the critical skills needed to navigate today’s digital landscape (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018). Despite a recent survey of teenagers ages 13 to 17 indicating that 46% of those surveyed reported using the internet almost constantly (Vogels et al., 2022), studies show that young people struggle to evaluate the credibility of online information (Breakstone et al., 2021; McGrew et al., 2018). Therefore, referring to young people as digital natives may not fully and accurately represent their digital capabilities.

Vogels et al. (2022) found that teenagers spent most of their time on the internet on YouTube, TikTok, Instagram, Snapchat, or Facebook, with 35% reporting that they used at least one of these social media platforms almost constantly. While using social media does not inherently benefit or harm young people (American Psychological Association [APA], 2023), social media sites provide easily accessible platforms for millions of people and open up avenues for misinformation and disinformation to rapidly disseminate (Levy et al., 2023). In fact, a recent study by Brewster et al. (2022) revealed that nearly 20% of videos on TikTok contained false or misleading information. Furthermore, Brewster et al. (2022) also reported that young people have begun to increasingly use TikTok as a search engine instead of Google to find information, with TikTok surpassing Google as the most popular website worldwide in 2021. The growing reliance on these social media platforms as a source of news and information has significantly complicated deciphering the credibility of online sources (Hobbs, 2017). Some even argue that this problem threatens our democracy as the health of a democracy depends on people’s ability
to access reliable information upon which they base their decisions (Breakstone et al., 2021; Levy et al., 2023). Because of the challenges that the adoption and reliance on digital platforms as a source of news and information presents, media literacy advocates argue that educators must equip students with the skills needed to evaluate the credibility of online information (Breakstone et al., 2021; McGrew et al., 2018). Due to the cognitive demands needed to evaluate online information critically and the multitude of factors that may influence this ability (Ku et al., 2019; Nygren & Guath, 2021; Powers, 2019; Verma et al., 2023), research requires a deeper investigation into understanding these complex cognitive processes.

**Problem Statement**

The increasing use and ease of access to the internet as a source of information has allowed for the severe growth and spread of false or inaccurate information (Levy et al., 2023). Scholars argue that because this growth and spread of misinformation and disinformation threatens the health of a democracy, individuals must learn how to assess the credibility of online sources to face this threat (Breakstone et al., 2021; Levy et al., 2023). However, extensive research illustrates that young people lack the skills to evaluate online information effectively (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018).

A recent study of nearly 3,500 high school students found that most participants could not analyze and verify the reliability of online advertisements, news, and social media sites (Breakstone et al., 2021). In another study that included 405 middle school students, 348 high school students, and 141 college students, McGrew et al. (2018) similarly found that students struggled to evaluate the credibility of online information. Furthermore, Notley and Dezuanni (2019) surveyed 1,000 young people ages 8 to 16 regarding their news consumption, engagement, and experience. They found that only 20% of those surveyed indicated they
received lessons during the past year to help them decide the accuracy and trustworthiness of news stories, while only 34% reported they felt confident in distinguishing fake news from real ones. However, after conducting a study that included 298 youth ages 10 to 12, Tamboer et al. (2023) found that they showed a significant increase in self-efficacy in their abilities to detect fake news. Therefore, researchers have called for the greater inclusion of civic online reasoning skills across school curricula to prepare students to become more informed citizens (Breakstone et al., 2021; McGrew et al., 2018). The Stanford History Education Group (SHEG) created and validated the civic online reasoning framework in 2018, offering a free online platform to assist educators in teaching secondary students the skills needed to navigate and evaluate online sources (SHEG, 2019; Wineburg et al., 2019). While research shows promising results that even a small amount of explicit instruction in civic online reasoning improves students’ abilities to evaluate online information (McGrew, 2020; Wineburg et al., 2022), limitations to these studies exist that this study seeks to address.

Although the effectiveness of previous civic online reasoning interventions has shown statistical significance (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), Artmann, Scheibenzuber, Fendt, and Nistor (2023) argued that these studies do not necessarily explain how students achieved improvement. While researchers may assume and expect performance improvement in the ability to evaluate online sources as a result of improved cognitive processing, Artmann, Scheibenzuber, Fendt, and Nistor (2023) pointed out that research has not sufficiently proven this assumption yet (p. 532). Ku et al. (2019) similarly argued that the field needs studies that capture the process of critical thinking while evaluating online sources. While some civic online reasoning researchers briefly discussed how they incorporated student interviews (McGrew et al., 2018; Wineburg et al., 2019) or aspects of
cognitive apprenticeship (McGrew & Breakstone, 2023; Wineburg et al., 2022) into their studies, these studies did not appear to focus on a deeper exploration of students’ engaged cognitive processes while evaluating online sources. Because of the complex interplay of cognitive processes that impact individuals’ abilities to evaluate online information (Artmann, Scheibenzuber, & Nistor, 2023; Ku et al., 2019; Nygren & Guath, 2022; Verma et al., 2023), conducting a more in-depth investigation into how students cognitively process online sources after receiving explicit instruction in civic online reasoning skills may provide insights to help address this limitation.

Furthermore, while much of the current research on civic online reasoning has utilized a quantitative, experimental design to test interventions (McGrew & Breakstone, 2023; McGrew et al., 2019; Wineburg et al., 2022), the research field lacks qualitative approaches that primarily focus on students’ perspectives on civic online reasoning interventions. Additionally, although interventions tend to focus primarily on teenagers, De Leyn et al. (2022) pointed out that media literacy research rarely amplifies their voices and, therefore, necessitated the inclusion of student perspectives and experiences. Tamboer et al. (2023) also supported the idea that future research should strive to incorporate youths’ views to develop more effective interventions. This study seeks to address this gap by incorporating and emphasizing qualitative data from individual student interviews to gain insight into how they cognitively process learning and apply civic online reasoning skills. To address these limitations and more fully understand the complexity of this research problem, I utilized a case study-mixed methods research design to investigate the potential relationships between explicit civic online reasoning instruction, students’ cognitive processes, and their abilities to evaluate online information.
Purpose of the Study

This study explored how high school students intuitively and analytically process evaluating online information following a semester-long media literacy course. Using a case-study-explanatory sequential mixed method design, I collected quantitative data and then explained the quantitative results with in-depth qualitative data. The population consisted of high school students who completed a semester-long media literacy course during the 2023 Spring semester. The first quantitative phase of the study included a questionnaire followed by civic online reasoning performance tasks. The quantitative data aimed to establish what factors may impact students’ cognitive abilities to evaluate the credibility of online information, their self-perceptions of civic online reasoning skills, and their performance levels on civic online reasoning performance tasks. A second exploratory phase included student interviews following the quantitative results to explain students’ perceptions of their cognitive processes as they evaluate online sources in greater detail. The exploratory phase also included collecting and analyzing artifacts from their media literacy course, including student responses to discussion posts, assignments, and projects. I qualitatively analyzed these artifacts to help gain a more complete understanding of students’ cognitive processes as they learned civic online reasoning skills throughout the course. Finally, in addition to quantitatively analyzing the civic online reasoning performance tasks, I also qualitatively analyzed students’ responses to understand their cognitive processes further as they engaged with evaluating online sources. Due to the small population size and my desire to deeply explore the depth and complexity of how students perceive their cognitive processes while learning and applying civic online reasoning skills, I placed greater emphasis on the qualitative data (quan → QUAL) (Creswell & Plano Clark, 2017).
Rationale for the Study

Although researchers have conducted several studies that assess students’ abilities to evaluate online information critically before and after civic online reasoning interventions (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), Ku et al. (2019) argued that such interventions fail to capture the complex and multi-faceted cognitive processes that students utilize when evaluating sources. Because learning how to evaluate online sources requires time-consuming and cognitively demanding critical thinking skills, individuals have the tendency to rely on automatic cognitive processing to sift through digital information more quickly and efficiently (Powers, 2019). However, in doing so, individuals often rely on intuitive thinking, rapidly evaluating online content based on prior knowledge, beliefs, emotions, and heuristics, which can lead to erroneous or biased conclusions (Ku et al., 2019). Despite the potential influence that these factors may have on students’ abilities to critically evaluate online information, leading researchers in the field of civic online reasoning have consistently highlighted the absence of data on students’ prior knowledge, beliefs, and opinions as limitations to their studies (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022). Because these factors may influence the way individuals process and evaluate information (Nygren & Guath, 2022), researchers in the field recommended that future studies should explore how such factors may impact students’ civic online reasoning skills (McGrew & Breakstone, 2023; McGrew & Byrne, 2021; Wineburg et al., 2022).

Additionally, while Tamboer et al. (2023) found that young people reported an increase in self-efficacy to detect fake news following a news literacy intervention, other studies indicate that people tend to overestimate their information literacy skills (Mahmood, 2016). Kahneman (2011) cautioned against viewing high subjective confidence as an indicator of accuracy, as
overconfidence may lead to errors in thinking and processing information. Because their study did not measure youths’ actual abilities to detect fake news, Tamboer et al. (2023) recommended that future research test whether youths can better detect fake news following an intervention.

Furthermore, a debate exists in the research field regarding the impact that motivated reasoning may have on individuals’ abilities to evaluate the credibility of online sources (Pennycook & Rand, 2018). While some studies support that motivated reasoning impacts individuals’ abilities to judge the accuracy of online posts (Kahne & Bowyer, 2017), other studies suggest that analytical thinking rather than motivated reasoning plays a greater role in individuals’ abilities to discern fake news from real news (Pennycook & Rand, 2018). Tandoc et al. (2021) argued that previous studies that have examined factors behind the spread of fake news, such as social media use, political bias, and cognitive ability, have usually done so in isolation (p. 238). Seeking to address this limitation, Tandoc et al. (2021) conducted a study that found that cognitive ability and political bias can predict the extent to which individuals fall for fake news (p. 246). Due to the complexity of cognitive processes, Verma et al. (2023) argued for the importance of considering how multiple factors may impact one’s ability to discern the credibility of online sources. Therefore, to address the complexities of cognitive processes and the potential impact of motivated reasoning and analytical thinking on individuals’ abilities to evaluate online information, I employed a case study-mixed methods research design to gain a more comprehensive and nuanced understanding of students’ civic online reasoning skills.

**Research Questions**

This study explored how explicit civic online reasoning instruction taught within a semester-long media literacy course may impact high school students’ intuitive and analytical
cognitive processes when evaluating online sources. The study addressed the research questions listed below.

**Overarching Question**

1. How may explicit civic online reasoning instruction impact high school students’ intuitive and analytical cognitive processes when evaluating online sources?

**Quantitative Question**

2. What percentage of high school students report high confidence in their ability to evaluate the credibility of online sources, and what is the relationship between this confidence level and their civic online reasoning skills?

**Qualitative Questions**

3. What perspectives do students hold regarding how a semester-long media literacy course impacted their intuitive and analytical cognitive processes when evaluating online sources?

4. How may heuristics, cognitive biases, and confidence in civic online reasoning abilities impact students’ intuitive and analytical cognitive processes?

**Mixed Methods Research Question**

5. How does exploring students’ intuitive and analytical cognitive processes while evaluating online sources contribute to understanding their civic online reasoning skills?

**Significance of Methods**

I utilized a case study-explanatory sequential mixed methods research design to conduct my study, collecting quantitative data and then explaining the quantitative results with in-depth qualitative data. As the study focused specifically on a bounded system consisting of a single, semester-long high school media literacy course, I employed an intrinsic case study research
design to deeply explore students’ perspectives and experiences in taking this course (Creswell & Guetterman, 2018; Merriam & Tisdell, 2016; Stake, 1995). Creswell and Plano Clark (2017) argued that a fuller and more complete understanding of a complex research problem often necessitates the collection and analysis of both quantitative and qualitative forms of data. As researchers highlight the complexity of understanding the cognitive processes that individuals utilize while evaluating online sources (Artmann, Scheibenzuber, & Nistor, 2023; Ku et al., 2019; Nygren & Guath, 2022; Verma et al., 2023), collecting both quantitative and qualitative data assisted in addressing the research questions more comprehensively. Furthermore, the reviewed literature revealed that while a significant majority of the research related to civic online reasoning utilized a quantitative or experimental design (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), the research field lacks the amplification of students’ perceptions on such initiatives (De Leyn et al., 2022). Therefore, using an explanatory sequential mixed methods research design allowed me to integrate previously validated quantitative methods (SHEG, 2016) while creating space to explore student perspectives on such initiatives through qualitative interviews and student artifacts to fill this research gap.

Quantitative data consisted of an online questionnaire and civic online reasoning performance tasks. The collection of this quantitative data assisted in understanding what factors may contribute to students’ abilities to evaluate online sources and provide insights into how they perceive their civic online reasoning skills. After completing this questionnaire, student participants were invited to respond to open-ended performance tasks to assess their civic online reasoning skills. After collecting and analyzing the quantitative data, I invited student participants who completed the quantitative section of the study to participate in semi-structured individual interviews. Conducting qualitative, semi-structured interviews following the
quantitative data collection helped explain the initial results in greater depth (Creswell & Plano Clark, 2017). Because interviews can help focus on understanding students’ thought processes (Jacobsen et al., 2018), interviewing students helped me to explore the cognitive processes they engage with while critically evaluating online information. For instance, Powers (2019) found that when asked to explain their thought processes while evaluating online news, many students lacked a conscious awareness or understanding of evaluation strategies that may impact what sources they deemed credible (p. 35). Because Powers (2019) argued that evaluating the credibility of online sources requires activating higher-ordered critical thinking skills, conducting interviews with students offered valuable insights into understanding the complex cognitive processes they engage with as they evaluate online information.

Finally, I collected student artifacts from their media literacy course, including student responses to discussion posts, assignments, and projects. Because previous research suggests that lessons related to civic online reasoning positively impact student performance on civic online reasoning assessments (Wineburg, 2022), analyzing what interventions students received in this course and how students responded to these interventions helped triangulate the data. To establish how students cognitively engage with sources after several months away from their media literacy course, I also qualitatively analyzed students’ responses to the civic online reasoning performance tasks. Because researchers can use personal documents as a good source of data concerning a person’s attitudes, beliefs, and view of the world (Merriam & Tisdell, 2016, p. 166), qualitatively analyzing these artifacts helped to understand better how students perceive their intuitive and analytical thinking as they learn and apply civic online reasoning skills. Due to the small target population and sample size, as well as my desire to more deeply explore students’ perspectives on their cognitive processes, I used a case-selection variant, placing
priority on the second qualitative phase of the study (quan → QUAL) (Creswell & Plano Clark, 2017, pp. 82-83).

**Significance of Study**

Researchers have noted that the field lacks a comprehensive understanding of the cognitive processes involved when evaluating the credibility of online sources (Artmann, Scheibenzuber, Fendt, & Nistor, 2023; Ku et al., 2019). This study seeks to address this gap and contribute to the growing body of research in the field. While the majority of reviewed studies on civic online reasoning utilized a quantitative, experimental research design (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), this study employed a case study-mixed method research approach to gain a more comprehensive understanding of the impact of a media literacy course on students’ abilities to evaluate online information. Furthermore, by exploring students’ cognitive processes in how they perceive and apply their civic online reasoning skills, this study may help students gain a greater awareness of their cognitive processes, thus allowing them to navigate the digital landscape and foster a deeper understanding of the online information they encounter (Powers, 2019). Powers (2019) also argued that researchers must better understand students’ cognitive processing to design successful educational interventions. Therefore, a deeper understanding of students’ cognitive processes through a case study approach may assist educators in designing more effective civic online reasoning interventions that empower students to become more critical consumers of online content.

**Definition of Terms**

*Analytical thinking:* A cognitive process that allows reflective reasoning and adheres to the standards of critical thinking; more complex and demanding of cognitive resources associated with System 2, or slow thinking (Kahneman, 2011; Ku et al., 2019).
Bias: Burkholder and Philips (2022) supported the need for an operational definition of bias to avoid oversimplifying bias in terms of badness and goodness. Therefore, this study broadly defines bias as “a kind of learning, or an inclination, or a predisposition” (Burkholder & Philips, 2022, as cited in Blair, 2012, p. 31).

Civic online reasoning: A curricular approach within the broader field of media literacy designed to help students effectively search for, evaluate, and verify online sources, especially related to social and political information; focuses on three key questions: Who is behind the information? What is the evidence? What do other sources say? (McGrew et al., 2018; Wineburg et al., 2022).

Click restraint: Rather than immediately clicking on the first results that come up when researching online information via Google, as the first results do not always indicate a high level of credibility, examine each URL, consider the source of information, and scan it before clicking on a link (Baer & Kipnis, 2023; Wineburg & McGrew, 2019).

Cognitive bias: Biases that may interfere with cognitive ability and critical thinking, making it hard to evaluate sources objectively (Burkholder & Philips, 2022; Tandoc et al., 2021).

Cognitive processes: Defined according to dual process theory, human cognition processes information by autonomous, intuitive thinking, System 1, and deliberative, analytic thinking, System 2 (Kahneman, 2011; Pennycook & Rand, 2019).

Confirmation bias: An example of cognitive bias is where individuals tend to remember, interpret, and support information that confirms their pre-existing beliefs (Tandoc et al., 2021; Verma et al., 2023).

Credibility: The believability and trustworthiness of a source are based on three questions to determine if the source is providing accurate information: Who is behind the information?
What is the evidence? What do other sources say? (McGrew et al., 2018; McGrew & Byrne, 2021).

*Critical ignoring:* The ability to choose what information to ignore, resist low-quality and misleading information, and decide where to invest one’s limited cognitive and attentional capacities (Kozyreva et al., 2022).

*Critical thinking:* Purposeful, reasoned, and goal-oriented thinking that is also conscious and effortful (Kozyreva et al., 2022).

*Disinformation:* Information that is false, inaccurate, or misleading created with a deliberate intention to mislead people (Axelsson et al., 2021; Pennycook & Rand, 2021).

*Echo chambers:* When internet users are surrounded by like-minded people or sources with similar viewpoints on their online platforms, reinforcing and amplifying their beliefs and ideologies (Ku et al., 2019; Verma et al., 2023).

*Fake news:* False or misleading news that resembles legitimate news content but is fabricated or extremely inaccurate (Pennycook & Rand; Verma et al., 2023).

*Filter bubbles:* Algorithms that personalize internet users’ online content and can lead to echo chambers (Verma et al., 2023).

*Heuristics:* Mental shortcuts (Kahneman, 2011; Pennycook & Rand, 2021). In this study, heuristics specifically refer to mental shortcuts that individuals may utilize to evaluate an online source’s credibility, which may work some of the time but can also lead to misleading conclusions. For example, heuristics may include judging online content by its appearance, URL, or content (McGrew, 2021).
Information overload: When individuals receive an excessive amount of information in a relatively short period of time, leading to difficulties in processing information (Heiss et al., 2023).

Intuitive thinking: A cognitive process that operates automatically, is influenced by heuristics, and makes fast judgments and decisions by relying on prior knowledge and beliefs; the dominant, default mode of thinking associated with System 1, or fast thinking (Kahneman, 2011; Ku et al., 2019).

Lateral reading: Leaving a website and opening up new tabs to learn more about the site and its claims based on what other sources on the internet say about it (Wineburg & McGrew, 2019).

Media literacy: The ability to access, analyze, evaluate, create, and act using all forms of communication (National Association for Media Literacy Education [NAMLE], 2023).

Misinformation: Information that is false, inaccurate, or misleading but not necessarily created or spread deliberately to mislead (Axelsson et al., 2021; Pennycook & Rand, 2021).

Motivated reasoning: When an individual is motivated by their confirmation biases to actively and analytically seek out information that is consistent with their own beliefs and ideologies; individuals judge contrary information with greater scrutiny and are also less likely to accept information that is inconsistent with their beliefs and ideologies (Kahne & Bowyer, 2017; Pennycook & Rand, 2019).

Summary

Despite the significant amount of time young people spend online (Vogels et al., 2022), studies show that students struggle to navigate online information (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018). In response to these challenges, educational researchers have
called for the greater implementation of civic online reasoning skills. Although many studies on civic online reasoning provide a quantitative, experimental approach to measure the effectiveness of interventions (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), the field needs greater research to more deeply explore students’ cognitive processes when evaluating online sources (Artmann, Scheibenzuber, Fendt, & Nistor, 2023; Ku et al., 2019). Because researchers themselves must have a better understanding of students’ cognitive processes to design successful educational interventions (Powers, 2019), gaining a deeper understanding of students’ cognitive processes may assist educators in designing more effective civic online reasoning interventions that empower students to become more critical consumers of online content. Therefore, I employed a case study-mixed methods approach to explore how students intuitively and analytically process online information after instruction in civic online reasoning skills. In Chapter 2, I reviewed the literature to contextualize the research problem and explained how I framed my research around a theoretical framework that intertwined a civic online reasoning framework and dual process theory.
CHAPTER 2

Chapter 2 reviews the literature and contextualizes civic online reasoning within the larger field of media literacy. I first discuss the prevalent use of the internet and social media amongst young people and explain what challenges this presents in evaluating the credibility of online content. While some states have called for adopting media literacy initiatives to address these challenges, these initiatives remain the exception rather than the norm across education (DiGiacomo et al., 2023). Furthermore, implementing these initiatives can prove challenging for educators as media literacy education encompasses a wide array of potential definitions, topics, and assessment strategies (Bulger & Davis, 2018; DiGiacomo et al., 2023; Huguet et al., 2021; Schilder et al., 2016). To address these challenges, I concentrate on the civic online reasoning framework as a targeted approach to media literacy education and provide an overview of recent research and initiatives that show promise in helping students improve their abilities to evaluate online information.

Despite the promising results of these initiatives, leading researchers in civic online reasoning advocate for further investigation to enhance support for students in learning and applying these skills (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022). Designing effective educational interventions can prove difficult unless researchers know more about students’ cognitive processing (Powers, 2019). Therefore, I integrated dual process theory into my theoretical framework, allowing for a more comprehensive understanding of students’ intuitive and analytical thinking processes when engaging with online sources. Through this approach, I aim to contribute to civic online reasoning by better understanding students’ cognitive processes while engaging with online information after completing a media literacy course.
Challenges of the Digital Landscape

With the sustainability of democracies relying on an informed citizenry (Mason et al., 2018), the proliferation of the internet has dramatically expanded the availability of information and provided citizens with a wealth of sources to inform their decisions. While the democratization of the internet has provided an easily accessible platform that can empower marginalized voices (Ziv & Bene, 2022) and contribute to civic engagement (Knowles et al., 2023), the nature of the internet has also made it easier to spread misleading information. Although individuals can now easily access a seemingly endless amount of digital information, much comes from unvetted sources lacking credibility (Kozyreva et al., 2022). Hodgin (2019) explained how, in the past, information that the media presented had to pass through institutional gatekeepers, experts, and formal organizations before circulating to the public. Now, with the internet, people can self-publish information without passing through these same gatekeepers, thus allowing for the increased creation and spread of unverified information (Hodgin, 2019).

Furthermore, because social media sites largely depend on advertisements to generate revenue (Gallo & Cho, 2021), their systematic reward structures incentivize users to share news that engages and attracts others, regardless of the truthfulness or falsity of the information shared (Ceylan et al., 2023). Because people develop these habits repeatedly using social media, Ceylan et al. (2023) suggested that online platforms should restructure their reward systems to promote accurate information instead of popular, attention-getting material (p. 6). However, Brown (2021) argued that social media companies would unlikely enact measures that may significantly hurt their business model due to their reliance on content promotion for advertising revenues. Although some social media companies have acted to limit the spread of misinformation on their
platforms, Brown (2021) further argued that these measures remain inadequate, prompting calls for greater regulation of these sites.

However, regulating the spread of online misinformation through governmental laws and policies remains highly controversial due to the potential restrictions this may place on freedom of speech and freedom of expression (Brown, 2021). Brown (2021) further highlighted uncertainty regarding the effectiveness of such restrictions and whether these measures would actually reduce the amount of misinformation circulated through social media. Therefore, Brown (2021) considered individual self-regulation the least costly option regarding financial resources and liberties, placing a great deal of responsibility on individuals to evaluate the credibility of online information. With an increasing number of young people continuing to rely heavily on the internet and social media as their main source of news and information (Vogels et al., 2022), education must prioritize teaching students how to evaluate the credibility of online sources effectively (Ziv & Bene, 2022). To thrive as informed members of a democratic society, students must learn how to navigate the digital landscape and efficiently sort through the vast amount of information that floods their screens (Wineburg et al., 2020). While many scholars have necessitated the teaching of media literacy skills to help students better navigate the digital landscape (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018), studies indicate that many students struggle to evaluate the credibility of online information (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018).

The Struggle for Students to Evaluate the Credibility of Online Information

Despite the significant amount of time that young people spend online and the reliance on social media platforms as a source of information (Vogels et al., 2022), extensive research shows that young people struggle to identify the credibility of online information (Breakstone et al.,
For example, McGrew et al. (2018) developed a bank of performance tasks to measure the core competencies of civic online reasoning. After prototyping and conducting logical analyses of the tasks, engaging in multiple rounds of pilot testing and revision, and conducting think-aloud interviews with the students, McGrew et al. (2018) then used a rubric to evaluate 15 performance tasks and analyze 2,616 student responses. McGrew et al. (2018) found striking consistencies across middle school through college level students’ performance on these tasks. According to this study, most students struggled with identifying sponsored posts, evaluating evidence, weighing the strengths and weaknesses of evidence presented, and reading sources laterally (McGrew et al., 2018). Building on this research, Breakstone et al. (2021) conducted a quantitative study of nearly 3,500 high school students that utilized a multivariate regression to explore the relationship between students’ characteristics and their performance on the assessments. Their study similarly revealed that most participants could not successfully analyze and verify the reliability of online advertisements, news, and social media sites (Breakstone et al., 2021). While teenagers may feel comfortable in the digital world (Farmer, 2019), these studies support the idea that they actually lack the evaluation skills to analyze the quality of sources.

Because maintaining the stability and legitimacy of a democracy relies on well-informed citizens (Mason et al., 2018; Wineburg et al., 2020), education must play a more vital role in helping young people develop the skills needed to decipher credible and noncredible sources that may inform their decisions (Kahne & Bowyer, 2017). To respond to this need, media literacy advocates have called for the integration and teaching of critical skills needed to evaluate online information across educational institutions to prepare students to navigate the digital landscape (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018).
The Importance of Media Literacy Education

With a significant number of individuals turning to social media for their news (Bulger & Davis, 2018; Middaugh, 2019), Middaugh (2019) asserted that arguing over whether or not the internet and social media negatively impact democracy serves little purpose as the individuals who rely on these platforms will likely continue to do so. Instead, education must emphasize equipping students with media literacy skills to help them become informed and effective democratic citizens (Middaugh, 2019). The National Association of Media Literacy Educators, or NAMLE (2023), defines media literacy as the ability for people to “access, analyze, evaluate, create, and act using all forms of communication” and promotes the need for media literacy to become an essential, highly valued, and widely practiced skill across education (para. 2). With the increased likelihood of disinformation and misinformation spreading over the internet and social media, especially during highly politicized and volatile circumstances as seen in the 2016 and 2020 presidential elections, educators must try to equip students with media literacy skills to navigate the digital landscape (Pearcy, 2021). However, Bulger and Davison (2018) advise that educators cannot treat media literacy as a panacea. As the media literacy umbrella has grown, defining, implementing, and assessing objectives in media literacy remains challenging for educators (Bulger & Davison, 2018). As more educational institutions adopt media literacy policies, addressing the challenges associated with these initiatives may help educators develop a more comprehensive way forward in teaching media literacy skills.

Media Literacy Initiatives in Education

With the increased amount of time that youth spend online and on social media (DiGiacomo et al., 2023), the American Psychological Association (APA) has recently recommended that adolescents take part in media literacy training to help them develop
psychologically-informed competencies that allow them to navigate social media more effectively (APA, 2023, p. 8). According to Media Literacy Now (2023), 17 states have implemented legislation related to media literacy education in public schools across the United States. In 2021, Illinois became the first state to require media literacy courses at every high school (Medlin, 2021). Furthermore, in 2022, New Jersey and Delaware became the first states to mandate media literacy education across K-12 public schools (Media Literacy Now, 2023). Although more states have begun to pass legislation integrating media literacy more purposefully across education (Media Literacy Now, 2023), media literacy education remains the exception rather than the expectation across schools in the United States (DiGiacomo et al., 2023). Due to the breadth of media literacy education, challenges in defining, implementing, and assessing media literacy remain and may hinder attempts for educators to move forward with such initiatives.

*Challenges in Defining Media Literacy Initiatives in Education*

DiGiacomo et al. (2023) argued that there remains a lack of consensus surrounding the appropriate terms and dimensions that best define media literacy. Huguet et al. (2021) noted that the all-encompassing definition of media literacy may present challenges to educators due to the myriad of ways they may interpret what media literacy education entails (p. 1). Similarly, RobbGrieco (2014) agreed and argued that although there may be great value in approaching media literacy across diverse strands of practice, such diversity can become a barrier to communication and growth in the field. As the call for media literacy education has increased along with the significant development and expansion of media literacy over the past 20 years (Hobbs et al., 2022), such variations in defining media literacy may hinder attempts to implement coherent media literacy instruction (DiGiacomo et al., 2023).
Furthermore, DiGiacomo et al. (2023) found that most states did not define guiding terms in their media literacy policies. For example, while many states used the terms *digital citizenship* and *media literacy* as synonymous, the policies do not define either. DiGiacomo et al. (2023) argued that this lack of clarity in defining media literacy may leave too much open to interpretation and lead to unfocused and unclear outcomes. Bulger and Davis (2018) further point out that media literacy initiatives may address a wide range of issues, including (a) misinformation, (b) copyright, (c) plagiarism, (d) information credibility, and (e) bullying. Such diversity in educational objectives may lead to incoherent expectations of outcomes and difficulty in making decisions regarding how to implement and measure these different initiatives (Bulger & Davis, 2018).

**Challenges in Implementing Media Literacy Initiatives in Education**

Since going into effect during the 2022-2023 school year, Illinois’s media literacy law has required that high schools include a unit on media literacy but did not specify what a unit should entail. While designed in this way to allow teachers more autonomy and opportunity to integrate media literacy into their current curriculum, Cooper (2022) argued that this may lead to complications for teachers as they have a limited number of resources to work with due to the lack of funding and oversight. DiGiacomo et al. (2023) agreed and found that the lack of financial resources allocated to promote media literacy education seems commonplace, as only five media literacy bills out of 22 mentioned funding. Furthermore, although DiGiacomo et al. (2023) also found mentions of resources across several media literacy bills, these resources lacked specificity, making them incomprehensive. Accumulating resources to implement media literacy education with limited support may prove challenging for educators.
In addition to the lack of instructional resources, teachers cited a lack of guidance on how to navigate programs or integrate media literacy within their classes as a major obstacle (Baker et al., 2021). Huguet et al. (2021) argued that clearly specified standards should guide what skills and knowledge educators should prioritize in teaching their students. Although several media literacy-relevant standards exist originating from areas such as (a) information literacy, (b) news literacy, (c) digital literacy, and (d) 21st Century Skills, the volume of possibly relevant standards may create confusion for educators in determining the most important media literacy competencies to address (Huguet et al., 2021). Furthermore, many educational standards have not been revised in several years and do not accurately reflect the critical skills students need to navigate today’s digital information age (Trust et al., 2022). For example, while Trust et al. (2022) noted that the International Society for Technology in Education (ISTE) Standards include a digital citizenship component, the standards focus on “the rights and responsibilities of participating in a digital world” but lack standards regarding the “ability to critically investigate the media” (pp. 172-173). Furthermore, Trust et al. (2022) also noted that the 2017 National Education Technology Plan does not even include the term media literacy. Therefore, Trust et al. (2022) urged policymakers to revise and update standards that offer educators clearer guidelines on how to more effectively and purposefully incorporate media literacy skills into their classes. Without clear definitions or guidelines for implementing media literacy education, effectively assessing media literacy skills may also prove challenging for educators (Schilder et al., 2016).

**Challenges in Assessing Media Literacy Education**

Schilder et al. (2016) argued that the multidimensionality and complexity of media literacy education make it impossible to develop one instrument to assess all aspects of media literacy. Because of this, little consensus exists over the appropriate way to measure media
literacy (Schilder et al. 2016), resulting in the creation and implementation of multiple forms of assessments. Hobbs et al. (2022) found that self-reported, quantitative media literacy measures dominate the scholarly literature, although such scales may not prove reliable instruments for assessing these skills (Mahmood, 2016). For example, Maksl et al. (2017) validated using the News Media Literacy Scale, including a mix of Likert scale items and multiple-choice questions. The Likert scale allowed students to self-report how they cognitively process information and perceive themselves as in control of whether the news media influences them, and the multiple-choice questions in their scale measured students’ knowledge about the institutions that produce the news (Maksl et al., 2017). While researchers have continued to use the News Media Literacy Scale as a base to develop a variety of more specific forms of assessment, Johnson et al. (2021) noted that such scales do not measure the ability to differentiate news from other forms of media or to judge the reliability of news (p. 161).

To address this limitation, Johnson et al. (2021) created and validated two new scales, the Headline Literacy Scale and the Hard News Standards Knowledge Scale, to measure the ability to identify reliable news headlines. Both measures include Likert scale items that ask people to what extent they agree or disagree with statements about what makes a good headline and what constitutes hard news (Johnson et al., 2021). Although researchers have validated these measures, the quantitative and self-reporting nature of these assessments limits the capacity to measure some of the more critical media literacy competencies (Schilder et al., 2016). Therefore, Schilder et al. (2016) recommended that researchers create and validate assessment instruments that measure higher-order skills fundamental to media literacy that can effectively gauge students’ abilities to analyze and evaluate media messages critically.
Approaching Media Literacy Education through a Civic Online Reasoning Framework

Because media literacy encompasses various definitions, implementations, and assessments, efforts to navigate media literacy education legislation with little preparation or support have proved challenging for educators. While recognizing media literacy education as a larger field of study, I have navigated these challenges by adopting civic online reasoning, a subset of media literacy, as a key part of my theoretical framework to guide my research. Approaching media literacy education through a civic online reasoning theoretical framework may present educators with a more comprehensive way forward in navigating the tensions in defining, implementing, and assessing media literacy skills.

McGrew et al. (2018) defined civic online reasoning as “the ability to effectively search for, evaluate, and verify social and political information online” (p. 166). As studies suggest that young people do not have the skills to evaluate online information (Levy et al., 2023), the Stanford History Education Group (SHEG) began conducting extensive research in 2015 to understand and address this problem better (SHEG, 2016). Through their studies, researchers determined that students relied extensively on checklist approaches and weak heuristics that often failed to help students successfully evaluate the credibility of online sources (Breakstone et al., 2018b; McGrew, 2021; Wineburg et al., 2020). In search of solutions to this problem, researchers turned their attention to studying how professional fact-checkers evaluate online information, finding that they utilize strategies known as lateral reading and click restraint to more efficiently evaluate the credibility of online information (Wineburg & McGrew, 2019). Based on their findings, SHEG developed the civic online reasoning framework as a curricular approach to assisting secondary-level students in developing more effective skills like the ones
utilized by professional fact-checkers to evaluate online content (SHEG, 2019; Wineburg et al., 2019).

Challenging Traditional Checklist Approaches

Although prominent media literacy organizations offer checklist approaches to assist students with evaluating the credibility of online sources, relying on these checklists can prove time-consuming and ineffective (Breakstone et al., 2018b). For example, the origins of the popular checklist approach, the CRAAP test, an acronym standing for Currency, Relevance, Authority, Accuracy, and Purpose, was initially designed as a tool to help librarians select printed library materials in 1978 (Ziv & Bene, 2022, p. 906). Wineburg et al. (2020) argued that individuals cannot effectively apply this same antiquated checklist approach when evaluating an infinite number of sources on the open internet. In addition to the obsolete nature of checklist approaches, they often include between 10 and 30 questions, making them lengthy and impractical for regular use. While the specific types and number of questions may vary, most versions of the CRAAP test direct students to study (a) a website’s domain, (b) the About page, (c) the authority of its links, (d) the presence or absence of banner ads, (e) the inclusion of contact information, and (f) its currency (Wineburg et al., 2020). Checklist approaches require students to spend considerable time and effort closely analyzing a single source to verify its credibility (Breakstone et al., 2018b; Ziv & Bene, 2022). While this approach may have once served librarians well when choosing from a finite number of printed materials to stock their shelves, scholars have argued about the ineffective and potentially misleading nature of employing the same strategies on the open internet (Breakstone et al., 2018b; Wineburg et al. 2020).
Despite pointing out the ineffective and misleading nature of checklist methods, Breakstone et al. (2018b) and Wineburg et al. (2020) found that many students have internalized a set of checklist-like criteria, leading them to utilize weak strategies to determine a source’s credibility. For example, after surveying 263 college-level students tasked with evaluating the trustworthiness of an online source, Wineburg et al. (2020) found that many students were deceived by domains, immediately assigning reliability to websites with .org. Despite many college and university guidelines equating .orgs with nonprofit organizations, Wineburg et al. (2020) considered this a catch-all category that does not fit neatly into other domains such as .edu, .gov., or .mil (p. 9). As anyone can buy a .org domain without a vetting process, Wineburg et al. (2020) warned that such ingrained beliefs about .org are not just wrong but could also be dangerous. Furthermore, Breakstone et al. (2018b) conducted an examination of the website minimumwage.com to determine its credibility. If employing the CRAAP checklist approach to analyze the website closely, individuals may deem minimumwage.com credible as it easily passes the test. However, leaving the website to learn more about who created minimumwage.com revealed information not readily available directly on the website, which may lead individuals to question its credibility. Due to checklists’ ineffective and misleading nature, civic online reasoning researchers argued that individuals must learn a new set of strategies utilized by professional fact-checkers to more effectively and efficiently evaluate online sources (Breakstone et al., 2018b; Wineburg et al., 2020).

**Using Civic Online Reasoning Skills: Lateral Reading and Click Restraint**

To understand how experienced internet users judge the credibility of online sources, Wineburg and McGrew (2019) employed a think-aloud methodology to compare strategies utilized by 45 total participants who included 10 Ph.D. historians, 10 professional fact-checkers,
and 25 Stanford University undergraduate students. Wineburg and McGrew (2019) found that fact-checkers learned more about the credibility of sources more quickly than historians and undergraduate college students by utilizing strategies such as lateral reading and click restraint. Wineburg and McGrew (2019) explained that lateral reading meant that fact-checkers left a website and opened up new tabs to learn more about the site and its claims based on what other sources on the internet say about it. Interestingly, the study also found that while reading laterally, fact-checkers tended to initially rely on Wikipedia as a starting point to determine a source’s credibility (Wineburg & McGrew, 2019). However, many educators tell their students not to use Wikipedia because of its susceptibility to mistakes and easily editable nature (Digital Inquiry Group [DIG], 2020). Despite this, researchers pointed out that the ability to edit Wikipedia kept it more current and up-to-date compared to print encyclopedias and only high-level Wikipedians can make changes to the most viewed entries (DIG, 2020). Rather than avoiding the use of Wikipedia, researchers support that educators should teach students how to use it wisely as professional fact-checkers do (DIG, 2020; McGrew & Byrne, 2020).

Furthermore, fact-checkers also utilized click restraint, meaning that they did not immediately click on the first results that came up when researching online information via Google, as the first results do not always indicate a high level of credibility (Baer & Kipnis, 2023; Wineburg & McGrew, 2019). Instead, they examined each URL, considered the source of information, and scanned it before clicking on a link. Baer and Kipnis (2023) further explained that practicing click restraint can help internet users get a fuller picture of the coverage available on a source before venturing down too many rabbit holes and can, therefore, help internet users make better choices about selecting appropriate sources (p. 279). When evaluating online information, internet users must utilize the same strategies as fact-checkers and can begin by
asking themselves three fundamental questions: (a) Who is behind the information? (b) What is the evidence? and (c) What do other sources say? (McGrew et al., 2018). To encourage educational institutions to integrate the same strategies used by professional fact-checkers, SHEG (2019) created and validated a civic online reasoning curriculum that includes lessons, videos, and assessments to help students develop these skills. It should be noted that SHEG (2019) has recently transitioned to the Digital Inquiry Group (DIG) in 2024. Despite this transition, DIG still offers the same civic online reasoning resources for free to educators (DIG, 2024).

Validating Civic Online Reasoning Assessments

Based on the strategies utilized by professional fact-checkers, SHEG (2016) originally developed and validated a bank of 15 performance tasks to evaluate students’ civic online reasoning skills. They conducted extensive piloting, revising, and field testing by administering and scoring 56 tasks to students across 12 states and collecting and analyzing 7,804 student responses to ensure the validity of these performance tasks and accompanying rubrics (SHEG, 2016, p. 3). Since then, SHEG (2019) has provided even more assessment tools for educators to utilize for free that integrate relevant and timely political and social topics. For example, topics include topics such as (a) gun control, (b) social media, (c) climate change, (d) COVID-19, (e) college tuition, and (f) the death penalty (SHEG, 2019). Each assessment aligns with one of the key questions of civic online reasoning: (a) Who is behind the information? (b) What is the evidence? and (c) What do other sources say? (McGrew et al., 2018). Researchers have designed all assessments as short-performance tasks that can serve as formative assessments for teachers. As one example, the following assessment evaluates students’ abilities to verify the reliability of a website:
You are researching children's health and come across this website:

http://www.acpeds.org/. Please decide if this website is a trustworthy source of information on children's health. You can open a new tab and do an internet search if you want. Take about 5 minutes to complete this task.

1. Is this website a trustworthy source to learn about children's health?

2. Explain your answer, citing evidence from the web pages you used. Be sure to provide the URLs to the web pages you cite (SHEG, 2019, Website Reliability Assessment section).

To assist teachers in evaluating students’ responses, SHEG (2019) provides detailed rubrics and grading guidelines for all of their assessments, including the prompt above, to help educators determine if their students respond at a beginning, emerging, or mastery level. Recent studies show promising results that utilizing these resources with high school students can help them develop their civic online reasoning skills (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022).

**Civic Online Reasoning Interventions**

Leading researchers in civic online reasoning have consistently utilized experimental, quantitative-driven studies to test the validity of civic online reasoning interventions with high school students (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022). For example, after conducting civic online reasoning pre- and posttests with 420 high school students who participated in six lessons, McGrew and Byrne (2021) found that many students progressed in their lateral reading skills and abilities to investigate online sources. Similarly, McGrew (2020) compared pre- and post-tests of 68 high schoolers who participated in eight lessons devoted to teaching students civic online reasoning skills. McGrew (2020) found that students’ scores
improved significantly on three of the four tasks they completed. Wineburg et al. (2022) conducted a similar study that compared the pre- and post-tests of 271 high school students in treatment classrooms to 228 students who did not receive civic online reasoning interventions. The results of this study indicated that students in the experimental classroom grew significantly in their ability to judge the credibility of online content.

While research shows promising results that even a small amount of interventions in civic online reasoning can improve students’ abilities to evaluate online information critically, the findings still suggest that students need more support to successfully carry out evaluation strategies (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022). For example, McGrew (2020) noted that most students still could not successfully show evidence of reading laterally. Similarly, McGrew and Byrne (2021) also found that students struggled with lateral reading, and more than half of students either showed no or less evidence of change from the pre- to post-test. Furthermore, Wineburg et al. (2022) found that although students in the treatment classes almost doubled their scores from pre- to post-test, many still earned less than half of the possible points on the assessment.

In response to these results, McGrew and Byrne (2021) recommended integrating civic online reasoning instruction across the curriculum, as restricting the instruction of these skills to a single course or workshop may not sufficiently prepare students to become skilled consumers of digital content (Breakstone et al., 2021, p. 512). McGrew and Breakstone (2023) examined how ninth-grade biology and geography teachers taught civic online reasoning skills embedded within their curriculum to study how teachers could incorporate civic online reasoning across the curriculum. After collecting and analyzing 574 pre- and post-tests, the findings indicated a statistical significance in students’ ability to evaluate the credibility of online information.
However, McGrew and Breakstone (2023) noted that the COVID-19 pandemic affected how diligently all teachers integrated civic online reasoning interventions. Therefore, the study could not provide evidence regarding the effects of a genuinely cross-curricular intervention on students learning civic online reasoning skills (McGrew & Breakstone, 2023). Still, the study supported previous research that civic online reasoning interventions can impact students’ abilities to evaluate the credibility of online information (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022).

Despite the potential implications of these studies, the field still lacks research that more closely examines students’ analytical and intuitive thinking processes after receiving civic online reasoning interventions. While earlier studies utilized think-aloud methodologies to validate civic online reasoning assessments cognitively (McGrew et al., 2018; Wineburg et al., 2016), the field lacks studies that explore students’ cognitive processes following civic online reasoning interventions. Because designing effective educational interventions can prove difficult unless researchers know more about cognitive processing (Powers, 2019), a closer examination of this phenomenon may provide insight that can further contribute to civic online reasoning initiatives. To examine how students intuitively and analytically process online information more closely, I have intertwined a civic online reasoning framework with dual process theory as my theoretical framework.

**Using a Dual Process Theoretical Framework to Understand Civic Online Reasoning**

According to Kahneman (2011), dual process theory supports the idea that fast and slow thinking characterizes cognitive processes. System 1, fast thinking, operates automatically and intuitively, working with little or no effort, while System 2, slow thinking, operates analytically, requiring more effort and mental work as it monitors System 1. Kahneman (2011) noted that
heuristics and cognitive biases influence both systems and can impact decision-making. System 1 generates impressions and feelings, and when endorsed by System 2, these can become beliefs and attitudes biased to believe and confirm System 1 (Kahneman, 2011, p. 106). Kahneman (2011) explained that while System 2 has the capability of reasoning, it often still seeks information that remains consistent with existing beliefs (p. 103). Because of this, Evans (2018) argued that cognitive biases impact how Systems 1 and 2 operate in information processing and decision-making.

Kahneman (2011) further explained that System 1 largely relies on heuristics, or mental shortcuts, to process information cognitively. Because of the autonomous processing of heuristics, Stanovich (2010) argued that one of the most critical roles of System 2 is to override System 1 when making important decisions. However, although System 2 has the capability to reason, it also resorts to laziness (Kahneman, 2011). Because System 2 often takes the path of least effort, it may endorse a mental shortcut that System 1 employs without much scrutiny, regardless of the accuracy or appropriateness of the heuristic utilized for a task (Kahneman, 2011, p. 99).

Furthermore, Kahneman (2011) argued that while recognizing the shortcomings of heuristics and cognitive biases takes considerable effort, the demand for effort diminishes the more skilled one becomes in a task, resulting in greater cognitive ease. As individuals become more skilled or experienced in a task, their mental processes become more automatic and require less effort. If individuals find a task or skill easier to complete due to familiarity or expertise, they may feel more confident. This confidence can impact how System 1 processes information, potentially leading to quicker and more intuitive responses (Kahneman, 2011). However, Kahneman (2011) also noted that gaining expertise in complex tasks is a slow and intricate
process that takes a long time to develop and warns against considering high subjective confidence as an indicator of accuracy. Because cognitive biases or errors may still influence individuals’ confidence in their judgments (Kahneman, 2011), feelings of confidence have little relationship with accuracy (Evans, 2018; Shynkaritk & Thompson, 2006). By integrating a civic online reasoning framework with dual process theory, I sought to understand how cognitive biases, heuristics, and confidence influence students’ intuitive and analytical thinking processes and their abilities to evaluate online information after receiving civic online reasoning instruction.

**Intuitive Thinking**

System 1 operates intuitively and can rely on heuristics, cognitive biases, and overconfidence to process online information more quickly and efficiently (Kahneman, 2011). Scholars argue that the reliance on heuristics and biases may result in less accurate discernment of the credibility of online information (Artmann, Scheibenzuber, & Nistor, 2023). Furthermore, research indicates that individuals tend to overestimate their confidence in their abilities to determine the credibility of online information (Mahmood, 2016; Veeriah, 2021). As the reviewed literature indicates that these factors influence how individuals intuitively process online information, I have examined their role in impacting students’ intuitive thinking as they evaluate online sources after completing a media literacy course.

**Heuristics.** As previously discussed, many students seem to have internalized the traditional checklist approach when evaluating online sources, leading them to utilize ineffective and weak heuristics (Breakstone et al., 2018b; Wineburg et al., 2020). For example, to understand what weak heuristics surfaced in high school classes when evaluating online information, McGrew (2021) collected data through video recordings of six teachers who each
taught civic online reasoning lessons throughout six class periods. McGrew (2021) specifically found that both high school teachers and students utilized weak heuristics when evaluating online information, largely clustered into five specific categories: (a) relying on a website’s appearance, (b) reports of its self-identified reliability, (c) content, (d) URL, and (e) the degree of engagement with the source (in the case of social media posts) (p. 9). Because these characteristics can easily be changed or manipulated, reliance on these heuristics can lead to misleading or problematic evaluations (Breakstone et al., 2018b; Wineburg et al., 2020). Despite the ineffectiveness of these weak heuristics, many individuals continue to rely on these mental shortcuts to avoid information overload when evaluating online sources (Heiss et al., 2023; Powers, 2019).

Due to the automaticity and intuitive nature of System 1 (Kahneman, 2011), internet users often utilize heuristics to sift through online sources to avoid information overload quickly. When individuals receive an excessive amount of information in a relatively short period of time, information overload can lead to difficulties in processing information. This phenomenon becomes especially challenging during crises, such as the COVID-19 pandemic, when individuals are rapidly exposed to a large amount of new information, making it challenging to discern credible sources (Heiss et al., 2023, p. 5). Reliance on heuristics to avoid information overload may weaken internet users' abilities to think critically and inhibit the activation of higher-order thinking strategies needed to evaluate online information (Powers, 2019). Although some theories speculate that people are more likely to engage with systematic, analytical thinking when they have more at stake, Klawitter and Hargittai (2018) conducted a study that suggested differently. After conducting individual interviews with 76 adult internet users to learn about how they seek health information online, participants still heavily relied on heuristics to
process online information, such as relying on search engine rankings as a means of assessing information credibility (Klawitter & Hargittai, 2018, p. 264). Furthermore, they also found that participants relied on confirmation bias, or previously learned or believed information that confirmed their already-held opinions, to assess the credibility of online health information (Klawitter & Hargittai, 2018, p. 262). To better understand how heuristics can lead to prejudiced or problematic assessments of online information, Metzger et al. (2010) argued that future studies should emphasize how potential cognitive biases, such as confirmation biases, may result from an overreliance on heuristics.

**Cognitive Biases.** Leading researchers in civic online reasoning have consistently highlighted the absence of data on students’ prior knowledge, beliefs, and opinions as limitations to their studies (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022). Because these factors may influence the way individuals process and evaluate information (Nygren & Guath, 2022), researchers recommended that future studies should explore how they may impact students’ civic online reasoning skills (McGrew & Breakstone, 2023; McGrew & Byrne, 2021; Wineburg et al., 2022). Furthermore, these factors inform individuals’ biases (Burkholder & Philips, 2022) and impact how Systems 1 and 2 operate (Kahneman, 2011). Verma et al. (2023) posited cognitive biases, such as confirmation biases, heuristics that individuals use when evaluating online sources. Investigating the influence of students’ cognitive biases on their abilities to apply civic online reasoning skills may assist in further contributing to the field.

Researchers have conducted several studies that link individuals’ cognitive biases to their abilities to discern the credibility of online information (Kahne & Bowyer, 2017; Tandoc et al., 2021; Verma et al., 2023; Zlatkin-Troitschanskaia et al., 2020). Using an experimental research design, Kahne and Bowyer (2017) conducted a nationally representative survey involving 2,101
youths ages 15 to 27 who were tasked with judging the accuracy of an online post. After randomly assigning participants to see one of six posts on either economic inequality or tax policy, Kahne and Bowyer (2017) found that most participants characterized a post as accurate when it aligned with their political views. Similarly, Tandoc et al. (2021) conducted a cross-sectional survey including 1,000 participants and found a relationship between individuals’ political biases and their susceptibility to believing fake news. After measuring factors including participants’ anti-government bias and belief in anti-government fake news, Tandoc et al. (2021) found that participants with anti-government bias were more likely to believe in anti-government fake news. Verma et al. (2023) also conducted a cross-sectional survey involving 500 participants to investigate the relationships between confirmation bias, media literacy, cognitive abilities, and susceptibility to fake news. After analyzing these factors using a two-stage approach, Verma et al. (2023) found individuals with higher confirmation bias tend to be more susceptible to fake news. Finally, Zlatkin-Troitschanskaia et al. (2020) investigated 30 university students who completed a task where they reviewed online information sources and wrote a policy recommendation regarding the construction of new wind turbines. After conducting semi-structured cognitive interviews immediately following the completion of a performance task, Zlatkin-Troitschanskaia et al. (2020) found that students who already held strong beliefs on the topic regarded these beliefs as decisive, and their beliefs influenced what information they selected, evaluated, and cited in their final task. Therefore, Zlatkin-Troitschanskaia et al. (2020) concluded that most participants based their decisions on their biases rather than critical reasoning.

Furthermore, some of these studies also suggested that individuals exposed to media literacy interventions positively impacted their abilities to discern the credibility of online
information (Kahne & Bowyer, 2017; Verma et al., 2023). For example, Kahne and Bowyer (2017) found that participants who reported the most media literacy experiences were more likely to accurately identify an evidenced-based post than a post that included misinformation, suggesting that interventions may help students recognize their biases and evaluate online posts more critically. Verma et al. (2023) also found that people with greater media literacy experiences were less likely to fall for fake news. Furthermore, to understand how students respond to a media literacy intervention focused on confronting confirmation bias, Wittebols (2020) collected 35 student reflection papers from a semester-long university course designed to help students conduct online research. The reflection papers focused on an exercise where students grappled with understanding the role of their own confirmation biases in their online habits. Based on the data collected from the reflection papers, most students felt that the assignment helped them enhance their self-knowledge, catch themselves engaging in confirmation bias, and open up to more diverse views and opinions (Wittebols, 2020, p. 218). Wittebols (2020) concluded that the course helped students navigate digital information with greater confidence and awareness of confirmation bias's role in their online experiences. Based on the findings of these studies, I also explored how media literacy interventions may impact students’ understanding and awareness of their own cognitive biases through my study.

**Confidence.** Because of the potential impact of subjective confidence on individuals’ intuitive thinking (Kahneman, 2011), I have examined how a media literacy course may impact students’ confidence level in their civic online reasoning skills compared to their actual abilities. Notley and Dezuanni (2019) surveyed 1,000 young people ages 8 to 16 to learn more about their news consumption, engagement, and experience. Their findings indicated that many young people did not feel confident distinguishing fake news from real news, and only 20% reported
they had lessons during the past year to help them decipher the trustworthiness and truthfulness of news stories (Notley & Dezuanni, 2019). To address this gap, Tamboer et al. (2023) conducted an exploratory mixed-methods study with 298 youth ages 10 to 12 to learn more about their understanding of fake news before and after a fake news literacy intervention. Participants responded to one open-ended knowledge question about fake news and several questions regarding their awareness of and self-efficacy in detecting fake news. Following the intervention, Tamboer et al. (2023) found that while the intervention increased youth’s fake news self-efficacy, it did not increase their knowledge or awareness of fake news. However, Tamboer et al. (2023) did not measure youth’s actual fake news detection and encouraged the development of effective media literacy interventions that empower youth to identify fake news.

While Tamboer et al. (2023) noted that future research should consider testing whether increased knowledge, awareness, and self-efficacy can help students identify fake news, previous studies have indicated that individuals tend to overestimate their abilities to evaluate the credibility of online information (Mahmood, 2016). Kahneman (2011) argued that System 1 thinking strongly ties into an individual’s feeling of confidence and cannot be considered an indicator of accuracy. Mahmood (2016) reviewed 53 studies that assessed and compared individuals’ self-reported information skills and their actual knowledge or skills. They found that 64% of the studies clearly showed that individuals overestimated their self-reported information literacy skills compared to their actual skills. Only four studies showed a positive correlation between their perceived and actual skills (Mahmood, 2016, pp. 204-205). However, it remains unclear from Mahmood’s (2016) findings whether individuals across the studies had exposure to information literacy training or education. Therefore, this research addresses this limitation by
studying the impact of a media literacy course on students’ perceived and actual civic online reasoning skills.

**Analytical Thinking**

As System 2 operates more analytically and deliberately, scholars support that analytical thinking may allow individuals to more easily discern the credibility of online information (Artmann, Scheibenzuber, & Nistor, 2023). Pennycook and Rand (2018) argued that lazy thinking, rather than biased thinking, may better explain people’s abilities to evaluate online information. After presenting a series of fake and real politically-aligned or neutral headlines formatted as Facebook posts to 3,446 participants, Pennycook and Rand (2018) found that analytical thinking rather than biased thinking played a greater role in participants’ abilities to discern fake news from real news, regardless of one’s political ideology. Their findings indicated that “people fall for fake news because they *fail* to think, not because they think in a motivated or identity-protective way” (Pennycook & Rand, 2018, p. 48). Furthermore, Bago et al. (2020) surveyed 1,635 participants to determine what role deliberation plays in assessing the truth of news. Their findings indicated that people made fewer mistakes in judging the accuracy of headlines after deliberation, supporting the idea that interventions that promote deliberation may effectively help people discern the credibility of online sources (Bago et al., 2020). As becoming media literate requires activating higher-order thinking strategies (Powers, 2019, p. 7), researchers call for the need to more closely examine the relationship between critical thinking and evaluating online information (Artmann, Scheibenzuber, Fendt, and Nistor, 2023; Ku et al., 2019).

Due to the challenges of understanding the complex nature of cognitive processes, current studies do not necessarily capture students’ actual process of critical thinking when
engaging with online sources (Artmann, Scheibenzuber, Fendt, and Nistor, 2023; Ku et al., 2019). However, some research does suggest a relationship between analytical thinking and students’ abilities to discern the credibility of online information (Artmann, Scheibenzuber, & Nistor, 2023; Artmann, Scheibenzuber, Fendt, and Nistor, 2023). To evaluate 36 elementary students’ cognitive processes as they participated in a pilot online news literacy training program, Artmann, Scheibenzuber, and Nistor (2023) conducted a quantitative study that included basic descriptive measures, a causal comparison, and quantitative content analysis. They found that students shifted from intuitive to analytic thinking and significantly grew their news literacy performance. Furthermore, Artmann, Scheibenzuber, Fendt, and Nistor (2023) conducted a 3x2 factorial experiment involving 179 university students to compare how an intervention in lateral reading may impact students’ cognitive processing. The students were divided into three groups: (a) a control group that received no training, (b) a written instruction group that learned about lateral reading from reading instructions, and (c) a training group that received instruction from a trainer. After analyzing pre-tests and post-tests across groups, Artmann, Scheibenzuber, Fendt, and Nistor (2023) found that students who received lateral reading training showed the highest instances of analytical thinking while the control group showed the highest instances of intuitive thinking. Based on these studies, examining to what extent students employ intuitive versus analytical thinking may assist in better understanding how students cognitively process online information following a media literacy course.

While these studies suggest a correlation between analytical thinking and students’ abilities to evaluate the credibility of online information successfully, researchers acknowledged that internet users may also struggle to regularly engage with the more cognitively demanding nature of analytical thinking (Caulfield, 2018a; Molerov et al., 2020). Furthermore, research also
indicates that analytical thinking may not always effectively help individuals evaluate online sources (Metzger et al., 2015). Metzger et al. (2015) surveyed 2,747 young people ages 11 to 18 to understand their awareness of online credibility problems, use of specific information evaluation practices, and accuracy in credibility assessment. Interestingly, Metzger et al. (2015) found that youth who reported having a background in online credibility evaluation did not perform well on the assessments despite using analytic evaluation strategies. Metzger et al. (2015) concluded that explicit training may not always lead youth to the right conclusions about online information, suggesting that analytical thinking may not always prove the most effective strategy in evaluating the credibility of online sources.

Can Individuals Apply Intuitive Thinking to Civic Online Reasoning?

While researchers emphasize the importance of individuals slowing down to engage in analytical thinking when evaluating online sources (Ecker et al., 2022), others recognize the tedious and cognitively demanding nature of employing analytical thinking (Caulfield, 2018a; Molerov et al., 2020). People cannot always expend the time and energy required for analytical evaluation of each online source, resulting in individuals relying on heuristics to minimize cognitive efforts and save time (Metzger et al., 2010). Although reliance on heuristics can lead to biased and faulty thinking (Ku et al., 2019), Metzger et al. (2010) suggested that future studies should develop an inventory of heuristics that people can use to help them more successfully evaluate online information. Therefore, this study explored whether students can more intuitively process online sources based on strategies learned from their media literacy course.

Caulfield (2018a) argued that while media literacy interventions often require individuals to think deeply about media, interventions should focus on reducing cognitive overload by employing methods that require less thinking when initially encountering online information.
Caulfield (2018b) further argued that critical thinking may harm internet users when wrongly applied. Kozyreva et al. (2022) agreed and explained that regardless of the importance of emphasizing the ability to think critically, investing effortful, critical thinking in sources is not always the best approach, especially considering that internet users should just ignore some sources in the first place (p. 4). For example, if an internet user deeply investigates disinformation from neo-Nazi literature, individuals would better spend their time ignoring the source completely rather than spending any more time with it at all (Caulfield, 2018b). Instead of engaging with critical thinking, internet users must learn to more intuitively apply critical ignoring by choosing what sources to ignore and deciding where to invest one’s limited attentional capacities (Kozyreva et al., 2022, p. 4). Like handwashing and seatbelt wearing, Caulfield (2018a) suggested that individuals must learn to more simply and automatically apply these strategies to reduce the cognitive demands of evaluating online information. Furthermore, Wineburg and McGrew (2019) recognized that while employing the same heuristics used by fact-checkers takes time and practice to effectively develop, teaching heuristics and strategies like lateral reading and click restraint may help to eliminate some common errors in judging the credibility of online sources. While explicitly learning such skills requires greater conscious effort and awareness (Powers, 2019), the demand for energy and effort diminishes the more skilled one becomes in a task (Kahneman, 2011). Therefore, this study explored if students may learn to more effectively and intuitively employ the same strategies utilized by fact-checkers when evaluating online information after completing a media literacy course.

**Summary**

In Chapter 2, I have reviewed the literature that first explains how students struggle to identify the credibility of online information. In response to this problem, some state legislators
have mandated teaching media literacy across public schools (DiGiacomo et al., 2023). However, educators may struggle to integrate such initiatives as defining, implementing, and assessing media literacy, which remains a significant challenge. In response, I will concentrate on a civic online reasoning framework as a more focused approach to media literacy education to support secondary students in navigating the digital landscape. Despite the antiquated and potentially misleading nature of checklist approaches, students continue to rely on these more intuitively to assess the credibility of online information (Breakstone et al., 2018b; Wineburg et al., 2020). Instead, civic online reasoning researchers support that individuals should mimic the strategies employed by professional fact-checkers, such as lateral reading and click restraint, to evaluate the credibility of online sources more effectively (Wineburg & McGrew, 2019).

Although studies in civic online reasoning suggest that students can improve their abilities to critically evaluate the credibility of online information even with minimal interventions (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022), more work in the field is required to support students further. As scholars also suggest that understanding how students cognitively process information is imperative to designing effective instruction (Powers, 2019), I approached this study utilizing a dual process theory framework that will concentrate on students' intuitive and analytical thinking processes when evaluating online information. Several researchers have conducted studies demonstrating how heuristics and cognitive biases influence individuals' intuitive thinking processes (Metzger et al., 2010; Verma et al., 2023), thus affecting their ability to evaluate the credibility of online information. Researchers have also supported that if individuals slow down and engage with analytical thinking, they are more likely to evaluate online information's credibility effectively (Bago et al., 2020). However, others recognize that analytically thinking about every online source that individuals encounter is
impractical for regular use (Caulfield, 2018a; Molerov et al., 2020). Therefore, the question remains if students can more intuitively adopt practices utilized by professional fact-checkers, such as lateral reading and click restraint, after learning and practicing civic online reasoning strategies. As a result, this study seeks to explore how students engage with intuitive and analytical thinking following a semester-long media literacy course focused on the explicit instruction of civic online reasoning.
CHAPTER 3

Chapter 3 describes the research design, participants, setting, instruments, procedures, and data analysis. Using a case study-explanatory sequential mixed methods research design, I first collected quantitative data through a Qualtrics questionnaire and civic online reasoning performance tasks. The quantitative data analysis then informed the collection and analysis of the qualitative data to provide a deeper understanding of students’ cognitive processes when engaging with online sources. Qualitative data included individual semi-structured student interviews and artifacts, including student responses, assignments, and projects from their media literacy course. A qualitative analysis of the civic online reasoning performance tasks also helped to provide a deeper understanding of the quantitative findings. Furthermore, Chapter 3 discusses the limitations of this study, including potential threats to validity, reliability, and researcher bias, and provides a detailed explanation of the steps taken to mitigate these challenges.

Research Design

Guetterman and Fetters (2018) defined a case study-mixed methods research design as “a research design that employs a ‘parent’ case study design and uses mixed methods by collecting, analyzing, and integrating qualitative and quantitative data” (p. 906). As the study focused specifically on a bounded system consisting of a single, semester-long high school media literacy course at the target high school completed in the Spring 2023 Semester, I employed an intrinsic case study research design to deeply explore students’ perspectives and experiences after taking this course (Creswell & Guetterman, 2018; Merriam & Tisdell, 2016; Stake, 1995). Furthermore, Stake (1995) specified that researchers may intrinsically select a case when they have a particular interest in learning about a specific or unique case with the goal of developing an in-depth understanding of it through the collection and analysis of multiple forms of data (Creswell &
Guetterman, 2018). Additionally, because Stake (1995) pointed out that case study researchers commonly rely on relatively small databases, Gerring (2017) argued for the importance of researchers enlisting a wide range of evidence. Therefore, I utilized multiple forms of quantitative and qualitative evidence regarding the case, gathered through questionnaire responses, performance task results, individual student interviews, and student artifacts from the media literacy course.

Furthermore, I used an explanatory sequential mixed methods research design within this case study to collect quantitative data and then explain the quantitative results with in-depth qualitative data (Creswell & Plano Clark, 2017). Creswell and Plano Clark (2017) argued that a fuller and more complete understanding of a complex research problem often necessitates the collection and analysis of both quantitative and qualitative forms of data. When combined, a mixed methods approach takes advantage of the strengths of quantitative and qualitative methods, complementing one another and allowing for a more robust study and analysis (Ivankova et al., 2006). As I wanted to understand better how students intuitively and analytically process online information, collecting quantitative and qualitative data assisted in a more comprehensive approach to understanding the intricacies of their cognitive processes.

The decision to collect quantitative data first stemmed from my desire to identify patterns and trends related to how students evaluate online information so that I could explore these factors in the subsequent qualitative phase. For example, participants completed civic online reasoning performance tasks in the quantitative phase. In the follow-up individual student interviews, I asked students to reflect on how they completed these tasks to understand the cognitive processes they engaged with while analyzing online sources. Additionally, the reviewed literature reveals that while a significant majority of the research related to civic online
reasoning has utilized a quantitative or experimental design (McGrew & Breakstone, 2023; McGrew & Byrne, 2021; Wineburg et al., 2022), fewer studies have focused on amplifying students’ perceptions on such initiatives (De Leyn et al., 2022). Therefore, using a case study-mixed method research design allowed me to integrate previously validated quantitative methods (SHEG, 2019) while creating space to explore student perspectives on such initiatives through qualitative interviews to fill this research gap.

**Description of the Participants**

The population included 23 high school students in grades 10-12 (N=23) who took a piloted media literacy course at the target high school during the Spring 2023 semester. The population included students still in attendance at the target high school during data collection. Students ranged between the ages of 15 and 17 years old. The inclusion criteria also required students to obtain parental consent and give their assent to participate in the study. Exclusion criteria included students who took the course but graduated from or no longer attended the target high school, students who initially enrolled but then dropped the course, and students on the roster who did not attend at least half of the course. I excluded students who graduated from or no longer attended the target school due to not having accessibility to them. Furthermore, the study excluded students who did not attend at least half of the course due to concerns that their limited exposure to the content may compromise the depth of their insights regarding the impact of the class. A total of 12 students from the population returned parental consent forms and assented to the study, resulting in a sample size of 12 (n=12). Due to the small population and sample size, I collected minimal demographic details to protect the students’ identities. Specifically, students’ genders, ethnicities, races, and socioeconomic statuses were not collected and analyzed as a part of this study.
Description of the Setting

The target high school was a large, diverse public suburban school in Southeastern Pennsylvania. Students completed the online questionnaire and civic online reasoning performance tasks through Qualtrics. Students participated in the interviews on-site in my classroom at the target high school. This study focused on a single media literacy course taught at the target high school during the Spring 2023 semester. When utilizing case studies, researchers must identify a bounded system, meaning a case has clear temporal and spatial boundaries (Gerring, 2017). In other words, researchers can “fence in” a specific unit of analysis to study a particular case (Merriam & Tisdell, 2016, p. 39). Case study researchers agree that one specific program may make a case (Creswell & Guetterman, 2018; Merriam & Tisdell, 2016; Stake, 1995). Therefore, the following section provides an in-depth description of the students' media literacy course, establishing the course as the single unit of analysis that constitutes the case.

Description of the Media Literacy Course Curriculum

This section outlines the key aspects of the media literacy course completed by students during the Spring 2023 semester. I proposed the creation of a media literacy course to my principal during the 2020-2021 school year. After gaining approval from the principal, curriculum supervisor, and school board, I created and implemented this course for the first time as a semester-long social studies elective class offered to ninth through twelfth grade students beginning in the Spring 2023 semester. I based the curriculum on various sources, including resources provided freely to educators from the Civic Online Reasoning Curriculum (SHEG, 2019), Crash Course: Media Literacy (Crash Course, 2023), Crash Course: Navigating Digital Information (Crash Course, 2023), iCivics (iCivics, 2017), the News Literacy Project (News
Literacy Project, 2023), and PBS LearningMedia for Teachers (PBS & WGBH Educational Foundation, 2023). By drawing from these sources, the curriculum aimed to equip students with the necessary skills to comprehend the influential role of media in their lives and foster a deeper understanding of how to navigate the digital landscape.

The semester-long media literacy course included four units. The first unit covered the introduction and history of media literacy. In this unit, students learned key terms related to media and media literacy and completed assignments related to their personal media use. In the second unit, students learned about the role and impact of media. In this unit, students learned the difference between advertising, entertainment, news, opinion, propaganda, and raw information and how to identify these differences. The third unit focused on analyzing media and comprised most of the course. In this unit, students learned how to evaluate online information through a civic online reasoning framework and completed several assignments assessing these skills. The final unit focused on a summative media literacy project where students researched a topic of their choice and created a presentation of their information to evaluate the skills they gained from the course. Table 3.1 illustrates the units of the course and the key topics discussed within each unit. The results of this study contributed to improvements in the course, aiming to prepare students with the skills needed to evaluate the credibility of online information.

Description of Methods and Instruments

Quantitative instruments included a Qualtrics questionnaire and three civic online reasoning performance tasks. An analysis of these data then assisted with informing the qualitative data collected for this study.
Table 3.1

Media Literacy Course Curriculum

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Introduction and History to Media</td>
<td>Media, Media literacy, History of media literacy,</td>
</tr>
<tr>
<td>Literacy</td>
<td>Personal media literacy use</td>
</tr>
<tr>
<td>Unit 2: The Role and Impact of Media</td>
<td>Advertising, Entertainment, News, Opinion, Propaganda,</td>
</tr>
<tr>
<td></td>
<td>Raw information</td>
</tr>
<tr>
<td>Unit 3: Analyzing Media</td>
<td>Civic online reasoning skills</td>
</tr>
<tr>
<td>Unit 4: Media Literacy Research Project</td>
<td>Student research, application, and</td>
</tr>
<tr>
<td></td>
<td>presentation of media literacy skills</td>
</tr>
</tbody>
</table>

Qualitative data included individual semi-structured student interviews and several purposefully selected student artifacts, including student assignments, responses, and projects from their Spring 2023 media literacy course to explain the quantitative data results further. I also qualitatively analyzed the civic online reasoning performance tasks to deepen my understanding of students’ thinking processes while evaluating online information. This section explains the use of each instrument employed in this study by providing comprehensive details and justifications grounded in the research. Figure 3.1 illustrates the research design utilized in this study.
### Quantitative Methods and Instruments

In explanatory sequential mixed methods research designs, researchers first collect quantitative data and follow up on specific results by collecting and analyzing qualitative data to help explain the quantitative results (Creswell & Plano Clark, 2017; Ivankova et al., 2006). This section overviews this study's quantitative methods and instruments, including a Qualtrics questionnaire and three civic online reasoning performance tasks.

**Qualtrics Questionnaire.** All students who completed the media literacy course during the Spring 2023 semester and were still enrolled at the target high school were recruited for this study. Because all students in the target population were under 18, parents or guardians consented before their child could participate in the study. After students returned their parental consent forms, they received a code number and a link to the Qualtrics questionnaire through their school email. The questionnaire first asked student participants for their assent. Because students accessed the link to the questionnaire through their school email and inputted a provided
code number after providing assent, the questionnaire did not include any other exclusion criteria, allowing all respondents to advance with completing it.

Researchers utilize survey studies to describe data trends, explore potential correlations among variables, and learn more about a population (Creswell & Guetterman, 2018). Because previous research has indicated a relationship between social media news consumption habits and critical thinking (Ku et al., 2019), I quantitatively measured students’ self-reported media consumption habits and what factors may impact their abilities to evaluate online sources critically. The Qualtrics questionnaire included 30 closed-ended or semi-closed-ended questions. Because closed-ended questions allow respondents to answer the question using a response already provided, this led to more ease in comparing and coding the responses and statistically analyzing the data (Creswell & Guetterman, 2018, p. 395). The questionnaire included 11 semi-closed-ended questions to allow respondents to input additional responses if their answers did not fit the provided response choices (Creswell & Guetterman, 2018). The questionnaire included limited open-text fields to help student participants avoid survey fatigue (Davies, 2019).

The questionnaire consisted of nominal and ordinal scales. Researchers use nominal or categorical scales to provide response options where participants can check one or more categories that describe their traits, attributes, or characteristics (Creswell & Guetterman, 2018, p. 164). The questionnaire included 15 nominal scale items. As previous research indicates that background, education, and self-rated abilities may impact students’ performance when evaluating the credibility of online information (Nygren & Guath, 2022), I collected and analyzed demographic and background information from student participants to help better understand what factors may impact how they cognitively process online information. Nominal scale items included: (a) participants’ ages and grade levels, (b) online media and news
consumption habits, (c) what classes students have taken that they believe have had an impact on their media consumption habits, (d) how students feel their family and friends may impact their media consumption habits, and (e) how students react to specific online scenarios.

Researchers also use ordinal scales to provide response options to questions where participants may rank a trait, attribute, or characteristic from most important to least important or to a great extent or a little extent (Creswell & Guetterman, 2018). Researchers commonly treat the popular Likert scale as ordinal data in educational research. The Likert scale typically involves participants ranking their level of agreement or disagreement with statements, ranging from strongly agree to strongly disagree (Creswell & Guetterman, 2018, p. 165). The questionnaire included 15 ordinal scale items. As Tamboer et al. (2023) found that students’ knowledge or awareness of fake news did not increase following a fake news literacy intervention despite their self-efficacy increasing, I also wanted to collect and analyze student perceptions of their civic online reasoning skills after completing a media literacy course. In the questionnaire, ordinal scale items included (a) how confident students feel in their ability to evaluate the credibility of online information, (b) how easy students perceive evaluating online information is, (c) how students perceive the importance of learning media literacy skills, (d) how students perceive the impact of the media literacy course, and (e) how students rank the importance of specific factors when determining the credibility of online sources. Table 3.2 provides a breakdown of the nominal and ordinal scales and survey items used in the questionnaire. Collecting these data allowed me to quantitatively measure and analyze students’ self-reported civic online reasoning skills, which I then further explained utilizing the qualitative data. A copy of the questionnaire is provided in Appendix B.
### Table 3.2

**Nominal and Ordinal Scales in the Qualtrics Questionnaire**

<table>
<thead>
<tr>
<th>Type of Scale</th>
<th>Explanation of Questionnaire Items</th>
</tr>
</thead>
</table>
| Nominal Scale      | ● Age  
                     ● Grade level  
                     ● Online media and news consumption habits  
                     ● What classes students have taken that they believe have had an impact on their media consumption habits  
                     ● How students feel their family and friends may impact their media consumption habits  
                     ● How students react to specific online scenarios |
| Ordinal Scale      | ● How confident students feel in their ability to evaluate the credibility of online information  
                     ● How easy students perceive evaluating online information is  
                     ● How students perceive the importance of learning media literacy skills  
                     ● How students perceive the impact of the media literacy course  
                     ● How students rank the importance of specific factors when determining the credibility of online sources |

**Civic Online Reasoning Performance Tasks.** After completing the online questionnaire, the questionnaire invited student participants to complete three open-ended civic online reasoning performance tasks. The questionnaire asked students to choose between completing the civic online reasoning tasks as part of the questionnaire or during a later Academic Intervention and Enrichment (AIE) period. Students could also choose to opt out of this part of the study. Students chose to complete the performance tasks immediately after completing the questionnaire or separately at a later date and time to avoid survey fatigue. The purpose of offering this choice to students was to dissuade participants from dropping out midway through the survey or losing interest and speeding through, thus potentially giving inaccurate data (Davies, 2019). The performance tasks measured students’ civic online reasoning
skills quantitatively. The Stanford History Education Group (SHEG) created a series of civic online reasoning performance tasks that educators can freely use to assess their students’ civic online reasoning skills (SHEG, 2019). With permission from SHEG (2019), I utilized three of these provided performance tasks to evaluate each of the three critical questions of civic online reasoning: Who is behind the information? What is the evidence? What do other sources say? (McGrew et al., 2018; Wineburg et al., 2022).

The first performance task addressed the question of *who is behind the information* and assessed students’ abilities to verify the reliability of a website. Students visited a website that provided them with information regarding COVID-19. Students first decided if the website was a trustworthy source of information on COVID-19 and then explained their answer by citing evidence from web pages they used to make their decision (SHEG, 2019). The second performance task addressed the question of *what is the evidence* and assessed students’ abilities to evaluate evidence provided on social media. Students considered the source of a tweet and the information contained in it, describing what may make it both a helpful and less helpful source of information. The third and final performance task addressed the question of *what do other sources say* and assessed students’ abilities to research a claim on the open internet. Students considered the claim that Cesar Chavez opposed unauthorized immigration to the United States, conducted research online regarding this topic, and decided whether or not this claim was valid, citing their sources (SHEG, 2019). A copy of the performance tasks is included at the end of the questionnaire in Appendix B.

**Civic Online Reasoning Performant Task Rubrics.** Each performance task was then graded using rubrics created and provided by SHEG (2019). The rubrics for each performance task provided criteria evaluators must consider to determine if a response scores as beginning,
emerging, partial mastery, or mastery level. For example, for a student to score mastery on the first performance task, the student must reject the website as a trustworthy source, provide a clear rationale, support their reasoning with reliable evidence, and cite their sources of information. If a student rejected the website as a trustworthy source and provided supporting evidence but failed to provide a complete explanation or did not cite where the evidence came from, the student would score emerging. Finally, if a student rejected the source but provided an incoherent, irrelevant, or unreasonable explanation or accepted the source as trustworthy, the student would score as beginning (SHEG, 2019). Copies of the provided rubrics are included in Appendices C through E. To quantitatively analyze the data from the civic online reasoning performance tasks. I assigned numerical values to each criterion. Table 3.3 includes the numerical values assigned to each performance task.

Table 3.3

<table>
<thead>
<tr>
<th>Performance Task #1: COVID-19 Health</th>
<th>Performance Task #2a: Claims on Social Media Rubric</th>
<th>Performance Task #2b: Claims on Social Media Rubric</th>
<th>Performance Task #3: Researching a Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>1= Beginning</td>
<td>1= Beginning</td>
<td>1= Beginning</td>
<td>1= Beginning</td>
</tr>
<tr>
<td>2= Emerging</td>
<td>2= Emerging</td>
<td>2= Emerging</td>
<td>2= Emerging</td>
</tr>
<tr>
<td>3= Mastery</td>
<td>3= Mastery</td>
<td>3= Mastery</td>
<td>3= Partial Mastery</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4= Mastery</td>
</tr>
</tbody>
</table>

Qualitative Methods and Instruments

After collecting and analyzing the quantitative data, I collected and analyzed qualitative data to explain the quantitative results. Because I wished to thoroughly explore the impact of a media literacy course on students’ cognitive processes, I collected and analyzed multiple forms
of qualitative data, including individual semi-structured student interviews, student artifacts from their media literacy course, and civic online reasoning performance tasks. Due to the small target population and sample size, as well as my desire to emphasize the qualitative data to examine students’ cognitive processes following the completion of the media literacy course, I used a case-selection variant, where the researcher places priority on the second qualitative phase of the study (quan → QUAL) (Creswell & Plano Clark, 2017, pp. 82-83). While Ivankova et al. (2006) noted that sequential explanatory designs typically prioritize the quantitative data, a researcher may prioritize the qualitative data depending on the purpose of the study and the researchers’ interests. As I am most interested in exploring student perspectives regarding the cognitive processes they engage with when evaluating the credibility of online sources, emphasizing the qualitative data through a case study approach assisted in building a more in-depth understanding of students’ cognitive processes.

**Individual Semi-Structured Interviews.** After completing the Qualtrics questionnaire and civic online reasoning performance tasks, students indicated their interest in participating in an individual semi-structured interview. The interviews aimed to gain insight from a subset of the population to evaluate the impact of the media literacy course on students. Due to the small population and sample size, I used convenience sampling to select students to participate in the semi-structured interviews. According to Creswell & Guetterman (2018), researchers use convenience sampling to select willing and available participants to participate in the study. Students who agreed to an interview received an email through their school email that asked them to choose an Academic Intervention and Enrichment (AIE) period to conduct the individual student interview. Students who did not respond to the initial email received a follow-up email a week later to remind them to schedule an interview. The interview took place in my classroom.
during AIE. The door to the classroom was left open, and other adults were nearby in the hallway and other classrooms. The interview took about 30 minutes to complete. I audio-recorded the interviews with permission from each participant. Five of the 12 participants who completed the quantitative phase of the study participated in individual interviews.

The quantitative data, which included students’ level of performance on the civic online reasoning performance tasks and how they perceive their civic online reasoning skills, helped formulate interview questions to better gauge students’ cognitive processes while evaluating online sources. Additionally, conducting qualitative, semi-structured interviews following the quantitative data collection helps explain the initial results in greater depth (Creswell & Plano Clark, 2017). Furthermore, interviewing participants allows researchers to understand how people interpret the world around them, especially regarding past events (Merriam & Tisdell, 2016). As my goal from the research was to understand students’ perspectives regarding their civic online reasoning skills following a media literacy course they have already taken, interviewing was an appropriate research method to utilize.

According to Merriam and Tisdell (2016), researchers can more flexibly word and structure questions in semi-structured interviews, allowing the interviewer to explore a list of questions or issues. By conducting individual semi-structured interviews, researchers can gain specific information from all respondents while allowing for more flexibility in their questions (Merriam & Tisdell, 2016). I began by asking students for background information regarding their internet and social media use, how they define media literate and civic online reasoning, and how important they consider media literacy. The questions then shifted to their perspectives on their media literacy course, such as why they took the class, what they learned, whether they learned similar skills in other classes, and what impact the course may have on them. Finally,
students explained their perspectives on their intuitive and analytical thinking when evaluating online sources.

Analyzing the interviewees’ responses helped to explain the quantitative results further. For example, while the questionnaire sought to quantify important background information regarding how participants regularly use the internet and social media, conducting interviews allowed students to provide further details that built on this background by describing in their own words how they regularly use the internet. Additionally, while students quantitatively responded to what extent they felt that taking the media literacy course impacted their abilities to verify the credibility of online information, asking students to describe their takeaways from the course further explained these quantitative results. Furthermore, several items in the questionnaire asked students to consider how biases may impact their abilities to evaluate the credibility of online information. For example, students quantitatively responded to what extent they believed their biases could influence their understanding of online information. Due to the impact biases may have on students’ intuitive thought processes (Evans, 2018; Kahneman, 2011), interviewing students assisted in more deeply understanding the cognitive processes they engage with when evaluating online information. Finally, while the civic online reasoning performance tasks and a few questionnaire items sought to quantify students’ civic online reasoning skills, utilizing interviews allowed me to explain these quantitative results further and more deeply. A copy of the interview questions is attached in Appendix F.

**Student Artifacts.** The qualitative data also included student artifacts from their media literacy course, such as student assignments, responses, and projects. Because qualitative data helps to explain the quantitative data in explanatory sequential mixed methods research (Creswell & Plano Clark, 2017), I purposefully selected and analyzed student artifacts from their
media literacy course that would support the quantitative results further. For example, the first part of the questionnaire asks student participants to consider their media consumption habits, providing context for their overall media engagement. To contextualize these quantitative data, I qualitatively analyzed an assignment that students completed during the course that required students to reflect on their personal media use. Additionally, students completed an assignment where they identified biases that may impact how they view the media. Qualitatively analyzing these assignments further explained the quantitative data that sought to measure students’ perspectives on their biases' role in evaluating the credibility of online information.

Furthermore, as this study focused on understanding students’ perceptions and uses of civic online reasoning skills, I qualitatively analyzed in-class activities where students learned these skills, several of which are based on the resources and skills provided by SHEG (2019). This analysis allowed me to explore how students cognitively processed learning this information from the media literacy course and if and how their thinking processes have evolved since taking the class. Finally, I qualitatively analyzed their final summative media literacy project, in which students chose a topic to research and applied the media literacy skills they learned to create a presentation of their findings. Analyzing these projects and other student artifacts allowed me to explore what students learned from the class more deeply and understand how students’ cognitive processes regarding evaluating online sources may have changed or remained the same over time. Table 3.4 includes a list and description of the artifacts.
Table 3.4

*Student Artifacts from their Media Literacy Course*

<table>
<thead>
<tr>
<th>Unit</th>
<th>Artifact</th>
<th>Description of Artifact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Media and Me Project</td>
<td>Create a collage and description of media that you regularly use and a collage of important things in your life that do not revolve around media.</td>
</tr>
<tr>
<td>1</td>
<td>Journal #1: Media and Me</td>
<td>On average, how many hours a day would you say you spend using media in some way? Does this amount of time surprise you? Why or why not?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Look at your collage that you put together for life WITHOUT media. Realistically, do you think media still plays a significant role in these parts of your life?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If you were to give up some form of media for a period of time, what would you give up and why? How long do you think you could go without?</td>
</tr>
<tr>
<td>3</td>
<td>Check Your Biases Project</td>
<td>Create a collage of terms/images related to student's self-identified biases. Using key terms from class (implicit bias, cognitive dissonance, confirmation bias, motivated reasoning, filter bubbles, echo chambers), write a paragraph that explains how your biases may impact how you view the world.</td>
</tr>
<tr>
<td>3</td>
<td>Warm Up #1: Lateral Reading</td>
<td>Take a few minutes to explore both websites (<a href="https://www.aap.org/">https://www.aap.org/</a> and <a href="https://acped.org/">https://acped.org/</a>). Which website do you think is more CREDIBLE in learning more about pediatrics (the branch of medicine that involves medical care for children)? Explain why.</td>
</tr>
<tr>
<td>3</td>
<td>Warm Up #2: Lateral Reading</td>
<td>Skim the attached link (<a href="https://www.instituteforenergyresearch.org/renewable/the-100-percent-renewable-energy-myth/">https://www.instituteforenergyresearch.org/renewable/the-100-percent-renewable-energy-myth/</a>) and answer the following questions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ What is the general argument that the attached article is making?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ What organization is behind this article?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ What do you know about this organization (if anything)? What information can you find out about this organization (if anything)?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Do you think the website is a strong source of information about renewable energy? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Warm Up #3: Evaluate the Evidence</td>
<td>Examine the provided Facebook conversation. Did Anya or Grace provide stronger evidence to support their argument? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Warm Up #4: Click Restraint</td>
<td>When you do an internet search in a search engine, which site do you usually click on first? Explain.</td>
</tr>
<tr>
<td>4</td>
<td>Media Literacy Project</td>
<td>After choosing a timely and relevant topic, conduct a research project using the skills you have learned from class. The project is broken up into 8 parts:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 1: Introduction to the Media Literacy Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 3: Infozones</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 4: Social Media Discourse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 5: News Media Bias</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 6: Evaluating Sources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 7: Reflection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Part 8: Media Presentation of Your Findings</td>
</tr>
</tbody>
</table>
Creswell and Guetterman (2018) explain that documents can provide valuable information in helping researchers understand central phenomena in qualitative studies (p. 233). Merriam and Tisdell (2016) agree and support that personal documents can be a good source of data concerning a person’s attitudes, beliefs, and world views (p. 166). As these factors may impact students’ intuitive and analytical thinking processes when evaluating online information (Nygren & Guath, 2022), qualitatively analyzing these data sources further helped to address the research questions. Additionally, as previous research suggests that lessons related to civic online reasoning positively impact student performance on civic online reasoning assessments (Wineburg, 2022), analyzing what interventions students learned through the course and how students responded to these interventions helped contextualize the data.

**Civic Online Reasoning Performance Tasks Responses.** While I provided detailed information regarding the civic online reasoning performance tasks and rubrics in the previous quantitative methods and instruments section, I also analyzed students’ responses qualitatively. Due to the open-ended nature of student responses to these tasks, I looked for overlapping themes across the responses (Creswell & Guetterman, 2018) to understand students’ rationale in establishing the credibility of the performance tasks. While scoring the performance tasks using SHEG’s (2019) provided rubrics allowed me to quantify the level of mastery students achieve, qualitatively analyzing the students’ responses assisted in understanding students’ cognitive processes more deeply. Because previous studies indicate that individuals rely on cognitive biases and heuristics when evaluating online sources (Nygren & Guath, 2022; Powers, 2019), qualitatively analyzing students’ responses allowed me to explore how these factors may impact students’ intuitive and analytical thinking processes. The following data analysis section of this
chapter discusses the qualitative coding and analysis of these responses in greater detail. The performance tasks and rubrics can be found in Appendix B through E.

**Study Procedures**

This section provides a comprehensive overview of the procedures used to conduct my research. After discussing the details of the recruitment process, I then explain the sequential approach I employed to collect quantitative data followed by qualitative data.

**Recruitment and Parental Consent**

Recruitment of students began following approval from the Institutional Review Board (IRB) and my committee members. I recruited students who completed the media literacy course at the target school in the Spring 2023 semester to participate in the study. After placing a sealed envelope to each student containing a recruitment flyer and letter for each student in their AIE teachers’ mailboxes, they distributed these to their respective students. Each envelope contained two copies of the letter of parental consent, one for students to return and another for participants to retain. Additionally, students and families received an email containing the study's details, a digital copy of the recruitment flyer, and a letter of parental consent.

Furthermore, a message on Schoology, the target school’s learning management system used to communicate course information with students, prompted students to check their emails for information regarding the research study opportunity. After a week, I sent a follow-up email reiterating the study details and enclosed the recruitment flyer and parental consent letter. Students returned their letters of consent directly to me. A total of 12 students out of 23 returned the parental letter of consent, resulting in a 52% return rate. After receiving returned letters of parental consent, I placed them in an envelope and held them in a locked file cabinet for secure storage.
Student Assent and Phase One of Quantitative Data Collection

After receiving all letters of parental consent, all students who returned their consent to participate in the study received an email with details of the study's first phase. The email included a link to the online questionnaire taken through Qualtrics and a code number for each student. The first question in the online questionnaire asked for student assent. Qualtrics prompted students who gave their assent to complete the remainder of the online questionnaire. If a student did not give their assent, the questionnaire automatically ended. However, all students did assent, allowing them to continue with the questionnaire.

Student participants received a follow-up email three days after the initial email reminding them to respond to the questionnaire if they still needed to complete it. The second question asked students to input the code number in their email with the link to the questionnaire. The code number allowed me to follow up with students for individual interviews and for those students who requested to complete the civic online reasoning performance tasks during a separate AIE period. Students took approximately 10 minutes to complete the questionnaire. A total of 12 students completed the Qualtrics questionnaire (n=12).

Phase Two of Quantitative Data Collection

After completing the questionnaire, students were asked to complete three civic online reasoning performance tasks. The question asked if students would like to respond to the performance tasks either as a part of the questionnaire or at another time during their AIE period. The purpose of providing this option to students was to avoid survey fatigue and encourage students to complete this part of the study in a way that worked best for each individual. Students also had the option to opt out of completing this part of the study. If students chose to complete the performance tasks at another time during their AIE period, the code numbers allowed me to
identify the students who still needed to complete these correctly. These students received an email within two days of completing the questionnaire to arrange a time to respond to their civic online reasoning performance tasks during their AIE period. Students received a pass through the school email to give to their AIE teacher, allowing them to come to my classroom to complete the performance tasks. The civic online reasoning performance tasks took students about 15 minutes to complete. For students who still needed to complete the performance tasks, I emailed these students as a reminder to complete them. Nine students fully completed each of the performance tasks, and three students did not complete them (n=9).

**Qualitative Data Collection**

In explanatory sequential mixed methods research designs, researchers collect and analyze qualitative data to explain the results of the quantitative data (Creswell & Plano Clark, 2017). In this phase, I conducted individual semi-structured student interviews and qualitatively analyzed student artifacts from their media literacy course and the civic online reasoning performance tasks. Furthermore, due to the small population and sample size and my desire to explore students’ cognitive processes more deeply when evaluating online information, the greater emphasis of this study was placed on qualitative data.

**Individual Semi-Structured Student Interviews.** Due to the small population and sample size, I used convenience sampling to select students to participate in the follow-up individual semi-structured student interviews. Five students who completed the quantitative phase of the study from the tenth through twelfth grades agreed to participate in the follow-up interview. No incoming ninth graders participated in this study as they were not enrolled in last year’s media literacy course. The interview took place in person inside my classroom. No other students were present. The interview took about 30 minutes to complete. I audio-recorded the
Student Artifacts and Civic Online Reasoning Performance Tasks. Students completed several discussion posts, assignments, and projects correlated with several questionnaire items and the civic online reasoning performance tasks. After analyzing the quantitative data, I purposefully selected specific artifacts to analyze qualitatively to explain the quantitative data results further. Additionally, I collected the civic online reasoning performance tasks through Qualtrics, as discussed in the previous section. The student artifacts and civic online reasoning performance tasks were similarly coded and analyzed to understand students' intuitive and analytical thinking processes when analyzing online sources.

Data Analysis

This section provides a detailed overview of the quantitative data analysis that then informed the collection and analysis of the qualitative data. In an explanatory sequential design, researchers analyze the follow-up qualitative phase of the study to provide a robust explanation of specific results from the initial quantitative phase (Creswell & Plano Clark, 2017).

Analysis of Quantitative Data

I analyzed the data from the online questionnaire and civic online reasoning scenarios to finalize the qualitative data collection through individual semi-structured student interviews and student artifacts from their media literacy course. This section discusses the specific analytical and coding procedures of each phase of the quantitative data.

Questionnaire Data Analysis. Before analyzing the quantitative data, I scored the data by assigning a numeric score or value to each response category for each questionnaire item and performance task score. Researchers should consistently score each question on Likert scale
items using the same numbering system but can arbitrarily assign numbers that make sense for categorical scales. I first used single-item scores to code the quantitative data. Researchers use single-item scores to provide a detailed analysis of each person’s response to each question. Utilizing a codebook allowed me to consistently record how I coded the quantitative responses (Creswell & Guetterman, 2018). Furthermore, several questionnaire items sought to measure students’ civic online reasoning skills quantitatively. To allow for statistical analysis, I created a summed score of the individual items measuring civic online reasoning skills, adding the items that measure civic online reasoning skills to compute an overall score (Creswell & Guetterman, 2018, p. 176). Table 3.5 provides the questionnaire items used to measure students’ understanding of civic online reasoning, including the specific item, the value assigned to each response, and the civic online reasoning skills each item measured. The civic online reasoning skills that the questionnaire sought to measure include avoiding misleading heuristics, click restraint, lateral reading, and learning who is behind the information (SHEG, 2019). Individual numerical items for the ordinal scale ranged from 1 to 5, with 1 indicating lower civic online reasoning skills and 5 indicating higher civic online reasoning skills. The nominal scale items ranged from 1 to 2, with 1 indicating lower civic online reasoning skills and 2 indicating higher civic online reasoning skills. Students could have earned from 7 to 30 points, with higher scores indicating higher civic online reasoning skills.

Researchers use statistics, or calculations of values based on numbers, to analyze quantitative data to describe trends (Creswell & Guetterman, 2018, p. 181). I analyzed the questionnaire results through SPSS using descriptive and correlational statistics. Descriptive statistics indicate general tendencies in the data, such as the mean, median, mode, variance, standard deviation, range, or a comparison of how one score relates to all others.
Table 3.5

*Questionnaire Items Measuring Civic Online Reasoning Skills*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Assigned Value</th>
<th>Skills Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ordinal Items:</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| If a website looks professional, this is always a good sign that the website is    | ● 5=Strongly Disagree *  
● 1=Strongly Agree *  | ● Avoiding     |
| credible.                                                                         |                | misleading heuristics                                |
| Rank how important you think each item is when you are determining the credibility | ● 5= Not Important *  
● 1= Most Important * | ● Click restraint |
| of an online source:                                                               |                |                                                     |
| ● The domain (.org, .com)                                                         | ● 5= Not Important *  
● 1= Most Important * | ● Lateral reading |
| ● The website’s About page                                                         | ● 5=Not Important *  
● 1=Most Important * | ● Learning who is behind the information |
| ● Learning what other online sources say about the website                        | ● 5=Most Important  
● 1=Not Important | | |
| **Nominal Items:**                                                                |                |                                                     |
| What are you most likely to do first when you want to determine the credibility    | ● 2= Learn more about who created the source  
● 2= Leave the website to learn more about what other online sources say about it  
● 1=Look at the domain (.com, .org) | ● Learning who is behind the information |
| of online sources?                                                                 |                |                                                     |
| You are doing research on a controversial topic for a school project. You do an    | ● 2= Scan several of the results before deciding which site to visit first  
● 1= Click on the first few links that appear  
● 1= Click on the first link that most aligns with what you already believe about the topic | | |
| internet search on your topic. What are you most likely to do first when looking for |                |                                                     |
| reliable information on the topic?                                                |                |                                                     |
| You see a shocking post from a source on social media you are not familiar with.    | ● 2= You check to see if other sources are reporting the same story  
● 1= You click on the story to learn more about it | | |
| Thousands have viewed and shared the post. What are you most likely to do first    |                |                                                     |
| when you see this?                                                                 |                |                                                     |

*Note:* *The item was reversed to align higher scores with higher civic online reasoning skills.*
Descriptive statistics allowed me to summarize the overall trends in the data, provide an understanding of variations across the scores, and give initial insights into how one score stands when compared with other scores (Creswell & Guetterman, 2018, p. 181). Researchers typically report all three measures of central tendency, including the mean, average score, the median, the middle of a set of scores, and the mode, the most frequently occurring score (Creswell & Guetterman, 2018, p. 182). While analyzing the questionnaire, I specifically reported measures of central tendency on the following variables: (a) hours a day that students typically spend online, (b) confidence levels in their abilities to evaluate online information, (c) perceptions on the level of difficulty in evaluating online information, (d) civic online reasoning skills, and (e) perceptions of bias.

In correlational research designs, researchers use statistical tests to describe and measure the degree of association, or relationship, between two or more variables or sets of scores for each person (Creswell & Guetterman, 2018, p. 343). Creswell and Guetterman (2018) define a correlation as “a statistical test to determine the tendency or pattern for two (or more) variables of two sets of data to vary consistently” (p. 343). Specifically, this study employed an explanatory research design, where researchers analyze if a simple association between two variables exists (Creswell & Guetterman, 2018, p. 345). One common characteristic of explanatory research design includes the investigator correlating two or more variables (Creswell & Guetterman, 2018). Furthermore, because this study had a small sample size of 12 student participants and did not involve multiple groups or treatment conditions, I also analyzed all participants as a single group, another common characteristic of explanatory research design (Creswell & Guetterman, 2018). Researchers use correlational research to describe the degree of association between two or more variables by looking for a pattern of responses and using
statistical procedures to determine the strength of the relationship and its direction (Creswell & Guetterman, 2018, p. 365).

Based on previous research, I tested the relationship between students’ confidence levels in their civic online reasoning skills with several other variables. For example, due to the relationship between confidence and cognitive ease (Kahneman, 2011), I tested the relationship between students’ confidence in their civic online reasoning skills with how easy they felt it was to determine the credibility of online information. Additionally, because previous research indicates that individuals tend to overestimate their abilities in determining the credibility of online information (Mahmood, 2016; Veeriah, 2021), I also tested their confidence levels with their civic online reasoning skills, measured quantitatively through the questionnaire and performance tasks. Furthermore, I tested the relationship between these two sets of scores, comparing the summed scores of the civic online reasoning questionnaire results to the performance task results. Because the questionnaire measured how students responded to hypothetical situations and performance tasks measured how students responded to actual situations, this provided greater insight into understanding how individuals' perceptions align with their skills. Finally, as previous research also indicates that a fake news literacy intervention positively impacted young people’s self-efficacy toward fake news (Tamboer et al., 2023), I tested students’ confidence with how students felt taking the media literacy course impacted their ability to evaluate the credibility of online sources.

To test these relationships, I utilized nonparametric correlational statistics. Researchers use nonparametric statistics when analyzing data that may not follow the same rules as parametric statistics. Statisticians largely agree that researchers need a sample size of 30 to ensure robustness in parametric statistics (Salkind & Frey, 2000, p. 295). Due to my small
sample size, I used Spearman’s rank correlation coefficient and Kendall’s tau to compute the
correlation between items as a nonparametric statistic (Salkind & Frey, 2019). Researchers use
these nonparametric tests to measure the correlation between two ranked variables (Learn
Statistics Easily, 2024). Although comparing Spearman’s rank and Kendall’s tau does not tend to
result in substantial differences (Puth et al., 2015), researchers also note different strengths and
weaknesses of each correlation coefficient (Learn Statistics Easily, 2024; Xu et al., 2013). For
example, researchers should employ Spearman’s rank for small sample sizes because it has more
power in detecting weak correlations in small sample sizes. However, Kendall’s tau may provide
a more accurate estimate of the correlation with a small sample size, especially when the dataset
contains a significant number of ties in ranks. Additionally, outliers in the data have less
influence on detecting a correlation when using Kendall’s tau (Learn Statistics Easily, 2024; Xu
et al., 2013). However, Puth et al. (2014) noted that with sample sizes as low as 10, these
methods offer relatively low power for detecting significant levels of association. To account for
this limitation, I used inferential statistics cautiously and instead placed greater reliance on my
descriptive statistics and qualitative data.

**Civic Online Reasoning Performance Tasks.** To quantitatively analyze the
performance tasks, I scored each response by assigning a numerical value to each, indicating the
students’ levels of mastery of each task. Table 3.3 illustrates the numerical value that correlated
with each score, aligning with the rubric provided by SHEG (2019). In addition to scoring each
of these responses as single items, I used summed scores to measure the sum of questions that
measure the same variable (Creswell & Guetterman, 2018). While the individual scores
correlated with specific civic online reasoning skills, the summed scores measured the students’
collective civic online reasoning skills. The collective scores could range from 4 to 13, with 4
considered beginning level and 13 considered mastery level across all performance tasks. I used descriptive statistics to report measures of central tendency of the scores. Additionally, I also used Spearman’s rank and Kendall’s tau to test the relationship between the summed scores of the performance tasks and students’ perceptions of confidence and ease, as measured from the questionnaire. As previously noted, I also tested the relationship between the summed score of the performance tasks and the summed score of the questionnaire items measuring civic online reasoning skills to assess the correlation between responses to hypothetical scenarios and actual scenarios. Creswell and Guetterman (2018) noted that ethical issues can arise when researchers lack an adequate sample size. Therefore, I emphasized the qualitative data over the quantitative data to alleviate this ethical concern. Furthermore, the quantitative data results helped me refine the semi-structured interview questions and establish what student artifacts to study and analyze further to explain the quantitative data.

**Qualitative Analysis**

I conducted two coding cycles to analyze the qualitative data because rarely anyone gets coding right the first time (Saldaña, 2015). In my first round of coding, I used In Vivo coding. Saldaña (2015) noted the appropriateness of using In Vivo coding for virtually all qualitative studies, particularly for beginning qualitative researchers learning how to code data. An In Vivo code refers to a word or short phrase taken directly from the participants’ language. Manning (2017) explained how researchers can use In Vivo coding as an initial form of analysis to help lead them to more complex and nuanced categories. Saldaña (2015) argued that In Vivo coding especially benefits studies that prioritize and honor the participant’s voice. De Leyn et al. (2022) pointed out that media literacy research rarely amplifies students’ voices and, therefore, necessitated the inclusion of student perspectives and experiences. Tamboer et al. (2023) also
supported the idea that research should strive to incorporate youths’ views on media literacy interventions to develop more effective interventions. Therefore, I first coded qualitative data using In Vivo coding, allowing me to stay close to the student participants' language and experiences.

After completing In Vivo coding in the first cycle, I conducted a second coding cycle to refine the qualitative data further and deepen the analysis (Saldaña, 2015). I utilized provisional coding generated from a predetermined set of codes based on previous research findings (Saldaña, 2015). Saldaña (2015) explained that researchers can utilize provisional coding to build on or corroborate previous studies. For example, De Leyn et al. (2022) conducted semi-structured interviews with 31 teenagers to explore their perceptions regarding media literacy education. After combining a thematic and inductive approach, De Leyn et al. (2022) constructed an initial code scheme to guide their analysis. Specifically, De Leyn et al. (2022) identified *media use, media literacy, and education* as labels within their initial code scheme. As my research focuses on the students’ perceptions of a media literacy course, I used this coding scheme to analyze my qualitative data. However, Saldaña (2015) also argued that researchers must exercise provisional coding cautiously. Researchers may become too enamored with their provisional codes and risk attempting to fit qualitative data into codes and categories that may not apply (p. 146). Saldaña (2015) reminded researchers that they can revise, modify, delete, and expand to include new codes (p. 144). Therefore, due to my interest in students’ perceptions, I also added *takeaways* as a code to develop a greater understanding of what students felt they learned from the course.

To understand students’ intuitive and analytical thinking processes when evaluating online information, I also provisionally coded the qualitative data based on previous research
using the following codes: *analytical thinking, heuristics, effort, confidence, and bias*. For example, Artmann, Scheibenzuber, Fendt, and Nistor (2023) used content analysis codes to analyze 36 elementary students’ abilities to assess online news as true or fake. As their study sought to understand internet users’ intuitive and analytical cognitive processing of online information, one of their codes included *investigative analytical processing*, which they classified as when participants actively searched for information on the source and analyzed it based on newly acquired knowledge (Artmann, Scheibenzuber, Fendt, and Nistor, 2023, p. 37). In alignment with the dual process theory, as this cognitive processing suggests greater effort (Kahneman, 2011), I coded instances when participants actively sought out information beyond what the source provided them as *analytical thinking*.

Furthermore, I utilized the code *heuristics* to refer to instances when participants relied on mental shortcuts, especially surface-level characteristics, to evaluate the credibility of sources. I based this code on McGrew’s (2021) study that found that both high school teachers and students utilized weak heuristics when evaluating online information, such as (a) relying on a website’s appearance, (b) reports of its self-identified reliability, (c) content, (d) URL, and (e) the degree of engagement with the source (in the case of social media posts) (p. 9). Additionally, based on the dual process theory, if individuals find a task or skill easier to complete due to familiarity or expertise, they may feel more confident. This confidence can impact how System 1 processes information, potentially leading to quicker and more intuitive responses (Kahneman, 2011). Therefore, I coded interview excerpts using *confidence* and *effort* to account for how students described their own levels of confidence and ease in evaluating online sources after completing the media literacy course. Finally, because researchers have conducted several studies that link individuals’ cognitive biases to their abilities to discern the credibility of online
information (Kahne & Bowyer, 2017; Tandoc et al., 2021; Verma et al., 2023; Zlatkin-Troitschanskaia et al., 2020), I used the code bias to identify how participants perceive bias and how this may impact their evaluation of online sources.

**Validity and Reliability**

According to Creswell and Plano Clark (2017), potential threats to validity and reliability in explanatory sequential research designs often include (a) failing to identify important quantitative results to explain, (b) not explaining surprising, contradictory quantitative results with the qualitative data, and (c) not connecting the initial quantitative with the qualitative follow-up (p. 251). To navigate these potential threats, I carefully analyzed my data to ensure that I addressed the nuances of the quantitative and qualitative data, relying on the expertise of my advisor and committee members to assist me through this process. Furthermore, Creswell and Guetterman (2018) explained that in educational research, having a tightly controlled environment and monitoring all events is challenging, making it more difficult to attribute cause and effect (p. 306). While this study aimed to investigate the potential correlation between students' confidence in their civic online reasoning skills and their proficiency in civic online reasoning performance tasks, the study predominantly focuses on qualitative methods, limiting the emphasis on any possible cause-and-effect relationships.

**Internal Validity**

Threats to internal validity may include history, maturation, selection, and mortality. Individuals may develop or change over time, potentially affecting their performance (Creswell & Guetterman, 2018, p. 306). Because students have been away from this class for several months, this time away from the media literacy course may impact their performance. However, part of this study's purpose is to better understand what civic online reasoning skills students
maintain, if any, after being away from the course for several months. Selection threats often arise when participants are allowed to self-select, meaning that students who elect to participate in the study are already more motivated than those who do not. Furthermore, individuals may drop out of the study, making drawing conclusions from scores more complex (Creswell & Guetterman, 2018, p. 306). I implemented several measures to encourage greater participation from the target population. For example, students could win a voucher to the school store for participating in at least two phases of the study. Students could also complete only the first part of the study to encourage participation. I implemented these measures to encourage all students from the target population to participate in the study and to help discourage participants from dropping out. Implementing these measures helped to gain a sample size of 12, resulting in a participation rate of 52% of the target population.

**External Validity**

Creswell and Guetterman (2018) also identified history as a potential threat to external validity, as researchers may generalize findings to past and future situations (p. 308). Despite this concern, this study aimed to deepen my understanding of students’ cognitive processes when evaluating online sources. To achieve this, I used quan → QUAL, thus emphasizing the qualitative data over the quantitative data. Given this emphasis on qualitative data, I did not seek to generalize findings to past and future situations. Additionally, the study’s small population and sample size further constrained generalizability. In line with Merriam and Tisdell’s (2016) perspective, I wished to understand the research phenomenon in greater depth rather than discover what is generally true of the larger population. Additionally, Creswell and Plano Clark (2017) argue that mixed methods researchers require competency with both quantitative and qualitative methods. As a doctoral candidate with limited experience in research methods, I
relied on the expertise of my committee members to help guide me with my research to alleviate this threat.

**Reliability**

Merriam and Tisdell (2016) defined reliability as the extent to which research findings can be replicated. Creswell and Guetterman (2018) recommended that beginning researchers use existing, validated instruments to enhance the reliability of the study. Previous researchers have employed SHEG’s (2019) civic online reasoning performance tasks and rubrics across multiple studies (SHEG, 2016; SHEG, 2019). Therefore, I integrated these previously validated instruments, thus enhancing the reliability and validity of my study. Furthermore, to ensure reliability in qualitative research, Merriam and Tisdell (2016) argued that qualitative researchers must consider the consistency and dependability of the results (Merriam & Tisdell, 2016). Therefore, I employed interrater reliability, researcher reflexivity, and triangulation to achieve reliability, which I discuss in detail in the following sections.

**Interrater Reliability**

Two individuals, including a graduate assistant and myself, reviewed and graded 90% of the civic online reasoning performance tasks using rubrics created and provided by SHEG (2019) to ensure interrater reliability. After meeting to discuss how to grade each response using the provided rubrics, we each graded responses separately. We then met to share scores and discuss any discrepancies. After our initial scoring, we agreed on 85% of the scores, leaving five scores up for discussion. We met to discuss these discrepancies and referred to the rubrics to explain our differences in scoring. After closely re-examining the rubrics and responses and sharing our thought processes, we reached 100% agreement on the scores.
Additionally, a doctoral candidate and I coded and reviewed about 15% of the qualitative data to establish interrater reliability further. The reviewed qualitative data consisted of 40 coded excerpts from student interviews, civic online reasoning performance tasks, and assignments. After explaining my coding process, the second rater individually coded each item. After comparing our initial codes, we agreed on 24, resulting in an initial agreement of 60%. After discussing the remaining 16 codes that we did not initially agree on, we came to an agreement on all but two codes, resulting in an agreement rate of 95%. Using interrater reliability aids in negating any bias one individual might bring to scoring, further validating this study (Creswell & Guetterman, 2018).

**Researcher’s Bias**

As the teacher who created and taught the media literacy course utilized as a part of this dissertation project, I took on the position of an insider researcher. While this positionality gave me greater access to data compared to an outsider researcher, researchers may make the mistake of treating themselves as an “outside observer” instead of as an insider (Herr & Anderson, 2012, p. 5). Additionally, I created and implemented this course before considering its use as a data source for my dissertation, creating a potential ethical conflict due to my previous relationship with the student participants. To address this ethical concern, I practiced researcher reflexivity, where researchers critically self-reflect on how their biases affect the study and self-disclose how they may shape their inquiry (Creswell & Miller, 2010; Merriam & Tisdell, 2016).

In reflecting on my biases, I recognized that my predominant role as a social studies teacher may have influenced the decisions I made when creating and teaching the course. For example, in alignment with Clark et al. (2021), I believe that “social studies educators have a responsibility to contribute to students’ understanding of current events as well as to develop
students’ capacity to consider the modes of information they consume” (p. 24). However, when integrating current events into the classroom, Clark et al. (2021) pointed out that a teacher’s own ideology may consciously or unconsciously influence the current events educators select for lessons. Therefore, they recommended that teachers reflect on how their ideologies may shape their resource choices and have open conversations with their students about the influence of ideology on news production and consumption (Clark et al., 2021). To address concerns related to bias, I integrated several established educational resources into the course, striving to foster the critical skills needed to understand the influence of biases when evaluating online sources (iCivics, 2017; Otis, 2020; News Literacy Project, 2023; PBS & WGBH Educational Foundation, 2023; SHEG, 2019). Acknowledging my presence in the study as an insider researcher and my role as both the researcher and the teacher of the course in question increased the transparency of my research and helped ensure validity.

Furthermore, as the creator and teacher of the media literacy course, I also had a personal interest in seeing the study's positive outcomes. Herr and Anderson (2012) cautioned researchers to avoid the temptation of putting a positive spin on their data and suggested that researchers bring in an outsider researcher to the study to alleviate this ethical conflict (p. 7). Therefore, I utilized interrater reliability to analyze and code the quantitative and qualitative data. Furthermore, I based the quantitative instruments used in the study on instruments that SHEG has already used and validated (SHEG, 2019). I then triangulated the quantitative and qualitative data with student artifact analyses, semi-structured interviews, and a qualitative analysis of the civic online reasoning performance tasks. By utilizing an outsider researcher, integrating previously validated instruments, and including multiple data sources, this triangulation further addressed this ethical conflict, contributing to the study's validity (Merriam & Tisdell, 2016).
Finally, I also utilized an audit trail to provide detailed and precise documentation of all methods, procedures, and decisions throughout the research process (Creswell & Miller, 2010; Merriam & Tisdell, 2016). Providing a detailed account of my research process increased the reliability of my study as it helped ensure that the conclusions I drew from the research were logical and grounded in the data. Utilizing an audit trail also helped me critically examine and reflect on the potential impact of my biases on the research process. This commitment to transparency through detailed documentation of the research process further enhanced the validity and reliability of this study.

**Triangulation**

According to Creswell and Guetterman (2018), investigators use triangulation to improve their inquiries by collecting and combining different kinds of data on the same phenomenon (p. 546). Mixed methods research allows researchers to integrate multiple databases to understand a phenomenon and research problem. Furthermore, because case study researchers tend to rely on relatively small databases (Stake, 1995), Gerring (2017) argued for the importance of enlisting a wide range of evidence. Therefore, I used several instruments to triangulate the data of my research study by gathering data from various sources, including a questionnaire, civic online reasoning performance tasks, semi-structured interviews, and student artifacts, and by involving several participants in the study. The triangulation of data drawn from several sources or individuals helps researchers validate their study (Creswell & Plano Clark, 2017).

To implement triangulation effectively, I followed an explanatory sequential research design by utilizing qualitative data to explain and clarify the quantitative data (Creswell & Plano Clark, 2017). For example, while students responded to civic online reasoning performance tasks as part of the quantitative data, students could then reflect on their experience while completing
these tasks during the follow-up individual student interviews. Additionally, while students reported how they engaged with news and current events in the questionnaire, the interviews allowed students to clarify what this engagement process looks like. Furthermore, while students indicated the impact of taking the media literacy course on their abilities to evaluate the credibility of online information in the questionnaire, a qualitative analysis of the interviews, artifacts, and performance tasks allowed me to corroborate or contradict the quantitative findings.

**Informed Consent and Protection of Human Subjects**

Parental consent was required and collected because the population comprises high school students younger than 18. Furthermore, a Spanish teacher at the target high school translated the parental consent form into Spanish, as some of the students' parents speak Spanish as their first language. Therefore, students received a copy of the parental consent form in English and Spanish. After parents granted their consent, student assent was also required and collected. I personally distributed and collected parental consent forms and assent forms. To further protect students, student participants could drop out of the study at any time. I assigned code numbers to protect participants' confidentiality and did not use their real names. Due to the small population, minimal demographic details were collected to protect the students' identities. Specifically, students’ genders, ethnicities, races, and socioeconomic statuses were not collected and analyzed as a part of this study.

Furthermore, I requested permission from parents and students to use the assignments of this course as artifacts for this study. No artifacts were used without parental consent and student assent. Grades from these assignments were not impacted by the student's decision to participate or not participate in this study. Because the target high school offers the media literacy course as
an elective, I currently teach or may teach some student participants in future classes.

Assignments and course grades were not and will not be impacted by the student's decision to participate or not participate in this study.

**Summary**

Chapter 3 provides an in-depth description of my methodology in this study. I have employed a case study-explanatory sequential mixed methods research design to develop an in-depth understanding of the impact of a media literacy course on students’ cognitive processes through the collection and analysis of multiple forms of data (Creswell & Guetterman, 2018). After collecting and analyzing quantitative data through a questionnaire and civic online reasoning performance tasks, I collected and analyzed qualitative data, including semi-structured student interviews, student artifacts from their media literacy course, and a qualitative analysis of the civic online reasoning performance task responses to explain the quantitative results further. Due to the small population and sample size and my desire to deeply understand students’ cognitive processes, I used a case-selection variant to prioritize the second qualitative phase of the study (quan → QUAL). In addition to describing the details of the methodology utilized in this study, I also provided an overview of the threats to reliability, validity, and researcher bias and addressed ways that I mitigated these threats. Chapter 4 provides a detailed account of the study’s results.
CHAPTER 4

Chapter 4 begins with an overview of the demographics and preliminary results, followed by a detailed analysis of the study results. I first analyzed the quantitative data, consisting of the questionnaire and civic online reasoning performance tasks, prior to analyzing the qualitative data, which included student interviews, artifacts, and responses to civic online reasoning performance tasks. The descriptive and inferential statistics used to analyze the quantitative data informed the collection and analysis of the qualitative data. Using In vivo coding followed by provisional coding, I analyzed the qualitative data through two coding cycles to establish categories and themes that emerged from the data. I then compared the quantitative and qualitative data results to establish consistencies and inconsistencies between the data sets.

Chapter 4 provides the results of this explanatory sequential mixed methods study to address the following research questions:

**Overarching Question**

1. How may explicit civic online reasoning instruction impact high school students’ intuitive and analytical cognitive processes when evaluating online sources?

**Quantitative Question**

2. What percentage of high school students report high confidence in their ability to evaluate the credibility of online sources, and what is the relationship between their confidence levels and civic online reasoning skills?

**Qualitative Questions**

3. What perspectives do students hold regarding how a semester-long media literacy course impacted their intuitive and analytical cognitive processes when evaluating online sources?
4. How may heuristics, cognitive biases, and confidence in civic online reasoning abilities impact students’ intuitive and analytical cognitive processes?

**Mixed Methods Research Question**

5. How does exploring students’ intuitive and analytical cognitive processes while evaluating online sources contribute to understanding their civic online reasoning skills?

After providing a brief overview of the demographics, Chapter 4 first discusses preliminary quantitative and qualitative data regarding students’ online and social media use, engagement with current events, and the influence of high school classes on their ability to evaluate online information. As previous research indicates that students’ background and education may impact students’ performance when evaluating the credibility of online information (Nygren & Guath, 2022), these preliminary results provide important insights into contextualizing students’ cognitive processes and understanding of civic online reasoning skills. Chapter 4 then provides the detailed results regarding the quantitative, qualitative, and mixed methods research questions. Finally, I address the overarching research question at the end of Chapter 4 due to its culmination of the quantitative and qualitative data.

**Demographics of the Sample**

The population included 23 students who completed a media literacy course at the target high school during the Spring 2023 semester (N=23). A total of 12 students completed the questionnaire, resulting in a return rate of 52% (n=12). Due to the small and targeted population size, I collected minimal demographics to protect the students' identities in the study. Table 4.1 illustrates the questionnaire's basic demographics, including students’ grades and ages.
Table 4.1

Participant Demographics

<table>
<thead>
<tr>
<th>Grade</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Sample Size 12

Preliminary Results

The questionnaire first sought to establish background information regarding students’ online and social media use, engagement with current events, and the influence of high school classes on their ability to evaluate online information. While these items did not explicitly address the research questions, they offered important information to contextualize students' online habits. Additionally, these items laid the groundwork for exploring students’ perceptions of their civic online reasoning skills and cognitive processes in the qualitative phase of this study.

Quantitative Analysis of Students’ Regular Online and Social Media Use

Because research indicates that young people spend an increasing amount of time constantly connected to the internet (Vogels et al., 2022), the questionnaire included several items to establish how students regularly use the internet and social media, including hours spent online, online activities, and sources of news and current events. All students reported owning a
smartphone. Three students reported spending between one and three hours online, and one student reported spending more than 13 hours per day online. Table 4.2 illustrates the range of hours students reported spending online per day.

Table 4.2

<table>
<thead>
<tr>
<th>Hours Per Day</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>3</td>
</tr>
<tr>
<td>4-6</td>
<td>4</td>
</tr>
<tr>
<td>7-9</td>
<td>2</td>
</tr>
<tr>
<td>10-12</td>
<td>2</td>
</tr>
<tr>
<td>13 or more</td>
<td>1</td>
</tr>
</tbody>
</table>

**Median**

4-6 hours per day

The top three online activities students reported included keeping up with what friends and family are doing, shopping and researching products, and visiting accounts by people they do not know. Only one student reported keeping up with current events as one of their top three online activities. Table 4.3 provides a breakdown of students’ reported top three online activities across the 12 participants.

Despite the limited prioritization of current events, all 12 students indicated receiving information about the news through social media. Notably, none of the students reported neglecting news altogether. Brewster et al. (2022) reported that young people have increasingly used social media sites, specifically TikTok, as search engines instead of Google to find information. Therefore, establishing where students receive information regarding current events provides background into understanding their engagement with current events, especially via social media.
Table 4.3

*Top Three Online Activities Students Do Most on an Average Day*

<table>
<thead>
<tr>
<th>Online Activities</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keeping up with what friends and family are doing</td>
<td>8</td>
</tr>
<tr>
<td>Shopping and researching products</td>
<td>5</td>
</tr>
<tr>
<td>Visiting accounts by people you don’t personally know (meme accounts, celebrity accounts, etc.)</td>
<td>5</td>
</tr>
<tr>
<td>Checking and sending email</td>
<td>4</td>
</tr>
<tr>
<td>Playing games</td>
<td>4</td>
</tr>
<tr>
<td>Finding information about events, movies, restaurants, etc.</td>
<td>3</td>
</tr>
<tr>
<td>Researching topics you are interested in</td>
<td>2</td>
</tr>
<tr>
<td>Checking weather, traffic, or public transportation</td>
<td>1</td>
</tr>
<tr>
<td>Keeping up with current events</td>
<td>1</td>
</tr>
<tr>
<td>Other: Just scrolling, watching videos</td>
<td>1</td>
</tr>
<tr>
<td>Other: Sports</td>
<td>1</td>
</tr>
<tr>
<td>Other: Watching videos, doing homework</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.4 illustrates where students reported receiving information regarding current events and the news through social media. Ten students reported receiving information about current events and the news from Instagram, and nine reported TikTok as a source for keeping up with the news and current events. Furthermore, the qualitative analysis found that students discussed various current events students access via social media, suggesting that they encounter various political, international, and domestic issues, providing context into understanding how they may engage with these online sources.
Table 4.4

Sources of News and Current Events

<table>
<thead>
<tr>
<th>Sources</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social media</td>
<td>12</td>
</tr>
<tr>
<td>• Instagram</td>
<td>10</td>
</tr>
<tr>
<td>• TikTok</td>
<td>9</td>
</tr>
<tr>
<td>• YouTube</td>
<td>4</td>
</tr>
<tr>
<td>• Snapchat</td>
<td>3</td>
</tr>
<tr>
<td>• Facebook</td>
<td>1</td>
</tr>
<tr>
<td>• I don’t keep up with the news on social media</td>
<td>0</td>
</tr>
<tr>
<td>News websites</td>
<td>9</td>
</tr>
<tr>
<td>Talking with family</td>
<td>6</td>
</tr>
<tr>
<td>Talking with friends</td>
<td>6</td>
</tr>
<tr>
<td>Teachers</td>
<td>6</td>
</tr>
<tr>
<td>Television</td>
<td>5</td>
</tr>
<tr>
<td>Print newspaper</td>
<td>1</td>
</tr>
<tr>
<td>Radio or podcasts</td>
<td>1</td>
</tr>
<tr>
<td>I don’t keep up with the news</td>
<td>0</td>
</tr>
</tbody>
</table>

Qualitative Analysis of Students’ Regular Online and Social Media Use

After conducting two rounds of coding using In vivo and provisional coding across all qualitative data, including student artifacts, interviews, and civic online reasoning performance tasks, several patterns emerged regarding how students reported regularly using online and social media to support and explain the quantitative findings. For example, students did a project during their media literacy course, creating a collage illustrating their lives with and without media. Students then completed a journal response following this assignment that asked them to reflect on their personal media use. Student participants reported spending between five and 12 hours
daily connected to media. All participants reported social media as a major part of their lives revolving around media and cited TikTok, Snapchat, and Instagram as the most popular social media platforms.

Furthermore, five participants elaborated more on their social media use in the individual student interviews. All five participants referenced social media sites they regularly use, including Instagram, Pinterest, YouTube, TikTok, Snapchat, and Facebook, with several specifying how they use these platforms for different purposes. For example, Participant 1 explained that they used Pinterest for ideas, YouTube for entertainment, and Instagram to stay updated on friends and social topics. Participant 3 further explained that they use YouTube and other streaming services as entertainment that provide them with “a sense of enjoyment.” Participant 5 also specified that they use several social media platforms to keep up with their friends and family, but they use each platform differently. For example, they use TikTok for entertainment, Snapchat as their main form of communication, Instagram to post pictures and “to look at what other people are posting,” and iMessage to communicate with family. While Participant 8 indicated that they use Facebook to keep up with family, they spent more time on other social media platforms like Instagram, TikTok, and Snapchat. This qualitative data supports the quantitative data as student participants reported keeping up with friends and family as the top online activity students engage with on the questionnaire. Despite this finding, all students indicated exposure to current events, especially through social media, highlighting the importance of understanding how they engage with these online sources.

**Engagement with Current Events Online.** Interestingly, the quantitative data showed that only one student reported keeping up with the news or current events as one of their top three online activities they engage with on a daily basis. However, all 12 students still reported
using social media as a source of news. Therefore, I further investigated how students use the media and internet regarding current events and the news in the qualitative analysis of student artifacts and the follow-up individual student interviews. An analysis of the Media and Me project showed that three of the 12 participants referenced keeping up with the news. For example, Participant 9 cited using media to keep up with breaking news, Participant 6 explained that they use Reddit to get their news, and Participant 10 said they use social media platforms “24/7” to keep up with “shocking news.”

In the follow-up interviews, when asked to describe how students regularly use the internet and social media, Participants 2, 3, and 5 discussed how they keep up with the news or current events. Participant 2 explained, “I use the internet and social media to research stuff that I have questions on or to elaborate more on stuff… like current events around the world.” Participant 2 also noted that they receive updates on current events from platforms including TikTok, Snapchat, and Instagram, as well as through their Alexa. Participant 5 also indicated that they use the media to stay updated on the news. Additionally, Participant 3 explained that they used the media to learn more about current topics and to further their knowledge of politics. On the other hand, Participant 1 indicated that they only keep up with current events “a little bit, for sure, but not too much,” and Participant 8 responded that they did not really keep up with the news or current events. Despite these differences, all interviewees expressed some level of engagement with current events online, providing context into exploring how students evaluate these online sources.

**Active and Passive News Consumption.** All interviewees reported different ways they engage with the news, specifying if they actively sought out specific news stories or if they came across them more passively. While Participant 1 reported that they only keep up with current
events and the news “a little” to research for school and their academic team, they also reported reading newsletters or news in the morning. Participant 1 clarified that they actively seek out the news when they are interested in the topic or have “seen a lot about and want to make [their] own opinion.” Participant 2 noted that when scrolling through social media and they come across current events, they conduct further research if they have questions about the story. When asked how often they see current events on social media, Participant 2 responded, “I think a lot. Especially through TikTok because you are just scrolling and scrolling. They use their algorithms to show stuff.” Participant 3 further expressed relying on social media to learn about current topics, saying, “Social media provides a good educational basis for furthering your knowledge in overall politics.” Furthermore, Participant 5 explained that their enrollment in a current events course at the target high school prompted them to research different current events, specifying that they looked up current events more for their “school life, not so much [their] personal life.” Additionally, Participant 5 explained how they felt that they saw more news articles “popping up more often than [they] used to when [they] would just kind of search for [their] own personal interests” and further expressed, “I’m definitely not searching for politics or any of those kinds of like recent… although they’re interesting, it’s not my type of interest.” Participant 8 also said they see some information “pop up about an event that happened” when using social media. However, they also specified that they do not click on the stories or actively seek out news.

**Types of Current Events Students Engage With.** During the interviews, student participants shared what kinds of current events they engage with online, with four participants specifying the Russia-Ukraine War (Participants 2, 3, 5, 8) and the Israel-Hamas War (Participants 1, 2, 3, 5). Despite these similarities, students reported different engagement levels
with these specific current events, with some indicating more active engagement while others explained they came across these current events more passively. For example, Participant 1 explained that they actively sought out information on the Israel-Hamas War because they saw it “all over Instagram” and wanted to do their “own research before making [their] own judgment about the situation.” Participants 2 and 3 agreed that they have seen current events related to the Israel-Hamas War through their social media accounts and turned to news outlets if they want to research it further. On the other hand, while Participant 8 specifically recalled seeing current events related to the Russia-Ukraine War “pop up” on their social media feed, they did not click on the sources to investigate further. Participant 5 agreed that they saw the Russia-Ukraine War and Israel-Hamas War “popping up more often” compared to when they conduct searches for their own personal interests.

Students also discussed various current events they have seen online, showing a range of international, domestic, political, social, and human-interest topics, as seen in Table 4.5. Despite students reporting a mix of active and passive online news consumption, this data indicates that students experience exposure to a wide variety of current events while online. Furthermore, the qualitative data provides further support for the quantitative data, indicating all participants reported using social media as a source to receive information about news and current events. Because the growing reliance on these social media platforms as a source of news and information has significantly complicated the task of deciphering the credibility of online sources (Hobbs, 2017), media literacy advocates argue that educators must equip students with the skills needed to evaluate the credibility of online information (Breakstone et al., 2021; McGrew et al., 2018).
Table 4.5

**Interviewee’s Online Engagement with Current Events**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Types of Current Events Students Discussed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>● Israel-Hamas War&lt;br&gt;● LGBTQ+ Rights&lt;br&gt;● Overturning of Roe v. Wade</td>
</tr>
<tr>
<td>2</td>
<td>● Israel-Hamas War&lt;br&gt;● Russia-Ukraine War&lt;br&gt;● Donald Trump Jail Mugshot</td>
</tr>
<tr>
<td>3</td>
<td>● Israel-Hamas War&lt;br&gt;● Russia-Ukraine War&lt;br&gt;● COVID-19’s Impact on Racial Bias</td>
</tr>
<tr>
<td>5</td>
<td>● Israel-Hamas War&lt;br&gt;● Russia-Ukraine War&lt;br&gt;● Domestic Violence Stories&lt;br&gt;● Death of Matthew Perry&lt;br&gt;● Lil Tay’s Death Hoax</td>
</tr>
<tr>
<td>8</td>
<td>● Russia-Ukraine War&lt;br&gt;● Tom Brady’s Retirement&lt;br&gt;● Updates on the Eagles</td>
</tr>
</tbody>
</table>

**Quantitative Analysis on the Influence of Education**

Because media literacy education remains the exception rather than the expectation across schools in the United States (DiGiacomo et al., 2023), I sought to understand students’ previous exposure to such skills in their past educational experiences to contextualize what skills they may have prior to taking the media literacy course. The questionnaire included an item asking students what other high school classes they have taken where they have learned online evaluation skills, laying the groundwork for a deeper exploration of these perceptions in the individual student interviews. Students reported several other high school classes outside of the media literacy course where they felt they learned how to evaluate online information. Nine
students reported learning how to evaluate online information in social studies classes, and seven reported learning these skills in English. Table 4.6 provides a full list of the classes that students reported. Students also reported several classes that influenced their opinions about the news and current events. Eleven students reported media literacy, 10 reported social studies, and five reported English. Table 4.6 includes all of the high school classes students reported having an influence on their opinions regarding the news and current events. Furthermore, all 12 students agreed that taking the media literacy course helped them better evaluate the credibility of online information. To explore the influence of these classes on students’ civic online reasoning skills more deeply, I asked students to expand on these responses in the follow-up interviews.

**Qualitative Analysis on the Influence of Education**

The quantitative data revealed that most student participants reported learning how to evaluate the credibility of online sources in other high school classes outside of their media literacy course, specifically citing their social studies and English classes. Therefore, I investigated this further in the follow-up interviews to better understand students’ perceptions of what they learned from these classes. Participant 1 elaborated that they conducted “substantial research projects” in their social studies and English classes and learned how to use the library to find credible sources. When asked how they learned to identify the credibility of sources in these classes, Participant 1 explained, “I think it was more visual. They taught us URLs and stuff like that and also the look of the website.” Participant 2 also cited social studies and English as classes they have learned to find credible sources and explained that when conducting research projects in these classes, “You have to make sure they’re legible websites.”
Table 4.6

Influence of High School Classes on Students

<table>
<thead>
<tr>
<th>High School Class</th>
<th>Responses to Exposure of Evaluating Online Information in Other High School Classes(^a)</th>
<th>Responses to Influence of High School Classes on Students’ Opinions on the News and Current Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Literacy</td>
<td>4(^a)</td>
<td>11</td>
</tr>
<tr>
<td>Social Studies</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>English</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Business</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Current Events</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Digital Journalism</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Health</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Math</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Science</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Investing</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sociology</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>World Language</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Psychology</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: \(^a\)This question aimed to gauge other classes outside of Media Literacy where students felt they had learned how to evaluate online information. Therefore, Media Literacy was not included as a choice. However, it should be noted that four students did write in the media literacy course under the Other option. Media Literacy was included as an option for students to select if they felt this course influenced their opinions on the news and current events.

Participant 3 recalled that when conducting research on countries around the world in their social studies class, their teacher stressed keeping “an open mind in regards to their culture and how they conduct their way of living” and made sure “we were free of any bias.” When prompted further, Participant 3 explained that they learned this through “more of a conversation” but believed that “including it as a topic of conversation was very beneficial to the class and students.” Participant 8 referenced science as a class where they had to find credible sources,
explaining that their teacher would tell them to ensure their sources were true. However, Participant 8 did not feel they learned what students should look for when deciding the credibility of sources, noting that their teachers told them, “Just make sure it’s credible.” Furthermore, Participant 1 also reflected on their time in elementary and middle school, saying they learned “to look at the site and if it looks good, it’s most likely credible.”

Participant 1 felt that their core social studies and English classes emphasized learning how to evaluate the credibility of online sources more than elective classes. Despite also conducting research projects in their sociology and psychology classes, the target high school offers these classes as electives that students can take in addition to their core classes. Participant 1 elaborated, “It was kind of emphasized less because they were both semester classes, so we didn’t have a ton of time. And it was also, I don’t know, I guess, seen as not as important.” In the questionnaire, Participant 5 indicated that they did not feel they had learned skills related to evaluating the credibility of online sources. When asked to elaborate, Participant 5 explained that because the media literacy course focused on these skills so much, “it kind of just made the other classes look like they were just throwing websites” and further questioned, “How do we find them ourselves?” On the other hand, other interviewees reported a mix of teachers providing them with sources versus finding their own. Participant 1 felt that most of their research projects required them to conduct their own research, while Participants 2 and 8 recalled using both teacher-provided resources and conducting their research. While these preliminary results regarding students’ media and internet use and educational experiences did not directly address the research questions, they do provide essential context to understanding students’ confidence and understanding of civic online reasoning skills, perceptions of the media literacy course, and cognitive processes when evaluating the credibility of online sources.
RQ2: The Relationship between Confidence and Civic Online Reasoning Skills

To evaluate the relationship between students’ confidence levels and civic online reasoning skills, I analyzed the quantitative data using descriptive and inferential statistics of students’ self-reported confidence in their ability to identify credible sources online to their civic online reasoning skills. Because of the relationship between individuals’ perceptions of confidence and ease (Kahneman, 2011), I also quantified students’ perceptions of ease in determining the credibility of online sources.

Levels of Confidence and Ease in Evaluating Online Sources

Students reported high levels of confidence in their abilities to evaluate online sources. Interestingly, although students reported high confidence levels, the data suggested a greater range in perceptions of ease. When asked to what extent students feel confident in their ability to evaluate the credibility of online information, nine students agreed (75%), two students strongly agreed (16.7%), and one student neither agreed nor disagreed (8.3%). To establish if a relationship existed between students’ confidence and their skills, I correlated students’ confidence levels with their civic online reasoning skills. Responses varied regarding ease, with seven students finding it neither easy nor difficult (58.3%), three students finding it easy (25%), one student finding it very easy (8.3%), and one student finding it very difficult (8.3%). Due to this finding, I also correlated students’ perceptions of ease with their students’ civic online reasoning skills.

Measuring Civic Online Reasoning Skills

The quantitative data included several items to measure civic online reasoning skills. Twelve students completed the questionnaire (n=12), and nine completed the civic online reasoning performance tasks (n=9). I first used descriptive statistics to establish trends in these
two sets of quantitative data and inferential statistics to establish correlations between variables. Both the questionnaire and performance task results showed a wide range of scores, making for an interesting comparison to the students’ reported confidence levels.

**Civic Online Reasoning Questionnaire Results.** The questionnaire included closed-ended and semi-closed categorical items and Likert scales to gauge how students responded to certain scenarios involving civic online reasoning skills. I calculated a summed score using students’ responses to measure their civic online reasoning skills. Students could earn up to 30 points as the highest summed score, indicating a high level of civic online reasoning skills. Each Likert scale item had five points, while each categorical item had two points, as indicated in Table 4.7, providing the individual scores for each item.

It should be noted that three items in the questionnaire were not included in these results. I did not include the Likert scale item that asked students to what extent they agreed that they always fact-checked questionable information online because it did not measure a specific, measurable civic online reasoning skill. Still, the results showed a range of responses, with four (33.33%) disagreeing, three (25%) neither agreeing nor disagreeing, three (25%) agreeing, and two (16.67%) strongly agreeing. Additionally, I did not include the extent to which students agreed on the importance of the publication date and author’s credentials as part of the results.
Table 4.7

*Questionnaire Civic Online Reasoning Skills Individual Items*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank how important you think each item is when you are determining the credibility of an online source: The domain (.org, .com)</td>
<td>0% Most Important</td>
</tr>
<tr>
<td>Rank how important you think each item is when you are determining the credibility of an online source: The website’s About page</td>
<td>1 (8.33%) Most Important</td>
</tr>
<tr>
<td>Rank how important you think each item is when you are determining the credibility of an online source: Learning what other online sources say about the website</td>
<td>0% Not Important</td>
</tr>
<tr>
<td>To what extent do you agree: If a website looks professional, this is always a good sign that the website is credible.</td>
<td>1 (8.33%) Strongly Agree</td>
</tr>
<tr>
<td>What are you most likely to do first when you want to determine the credibility of online sources?</td>
<td>4 (33.33%) Look at the domain (.com, .org)</td>
</tr>
<tr>
<td>You are doing research on a controversial topic for a school project. You do an internet search on your topic. What are you most likely to do first when looking for reliable information on the topic?</td>
<td>2 (16.67%) Click on the first few links that appear</td>
</tr>
<tr>
<td>You see a shocking post from a source on social media that you are not familiar with. Thousands have viewed and shared the post. What are you most likely to do first when you see this post?</td>
<td>7 (58.33%) You click on the story to learn more about it</td>
</tr>
</tbody>
</table>
One (8.33%) ranked the publication date of a source as not important, two (16.67%) as somewhat important, seven (58.33%) as important, and two (16.67%) as very important. Four (33.33%) ranked the author’s credentials as somewhat important, four (33.33%) as important, three (25%) as very important, and one (8.33%) as most important. Although researchers consider the reliance on currency and authority as heuristics that may mislead individuals in evaluating the credibility of a source (Breakstone et al., 2018b), the items did not provide enough context to measure this as a civic online reasoning skill. For example, it could not be determined from the questionnaire item alone if the student may have conducted lateral reading to learn more about the author or the publication date.

Table 4.8 includes the summed scores of each item noted in Table 4.7 for each participant ranked in order from the highest summed score to the lowest (n=12). The students’ summed scores ranged from 14 to 22, with a median of 19.

**Table 4.8**

<table>
<thead>
<tr>
<th>Participant</th>
<th>Questionnaire Civic Online Reasoning Skills Summed Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>
Civic Online Reasoning Performance Tasks Results. Nine students completed the performance tasks ($n=9$), which measured students’ level of mastery when using civic online reasoning skills. Each performance task measured a specific civic online reasoning skill and was graded using a rubric created and provided by SHEG (2019). As described in Chapter 3, the first performance task addressed the question of *who is behind the information* and assessed students’ abilities to verify the reliability of a website. The second performance task addressed the question of *what is the evidence* and assessed students’ abilities to evaluate evidence provided on social media. The third and final performance task addressed the question of *what do other sources say* and assessed students’ abilities to research a claim on the open internet. According to the provided rubric, students could earn scores ranging from beginning to mastery level.

To allow for quantitative data analysis, I assigned numerical values to students' scores on each performance task, with the lowest numbers indicating a beginning level and the highest indicating a mastery level. The total possible summed scores ranged from 4 points, indicating beginning level, to 13 points, indicating mastery of civic online reasoning skills. Table 4.9 provides participants' scores on each performance task from the highest summed score of 11 to the lowest summed score of 4. When comparing the median of the individual performance task scores, student participants scored higher on Performance Task 3 compared to the other Performance Tasks. Table 4.9 provides the median of each performance task, showing a median of 3 for Performance Task 3, with six students scoring either partial mastery or mastery. The results of Performance Task 1 show a median of 2 (emerging), while the results of both parts of Performance Task 2 show a median of 1 (beginning).

Of the 36 individual scores, 19 responses scored beginning level (52.78%), nine responses scored emerging level (25%), six scored mastery level (16.67%), and two scored
partial mastery on Performance Task 3 (5.56%). The descriptive statistics showed a range of scores from 4 to 11, with a median of 6. Despite students reporting high confidence levels in their civic online reasoning skills, this data suggests their confidence may not reflect their true abilities, as previous research suggests (Mahmood, 2016). Therefore, I ran a series of correlational statistics to explore this relationship.

**Table 4.9**

*Civic Online Reasoning Performance Task Scores*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

**Median** | 2 | 1 | 1 | 3 | 6 |

*Note:* I assigned numerical values to each score for statistical analysis. For Performance Tasks 1, 2a, and 2b, the total possible scores ranged from Beginning (1) to Mastery (3). Performance Task 3 included an additional possible score of “Partial Mastery.” Therefore, the total possible scores for this performance task ranged from Beginning (1) to Mastery (4). The lowest summed score possible was 4, while the highest was 11.
The Correlation between Confidence and Civic Online Reasoning. Due to the small population size, I used Spearman’s rank correlation and Kendall’s tau to compute the correlation between items as a nonparametric statistic (Salkind & Frey, 2019). Because research suggests that media literacy instruction positively correlates with students’ confidence in their ability to evaluate the credibility of online sources (Tamboer et al., 2023), I tested the relationship between students’ perceptions of their confidence levels and the media literacy course's impact on their abilities to evaluate the credibility of online sources. Additionally, because research suggests a relationship exists between confidence levels and perceptions of ease (Kahneman, 2011), I tested the correlation between these variables. Due to this possible connection, I also tested the relationship between perceptions of ease and civic online reasoning skills, measured as two separate summed scores from the questionnaire and performance tasks as described in the previous section. As Table 4.10 indicates, the nonparametric tests showed statistical insignificance across these variables.

To test whether a relationship existed between confidence and skills, I correlated students’ confidence levels with their civic online reasoning skills using two quantitative data sets. All 12 participants completed the questionnaire, allowing me to compare these variables across all respondents. The nonparametric tests found a statistically insignificant correlation between students’ confidence levels and civic online reasoning skills, as measured by the questionnaire. However, when comparing the confidence levels to the summed performance task scores using Spearman’s rank, the results showed a correlation coefficient of .674 and a p-value of .047, suggesting a moderate statistical relationship between the variables. Although using Kendall’s tau resulted in slightly different results, showing a correlation coefficient of .593 and a p-value of .054, these results still suggest near statistical significance.
Table 4.10

Correlations of Variables Using Nonparametric Tests

<table>
<thead>
<tr>
<th>Variables Correlated</th>
<th>Spearman’s Rank</th>
<th>Kendall’s Tau</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td></td>
<td>.512</td>
<td>.089</td>
</tr>
<tr>
<td>● Levels of Confidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Levels of Impact on Media Literacy Course</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.399</td>
<td>.199</td>
</tr>
<tr>
<td>● Levels of Confidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Levels of Ease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Levels of Ease</td>
<td>-.199</td>
<td>.608</td>
</tr>
<tr>
<td>● Performance Task Summed Scores&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Levels of Ease</td>
<td>.004</td>
<td>.990</td>
</tr>
<tr>
<td>● Questionnaire Summed Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.674</td>
<td>.047&lt;sup&gt;*&lt;/sup&gt;</td>
</tr>
<tr>
<td>● Levels of Confidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Performance Task Summed Scores&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Levels of Confidence</td>
<td>.464</td>
<td>.129</td>
</tr>
<tr>
<td>● Questionnaire Summed Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.648</td>
<td>.059</td>
</tr>
<tr>
<td>● Performance Task Summed Scores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Questionnaire Summed Scores&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: <sup>a</sup>Indicates a smaller sample size (n = 9) than the other tests (n = 12).

*<sup>p</sup> < .05.
Furthermore, I tested the relationship between the two sets of scores, comparing the summed scores of the civic online reasoning questionnaire results to the performance task results. Because the questionnaire measured how students responded to hypothetical situations and performance tasks measured how students responded to actual situations, I tested these variables to determine if a correlation existed between how students think they respond to evaluating online information and how they actually respond. In this instance, using Kendall’s tau showed a correlation coefficient of .572 and a p-value of .048, suggesting a moderate statistical significance. Although using Spearman’s rank resulted in a correlation coefficient of .648 and a p-value of .059, these results still suggest near statistical significance. It should be noted that only nine students completed the performance tasks, resulting in a smaller sample size to compare the data and potentially impacting the results. Puth et al. (2014) noted that with sample sizes as low as 10, using these nonparametric tests offers relatively low power for detecting significant levels of association. Although some quantitative findings suggested statistical significance, I interpreted the data cautiously and relied on qualitative data to explain the quantitative data further. Students reported high confidence in their abilities to evaluate the credibility of online sources on the questionnaire successfully. They also agreed that their media literacy course helped improve these skills and agreed on the importance of learning to evaluate online sources. To explain these quantitative findings, I further explored students’ perceptions of their media literacy course in the follow-up individual student interviews.

**RQ3: Students’ Perspectives on the Impact of Media Literacy Education**

Responses from the questionnaire indicated that most students were interested in the course or it was recommended to them by a friend. Additionally, when asked to what extent they believed that students should learn how to evaluate the credibility of online sources in school, all
12 participants agreed or strongly agreed. Having established students’ perceptions regarding their motivation for taking the course and importance of media literacy, this section discusses the qualitative analysis of students’ perspectives on the impact of media literacy education.

**Students’ Understanding of Media Literacy**

To establish their understanding of key ideas from their media literacy class, I asked each student in the follow-up interviews to define *media literate* and *civic online reasoning skills*. Table 4.11 includes each interviewee’s definitions of both terms in their own words. As seen in the table, participants generally defined media literacy in terms of understanding, awareness, navigation, and the ability to distinguish credible sources. Participants demonstrated varying degrees of understanding when asked to define *civic online reasoning*. For example, Participant 2 associated *civic online reasoning* with an individual’s ability to use “common sense” while online. Participant 8 similarly associated this term with “you’re aware of social media and what’s going on.” Participant 1 emphasized, “Using your view as a citizen to understand news and updates,” while Participant 3 added, “How you interpret the media and what biases affect you as the reader.” Finally, Participant 5 defined civic online reasoning as “your ability to be able to identify a credible source.”

Table 4.11 also shows students’ responses regarding their perceptions of the importance of media literacy, providing support that all participants agreed on its importance. Most students emphasized the importance of evaluating sources to understand real from false information (Participants 1, 2, 5, 8), while Participant 3 stressed the importance of identifying bias. This qualitative data supports the quantitative data as all participants who completed the questionnaire agreed that learning how to evaluate the credibility of online information should be taught in school, speaking to the importance of media literacy.
**Table 4.11**

*Students’ Perceptions of Media Literacy*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Student Definition of Media Literate</th>
<th>Student Definition of Civic Online Reasoning Skills</th>
<th>Importance of Media Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Understanding what media you’re consuming and how it affects you and generally how you’re thinking should be affected by it. You should understand that you shouldn’t believe everything you see.”</td>
<td>“Using your view as a citizen to understand news and updates. Understanding different political beliefs of politicians and news organizations.”</td>
<td>“Yeah, [it is important] because, if not, I think there’d be a lot of false information and not verified information.”</td>
</tr>
<tr>
<td>2</td>
<td>“Understanding how you use media and how to analyze right or wrong or what’s fake, what’s true.”</td>
<td>“Common sense… Maybe some type of rules on the internet for like common sense. Like suspicious links or factual or not.”</td>
<td>“It’s important to be media literate so you can understand what you’re actually reading to see what’s real or not because there’s a lot of things on it [that] can be real or fake, especially now with AI.”</td>
</tr>
<tr>
<td>3</td>
<td>“The ability to successfully navigate the media without pertaining any bias which may be provided by various websites, as well as understanding what you’re reading and how it affects you as the reader.”</td>
<td>“How you interpret the media and what biases affect you as the reader and really what’s right and wrong regarding specific topics or the use of a particular website.”</td>
<td>“I do think it’s very important to be media literate to avoid any bias which may influence you or negatively impact your viewpoint or stance regarding topics in media.”</td>
</tr>
<tr>
<td>5</td>
<td>“To be aware of the media and to know what’s going on and how to basically use your own personal social media platforms.”</td>
<td>“Your ability to be able to identify a credible source by either using your resources or checking their own pages.”</td>
<td>“I think it is very important to be media literate because it can prevent you from spreading or receiving misinformation and understanding topics from different perspectives that may not be true.”</td>
</tr>
<tr>
<td>8</td>
<td>“Credible sources.”</td>
<td>“You’re aware of social media and what’s going on.”</td>
<td>“You can tell what’s true or what’s not online because a lot of stuff is false now. People are just wanting likes or attention on social media. So figuring out what’s real is important.”</td>
</tr>
</tbody>
</table>
Students’ Perceptions of their Media Literacy Skills

To explain the quantitative findings regarding students' confidence in their skills, interviewees discussed how media literate they considered themselves and to what extent the media literacy course contributed to this. Students generally considered themselves media literate and agreed that the media literacy course positively impacted their skills. For example, Participant 1 explained they felt “generally pretty media literate” and reflected that the course “made me more media literate.” Participant 2 also felt “pretty well” about their media literacy skills and felt the class increased them. Participant 5 agreed, “After taking this course compared to before, I’m definitely way more media literate than I used to be.” Participant 3 stated, “I would consider myself moderately media literate, especially after taking your class.” While Participant 8 agreed that they “gained a lot of knowledge” from the course, they also stated, “I wouldn’t say I’m great at it, but I’m definitely above average.” This qualitative data supports the quantitative data as the questionnaire showed that most participants reported high confidence in their media literacy skills, and all agreed the course positively impacted their abilities to discern the credibility of online information.

Students’ Takeaways from the Media Literacy Course

Interviewees further reflected on the major takeaways they gained from the course. All interviewees reported feeling that the course helped them gain skills or knowledge they have utilized outside of class. Students specifically recalled and discussed learning civic online reasoning skills, including lateral reading, click restraint, and learning who is behind the source. For example, Participant 1 stated, “You should and can pretty easily fact-check a source by doing lateral reading.” Similarly, Participant 3 recalled, “In class, you heavily emphasized cross-searching a lot of media sources to make sure that they are reliable. I implement that outside of
class.” Participant 2 agreed they also implemented what they learned in class by cross-referencing information to see “if it matches with other sources.” Additionally, Participant 5 explained how they continue to implement skills learned from class related to lateral reading and click restraint and stated:

I feel like I kind of have, I kind of have like a pattern now. Like, I kind of know what to do. because if this doesn’t work, then I have a backup plan. If this doesn’t work, then okay, let’s restart. And I definitely got that from this class.

Furthermore, Participant 8 explained that learning about who is behind the information, a key civic online reasoning skill, stood out to them as their greatest takeaway and stated, “You can see the people who made it and look them up and see their resume and stuff like what they do or the organization that made it.” Finally, some students connected their takeaways from the course to the importance of media literacy, reflecting on the broader implications of misinformation. For example, Participant 1 explained the importance of being more “cautious,” and Participant 2 spoke about the importance of being “vigilant” online. Participant 3 further reflected:

I think a major takeaway for me was just how easy it is for disinformation to spread throughout society. I find it rather scary, actually, that people would become so influenced by a certain viewpoint which may be completely false or inaccurate. And it has the ability to manipulate the way people believe, and that can have negative effects on many aspects of society… I feel far more informed in regards to determining what is biased and what is not biased, as well as the spread of disinformation and misinformation and how that affects the reader.
In support of the quantitative data, this qualitative data suggests that students felt more prepared to navigate the digital landscape after completing their media literacy course, laying the groundwork to explore students’ cognitive processes when engaging with online sources.

**RQ4: Students’ Cognitive Processes While Evaluating Online Information**

Scholars argue that reliance on heuristics and biases may result in less accurate discernment of the credibility of online information (Artmann, Scheibenzuber, & Nistor, 2023). Because research supports that biased thinking can influence how individuals evaluate online information (Kahne & Bowyer, 2017; Tandoc et al., 2021; Verma et al., 2023; Zlatkin-Troitschanskaia et al., 2020), both the quantitative and qualitative data analysis investigated how biases may influence students’ cognitive processes. Due to the influence that prior knowledge, beliefs, and opinions may have on how individuals process and evaluate information (Nygren & Guath, 2022), I examined students’ perceptions of how these factors may shape their biases and influence their cognitive processes when evaluating online information.

Additionally, I conducted a qualitative analysis of the student artifacts, interviews, and civic online reasoning performance tasks to explore students' cognitive processes further when evaluating online information. Initially, I analyzed student artifacts from their media literacy course to explore their intuitive and analytical thinking processes before, during, and after learning civic online reasoning skills. I then qualitatively analyzed the civic online reasoning performance tasks students completed in the quantitative phase to establish what cognitive processes students engaged with while completing them. Finally, a qualitative analysis of the student interviews provided insights into their evaluation process, providing a nuanced understanding of their cognitive processes. Utilizing multiple sources of data allowed me to
triangulate the data and gain a more comprehensive understanding of students’ cognitive processes.

**Quantitative Analysis on the Influence of Biases**

As research suggests that family and friends influence how young people receive and perceive the news and current events they consume (Jervelycke Belfrage, 2018; Young, 2015), I investigated how the influence of family and friends may contribute to students’ biases when evaluating online sources. The questionnaire item related to *Sources of News and Current Events* included a skip logic item for students who chose *talking with family* or *talking with friends* to quantitatively measure potential influences of biases and generate discussions in the qualitative interviews. Six students reported that they consider their family a news source. Six students reported gaining knowledge about current events and the news through casual conversations at home, and four reported overhearing family members talk. Of these six, four participants also indicated they get information about the news from their friends in addition to two other students. Six students reported getting news and current events during get-togethers or social events with friends, six through conversation and discussion with friends, and four in group chats or messages with friends. Table 4.12 provides a full list of the responses from students regarding how they get information about the news and current events from their family and friends.

Furthermore, several questionnaire items measured students’ perceptions of how their biases may influence their evaluation of online information, with each item measured on a Likert scale ranging from 1 to 5. Table 4.13 presents the range of responses for each item (*n*=12). The quantitative data indicates that the majority of students agreed that their biases influenced how they understood online information and expressed openness to different perspectives and opinions from online sources.
Table 4.12

*Family and Friends as Sources of News*

<table>
<thead>
<tr>
<th>Family</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through casual conversation at home</td>
<td>6</td>
</tr>
<tr>
<td>Overhearing family members talk</td>
<td>4</td>
</tr>
<tr>
<td>By watching news programs or documentaries together</td>
<td>2</td>
</tr>
<tr>
<td>During family gatherings or discussions</td>
<td>2</td>
</tr>
<tr>
<td>Through group chats or messaging apps with family members</td>
<td>2</td>
</tr>
<tr>
<td>When family members share news articles or links with me</td>
<td>2</td>
</tr>
<tr>
<td>Through social media posts or updates from family members</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Friends</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>During get-togethers or social events with friends</td>
<td>6</td>
</tr>
<tr>
<td>Through conversation and discussions with friends</td>
<td>6</td>
</tr>
<tr>
<td>In group chats or messaging apps with friends</td>
<td>4</td>
</tr>
<tr>
<td>Through social media posts or updates from friends</td>
<td>3</td>
</tr>
<tr>
<td>When friends share news articles or links with me</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note:* This question used skip logic based on students’ previous response, asking them where they get information about the news or current events. Six students indicated they got this information from their family (*n*=6), and six from their friends (*n*=6).

However, responses varied slightly for two items. Despite largely agreeing on feeling open to different perspectives, several students disagreed with consciously seeking perspectives that differed from theirs. Furthermore, while most students did not attribute strong importance to aligning a source with their beliefs, some considered this factor important or very important.
### Table 4.13

**Questionnaire Items Measuring Students’ Perceptions of Their Biases**

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Neither Agree nor Disagree (3)</th>
<th>Agree (4)</th>
<th>Strongly Agree (5)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that my own biases can influence my understanding of online information.</td>
<td>0%</td>
<td>1 (8.33%)</td>
<td>0%</td>
<td>5 (41.67%)</td>
<td>6 (50%)</td>
<td>4.5</td>
</tr>
<tr>
<td>I am open to different perspectives and opinions from online sources.</td>
<td>0%</td>
<td>0%</td>
<td>1 (8.33%)</td>
<td>10 (83.3%)</td>
<td>1 (8.33%)</td>
<td>4</td>
</tr>
<tr>
<td>I consciously seek out news sources that present different perspectives than my own.</td>
<td>0%</td>
<td>5 (41.67%)</td>
<td>2 (16.67%)</td>
<td>4 (33.33%)</td>
<td>1 (8.33%)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank how important you think each item is when you are determining the credibility of an online source: How closely the source aligns with what you already believe.</th>
<th>Most Important (1)</th>
<th>Very Important (2)</th>
<th>Important (3)</th>
<th>Somewhat Important (4)</th>
<th>Not Important (5)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>1 (8.33%)</td>
<td>2 (16.67%)</td>
<td>5 (41.67%)</td>
<td>4 (33.33%)</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note:* *a* This item was reversed to align more closely with the other Likert scale items measuring students’ perceptions of their biases.
During the follow-up interviews, students elaborated on their perceptions and influences of their biases, providing a deeper understanding of the role biases may play when evaluating online information.

**Qualitative Analysis on the Influence of Bias**

To further explore the influences of students’ biases, I qualitatively analyzed an assignment from their media literacy course, *Check Your Biases*. In the assignment students created a collage with an explanation of students’ self-identified biases that may impact how they view the world. The assignment encouraged students to consider how their biases may impact what sources they view online and how they feel about these sources based on their preconceived notions. Nine of the 12 participants completed the project. Of the nine projects, seven students reflected on their likes and interests as key biases that influence how they perceive the world, such as their favorite music artists, television shows, video games, and hobbies. Some students expressed how they surrounded themselves with people with the same views. For example, one participant wrote, “My family and friends generally have the same views… I think I tend to stay away from people/views that disagree or belittle my beliefs.” Another mentioned, “I am very set on what I like and when people bring ideas to me I don’t like I argue about why they are wrong.”

Another student who reflected on how their interest in fitness influenced their biases expressed, “I am biased with people that dont [sic] do any active stuff or fitness… there are so many ways to get fit without equipment or money.” Interestingly, only one student referenced their political ideology as an influence on their biases in their collage. Because several researchers have linked individuals’ cognitive biases to their abilities to discern the credibility of online information (Kahne & Bowyer, 2017; Tandoc et al., 2021; Verma et al., 2023; Zlatkin-
Troitschanskaia et al., 2020), analyzing student perceptions of their biases provides insights into how their biases may influence their abilities to evaluate the credibility of online sources.

Furthermore, I analyzed student interviews to understand student perceptions of how their biases impacted their evaluation of online information. When asked to define bias, interviewees generally defined bias as a viewpoint that represents a one-sided perspective. Participant 5 defined bias as “something that affects your judgment” and can “differ from person to person.” Participant 3 further elaborated that biases occur “intentionally or unintentionally.” Table 4.14 provides each interviewee’s definition of bias in addition to factors they felt influenced their biases when evaluating sources online.

Two participants indicated their political leanings influenced how they evaluated online information (Participants 1, 2), and two cited background knowledge as an influential factor (Participants 2, 5). In addition, Participants 5 and 8 emphasized their likes and interests as influential factors, while Participant 8 added relationships with family and friends as influences. Additionally, Participant 3 cited people’s education and upbringing as major influential factors, explaining that because they grew up outside of the United States, this has given them a “more sympathetic viewpoint” towards that country. Still, Participant 3 also emphasized how their education in the United States has influenced “how I view certain topics, especially international and foreign affairs.”

Additionally, when referencing online information regarding the Israel-Hamas War, Participant 1 explained how the posts they saw on Instagram from friends, celebrities, and influential people influenced their perspectives on the situation. Specifically, Participant 1 explained:
I think seeing other people’s beliefs influences how I think… I mean, everyone’s posting on their Instagram story right now… To me, it seems like people are very divided…

Before seeing the Israel-Hamas situation, I knew that the U.S. was pretty much allied with Israel. But then I began seeing more and more people say, like ‘support Palestine’…

Most of my friends’ posts are posting about it, but then there are also some, you know, celebrities or like influential people.

Participant 2 further explained that the “wording” of an article influences how they perceive a source, explaining that it depends on the author’s words and purpose. These insights offer valuable perspectives regarding the diverse influences on students’ biases, thus contributing to understanding how biases may influence students’ evaluation of online sources.

Students indicated varying degrees of conscious awareness regarding their biases when evaluating sources online. Participant 8 reported feeling “pretty aware” of their biases when they evaluate information online. When asked to elaborate, Participant 8 explained how they sometimes looked at “the other point of view” and “like to see like both sides of things.”

Participant 3 emphasized their awareness of bias when evaluating online sources, explaining that they “try to remain free of bias.” Although they recognized that many factors influenced how they viewed online sources, Participant 3 highlighted the importance of cross-referencing sources because “people might have a bias, so they refuse to look at a particular form of media or source provided.” When reflecting on their own process of evaluating online media sources, Participant 3 relied on using Ad Fontes Media's (2023) Interactive Bias Chart to assess the bias of online sources as part of their process for determining credibility. For example, Participant 3 utilized this chart to discern *The New York Times* as “a more reliable news site compared to others.”
because it “was more on a moderate spectrum… although I do believe it was slightly more left-leaning.”

**Table 4.14**

*Students’ Perspectives on Bias*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Definition of Bias</th>
<th>Factors that Influence Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“If one side if the if the article or argument is leaning towards one side of the argument, it would be it would be biased.”</td>
<td>● “Political affiliations are a big one.” &lt;br&gt;● “Because my parents grew up like listening to NPR in the morning. So I think that is why that is one of my first sources.” &lt;br&gt;● “With Instagram, definitely, there’s definitely more [from friends].” &lt;br&gt;● “I do have a bias towards liberal ideas.” &lt;br&gt;● “Seeing other people’s beliefs influences how I think.”</td>
</tr>
<tr>
<td>2</td>
<td>“Um, it seems like leaning towards, like a left or right way, depending on your background knowledge or unknowing of whatever is happening.”</td>
<td>● “Background knowledge.” &lt;br&gt;● “Political, like lean left, like I would like look at and if I saw an article reading that was about a person like, oh, that’s not true.”</td>
</tr>
<tr>
<td>3</td>
<td>“I would define bias as information, which may be veered towards a certain viewpoint in order to influence the reader, whether that is intentionally or unintentionally.”</td>
<td>● “I think everyone is subject to bias, whether it’s due to their education, where they grew up.” &lt;br&gt;● “I think the way people are raised.” &lt;br&gt;● “I think we are still subject to bias as citizens of a particular country.” &lt;br&gt;● “Because we are receiving the United States kind of perspective where our opinions regarding certain topics are influenced by how our government kind of represents itself in foreign affairs.”</td>
</tr>
<tr>
<td>5</td>
<td>“Bias is something that affects your judgment, that can differ from person to person.”</td>
<td>● “Background knowledge.” &lt;br&gt;● “I am very biased when it comes to either my own judgment or my own interest.”</td>
</tr>
<tr>
<td>8</td>
<td>“It’s like your opinion… Like if your, if your friend was in an argument with someone you don’t know, you’d probably lean towards you to defend your friend because you know them.”</td>
<td>● “Like things you like or people you like. Family and or like people you have a relationship with.” &lt;br&gt;● “If I like something, I’ll probably lean towards like that and instead of the other opinion.”</td>
</tr>
</tbody>
</table>
While Participant 1 also referenced utilizing this chart to determine a source’s bias as part of their evaluation process, Participant 1 explained their conscious awareness of their biases “depends how controversial the subject is.” Participant 1 elaborated:

If there is something that’s drawn along political lines or, you know, very controversial, I’ll realize I do have a bias towards liberal ideas, and I’ll generally look at the other side if I don’t know a lot about the situation.

However, Participant 1 further explained that their interest and familiarity with a topic also influenced their perceptions of online sources and stated:

I don’t think I’ll spend a lot of time looking at the other side if it’s just for something I’m interested in… I think the Israel-Hamas situation I didn’t know a lot about, so I wanted to see both sides. But I’ve done a lot of projects on like abortion and Roe v. Wade, so I kind of generally know the arguments there… If I’m talking about about my own opinion, I don’t think I’ll look at the other side as much.

Additionally, when reflecting on their conscious awareness of their biases online, Participant 2 said, “I don’t think I’m that aware until I do. Maybe more recently, like, oh, maybe I was being a little biased.” Furthermore, Participant 2 elaborated that if the author shapes the person “in a bad way,” they realize they can utilize lateral reading to do more research and “search it up to see if it’s like actual.” In addition, because Participant 5 associated bias with a person’s background knowledge, they felt taking their media literacy course impacted their ability to identify credible sources because it gave them background knowledge “compared to someone who didn’t take a course specifically teaching credible websites.” Furthermore, Participant 5 recognized:
Because I am very biased when it comes to either my own judgment or to my own interest, so I definitely have to look at other perspectives on the story to fully understand not only my side, but other, but the other side.”

This qualitative analysis suggests that students experience a range of influences on their biases, alongside differing levels of conscious awareness regarding the impact of their biases on their online information processing. Due to the connection between cognitive biases and heuristics (Verma et al., 2023), as well as research supporting that individuals tend to rely on heuristics or mental shortcuts when determining the credibility of sources (Artmann, Scheibenzuber, & Nistor, 2023; Powers, 2019), I explored students’ use of heuristics to evaluate online sources before, during, and after learning civic online reasoning skills.

**Students’ Cognitive Processes Before Learning Civic Online Reasoning Skills**

Previous research indicates that students rely extensively on checklist approaches and weak heuristics that often fail to help students successfully evaluate the credibility of online sources (Breakstone et al., 2018; McGrew, 2021; Wineburg et al., 2020). Furthermore, research also indicates that students tend to accept sources as more credible if they include evidence, especially in the form of graphs, charts, photographs, and videos, without questioning the trustworthiness or sufficiency of the evidence in supporting the source’s claims (Breakstone et al., 2018a, p. 220). The media literacy course first introduced students to civic online reasoning by having them complete a performance task to gauge how they would initially approach evaluating online sources. The performance task required students to explore two websites, one from the American Academy of Pediatrics (AAP) ([https://www.aap.org/](https://www.aap.org/)) and one from the American College of Pediatricians (ACP) ([https://acped.org/](https://acped.org/)), and decide which one they considered more credible. Of the 12 responses, nine students considered the American College of
Pediatricians’ website more credible, relying on surface-level characteristics to determine the source’s credibility. Despite the ACP’s professional appearance, Breakstone et al. (2018a) argued against considering the ACP, a conservative advocacy group, more credible than the AAP, the longstanding organization for pediatricians. When Breakstone et al. (2018a) presented this task to college students, most relied on heuristics and did not investigate past the websites’ surface features. Similarly, a qualitative analysis of participants’ responses indicated that students relied on heuristics to evaluate each source’s credibility.

Students noted the website's appearance, specifically pointing out the format and the website’s layouts. One student specifically judged a source as more credible than the other “because whoever made it see[ms] to have spent more time on it then [sic] whoever made the other website.” Students also noted the inclusion of a mission statement, information about the authors and board members, and contact information as key factors in their decisions. Additionally, students discussed specific information provided by the websites as a key factor in determining their credibility. For example, students considered a source more credible based on the information, details, topics, and resources included on the websites. One student judged a website as more credible “because it was more convincing” and “the info [sic] seemed accurate.” A few students referenced the interactive nature of the website to determine its credibility, such as learning how to join and what information you can click on and choose from. Finally, two students noted the label “college” on the ACP’s website as a factor in the source’s credibility. This analysis suggests that prior to explicitly learning civic online reasoning skills, students engaged more with intuitive thinking as they relied heavily on heuristics to determine a source’s credibility.
Before learning click restraint, another crucial civic online reasoning skill, students completed a response that asked them to consider which site they usually click on first when conducting an internet search. Many students reported they clicked the first or second link at the top of the page because “its [sic] easy” or “because it’s right there and it’s easy to access.” One student considered the first link in an internet search “the most trustable one.” Another student agreed, “I click the first page that I think is a reliable source which is usually at the top.” In these cases, students seemed to take the path of least effort, suggesting greater reliance on intuitive thinking. Some students reflected more analytically and considered the reliability of a source. For example, one student indicated they go to Wikipedia “to get basic information first and then go deep into to look for more.” Another student said they avoid Wikipedia and “click on the first site that doesn’t have an ad symbol… I do this so I don’t get biased (sponsored) or incorrect information.” Finally, a student reported they clicked on the first site they “recognize and know is credible. I do this because I know the information that is being shared is factual and is not biased.” As research indicates the first results do not always indicate a high level of credibility, individuals must learn to instead more analytically examine each URL, consider the source of information, and scan it before clicking on a link (Baer & Kipnis, 2023; Wineburg & McGrew, 2019).

**Students’ Cognitive Processes While Learning Civic Online Reasoning Skills**

As students began to learn civic online reasoning skills, some continued to rely on heuristics, or mental shortcuts, as signifying factors of a source’s credibility. For example, after learning to read laterally, students completed a task during the course to evaluate the credibility of a source titled *The 100 Percent Renewable Energy Myth* by the Institute for Energy Research (IER). Even when explicitly directed to find more information about the IER, six of the 12
students reported surface-level characteristics as determining factors of credibility, including its status as a nonprofit organization, layout, the founder of the website, and the amount and type of information the source included. One student considered this “most likely a strong source” because “just hearing the name [IER] makes you think that their [sic] trying to help out the earth.” One student accepted the IER as “an ok source of information” due to the inclusion of “common facts.” The same student noted, “When it comes to more indepth [sic] ideas they might not be 100% true,” but did not provide a more analytical response beyond the source itself. A more analytical investigation of this source through lateral reading would have revealed more about who is behind the information, a crucial civic online reasoning skill (SHEG, 2019).

Some students actively sought additional information beyond the source itself, demonstrating a more analytical process to evaluate the credibility of the organization behind the source. Upon further investigation, two students reported the IER’s status as a “front for the fossil fuel industry,” and one pointed out the importance of considering the bias or lack of objectivity of the source. One student reported, “It is blatantly biased and only selects information to continue to support the use of fossil fuels.” Another student wrote, “The website is not a strong source… The organization is biased towards maintaining nonrenewable resources.” Interestingly, one student who reported its status as a front for the fossil fuel industry still evaluated this as a credible source “because it has the persons [sic] contact info [sic] and research to back up their claim,” suggesting they still based the website’s credibility on its surface-level characteristics. This qualitative analysis may support previous research indicating many students seem to have internalized the traditional checklist approach when evaluating online sources, leading them to utilize ineffective and weak heuristics (Breakstone et al., 2018b; Wineburg et al., 2020).
In another assignment completed during their media literacy course, students compared a Facebook conversation between two people regarding gun control and explained which individual provided stronger evidence to support their argument (SHEG, 2019). One source included a visual chart to support their argument produced by the Minnesota Gun Owners Political Action Committee (MNGOPAC), while the other attached a link to an article written by The New York Times. Of the 10 responses, three students pointed to the inclusion of the MNGOPAC chart as a key reason why that individual provided stronger evidence to support their argument. While one student reported that the chart did not look very trustworthy, they did not explain why beyond the look of it. However, several students demonstrated greater analytical thinking as they evaluated the evidence and delved beyond the visual appeal of the chart. For example, one student provided a more analytical explanation that illustrated their consideration of the sources provided to evaluate their credibility:

I believe that Anya is providing stronger evidence to support her argument, the article that Anya cites is a reputable and well-known news source (The New York Times). Although Grace provides a graph in her post, the organization that created the graph is biased because it is a gun owners’ [sic] association. This means that the organization is in favor of less restrictive guns.

Six other students wrote similar explanations, noting the reliability of The New York Times and the bias of the MNGOPAC. As students learned civic online reasoning skills, many critically analyzed the sources and went beyond relying on heuristics, such as surface-level characteristics and the appearance of evidence to read laterally. While this suggests that more students engaged with analytical thinking, others continued to report using heuristics that led to misleading
conclusions, further suggesting the complexity of learning and applying civic online reasoning skills.

**Students’ Cognitive Processes After Learning Civic Online Reasoning Skills**

To investigate the development of their skills after completing the media literacy course, I qualitatively analyzed the students’ final media literacy project, civic online reasoning performance tasks, and interviews to understand the impact of explicitly learning civic online reasoning skills on how students cognitively process online information.

**Media Literacy Final Project.** After choosing a topic to investigate, students completed a summative project for the course to demonstrate the skills they learned from class. Students researched a topic of their choice online and explained their processes in determining what sources they deemed credible and why. While the project required students to laterally read and seek out information beyond the sources they investigated for their research topic, many reported using heuristics to determine a source’s credibility. Students noted the inclusion of an author, sources, publication date, about page, length and detail of the information provided, and lack of ads as determining factors when evaluating its credibility. For example, one student pointed out the inclusion of quotes as an indicator of reliability. Other students associated credibility with a source if it “shows links to where they got info” or if it “shows sources.” Another student focused on the nonprofit status of a source and deemed the source credible “because its main goal is not to make money, so probably won’t be distorted in order to get views and make money.”

While one student considered the author’s educational background, reputation, and number of articles written as indicators of credibility, other students considered the expertise of the authors in their research topic as an indicator of credibility. For example, one student who
researched the effects of violence in pop culture deemed a source credible because it included information from “real qualified doctors” and “backed up its claims with external links and research from doctors, psychologists, and qualified pediatricians.” Other students associated credibility with the author’s experience in their research topic. For example, one student who researched the effects of weight cutting in sports discussed how they considered sources from athletes more credible because they “know what [they are] talking about,” “the guy is an athlete and does it himself,” and shared their “own experience.” Another student who researched the positives and negatives of powerlifting seemed to agree with this notion and deemed “info from people who actually powerlift” credible. Interestingly, one student also deemed sources less credible if the authors did not have personal experience in their research topic. For example, after looking at a source written by Sarah Chodosh featured in Popular Science, the student reflected, “The information is very good, but it cannot be reliable because the author is not certified as a professional in the weight cutting field.” The same student noted that an article they investigated from the National Library of Medicine written by a “researcher” lacked credibility because the author was “not a professional in any sports or topics like that.” Additionally, when searching for information about their topic on social media, some students associated the credibility of a source with its verification status, the number of followers and subscribers, or the inclusion of good reviews.

While these results indicate that students utilized heuristics to verify the credibility of sources, many also showed evidence of engaging with civic online reasoning skills, suggesting engagement with analytical cognitive processing. One student reflected on how if they “second guess” the truthfulness of a source, this “makes me wanna [sic] open up another tab and do some lateral reading on it.” Another student researching the presidential election of 2020 explained, “I
had to laterally read almost every source to validate the information.” Several students used sources provided to them from class to help them laterally read and analytically investigate their own sources. For example, because the project required students first to explore information about their topic on Wikipedia, all students used Wikipedia as a starting point for their research. While many continued to rely on Wikipedia to read their other sources laterally, some students also utilized resources provided by their course, such as the Interactive Media Bias Chart (Ad Fontes Media, 2023) or fact-checking websites, including Politifact and FactCheck, to evaluate a source’s credibility. Furthermore, because of the reliance on social media for news and current events (Brewster et al., 2022), students also reflected on whether they could successfully use social media to research their topic. One student notably wrote:

I think social media can be used as a resource to conduct reliable research if you have well-developed media literacy skills. It can be hard to recognize bias and determine what is credible and what is not. If you can successfully do [sic], social media can help you conduct reliable research.

Students’ analyses also indicated that while they initially relied on surface-level characteristics, many then went on to analyze sources more deeply. For example, when asked if any sources students came across seemed more credible than others, one wrote, “Not if you just look at them but if you dig deeper than definitely.” Another student analyzed a source they deemed unreliable and stated, “Even though the article provides a fairly recent date (December 20, 2022) and an author, it is full of ads, and the site is mainly focused on revenue. Additionally, the site has published disinformation before.” This response suggests the student recognized that a recent date and author do not guarantee a source’s credibility and, therefore, conducted further investigation to verify. After laterally reading, the student discovered the source in question “has
published disinformation before” and “has published hoaxes in the past.” As evident from this qualitative analysis, while the project required students to explain their lateral reading process when verifying their sources, students’ responses varied regarding the degree of intuitive and analytical thinking they engaged with.

**Qualitative Analysis of the Civic Online Reasoning Performance Tasks.** After qualitatively analyzing the civic online reasoning performance tasks completed in the quantitative phase of the study, I analyzed their responses to determine what cognitive processes they engaged with. The results indicate that students engaged with varying cognitive processes, depending on the specifics of the tasks. For example, the first performance task asked students to determine the credibility of a website. While the prompt suggested that students open a new tab and conduct an internet search on the source, students’ responses suggested that most students relied on surface-level characteristics of the website to determine the source’s credibility. For example, one student noted that “their ge[t] to know them link they have at the bottom” made this a credible source of information. Other students used the source’s about page, a link provided by the website, publication date, and sources cited as factors to determine its credibility. One student also pointed out, “Its [sic] a .com website, [very] short, no evidence,” thus making this an untrustworthy source. Still, some students did take a more analytical approach and conducted lateral reading to determine the source’s credibility. For example, one student conducted a Google search, and another student “looked into the publisher of it.” While some gave a more analytical response beyond citing surface-level characteristics, no students provided or cited evidence beyond the source itself to support their responses.

A qualitative analysis of Performance Task 2 showed similar results. Students analyzed the credibility of a tweet about NRA members’ opinions on background checks. While the task
prompted students to list any sources used to make their decision, only two students provided sources outside of the ones provided in the tweet. Most students used surface-level heuristics to support their analysis of the tweet, such as the publication date, about page, verification status, lack of context of the post, or the evidence provided by the post itself. Students seemed to engage the most analytically with Performance Task 3 because it required students to conduct their own research on Cesar Chavez to respond to the prompt. For example, students cited several sources, including *ABC News*, the *Los Angeles Times*, Wikipedia, the Bill of Rights Institute, the United Farm Workers’ Union (UFW), and the Interactive Media Bias Chart (Ad Fontes Media, 2023) to determine if Cesar Chavez opposed undocumented immigration to the United States. While one student notably argued Chavez’s “views were nuanced” according to the UFW, another student pointed out that Chavez founded this organization. Another student explained how they also discovered Chavez as a founding member of the UFW, so they used *ABC News*, “a trusted news network,” to support their response. Interestingly, while Performance Task 3 provided the least information for students to work with, students seemed to engage the most analytically with this task compared to Performance Tasks 1 and 2.

**Student Reflections on their Cognitive Processes.** When asked to explain their processes in evaluating online sources in the follow-up interviews, students' responses suggested that they engage with a mix of intuitive and analytical thinking. Participant 5 notably said, “The look of a website can’t be an *identifier*, but it can be an *indicator*.” All interviewees referenced relying on heuristics, such as surface-level characteristics, as an indicator of a source’s credibility to some extent. For example, Participant 3 explained how they questioned a source’s credibility if it seemed “not as trustworthy in appearance,” and Participant 5 noted feeling skeptical of a source if it “looks suspicious” or “looks weird.” Other participants provided
specific examples of indicators they relied on to verify the credibility of a source. Participant 2 explained, “I look through the first couple and also look at like the names, like who published it… I look at the top, maybe like the top couple websites, and I’ll see if it’s like a .com or .org… the domain.” Similarly, when evaluating a source, Participant 1 explained, “I’ll use the URL in some cases if it’s like .gov or .edu. But seeing if there’s like an author page, seeing if there’s a date published, I think those are the main things.” Participant 8 indicated that sources written by a college or university “has to be” credible. Participant 8 also considered factors such as the number of followers and verification status of the source to indicate its credibility on social media.

Although interviewees noted relying on heuristics initially to assess a source’s credibility, many proceeded to consider sources more analytically. Four of the interviewees explained that when they began the process of lateral reading, they first utilized Wikipedia. Because Breakstone et al. (2018a) argued that Wikipedia can “serve as useful jumping off points for more in-depth research,” students also learned to utilize this as a starting point for lateral reading during their media literacy course (p. 220). For example, Participant 3 explained, “First, I would often look at Wikipedia because Wikipedia provides a brief description about the content provided by the website.” Participant 1 agreed and said, “I’ll just give it a quick Google and see what Wikipedia or other sites say about it.” Participant 2 similarly stated, “First, I look at Wikipedia. And then if it’s like a like a news… I could look at like another outlet for a news source.” Finally, Participant 5 explained that they tended to initially rely on Wikipedia “just because it’s more straightforward” and realized that Wikipedia can “be reliable and I can use my resources to check that.”
In addition to initially utilizing Wikipedia when lateral reading, Participants 1 and 3 explained how they also relied on the Interactive Media Bias Chart (Ad Fontes Media, 2023) as a source they used to verify a source’s credibility. For example, Participant 3 considered The New York Times a credible source because, according to the chart, “it was more on a moderate spectrum regarding other news websites, although I do believe it was slightly more left-leaning. But I overall, I would consider a more reliable news site.” Participant 1 further explained that they utilized the chart to determine NPR as a credible source and stated, “On the media bias chart… It was pretty much center with not being too biased on either side.” Furthermore, participants described other processes they followed when analyzing online sources. While Participant 8 noted they “kind of compare sources,” Participant 2 explained how they “cross-reference information” to see if it matches other sources. Participant 3 also supported the importance of “cross-examination” of information to investigate if a source is “biased in any form.” Participant 5 explained several examples of how they engaged with lateral reading. For example, Participant 5 recalled looking up an article about Matthew Perry’s death and wanting to know for certain if the news was true. Therefore, they opened multiple tabs until they found the news from a “credible source.” They also explained that when reading a news article about the Israeli-Hamas War, they found that:

Looking at other articles to explain questions that I have found for my first article was pretty helpful. And I looked at a couple different websites… I did go on to another tab, and I looked up their names, and I did research those specific websites that I used.

Furthermore, Participant 5 engaged more analytically with sources by utilizing click restraint, a key civic online reasoning skill (SHEG, 2019). For example, Participant 5 explained:
I now always scroll down, and I skip the first couple, and I click on multiple different resources or look up their name on a different source... I used to just look something up and click the, quite literally, first link because I thought it was just automatically reasonable because it’s Google.

Finally, Participant 1 emphasized the importance of understanding the purpose of a source to determine its credibility. They explained:

I’ll first kind of see like what it’s arguing about. So like the purpose, and then if I’m not familiar or already know about the website, I’ll do lateral reading. And if I can find that it’s biased, I’ll pick another article or news source. And then if it is, if it is biased, but there’s two credible sides to the argument... I will read the other side as well.

This analysis suggests that students use a blend of intuitive and analytical cognitive processes when evaluating online sources. In addition to the influence of biases and heuristics on cognitive processes, the dual process theory supports perceptions of confidence and ease further influences cognitive processes (Kahneman, 2011).

**Students’ Perceptions of Confidence and Ease When Evaluating Online Sources**

As part of the dual process theory, Kahneman (2011) argued the amount of mental effort a task takes determines whether an individual engages with intuitive versus analytical thinking processes. Furthermore, the demand for effort diminishes the more skilled one becomes in a task, resulting in greater cognitive ease. As individuals become more skilled or experienced in a task, their mental processes become more automatic and require less effort (Kahneman, 2011). In alignment with this theory, I asked interviewees to reflect on the effort they feel it takes to apply civic online reasoning skills, with students indicating varying perceptions of effort. Participant 8 expressed that while initially, they thought applying these skills “was pretty hard to pick up on,”
it became easier over time. Participant 8 further elaborated that the difficulty level depended on the online forum. For example, Participant 8 explained, “I would say online, it takes some effort, but [on] social media, it’s not that difficult.” While Participant 1 agreed it depends, they focused on the popularity of a news source and the level of controversy of the information presented. Participant 1 explained they felt it took less effort to evaluate a popular news source “because more people will have written about it and talked about it. But if it’s lesser known or you’re doing a more controversial subject or using a smaller news source, it’s definitely harder, and there’s more effort needed.” While Participant 5 did not explicitly express their perception of the difficulty level in applying civic online reasoning skills, they did express that they felt they could implement these skills daily.

Furthermore, Participants 2 and 3 agreed they did not find applying these skills too difficult. However, Participant 2 did acknowledge that using these skills took “a little effort” and stated, “I think you just have to put a little effort, like maybe five, 10 minutes, just to make sure, especially if you’re sourcing a project… I think it’s pretty easy just to do a little quick search.” While Participant 3 agreed that it does not require much effort and felt “it is an easy thing to do,” they also acknowledged, “It’s hard to distinguish between websites oftentimes.” As participants also reported varying degrees of ease in evaluating online sources on the questionnaire, this qualitative data supports the quantitative findings. To gain greater insight into students’ cognitive processes when evaluating online sources, interviewees also reflected on completing the civic online reasoning performance tasks that comprised part of the quantitative phase of the study.

During the interviews, students reported taking between 15 and 30 minutes to complete the tasks, with most reporting 15 to 20 minutes. While most students said they did not find the tasks challenging, Participant 5 reported they did. However, Participant 5 also noted, “When I
gave myself the time, and I really sat down, I paid attention, and I tried my best.” Additionally, Participant 1 specified, “The open search was definitely the most [challenging] because there were differing opinions.” Most students felt successful when asked how they felt upon completing the tasks. Participant 3 elaborated, “I believe that I was primarily successful completing the tasks, although I don’t know whether I was completely right or wrong. I know that I successfully utilized my resources.” Participant 8 felt only “kind of” successful in completing the tasks. When asked how much they relied on skills from their media literacy class, all students agreed they relied extensively on them to complete the tasks. For example, Participants 1, 2, and 3 explained how they utilized lateral reading. Participant 3 further elaborated they used the skills learned from class “to verify that [the sources] were free of bias.” Participant 1 added that they did not feel they could have completed the tasks without the knowledge gained from the class.

RQ5: Integrating Students’ Cognitive Processes and their Civic Online Reasoning Skills

Despite all interviewees reporting that they relied heavily on skills learned from class to complete the civic online reasoning performance tasks, the quantitative results also indicated that students did not demonstrate significant mastery. Furthermore, the qualitative analysis of the performance tasks suggested that students engaged with a combination of intuitive and analytical cognitive processes. Some students relied more heavily on heuristics, while others engaged more with analytical thinking, highlighting the complex interplay of cognitive processes in evaluating online sources. I compared the interviewees’ reflections on their civic online reasoning performance tasks to their summed scores to further integrate the quantitative and qualitative results. As Table 4.15 indicates, most interviewees reported completing the tasks successfully, did not find them challenging, and recalled relying on skills learned from class. However, the
interviewees’ summed scores ranged from 4 to 11, showing variance in their mastery levels. The integration of these datasets suggests a complex relationship between students’ cognitive processes, their perceived understanding of skills learned from class, and their performance levels on the civic online reasoning tasks.

Table 4.15

Comparing Students’ Reflections to their Civic Online Reasoning Scores

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Do you feel like you were successful?</th>
<th>Did you find them challenging?</th>
<th>How much did you rely on the skills from class?</th>
<th>Tasks’ Summed Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Yeah.”</td>
<td>“Not super challenging because I could use lateral reading, but the open search was definitely the most.”</td>
<td>“I would say a lot, and I don’t think I would be able to complete them as well without the class, especially the open search.”</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>“Yes.”</td>
<td>“I didn’t find them that challenging. Pretty straightforward.”</td>
<td>“A lot such as the lateral reading, I think that was my biggest one.”</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>“I do. I believe I was primarily successful completing the tasks, although I don’t know whether I was completely right or wrong.”</td>
<td>“I don’t believe it was too challenging.”</td>
<td>“I would say I heavily relied on skills.”</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>“Yes. When I gave myself the time and I really sat down, I paid attention and tried my best.”</td>
<td>“Yeah.”</td>
<td>“Very much, because I really had to think back and use what you taught me to really evaluate.”</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>“Kind of.”</td>
<td>“Not really… I put in a decent amount of effort of looking into articles.”</td>
<td>“Pretty much all the time. [I] tried to remember what we learned [about] bias and the author.”</td>
<td>4</td>
</tr>
</tbody>
</table>
RQ1: Impact of Civic Online Reasoning Instruction on Cognitive Processes

The analysis of the quantitative data followed by the qualitative data provides insight into answering the overarching research question regarding how explicit instruction may impact high school students’ cognitive processes while evaluating online sources. The quantitative data supports that students reported feeling confident in their abilities to evaluate the credibility of online information successfully and believed that taking the media literacy course positively impacted these skills. Additionally, the quantitative data showed greater variance in students’ perceptions of the ease of evaluating online sources. The qualitative data analysis of student interviews explained these findings further, supporting the findings that students felt confident in their skills and articulated an understanding of key skills learned throughout the course. Furthermore, the qualitative data suggests that prior to learning civic online reasoning skills, students relied more heavily on surface-level characteristics as heuristics to identify the credibility of online sources. As students learned these skills, the qualitative analysis suggested that students began to engage more with analytical skills, such as lateral reading, although many still relied on heuristics. Finally, the quantitative results of the performance tasks indicated that students did not demonstrate significant mastery. However, their reflections indicated that they implemented skills learned from class and felt successful. This data suggests a nuanced relationship between students’ intuitive and analytical cognitive processes and understanding of civic online reasoning skills, highlighting the complexity of learning and applying these skills.

Summary

Chapter 4 provides a detailed description of the findings, integrated and triangulated from various data sources, including the questionnaire, civic online reasoning performance tasks, student artifacts, and interviews. The preliminary results explain students’ online activity and
other high school classes’ influences on their perceptions of evaluating online sources, providing context for the research questions. Although the quantitative findings indicated a potential moderate relationship between students’ confidence and their mastery of civic online reasoning skills on the performance tasks, the results still indicated that students did not achieve high mastery levels. The quantitative and qualitative findings suggested that students felt that their media literacy class positively impacted their abilities to evaluate online sources, and students provided examples of insights they gained through the student interviews. Furthermore, the qualitative findings also indicated that while many students shifted from relying on heuristics to engaging with more analytical skills when evaluating online sources, many continued to utilize heuristics after learning civic online reasoning skills. After integrating the data, the findings suggested that students perceived an increase in their skills gained from their media literacy course. However, their lack of mastery of the performance tasks indicated that students may overestimate their abilities. These findings highlight the complex interplay of intuitive and analytical cognitive processes students engage with while evaluating online sources, providing insight into understanding the impact of media literacy interventions on their abilities. Chapter 5 discusses the conclusions of the study.
CHAPTER 5

Despite teenagers' widespread use of the internet (Vogels et al., 2022), research indicates that students lack the skills needed to critically evaluate online sources (Breakstone et al., 2021; Levy et al., 2023; McGrew et al., 2018). As more media literacy legislation passes to encourage educational institutions to integrate these skills into their curricula (Media Literacy Now, 2023), educators require continued research that evaluates the effectiveness of media literacy interventions. Therefore, this case study used an explanatory mixed methods approach to understand the impact a media literacy course may have on students’ cognitive processes while evaluating online information. Chapter 5 first discusses the findings of each research question, drawing on previous research and the theoretical framework that guided the study. The chapter then addresses the limitations of the study and offers implications for practice and recommendations for future research.

Discussion of Findings

Chapter 5 analyzes and interprets the quantitative and qualitative findings within existing literature and the theoretical framework that guided this study. I first discuss the preliminary results, explaining the importance of contextualizing students’ online habits and previous exposure to learning media literacy skills to understand their cognitive processes when analyzing online sources. I then address each research question, beginning with the quantitative, qualitative, and mixed methods research questions. Due to the culminating nature of the first research question, I discuss the overarching research question last.

Discussion of Preliminary Results

Previous research indicates that young people spend significant time online (Vogels et al., 2022). Research also supports that more individuals rely on social media to access information
regarding the news and current events (Brewster et al., 2022). This study supports these findings, with the quantitative data showing a median of students spending four to six hours a day online. While only one student reported keeping up with current events as one of their top three online activities, all 12 students did report relying on social media as a source of news and current events. Additionally, no students reported neglecting the news altogether. Furthermore, student interviewees discussed a wide range of complex topics they have come across on social media, with four specifically citing the Israeli-Hamas War and four citing the Russia-Ukraine War. Although students reported differing levels of engagement with current events, this finding highlights the importance of media literacy education due to their online exposure to complex topics. Furthermore, the growing reliance on these social media platforms as a source of news and information has significantly complicated deciphering the credibility of online sources (Hobbs, 2017). Therefore, media literacy advocates argue that educators must equip students with the skills needed to evaluate the credibility of online information (Breakstone et al., 2021; McGrew et al., 2018).

Despite the call for a greater focus on implementing these skills into school curricula, media literacy education remains the exception rather than the expectation across schools in the United States (DiGiacomo et al., 2023). Therefore, the preliminary research also aimed to establish students’ experiences with learning to evaluate online sources in other classes, providing context for their exposure to these skills before taking the media literacy course. The quantitative results found that most students reported learning skills related to evaluating online information in other high school courses, with nine citing their social studies class and seven citing their English classes.
When asked to expand on this in the individual interviews, all five interviewees discussed ways other classes have or have not emphasized these skills. For example, Participant 1 felt that their core social studies and English classes emphasized teaching these skills but did not feel that their elective courses did. Specifically, Participant 1 noted that in their sociology and psychology classes, “It was kind of emphasized less because they were both semester classes, so we didn’t have a ton of time. And it was also, I don’t know, I guess, seen as not as important.” Participant 3 also reported learning these skills through “more of a conversation” during their social studies class. Participant 8 explained that although their teachers told them to ensure the credibility of sources when conducting research projects, they did not feel they explicitly learned skills to determine a source’s credibility. Furthermore, Participant 5 felt that because of the heavy emphasis the media literacy class placed on learning how to evaluate online sources, in comparison, “it kind of just made the other classes look like they were just throwing websites.”

While the quantitative findings indicated that students felt they received some exposure to learning how to evaluate online sources in other high school classes, the qualitative findings indicate that their experiences lacked emphasis and depth in learning these skills. These preliminary findings provided context for understanding students’ online activity and previous exposure to media literacy skills, establishing important background for addressing the research questions.

**Discussion of RQ2: The Relationship between Confidence and Civic Online Reasoning Skills**

The results indicated that students reported high confidence levels regarding their abilities to discern the credibility of online information, with 11 students (91.67%) reporting they either agreed or strongly agreed with their abilities. However, the quantitative results measuring students’ civic online reasoning skills showed greater variance. Specifically, the individual
scores of the performance tasks showed that 19 responses scored beginning level (52.78%), nine responses scored emerging level (25%), six scored mastery level (16.67%), and two scored partially mastery (5.56%). Although Spearman’s rank correlation showed a moderate relationship between students’ confidence levels with their civic online reasoning performance task scores, students did not demonstrate mastery across the tasks. Furthermore, only nine of the 12 students completed the performance tasks, resulting in a smaller sample size to compare the variables. Therefore, I interpreted this correlation cautiously and utilized the results of the questionnaire to test the relationship between students’ confidence levels and their civic online reasoning skills across the entire sample. This comparison showed no statistical significance between the variables.

Mahmood (2016) argued that people tend to overestimate their information literacy skills, possibly helping to explain the statistical insufficiency of the reported results. Furthermore, while Kahneman (2011) suggested that individuals’ mental processes become more automatic and require less effort the more skilled or experienced they become in a task, gaining expertise in complex tasks is a slow and intricate process that takes a long time to develop. Therefore, Kahneman (2011) warned against considering high subjective confidence as an indicator of accuracy. Because individuals’ confidence in their judgments may still be prone to cognitive biases or errors (Kahneman, 2011), feelings of confidence have little relationship with accuracy (Evans, 2018; Shynkarik & Thompson, 2006). Furthermore, while previous research suggests that students progress in their civic online reasoning skills following interventions, these same studies suggest that students could still show greater progress in their skills (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022). Research also suggests that even though students report having prior experiences in online credibility evaluation, this does not necessarily
translate into students accurately applying these skills (Metzger et al., 2015). The quantitative findings support this previous research, suggesting a discrepancy between students’ confidence levels and their abilities to evaluate online information successfully.

**Discussion of RQ3: Students’ Perspectives on the Impact of Media Literacy Education**

The quantitative results indicated that all students agreed or strongly agreed that taking the media literacy course improved their civic online reasoning skills. Additionally, the quantitative results found that all students agreed or strongly agreed on the importance of learning media literacy skills in school. A qualitative analysis of student interviews helped to explain these quantitative findings and explored students’ perspectives on the impact of media literacy. All interviewees agreed on the importance of media literacy education, citing the importance of recognizing bias and separating real from false information. Furthermore, students generally considered themselves media literate and agreed that the media literacy course positively impacted their skills. All interviewees reported feeling that the course helped them gain skills or knowledge they have utilized outside of class. Students specifically recalled and discussed learning civic online reasoning skills, including lateral reading, click restraint, and learning who is behind the source.

This analysis aligns with previous research that suggests young people reported increased self-efficacy in detecting fake news following a news literacy intervention (Tamboer et al., 2023). Furthermore, De Leyn et al. (2022) pointed out that media literacy research rarely amplifies students’ voices and, therefore, necessitates the inclusion of student perspectives and experiences. Tamboer et al. (2023) also supported the idea that research should strive to incorporate youths’ views on media literacy initiatives to develop more effective interventions. Incorporating students’ perspectives regarding the course’s impact provides valuable insights for
assessing media literacy interventions, contributing to the development of more effective strategies that can better help students navigate the complexities of the digital landscape.

**Discussion of RQ4: Students’ Cognitive Processes While Evaluating Online Information**

Due to the cognitive demands needed to evaluate online information critically and the multitude of factors that may influence this ability (Ku et al., 2019; Nygren & Guath, 2021; Powers, 2019; Verma et al., 2023), this study explored students’ cognitive processes when engaging with online sources framed within the context of dual process theory. Integrating a civic online reasoning framework with dual process theory, I examined how biases, heuristics, and confidence may influence students’ cognitive processes and their abilities to evaluate online information.

**Discussion of Biases.** Because leading researchers in civic online reasoning have consistently highlighted the absence of data on students’ prior knowledge, beliefs, and opinions as limitations to their studies (McGrew, 2020; McGrew & Breakstone, 2023; Wineburg et al., 2022), this study examined how these factors may influence the way individuals process and evaluate information (Nygren & Guath, 2022). The quantitative data indicated that 11 students (91.67%) agreed or strongly agreed that their biases influenced how they understood online information. Furthermore, because research indicates that family and friends influence young people’s perspectives of the news and current events they consume (Jervelycke Belfrage, 2018; Young, 2015), I investigated students’ perceptions regarding how their family and friends may contribute to their biases when evaluating online sources. On the questionnaire, six students indicated they consider their family a news source, and six reported their friends as a source. Of these students, four considered both family and friends as a source. The qualitative data revealed greater insight into these influences. For example, Participant 1 explained, “Because my parents
grew up like listening to NPR in the morning. So I think that is why that is one of my first sources.” Furthermore, when asked to reflect on how their biases may impact how they perceive the world for a course assignment, Participant 1 wrote, “My family and friends generally have the same views… I think I tend to stay away from people/views that disagree or belittle my beliefs.” Participant 8 agreed that “family and or like people you have a relationship with” influences their biases. Participant 3 added, “I think the way people are raised” influences their biases.

The qualitative analysis further revealed other factors that students considered influential in shaping their biases. For example, one of the course assignments found that seven students considered their likes and interests as key biases that influence how they perceive the world. Although only one student referenced their political ideology, two interviewees indicated that their political leanings influenced how they evaluate online information. For example, Participant 1 noted, “I do have a bias towards liberal ideas,” and Participant 2 added, “Political, like, I lean left.” Additionally, Participants 2 and 5 both cited “background knowledge” as influences. Finally, Participant 3 added that education and citizenship influence their biases “because we are receiving the United States kind of perspective where our opinions regarding certain topics are influenced by how our government kind of represents itself in foreign affairs.”

Previous research suggests that students lack conscious awareness or understanding of their online evaluation strategies and rely on cognitive biases and heuristics to avoid information overload (Powers, 2019). Although 11 students (91.67%) expressed openness to different perspectives and opinions from online sources, five (41.67%) disagreed with consciously seeking perspectives that differed from theirs. Furthermore, while nine students (75%) did not attribute strong importance to the alignment of a source with their own beliefs, three students (25%)
considered this factor important or very important. The qualitative data provided more depth to explain these quantitative findings. Student interviewees indicated varying degrees of conscious awareness of their biases when evaluating online sources. For example, although Participant 8 indicated they felt “pretty aware” of their biases, Participant 2 stated, “I don’t think I’m that aware” of their biases while searching for information online, but added, “Maybe more recently” they have become more aware. Participant 1 explained that their conscious awareness of their biases “depends how controversial the subject is” and added that their level of interest and familiarity with a topic influenced their perceptions of online sources. Participant 1 further stated, “I don’t think I’ll spend a lot of time looking at the other side if it’s just for something I’m interested in… If I’m talking about my own opinion, I don’t think I’ll look at the other side too much.” As Participant 1 also identified their political leanings as an influence on their biases, this finding aligns with previous research that links individuals’ cognitive biases to their evaluation of online information (Kahne & Bowyer, 2017; Tandoc et al., 2021; Verma et al., 2023; Zlatkin-Troitschanskaia et al., 2020).

However, other studies suggest that individuals exposed to media literacy interventions positively impact their abilities to discern the credibility of online sources (Kahne & Bowyer, 2017; Verma et al., 2023) and may help students recognize their biases more critically when evaluating online information (Wittebols, 2020). Three interviewees explained how relying on skills or strategies from class has assisted them in confronting biases when evaluating online sources. For example, Participants 1 and 3 explained how they rely on the Ad Fontes’ (2023) Interactive Media Bias Chart to identify a source’s bias, a tool they learned about in their media literacy course. Additionally, Participant 2 explained how they now realize they can utilize lateral reading to investigate an author’s bias. These findings align with previous research
indicating that students felt that a media literacy intervention specifically focusing on confronting students’ confirmation biases helped them enhance their self-knowledge, catch themselves engaging in confirmation bias, and open up to more diverse views and opinions (Wittebols, 2020, p. 218). This suggests that media literacy interventions may assist in supporting students to engage more analytically with online sources and avoid relying solely on intuitive thinking that may result in individuals reaching biased conclusions (Ku et al., 2019).

**Discussion of Heuristics.** Due to the cognitive demands of processing online information (Ku et al., 2019; Nygren & Guath, 2021; Powers, 2019; Verma et al., 2023), individuals tend to rely on heuristics, or mental shortcuts, when evaluating online sources. Previous research indicates that students rely extensively on checklist approaches and weak heuristics that often fail to help students successfully evaluate the credibility of online sources (Breakstone et al., 2018; McGrew, 2021; Wineburg et al., 2020). Furthermore, research also indicates that students tend to accept sources as more credible if they include evidence, especially in the form of graphs, charts, photographs, and videos, without questioning the trustworthiness or sufficiency of the evidence in supporting the source’s claims (Breakstone et al., 2018a, p. 220). After analyzing assignments from their media literacy course, the qualitative data suggests that students initially relied heavily on heuristics, such as surface-level characteristics, when determining the credibility of a source. As students learned civic online reasoning skills, many began to more critically analyze the sources through lateral reading and went beyond relying on heuristics.

Although this suggests that more students engaged with analytical thinking, the qualitative analysis of the media literacy final project, civic online reasoning performance tasks, and student interviews indicated that students continued to report using heuristics that led to misleading conclusions. These qualitative findings align with the quantitative findings, which
also indicated students continued to rely on heuristics when determining the credibility of online sources. For example, the questionnaire showed that several students attributed importance to surface-level characteristics when evaluating online sources, with nine (75%) agreeing on the importance of the domain (.com, .org) and six (50%) agreeing on the importance of a website’s About page. Although these findings support previous research that found students continued to utilize weak heuristics when learning and applying civic online reasoning skills (McGrew, 2021), research also indicates that even a small amount of exposure to civic online reasoning can improve students’ abilities to evaluate online information critically (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022).

Research suggests that students who receive lateral reading interventions show higher instances of analytical thinking compared to students who did not receive training, indicating that enhancing cognitive processing may improve the ability to evaluate information (Artmann, Scheibenzuber, Fendt, & Nistor, 2023). Despite the continued reliance on heuristics, the qualitative and quantitative findings suggest that several students still demonstrated an understanding of civic online reasoning skills and showed engagement with analytical thinking. For example, the questionnaire indicated that many students acknowledged the importance of lateral reading, with all students agreeing on the importance of learning what other sources say. Furthermore, although all interviewees referenced relying on heuristics, such as surface-level characteristics, as an indicator of a source’s credibility to some extent, they also all discussed ways in which they engage with lateral reading. However, in alignment with previous research, the findings still suggest that students require more support to carry out evaluation strategies successfully (McGrew, 2020; McGrew & Byrne, 2021; Wineburg et al., 2022).
**Discussion of Students’ Perceptions of Confidence and Ease.** As part of the dual process theory, Kahneman (2011) argued that the amount of mental effort a task takes determines whether an individual engages with intuitive versus analytical thinking processes. Furthermore, the demand for effort diminishes the more skilled one becomes in a task, resulting in greater cognitive ease. As individuals become more skilled or experienced in a task, their mental processes become more automatic and require less effort (Kahneman, 2011). Building on the quantitative results, interviewees reflected on their confidence and ease in implementing skills learned from class, with students reporting varying perceptions of effort. Participant 1 explained that they felt the level of ease in determining a source’s credibility largely depended on the popularity of a news source and the level of controversy of the information presented. Although Participant 8 expressed that they thought applying skills from class “was pretty hard to pick up on” at first, it became easier over time. Participants 2 and 3 agreed they did not find applying these skills too difficult. However, Participant 2 acknowledged that applying these skills still took “a little effort,” and Participant 3 said it was “hard to distinguish between websites oftentimes.” Participant 5 elaborated, “I honestly could use them on a daily basis,” speaking to their confidence and ease in using skills learned from class regularly.

Furthermore, when asked to reflect specifically on the performance tasks they completed as part of the quantitative data collection, four interviewees did not find these tasks challenging (Participants 1, 2, 3, 8). However, Participant 5 reported that they did find the tasks challenging. Four interviewees felt they successfully completed the tasks (Participants 1, 2, 3, 5), and Participant 8 said they felt “kind of” successful. All students agreed they relied extensively on skills they learned from class to complete the tasks. These findings align with previous research that found a fake news literacy intervention increased students’ self-efficacy in detecting fake
news (Tamboer et al., 2021). However, Tamboer et al. (2021) also found that while the intervention increased youth’s fake news self-efficacy, it did not increase their knowledge or awareness of fake news. Previous research also supports that individuals tend to overestimate their abilities to evaluate the credibility of online information (Mahmood, 2016). Therefore, Kahneman (2011) argued that an individual’s confidence level should not be considered a good indicator of accuracy.

**Discussion of RQ5: Integrating the Quantitative and Qualitative Data**

Despite all interviewees reporting a heavy reliance on using skills learned from class and expressing relative success and ease in completing the tasks, the quantitative results of the performance tasks revealed a variance of summed scores, ranging from 4 to 11. Although the quantitative correlational statistics analysis found a moderate relationship between students’ perceptions of confidence and civic online reasoning skills using Spearman’s rank, Puth et al. (2014) noted that sample sizes as low as 10 offer relatively low power for detecting significant levels of association. Therefore, I interpreted these findings cautiously and emphasized the qualitative analysis in this study. Furthermore, the results indicate that students did not demonstrate mastery across the performance tasks. Although previous research indicates that youth show a significant increase in self-efficacy in their abilities to detect fake news (Tamboer et al., 2023), other studies indicate that people tend to overestimate their information literacy skills (Mahmood, 2016). The analysis seems to align with previous research, suggesting a discrepancy between individuals’ reported high confidence in their skills and overall mastery of the performance tasks.

Furthermore, the qualitative analysis suggested that while many students engaged with analytical thinking after learning civic online reasoning skills, many also relied on heuristics,
possibly leading them to faulty conclusions regarding a source’s credibility (Ku et al., 2019). The students’ performance task responses indicated that many did not investigate the first two sources beyond the provided information, suggesting that students relied more heavily on surface-level characteristics to determine their credibility. Because the third performance task specifically directed students to conduct an open search for information, more students engaged with analytical thinking by evaluating several sources to investigate a claim, possibly leading to higher scores on this specific task. However, previous research also indicates that explicit training may not actually lead youth to the right conclusions about online information (Metzger et al., 2015). For example, although Participant 5 cited several examples of engaging analytically with online sources during their interview, their performance tasks’ scores resulted in a summed score of six, earning less than half of the possible points. This may suggest that analytical thinking may not always prove the most effective strategy in evaluating the credibility of online sources (Metzger et al., 2015). Furthermore, due to the tedious and cognitively demanding nature of analytical thinking, Caulfield (2018a) supported that media literacy interventions should focus on reducing cognitive overload by employing methods requiring less thinking when initially encountering online information. Therefore, the overarching research question addressed the impact of civic online reasoning instruction on students’ cognitive processes.

**Discussion of RQ1: Impact of Civic Online Reasoning Instruction on Cognitive Processes**

Because students felt that taking the course helped improve their abilities to evaluate an online source’s credibility, this suggests that explicit civic online reasoning instruction may impact students’ cognitive processes when evaluating online information. Due to the cognitive demands of analytical thinking, Caulfield (2018b) argued that media literacy interventions should focus on reducing cognitive overload by employing methods that require less thinking
when initially encountering online information. Students learned several strategies from the course to help them more efficiently evaluate online sources, which many discussed implementing regularly. For example, most interviewees (Participants 1, 2, 3, 5) explained that when evaluating sources, they initially visited Wikipedia, a strategy learned from class and used by professional fact-checkers as a starting point in investigating a source (Digital Inquiry Group, 2020). Additionally, Participants 1 and 3 discussed relying on Ad Fontes’ (2023) Interactive Media Bias Chart, another source learned from class, as a starting point in investigating online sources. Although Participant 8 felt that applying these skills “was pretty hard to pick up on,” they also explained it became easier over time, suggesting that utilizing the skills became less cognitively demanding as they developed them. Participant 1 further elaborated that individuals “can pretty easily fact-check a source by doing lateral reading,” suggesting relative cognitive ease in utilizing skills learned from class.

However, the quantitative and qualitative findings also indicated variance in students’ perceptions of ease when evaluating online information, suggesting that applying these skills requires greater analytical thinking for some students. For example, when asked to reflect on completing the performance tasks, Participant 5 explained, “When I gave myself the time, and I really sat down, I paid attention, and I tried my best,” suggesting that Participant 5 took an effortful, analytical approach. Furthermore, interviewees reported taking between 15 and 30 minutes to complete the tasks, indicating that the tasks took time and effort. Although research supports that enhancing cognitive processes through lateral reading interventions may improve students’ abilities to evaluate online information (Artmann, Scheibenzuber, Fendt, & Nistor, 2023), the quantitative results indicated that students did not demonstrate mastery across the tasks. Although all interviewees indicated relying heavily on skills learned from class to
complete the tasks, the qualitative analysis also supports that students still utilized heuristics, such as surface-level characteristics, as an indicator of a source’s credibility to some extent. These findings suggest a nuanced relationship between students’ intuitive and analytical cognitive processes and understanding of civic online reasoning skills, highlighting the complexity of learning and applying these skills.

**Limitations**

Creswell and Guetterman (2018) define limitations as weaknesses or problems in a study identified by the researcher. Although 52% of the target population participated in the first quantitative phase of the study, the total number of participants amounted to only 12 of 23 possible participants. The small population size prevented generalizability beyond the specific context of this study. Additionally, the small sample size made it difficult to conduct meaningful inferential statistics, resulting in several statistically insignificant findings in the quantitative data. Although Spearman’s rank correlation between students’ confidence and their mastery levels on the performance tasks suggested a moderate statistical significance, only nine participants completed this phase of the study. Therefore, I interpreted this correlation cautiously and relied on descriptive statistics and qualitative data to complement this finding. Furthermore, due to the small population and sample size, I collected minimal student demographics to protect their identities. Although the questionnaire did collect students’ ages and grade levels, the small sample size prevented any meaningful inferential statistics regarding these demographic variables. Furthermore, I also chose to leave out any unique identifiers that students may have discussed in the interviews to ensure confidentiality. Despite these limitations, the depth of qualitative data allowed for meaningful analysis, mitigating the impact of the small sample size and limited demographic information on the study’s robustness.
Because I created and taught the media literacy course studied, this highlights my role as an insider researcher. Furthermore, my role as the instructor and researcher posed a potential conflict regarding my relationship with the student participants due to concerns related to confidentiality or coercion. As noted above, I made every effort to protect the confidentiality of the student participants by leaving out any unique identifiers in the data analysis. Furthermore, I clearly articulated my relationship with the students in the Institutional Review Board (IRB) approval and carefully followed the procedures for the study as outlined and approved by the IRB. Additionally, Carspecken and Saxena (2022) argued that establishing rapport with participants not only increases the trustworthiness and validity of the study but can also enhance the accuracy of what they express. Therefore, I considered my relationship with the students an asset as it allowed me to establish rapport and trust with them.

Five students participated in an individual interview during their Academic Intervention and Enrichment (AIE) period, a 30-minute structured work time built into their school day. I scheduled interviews during this period to minimize the loss of personal time for students. However, three interviews remained ongoing as the bell rang, ending the AIE period. Although the data from the interviews still led to a rich and detailed analysis, the time constraint resulted in some rushed questions and responses at the end of the interviews. To alleviate this limitation, multiple sources of qualitative data triangulated the analysis, including student artifacts from the course and a qualitative analysis of the civic online reasoning performance tasks.

Finally, the target high school offered the piloted media literacy course for the first time during the Spring 2023 Semester. However, developing an effective curriculum often takes years to refine, making curriculum development a continuous process that evolves over time (Neendoor, 2023). Although the study provides insight into helping to develop the media literacy
course, the results may have differed had the study relied on a more established course. Furthermore, this study focused on the impact of a stand-alone media literacy course. Although the study integrated students’ exposure to civic online reasoning skills in other high school classes to a small extent, McGrew and Byrne (2021) supported taking a cross-curricular approach to integrating these skills. Addressing these limitations helps to increase the transparency of the study and further establishes implications for practice and recommendations for future research.

**Implications for Practice**

The study’s results highlight the complex nature of cognitive processes involved in evaluating online information. Powers (2019) argued that researchers must understand students’ cognitive processing to design successful educational interventions. The study provided insight into students’ cognitive processes, suggesting that students engage with a blend of intuitive and analytical thinking while evaluating online information, with varied accounts regarding their reliance on biases and heuristics. Understanding how students cognitively process information and what factors influence these processes can provide educators and policymakers with valuable insights into designing effective media literacy instruction.

Additionally, this study focused on a piloted media literacy course offered at the target high school for the first time. As the school continues to offer this class, this study’s findings provide feedback that can help in making improvements to the course to assist students in developing their media literacy skills. Although the study found that students reported feeling more confident in their skills after taking the course, they did not demonstrate mastery of the performance tasks. Furthermore, although students agreed on the importance of learning these skills, the findings also indicated that students lacked a depth of exposure to learning to evaluate
online sources in other classes. McGrew and Byrne (2021) supported taking a cross-curricular approach to integrating civic online reasoning skills as research indicates that restricting the instruction of these skills to a single course or workshop may not sufficiently prepare students to become skilled consumers of digital content (Breakstone et al., 2021, p. 512). In addition to making improvements to the course, the target school may consider integrating media literacy across the curriculum to ensure students have more opportunities to learn and apply these skills.

According to Media Literacy Now (2023), Pennsylvania, the target high school’s state, does not yet have legislation requiring media literacy education. However, Senator Katie Muth sponsored and referred a bill on March 14, 2023, requiring “an age-appropriate model curriculum for students in kindergarten through grade twelve for media literacy instruction” (S. Bill No. 496, 2023). Although the bill remains pending, several surrounding states, including Delaware, New Jersey, and Ohio, have recently required the implementation and instruction of K-12 media literacy standards (Media Literacy Now, 2023). As more states adopt media literacy education, this study may help high school educators design and implement more effective instruction to meet the goals of this legislation.

**Recommendations for Future Research**

This study relied largely on implementing SHEG’s (2019) resources in teaching and assessing high school students’ civic online reasoning skills. Although SHEG (2019) provides a wealth of resources suitable for high school students, much of the legislation requires media literacy education from K-12. Furthermore, while some of the provided lessons include two levels, with the Level 2 version containing more advanced content (SHEG, 2019), there remains a gap in research regarding the modification and adaption of these lessons to accommodate students with disabilities and those with English as a second language. To ensure educators
effectively prepare students to navigate the digital landscape, future research in civic online reasoning should prioritize studying age- and developmentally-appropriate content tailored to the diverse needs of all students.

Additionally, this study focused on the impact of a single, semester-long media literacy course on students’ abilities to evaluate online information. However, research suggests that restricting the instruction of civic online reasoning skills to a single course may not sufficiently prepare students to become skilled consumers of digital content (Breakstone et al., 2021, p. 512). Although McGrew and Breakstone (2023) conducted a study to examine how teachers could incorporate civic online reasoning across the curriculum, the study did not provide evidence regarding the effects of cross-curricular interventions on students learning and applying civic online reasoning skills. Therefore, future studies should consider comparing both models to determine their effectiveness in helping students learn and apply these skills.

Furthermore, because De Leyn et al. (2022) pointed out that media literacy research rarely amplifies students’ voices, the study prioritized highlighting their perspectives on media literacy initiatives. Nonetheless, it remains crucial for research to also prioritize teacher preparation for effectively implementing these skills in their classrooms. Previous research indicates that teachers face several challenges in implementing media literacy instruction, including a limited amount of resources (DiGiacomo et al., 2023), lack of guidance (Baker et al., 2021), and unclear or outdated standards (Huguet et al., 2021; Trust et al., 2022). Therefore, future research should focus on addressing these challenges so that teachers can develop effective media literacy instruction. Additionally, research indicates that teachers’ biases, especially related to their political ideologies, can impact the resources they choose to integrate into their classes (Clark et al., 2021). Similar to how media literacy interventions aim to help
students recognize the influence of their biases on online source evaluation (Wittebols, 2020), teacher training in media literacy should also aim to increase educators’ awareness of their biases and their impact on source consumption and evaluation.

Finally, the significant increase and use of generative artificial intelligence (AI) technologies has further complicated navigating the digital landscape. According to the World Economic Forum’s (2024) Global Risks Report, the widespread use of AI has exacerbated the spread of misinformation and disinformation, posing the most severe threat to democracy over the next two years. Furthermore, NewsGuard has identified 750 Unreliable AI-Generated News and Information websites (UAINS) that operate with little or no human oversight, making them more susceptible to including false claims (Sadeghi et al., 2024). Although civic online reasoning emphasizes making students more critical consumers of online information, this new wave of rapidly evolving AI technologies requires targeted research on teaching students how to navigate the increasing complexities of the digital world.

Conclusion

This study contributes to the growing body of research on civic online reasoning by examining students’ cognitive processes when engaging with online sources. Although the study found that students feel confident in their skills, especially after completing a media literacy course, the results suggest that students did not demonstrate mastery of civic online reasoning performance tasks. The qualitative findings also indicate that students engaged with a blend of intuitive and analytical thinking, highlighting the complex nature of cognitive processes involved in evaluating online information. As young people continue to rely more and more on the internet and social media as a source of news and information, enhancing the skills to decipher the credibility of online sources remains of utmost importance. Therefore, future research must
continue to explore the effectiveness of media literacy interventions in improving students' abilities to discern the credibility of online information and become more critical consumers of media.
References


https://doi.org/10.1080/09518398.2022.2061632


https://doi.org/10.1073/pnas.221661420


https://doi.org/10.46303/ressat.2023.9

https://doi.org/10.1177/09637214221121570

https://doi.org/10.1016/j.tsc.2019.05.004

https://statisticseasily.com/kendall-tau-b-vs-spearman/

https://doi.org/10.1080/00933104.2022.2158149

https://doi.org/10.15760/comminfolit.2016.10.2.24


Medlin, P. (2021, August 12). Illinois is the first state to have high schools teach news literacy. NPR. Retrieved from https://www.npr.org/2021/08/12/1026993142/illinois-is-the-first-state-to-have-high-schools-teach-news-literacy


https://doi.org/10.3389/feduc.2020.577843

National Association for Media Literacy Education (NAMLE). (2023). https://namle.net/about/


https://doi.org/10.1080/00313831.2021.1897876


https://www.pbslearningmedia.org/


S. Bill No. 496. (2023).

https://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=PDF&sesYr=2023&sessInd=0&billBody=S&billTyp=B&billNbr=0496&pn=0464


https://doi.org/10.1093/acprof:oso/9780195341140.003.0001


Verma, A., Sharma, A., Prakash, A., Das, A. (2023, June). Disentangling the effect of confirmation bias and media literacy on social media users’ susceptibility to fake news. *Journal of Content, Community, & Communication, 17*(9), 16-30. [http://dx.doi.org/10.31620/JCCC.06.2023/03](http://dx.doi.org/10.31620/JCCC.06.2023/03)


Appendix A: Institutional Review Board Approval Letter

Jul 17, 2023 8:31:27 AM EDT

To: Julia Lennox
Col of Education & Social Work, Special Education


Dear Julia Lennox:

Thank you for your submitted application to the West Chester University Institutional Review Board. Since it was deemed expedited, it was required that two reviewers evaluated the submission. We have had the opportunity to review your application and have rendered the decision below for High School Students’ Understanding of Civic Online Reasoning: A Mixed Methods Study.

Decision: Approved

Selected Category: 6. Collection of data from voice, video, digital, or image recordings made for research purposes.

Sincerely,
West Chester University Institutional Review Board

IORG#: IORG004242
IRB#: IRB00005030
FWA#: FWA00014155
Appendix B: Questionnaire and Civic Online Reasoning Scenarios

I understand that my parent/s or guardian/s have given permission for me to take part in a study about student perspectives on a media literacy course under the direction of Mrs. Julia Lennox. I understand that the different parts of this study include:

- Allowing my student work samples from the Media in the Digital Age course to be used as data in this study.
- Completing an online survey. (10 minutes)
- Students will be invited to respond to civic online reasoning scenarios either as a part of the survey or during AIE with Mrs. Julia Lennox. (15 minutes)
- Students will be invited to take part in an individual interview during AIE with Mrs. Julia Lennox. (30 minutes)

Please contact Mrs. Julia Lennox at jlennox@kcsd.org if you have any questions about your participation.

My participation in this project is voluntary and I have been told that I may stop my participation in this study at any time. If I choose not to participate, it will not affect my studies or grades in past or future classes at KCSD in any way.

- YES, I agree to participate.
- NO, I do not agree to participate.

Please enter your provided code number below prior to continuing.

_____________

1. What grade are you currently in?

- 9
- 10
2. How old are you?
   - 14 or younger
   - 15
   - 16
   - 17
   - 18
   - 19 or older

3. How many hours a day do you typically spend online? Include the time you spend on apps like Instagram, Snapchat, etc.
   - 0
   - 1-3
   - 4-6
   - 7-9
   - 10-12
   - 13 or more

4. Do you own a smartphone?
   - Yes
   - No

5. Select the three online activities you do most on an average day.
   - Checking and sending email
   - Keeping up with what friends and family are doing
☐ Visiting accounts by people you don't personally know (meme accounts, celebrity accounts, etc.)

☐ Researching topics you are interested in

☐ Keeping up with current events

☐ Checking with weather, traffic, or public transportation

☐ Shopping and researching products

☐ Finding information about events, movies, restaurants, etc.

☐ Playing games

☐ Other: (Please specify) ________________________________

6. In the last week, where did you get information about the news or current events? Check all that apply.

☐ Television

☐ Print newspaper (e.g. New York Times, Wall Street Journal, etc.)

☐ News website (e.g. Huffington Post, Wall Street Journal website, CNN.com, etc.)

☐ Social media (e.g. Snapchat, Instagram, Twitter, YouTube, etc.)

☐ Radio or podcasts

☐ Talking with family or friends

☐ Teachers

☐ I don't keep up with the news

☐ Other: (Please specify) ________________________________
7. From which social media websites or apps did you get the most information about news or current events this past week? Select up to three.

- TikTok
- Facebook
- Twitter
- Instagram
- SnapChat
- YouTube
- Tumblr
- Reddit
- WhatsApp, GroupMe, Kik, or other group messaging app
- I don't keep up with the news on social media
- Other: (Please specify) __________________________________________________

8. To what extent do you agree with each statement below?

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident in my ability to evaluate the credibility of online sources.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I feel confident in my ability to distinguish fact from opinion in online content.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
I feel confident in my ability to tell an advertisement from a news article in online content.

I always fact-check questionable information that I come across online.

If a website looks professional, this is always a good indicator that the website is credible.

Online information that uses data and/or statistics is purely objective and cannot be argued with. Numbers don't lie.

Taking Media in the Digital Age helped me to better evaluate the credibility of online sources.
I believe that learning how to evaluate credibility of online sources should be taught in school.

9. To what extent do you agree with each statement below?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe that my own biases can influence my understanding of the online information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am open to different perspectives and opinions when consuming online information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I consciously seek out news sources that present different perspectives and opinions from my own.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I believe that journalists always need to present both sides of a story in order to present "neutral" and "unbiased" news.

10. I believe that assessing the credibility of online information is...
   - Very Easy
   - Easy
   - Neither Easy nor Difficult
   - Difficult
   - Very Difficult

11. What are you MOST likely to do FIRST when you want to determine the credibility of an online source?
   - Look at the domain (.com, .org, etc.)
   - Look for the publication date to see how current the source is
   - Look at the website’s About page to learn more about it
   - Learn more about who created the source
   - Look to see if there are any grammatical or spelling errors on the website
   - Look to see how closely the source aligns with what you already believe
   - Leave the website to learn more about what other online sources say about it
   - Other: (Please specify) __________________________________________________
12. Please rank how important you think EACH item is below when you are determining the credibility of an online source.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not important</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Very Important</th>
<th>Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>The domain (.com, .org, etc.)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The publication date to see how current the source is</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The website's About page</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The author's credentials</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The presence of any grammatical or spelling errors</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>How closely the source aligns with what you already believe</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Learning what other online sources say about the website</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
13. You are doing research on a controversial topic for a school project. You do an internet search on your topic. What are you MOST likely to do FIRST when looking for reliable information on the topic?
   - Click on the first few links that appear.
   - Scan several of the results before deciding which site to visit first.
   - Click on the first link that most aligns with what you already believe about the topic.
   - Other: (Please specify) __________________________________________________

14. You see a sensationalized story from an unfamiliar source on social media that you believe is fake. What are you MOST likely to do FIRST when you see this story?
   - You click on the story to learn more about it.
   - You share the story on social media.
   - You check to see if other sources are reporting the same story.
   - You ignore it.
   - Other: (Please specify) __________________________________________________

15. You see the same sensationalized story from an unfamiliar source on social media that you believe is fake. However, the story now has thousands of comments and likes and has been shared by thousands of people, including by some of your friends and family. How are you most likely to react now?
   - You change your mind and think the story must be true.
   - You check to see if other sources are reporting the same story.
   - You ignore it.
   - Other: (Please specify) __________________________________________________
16. The second phase of this study will involve the opportunity for you to respond to civic online reasoning scenarios. Your authentic perspective on each scenario is important and it will not matter if your response is "right" or "wrong." It will take about 15 minutes to complete.

How would you like to continue?

- I would like to respond to the scenarios now as part of this survey.
- I would like to complete the civic online reasoning scenarios during an AIE period with Mrs. Lennox.
- I do not wish to complete this part of the study.

17. You are researching Covid-19 and public health and come across this website:

https://flattenthefear.com/news-article/5-reasons-you-should-feel-better-about-getting-out-of-the-house/. Please decide if this website is a trustworthy source of information on Covid-19 and public health. You can open a new tab and do an internet search if you want. Take about 5 minutes to complete this task.

Is this website a trustworthy source to learn about Covid-19 and public health?

- Yes, this website is a trustworthy source.
- No, this website is not a trustworthy source.

Explain your answer, citing evidence from the webpages you used. Be sure to provide the URLs to the webpages you cite.

_________________________________________________________________
18. The following tweet appears in your Twitter feed:

New polling shows the @NRA is out of touch with gun owners and their own members. ampr.gs/1Pyw4qg #NRAfail

Why might this tweet be a useful source about NRA members' opinions on background checks? List any sources you used to make your decision.

________________________________________________________________

Why might this tweet not be a useful source about NRA members' opinions on background checks? List any sources you used to make your decision.

________________________________________________________________

19. Some people claim that Cesar Chavez, the co-founder of the United Farm Workers Union, opposed unauthorized immigration to the United States. Take a few minutes doing research online to decide if you believe this claim is true.
Do you believe Cesar Chavez opposed undocumented immigration to the U.S.? Explain using evidence from the websites you consulted.

20. Explain why the sources you used are strong. Be sure to include their URLs.

21. The final phase of the study will involve an individual interview with Mrs. Lennox. It will occur during AIE and will take about 30 minutes to complete. Are you willing to participate in the final phase of the study?
   - Yes
   - No

22. Thank you for your willingness to participate in an interview with Mrs. Lennox! Mrs. Lennox will follow up with you through your school email with more details about the interview.

   Please click below to exit the survey!
   - Exit the Survey
Website Reliability Parallel Rubric

Covid-19 Health

This task takes students to the website Flatten the Fear (flattenthefear.com) and asks them whether it is a trustworthy source to learn about Covid-19 and public health. Flatten the Fear is run by the Job Creators Network Foundation, which is a major political donor group and not a credible public health organization.

This exercise is an open web search in which students are free to stay on the Flatten the Fear or Job Creators Network Foundation sites or leave them to search for information about the group. Successful students will look beyond the surface features of the site and detect its agenda from content on the website or from leaving the site to search for reliable information about the organization.

<table>
<thead>
<tr>
<th>Mastery</th>
<th>Student rejects the website as a trustworthy source because of the organization’s agenda and provides a clear rationale. Student provides reliable supporting evidence and cites the source of information.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging</td>
<td>Student rejects the website as a trustworthy source and provides supporting evidence. However, the response falls short of Mastery because:</td>
</tr>
<tr>
<td></td>
<td>1) Student provides relevant evidence and says where the evidence is from, but the explanation is incomplete.</td>
</tr>
<tr>
<td></td>
<td>2) Student provides a complete explanation that is supported by relevant evidence but does not say where the evidence is from.</td>
</tr>
<tr>
<td>Beginning</td>
<td>Student rejects the source but provides an incoherent, irrelevant, or unreasonable explanation; or the student simply accepts the source as trustworthy.</td>
</tr>
</tbody>
</table>
Appendix D: SHEG’s Civic Online Reasoning Scenario Rubric #2

Claims on Social Media Rubric

This task presents students with a tweet from the liberal advocacy organization MoveOn.org that reads: “New polling shows the @NRA is out of touch with gun owners and their own members.” The tweet contains a link to a press release by the poll’s sponsor, the Center for American Progress, another liberal advocacy organization. Students are asked why this tweet might and might not be a useful source of information. Strong responses will note that the tweet may provide useful information given that it is based on a poll conducted by a professional polling firm. At the same time, students must acknowledge how the political alignment of the Center for American Progress and the political motivations of MoveOn.org, both of which support stronger gun control measures, may have shaped the structure of the poll and how its results were publicized.

**Question 1: Why might this tweet be a useful source?**

<table>
<thead>
<tr>
<th>Mastery</th>
<th>Student fully explains that the tweet may be useful because it includes data from a poll conducted by a polling firm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging</td>
<td>Student addresses the polling data and/or the source of the polling data but does not fully explain how those elements may make the tweet useful.</td>
</tr>
<tr>
<td>Beginning</td>
<td>Student does not address the polling data or the source of the polling data as a reason the tweet may be useful.</td>
</tr>
</tbody>
</table>

**Sample Responses**

**Mastery**

This student identifies the polling firm and provides evidence of the firm’s reliability.

*The polling information which the tweet references was collected by Public Policy Polling, which appears to have a fairly strong accuracy record, though with a Democratic bent (e.g., Wall Street Journal article: http://www.wsj.com/articles/SB122592455567202805)*
**Emerging**

This student references the poll but does not explain why that makes the tweet a useful source of information.

*The photo used in this tweet was compiled from a public policy polling survey.*

**Beginning**

This student focuses on the tweet’s appearance rather than its content.

*It could be useful because a graphic with a strong message can be enlightening or more likely thought provoking.*

This student equates Twitter followers with trustworthiness.

*MoveOn.org has a large following on Twitter.*

**Question 2:** Why might this tweet not be a useful source?
<table>
<thead>
<tr>
<th>Mastery</th>
<th>Student fully explains how the political motivations of the organizations involved may have influenced the content of the tweet and/or poll, which may make the tweet less useful.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging</td>
<td>Student addresses the source of the tweet or the source of the news release but does not fully explain how those elements may make the tweet less useful.</td>
</tr>
<tr>
<td>Beginning</td>
<td>Student does not address the source of the tweet or the source of the news release as reasons the tweet may be less useful.</td>
</tr>
</tbody>
</table>

**Sample Responses**

**Mastery**

This student explains how MoveOn.org’s work as a political advocacy organization might influence the tweet’s contents.

> According to the MoveOn.org Wikipedia page, MoveOn.org is a “progressive public policy” group and thus will most likely be against most any media or information distributed by the NRA. The criticisms section of the Wikipedia page cited more than one instance of MoveOn.org distorting the truth and even attempting to alter Google searches for their own benefit. I would seek a different source to know NRA members’ opinions on background checks.

**Emerging**

The student suggests that the tweet is politically motivated but does not explain how this might influence the content of the tweet.

> Although MoveOn.org claims to be independent, they also were paid to work on Obama’s campaign so are clearly Democrat-oriented, and the NRA members tend to be Republicans (http://front.moveon.org/about/#.V0NYKSMrLBI).
Beginning

This student focuses on the nature of Twitter rather than the source of the tweet.

Twitter is a social platform built for sharing opinions, and though there are plenty of news organizations sharing facts on Twitter, I’d be more likely to trust an article than a tweet.
Appendix E: SHEG’s Civic Online Reasoning Scenario Rubric #3

Researching a Claim Parallel Rubric

This assessment asks students to do an open search to investigate the claim that Cesar Chavez, co-founder of the United Farm Workers (UFW), opposed unauthorized immigration to the United States. At their start, the UFW supported restrictions on unauthorized immigration as a way to limit farm owners’ ability to hire undocumented immigrants as strikebreakers. Chavez even went as far as to have the UFW report undocumented workers to immigration authorities. However, by the mid-1970s, Chavez’s position on undocumented immigration had evolved. In the mid-1970s, his position shifted from promoting immigration restriction to expanding rights for undocumented workers.

Today, a Google search for [Cesar Chavez unauthorized immigration] turns up articles from anti-immigration groups and individuals who take Chavez’s early positions out of context to promote their own xenophobic cause. To successfully answer this question, students must disregard these unreliable sources and instead locate evidence from trustworthy sites, like articles published by ABC News and The Hill. Students might also use Wikipedia to track down reliable sources, like David G. Gutiérrez’s Walls and Mirrors: Mexican Americans, Mexican Immigrants, and the Politics of Ethnicity. After locating evidence from reliable sources, successful students will explain how the information addresses the question and why the sources they used are reliable.

<table>
<thead>
<tr>
<th>Mastery</th>
<th>Student provides clear reasoning supported by evidence. Student provides evidence from a reliable source and considers the reliability of the source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Mastery</td>
<td>Student provides a clear answer supported by evidence. Student provides evidence from a reliable source but does not explicitly discuss its reliability, or the student does not provide a complete explanation.</td>
</tr>
<tr>
<td>Emerging</td>
<td>Student claims that there is no reliable evidence on the topic at hand.</td>
</tr>
<tr>
<td>Beginning</td>
<td>Student provides evidence from a potentially biased source with no consideration of reliability of the source or provides an irrelevant explanation.</td>
</tr>
</tbody>
</table>
Appendix F: Semi-Structured Interview Questions

Introduction: Thank you for participating in this interview! May I audio-record our conversation?
I am interested in learning about your perspective as a student who took my class last year on
Media in the Digital Age. I am especially interested in learning about any takeaways from the
class that you may have. The interview will take about 30 minutes to complete. You may stop
the interview at any time, skip any questions you do not want to answer, and ask any questions to
clarify what I am asking. Do you have any questions? Are you willing to move forward with the
interview?

Introduction

1. In your own words, can you describe how you regularly use the internet/social media?
2. How would you define what it means to be media literate?
3. How would you define what it means to have civic online reasoning skills?
4. Do you think it is important to be media literate? Can you explain why or why not?

Perspectives on Media in the Digital Age

5. Why did you take Media in the Digital Age?
6. What was a takeaway for you after taking Media in the Digital Age? (Provide further
   prompts, such as the prompts below, as needed):
   1. What did you learn?
   2. What did you enjoy most about this class? What did you not enjoy about this
      class?
   3. What did you find most challenging about the class? How did you overcome
      those challenges?
7. Have you learned similar skills or knowledge in other classes? If so, can you give some examples?

8. Did you gain any skills or knowledge from this class that you think will be useful outside of class? If so, can you give some examples?

9. Do you think this class had an impact on your media literacy skills? Please explain and give specific examples where possible.

10. Have you ever used the skills you learned from Media in the Digital Age outside of class? Please explain and give specific examples where possible.

**Student Perspectives on How They Think When Evaluating Online Information**

11. How do you determine the credibility of online information? Please explain and provide some examples of any strategies you use.

   1. Potential follow up questions:

      1. How much effort do you feel you have to put into evaluating online information? Explain.

      2. Do you feel that this is something that you have always done or did you feel like you had to learn it?

      3. Have you ever encountered a situation where you had to evaluate information found on social media? If so, how did you approach it and what did you learn from the experience?

      4. How do you approach evaluating online information?

         1. What do you look for or do first?

         2. What strategies do you use?

12. How would you define the word *bias*?
13. What factors do you think influence your own biases?

   1. **Follow up as needed:** To what extent do you think your own background influences your biases (family, friends, where you come from, where you live, etc.)?

14. How aware are you of your own biases when engaging with online information?

15. Last year, we learned about something called **confirmation bias**. Can you explain what you remember learning about this word?

16. How do you think your biases, if any, might affect your ability to critically evaluate the online information that you engage with?

17. Have you ever consciously sought out news or media sources that challenge your existing beliefs or biases? Explain why or why not.

18. Are you open to different perspectives and opinions when consuming news and media, even if they contradict your own beliefs? Why or why not?

19. **Additional questions generated based on data analysis of quantitative including:**

   1. In the questionnaire, you indicated that you learned how to evaluate online sources in [name of high school class]. Can you talk more about your perspective on this?

   2. How long did it take you to complete the performance tasks?

   3. How successful do you feel you were in completing them?

   4. Did you find them challenging? Explain.

   5. How much did you rely on skills learned from our class? Explain.
June 20, 2023

West Chester University
Institutional Review Board
700 South Church Street
West Chester, PA 19383

Dear West Chester University, Institutional Review Board,

I, Dr. Dusty Blakey, Superintendent of [Redacted], have reviewed Julia Lennox’s request to conduct research. This letter documents approval for Julia Lennox to complete research regarding civic online reasoning and media literacy education, in accordance with IRB approval and school district policies. I have been advised of the scope of the research and how data will be collected. I also understand that all information to be gathered will be collected and stored in a confidential and appropriate manner. The research will take place between August 21, 2023, and May 31, 2024. Participants include high school students who have taken Media in the Digital Age in our school. Participation is voluntary. I understand permission is contingent upon approval from West Chester University’s Institutional Review Board.

Sincerely,

[Signature]

Superintendent