

**DIGITAL RESOURCES AIMING TO ADDRESS OR ALLEVIATE POST-SECONDARY  
FOOD INSECURITY: A SCOPING REVIEW**

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## Abstract

**Background:** There is growing evidence that food insecurity no longer impacts only those living in low- and middle- income countries but instead targets populations experiencing vulnerabilities such as post-secondary students globally. Food insecurity has many negative impacts on students such as high risks of mental health crises, decreased academic performance, and physical chronic illnesses. Post-secondary students increasingly rely on digital technologies to access information and supports, making digital resources important for addressing food insecurity within this population.

**Research Gap:** Although there is significant literature supporting the theory that food insecurity among post-secondary students is increasing, the literature about the digital resources available that aim to address or alleviate food insecurity among this population is limited.

**Aim:** This scoping review aims to map and describe what is already known about digital resources that exist, aiming to address or alleviate food insecurity among post-secondary students.

**Methodology:** This scoping review was conducted utilizing the Joanna Briggs Institute (JBI) methodologies for scoping reviews. Two independent reviewers screened peer-reviewed literature for inclusion and exclusion criteria, while the primary reviewer conducted a grey literature search through Google and citation chasing.

**Key Findings:** A total of twenty-six sources were included within this scoping review with 12 peer-reviewed sources, and 14 grey literature sources. Findings are presented within a framework that addresses nine themes: 1) the types of digital resources that exist in terms of aiming to address or alleviate post-secondary food insecurity, 2) the functions of these resources, 3) accessibility and equity considerations, 4) integration into campus systems, 5) ethical, privacy,

and stigma-related considerations, 6) reported outcomes, 7) institutional context and ownership, 8) target populations within the post-secondary setting, and finally, 9) gaps and opportunities identified within the literature.

**Implications:** The findings of this scoping review suggest there are ways digital resources are being utilized to address or alleviate food insecurity among the post-secondary population.

However, literature is limited in its demographic reach, consideration for accessibility, equity, and stigma, and implementation of programs that focus on how to address the root causes of food insecurity, rather than providing emergency, short-term outreach.

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## Table of Contents

|   |            |
|---|------------|
| <b>ABSTRACT.....</b>  | <b>III</b> |
| <b>ACKNOWLEDGEMENTS .....</b>   | <b>V</b>   |
| <b>TABLE OF CONTENTS.....</b>   | <b>VII</b> |
| <b>LIST OF TABLES.....</b>  | <b>IX</b>  |
| <b>LIST OF FIGURES .....</b>  | <b>X</b>   |
| <b>CHAPTER 1: INTRODUCTION AND BACKGROUND.....</b>                    | <b>1</b>   |
| <b>1.0 BACKGROUND:.....</b>   | <b>1</b>   |
| 1.0.1 FOOD INSECURITY IN POST-SECONDARY STUDENTS .....                | 1          |
| 1.0.2 IMPACTS OF FOOD INSECURITY .....                                | 2          |
| 1.0.3 THE EMERGING USE OF TECHNOLOGY IN POST-SECONDARY STUDENTS ..... | 3          |
| <b>1.1 SIGNIFICANCE:.....</b>   | <b>4</b>   |
| 1.1.1 STATEMENT OF THE PROBLEM/RESEARCH QUESTION: .....               | 4          |
| <b>1.2 METHODOLOGY: .....</b>   | <b>5</b>   |
| 1.2.1 SCOPING REVIEW RATIONAL .....                                   | 5          |
| 1.2.2 RELEVANCE .....   | 6          |
| <b>1.3 PURPOSE OF STUDY/OBJECTIVE: .....</b>                          | <b>7</b>   |
| <b>CHAPTER 2: LITERATURE REVIEW.....</b>                              | <b>9</b>   |
| <b>2.0 THE SOCIAL DETERMINANTS OF HEALTH .....</b>                    | <b>9</b>   |
| <b>2.1 KEY CONCEPTS.....</b>  | <b>11</b>  |
| 2.1.1 FOOD INSECURITY .....   | 11         |
| 2.1.2 POST-SECONDARY FOOD INSECURITY .....                            | 13         |
| 2.1.3 BARRIERS TO FOOD ACCESS .....                                   | 13         |
| 2.2.1 CAUSES AND CONSEQUENCES.....                                    | 15         |
| 2.2.2 POPULATIONS MOST AFFECTED.....                                  | 16         |
| <b>2.3 EXISTING SUPPORTS AND PROGRAMS.....</b>                        | <b>17</b>  |
| 2.3.1 CAMPUS-BASED FOOD BANKS/ PANTRIES .....                         | 17         |
| 2.3.2 GOVERNMENTAL PROGRAMS .....                                     | 18         |
| <b>2.4 GAPS IN THE LITERATURE .....</b>                               | <b>19</b>  |
| <b>2.5 SUMMARY AND CONNECTIONS TO STUDY.....</b>                      | <b>20</b>  |
| <b>CHAPTER 3: METHODOLOGY .....</b>                                   | <b>22</b>  |
| <b>3.0 EPISTEMOLOGY:.....</b>   | <b>22</b>  |
| <b>3.1 CONCEPTUAL FRAMEWORK: .....</b>                                | <b>22</b>  |
| <b>3.2 RESEARCH QUESTIONS: .....</b>                                  | <b>24</b>  |
| <b>3.3 METHODOLOGY: .....</b>   | <b>24</b>  |
| <b>3.4 PEER REVIEWED LITERATURE SEARCH .....</b>                      | <b>29</b>  |
| 3.4.1 PEER REVIEWED DATA CHARTING .....                               | 30         |
| <b>3.5 GREY LITERATURE SEARCH.....</b>                                | <b>31</b>  |
| 3.5.1 GOOGLE GREY LITERATURE SEARCH .....                             | 32         |
| 3.5.2 CITATION CHASING .....  | 32         |
| 3.5.3 GREY LITERATURE DATA CHARTING .....                             | 33         |
| <b>3.6 DATA ANALYSIS.....</b>   | <b>34</b>  |
| <b>3.7 METHODOLOGICAL RIGOUR .....</b>                                | <b>36</b>  |
| <b>3.8 ETHICAL CONSIDERATIONS:.....</b>                               | <b>37</b>  |
| <b>CHAPTER 4: RESULTS.....</b>  | <b>39</b>  |
| <b>4.0 OVERVIEW OF INCLUDED STUDIES.....</b>                          | <b>39</b>  |
| 4.0.1 PEER- REVIEWED LITERATURE .....                                 | 41         |
| 4.0.2 GREY LITERATURE .....   | 43         |

|  |           |
|--|-----------|
| <b>4.1 TYPES OF DIGITAL RESOURCES</b> .....                          | <b>44</b> |
| <b>4.2 FUNCTIONS AND PURPOSES OF DIGITAL RESOURCES</b> .....         | <b>45</b> |
| <b>4.3 TARGET POPULATIONS WITHIN POST-SECONDARY SETTINGS</b> .....   | <b>46</b> |
| <b>4.4 ACCESSIBILITY AND EQUITY CONSIDERATIONS</b> .....             | <b>47</b> |
| <b>4.5 INSTITUTIONAL CONTEXT AND OWNERSHIP</b> .....                 | <b>47</b> |
| <b>4.6 INTEGRATION INTO CAMPUS SYSTEMS</b> .....                     | <b>48</b> |
| <b>4.7 REPORTED OUTCOMES</b> .....                                   | <b>48</b> |
| <b>4.8 ETHICAL, PRIVACY, AND STIGMA-RELATED CONSIDERATIONS</b> ..... | <b>49</b> |
| <b>4.9 GAPS AND OPPORTUNITIES</b> .....                              | <b>49</b> |
| 4.9.1 DEMOGRAPHIC GAPS .....   | 49        |
| 4.9.2 ANALYTIC GAPS .....  | 50        |
| <b>CHAPTER 5: DISCUSSION</b> .....                                   | <b>51</b> |
| <b>5.0 SUMMARY OF KEY FINDINGS</b> .....                             | <b>51</b> |
| <b>5.1 INTERPRETATION OF FINDINGS</b> .....                          | <b>52</b> |
| <b>5.2 IMPLICATIONS FOR PRACTICE</b> .....                           | <b>54</b> |
| <b>5.3 IMPLICATIONS FOR POLICY</b> .....                             | <b>55</b> |
| <b>5.4 IMPLICATIONS FOR FUTURE RESEARCH</b> .....                    | <b>56</b> |
| <b>5.5 STRENGTHS AND LIMITATIONS</b> .....                           | <b>57</b> |
| <b>CHAPTER 6: CONCLUSION</b> .....                                   | <b>59</b> |
| <b>6.0 SUMMARY OF THE STUDY</b> .....                                | <b>59</b> |
| <b>6.1 KEY CONTRIBUTIONS</b> .....                                   | <b>60</b> |
| <b>6.2 RESEARCHER GROWTH AND REFLEXIVE DEVELOPMENT</b> .....         | <b>61</b> |
| <b>6.3 FINAL REFLECTIONS</b> .....                                   | <b>61</b> |
| <b>REFERENCES</b> .....  | <b>63</b> |
| <b>APPENDIX A</b> .....  | <b>72</b> |
| <b>APPENDIX B</b> .....  | <b>76</b> |
| <b>APPENDIX C</b> .....  | <b>77</b> |
| <b>APPENDIX D</b> .....  | <b>78</b> |
| <b>APPENDIX E</b> .....  | <b>79</b> |
| <b>APPENDIX F</b> .....  | <b>82</b> |
| <b>APPENDIX G</b> .....  | <b>83</b> |
| <b>APPENDIX H</b> .....  | <b>84</b> |
| <b>APPENDIX I</b> .....  | <b>93</b> |

## List of Tables

|  |           |
|--|-----------|
| <b>Table 1 Six Broad Indications for Scoping Reviews .....</b>   | <b>5</b>  |
| <b>Table 2 Definitions of Key Terms.....</b>   | <b>7</b>  |
| <b>Table 3 Influence of a Subjectivist Epistemology and Conceptual Framework for the Social Determinants of Health on Methodology.....</b> | <b>23</b> |
| <b>Table 4 JBI Scoping Review Framework Steps.....</b>   | <b>25</b> |
| <b>Table 5 Preliminary Key Concepts and Example Search Terms.....</b>  | <b>26</b> |
| <b>Table 6 Inclusion and Exclusion Criteria .....</b>  | <b>27</b> |
| <b>Table 7 Utilized Databases .....</b>  | <b>28</b> |
| <b>Table 8 Peer-Reviewed Literature Data Extraction Framework .....</b>  | <b>30</b> |
| <b>Table 9 Grey Literature Data Extraction Framework .....</b>   | <b>33</b> |
| <b>Table 10 Analytic Categories Used to Guide Data Synthesis .....</b>   | <b>34</b> |

## List of Figures

|  |           |
|--|-----------|
| <b>Figure 1 Visual Representation of the Social Determinants of Health Conceptual Framework .....</b>                          | <b>11</b> |
| <b>Figure 2 Visual Representation of the Years of Publication of Included Sources .....</b>                                    | <b>40</b> |
| <b>Figure 3 Visual Representation of the Country of Implementation/Origin of Included Sources .....</b>                        | <b>41</b> |
| <b>Figure 4 Visual Representation of Research Designs of Included Peer-Reviewed Literature .....</b>                           | <b>42</b> |
| <b>Figure 5 Visual Representation of Grey Literature Types .....</b>   | <b>44</b> |
| <b>Figure 6 Visual Representation of Digital Resource Types For Peer-Reviewed and Grey Literature .....</b>                    | <b>45</b> |
| <b>Figure 7 Visual Representation of the Functions of Digital Resources in Terms of How They Address Food Insecurity .....</b> | <b>46</b> |

## Chapter 1: Introduction and Background

### 1.0 Background:

#### *1.0.1 Food Insecurity in Post-Secondary Students*

Food insecurity impacts around 733 million people globally (World Health Organization, 2024), and while there is often focus on low- and middle-income countries, food insecurity has recently emerged as a growing issue among post-secondary students in high-income countries (McKay et al., 2025). Food insecurity can be defined as having reduced access to quality or quantity of food (Batchelder et al., 2023). As many students move away from home, it is common for them to experience financial hardship during their transition into a post-secondary setting, which can limit their ability to manage essential expenses such as food and other basic needs (Maynard et al., 2018). According to the University of Saskatchewan (2024), nearly 29% of Canadian post-secondary students were food insecure in 2023, a rate higher than that of the general population which experienced food insecurity at a rate around 18% (Statistics Canada, 2023). Additionally, 20% of college students in the United States experienced food insecurity in 2020 (Government Accountability Office, 2024).

Post-secondary students can be defined as any student who has completed high school and has moved onto advanced education at a university, college, or other recognized institution (Government of Canada, 2021). Over the past decades, enrollment in post-secondary institutions has increased drastically, with around 264 million students enrolled around the world (UNESCO, 2025). The number of enrollments has more than doubled in the last 20 years globally, and is expected to continue to increase (UNESCO, 2025). Enrollments in Canadian colleges and universities have increased to 2.3 million in the 2023/2024 academic year (Statistics Canada,

2025). Enrollment into US post-secondary institutions totalled 19.28 million students in the 2024/2025 academic year (Hanson, 2025). As student enrollment continues to increase, it is important to understand the programming and supports that exist for students experiencing food insecurity.

It is evident that food insecurity is not just a global problem that impacts those in lower-income countries, but it also impacts those experiencing vulnerabilities in high-income countries like post-secondary students. The World Bank (2024) assigns the economies of the world into four categories: low, lower-middle, upper-middle, and high based on each country's gross national income (GNI). To be considered low income, a country's GNI should be \$1,145 or less, lower-middle should be between \$1,146 and \$4,515, upper-middle ranges between \$4,516 and \$14,005, and high-income countries have a GNI above \$14,005 (World Bank, 2024). Although lower income countries experience food insecurity at a higher rate, 733 million people experience it globally (World Health Organization, 2024), with an increased emergence in post-secondary students in high-income countries (McKay et al., 2025).

### ***1.0.2 Impacts of Food Insecurity***

Food insecurity is widely recognized as a social determinant of health, influencing patterns of health behaviour and overall well-being. The social determinants of health can be defined as the conditions in which people are born, grow, work, age, and live and people's access to power, resources and money, which all have an impact on health inequities (World Health Organization, 2025). Throughout this scoping review, a conceptual framework focusing on the social determinants of health will be utilized. From a public health perspective, addressing health equity in terms of the social determinants of health is fundamental for improving health and reducing longstanding inequities. Addressing the social determinants accelerates the progress

toward health equity which is when every person has an opportunity to attain their highest level of health (CDC, 2024). This means food insecurity can be understood as a health inequality experienced by students that can negatively impact their health (Campanera et al., 2023).

The consequences of food insecurity are often recognized as severe negative health outcomes that span across the student's lifespan including diabetes, obesity, and other chronic health conditions (Batchelder et al., 2023; Campanera et al., 2023; Hagedorn-Hatfield et al., 2022; Maynard et al., 2018). Students experiencing food insecurity also experience poorer academic performance and outcomes due to lack of concentration, poor sleep, and increased stress (Batchelder et al., 2023; Maynard et al., 2018). Additionally, food insecurity has been associated with increased mental health impacts such as substance use, disordered eating, social isolation, suicidal ideation, anxiety, and depression (Batchelder et al., 2023). Hagedorn-Hatfield et al. (2022) explain that the social experiences of students experiencing food insecurity have declined, as they are feeling a lack of support and a decreased sense of community belonging. This lack of belonging can impact the mental and physical health of students resulting in lower grades, early dropouts, or chronic physical and mental health conditions (Hagedorn-Hatfield et al., 2022). It is important to find ways to fill the gaps of food insecurity and provide post-secondary students with healthful and available food to support their physical health, mental health, academic performance, and sense of community belonging.

### ***1.0.3 The Emerging Use of Technology in Post-Secondary Students***

The main goal of this scoping review is to map the current knowledge on digital resources that are available for post-secondary students that aim to address or alleviate food insecurity. In this study, technology refers to digital tools, platforms, or systems designed to deliver, facilitate or enhance interventions targeting post-secondary student food insecurity

(Fiveable, 2025). This may include mobile applications, websites, and other platforms that connect students to food resources, provide nutritional information, or enable access to food assistance programs (World Health Organization, 2021). Digital resources in the context of this study refer to the specific information or service-based assets provided through technology. These may include food bank appointment systems, meal planning platforms, community food-sharing networks, or web-based educational materials that aim to address or alleviate food insecurity among post-secondary students. Technology and the associated resources and devices have become a useful tool for those in the work force, in academia, or for personal use. Swanson and Walker (2015) found in their study of adult college students that these students have distinct preferences and practices for using technology and digital resources both in academic and non-academic spaces. Students often favour utilizing technology and digital resources for accessing learning management systems for accessing course materials and using social media or online forums for peer support networks (Swanson & Walker, 2015). It is important to note the extensive expansion of the utilization of technology and digital resources due to the COVID-19 pandemic when post-secondary students were required to move to remote learning (Rapanta et al., 2021). Since technology is readily available and highly utilized in an academic space, access to digital resources is available and may be useful to address or alleviate food insecurity within a post-secondary setting.

## **1.1 Significance:**

### ***1.1.1 Statement of the Problem/Research Question:***

Although there is significant literature on the impacts and prevalence of food insecurity within post-secondary settings, there is limited empirical literature examining digital resources designed to address or alleviate food insecurity among post-secondary students. In particular,

little is known about the types of resources that exist, how they are designed and implemented, and the extent to which they are usable, accessible, and available to students in practice.

Therefore, the purpose of this scoping review is to investigate digital resources that exist to address or alleviate post-secondary student food insecurity, their usability, availability, and accessibility, and exploring their effectiveness. By addressing this knowledge gap, this review creates an opportunity for future research to develop, evaluate, and empirically assess digital interventions that respond to food insecurity in post-secondary spaces.

## **1.2 Methodology:**

### ***1.2.1 Scoping Review Rationale***

According to Peters et al. (2021), the objective of scoping reviews is to define, explore, and summarize the available literature on an emerging area of study that is not yet suited for a full systematic review. Joanna Briggs Institute (JBI) and Peters et al. (2021) have classified six broad indications for conducting a scoping review, which can be found in Table 1. The purpose of this research was expected to fit under the need to identify and analyze knowledge gaps. However, further analysis of the data has revealed additional indications such as identifying the types of available evidence in the given field. Given the topic of digital resources used to address or alleviate post-secondary student food insecurity is a niche and emerging area of study, a scoping review is an appropriate methodology to map the existing literature and to identify gaps. Once the current and existing literature and gaps are identified, this creates valuable opportunities for further research that could close the gaps and create policy and programming

**Table 1**

#### ***Six Broad Indications for Scoping Reviews***

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| <b>No.</b> | <b>Indication for Scoping Review</b> |
|------------|--------------------------------------|
|------------|--------------------------------------|

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- 
1. Scoping Review will be used as a precursor to a systematic review.
  2. **Scoping review will be used to identify the types of available evidence in a given field.**
  3. Scoping review will be used to identify and analyse knowledge gaps.
  4. Scoping review will be used to clarify key concepts/ definitions in the literature.
  5. Scoping review will be used to examine how research is conducted on a certain topic or field.
  6. Scoping review will be used to identify key characteristics or factors related to a concept.
- 

(Peters et al., 2021)

### ***1.2.2 Relevance***

Although this scoping review has focused on at the effectiveness of digital resources available that are aimed to address or alleviate food insecurity within post-secondary students, this research can be used to inform future research on the topic. It can also inform the creation or revision of institutional policies or programs that could benefit students struggling with food insecurity. As mentioned previously, food insecurity has negative health implications on physical and mental health and can negatively impact academic performance and a sense of community belonging (Batchelder et al., 2023; Campanera et al., 2023; Hagedorn-Hatfield et al., 2022; Maynard et al., 2018). Loofbourrow and Scherr (2023) state that students experiencing food insecurity are 3.5 times more likely to drop out of their programs due to low income and poorer academic performance. This shows there is not only a health impact on students who experience food insecurity, but also an economic impact on the student, as well as the institution if students drop out of their programs. This scoping review can bring awareness to the knowledge gap that exists on this topic, and it can also promote recognition to an evolving issue students face on a daily basis. Looking at food insecurity with a social determinant of health lens results in a sense of urgency, as the barriers that impact a students' ability to access adequate food sources are explored. From a public health perspective, food insecurity negatively impacts health of post-

secondary students and leads to inequity. As institutions increasingly explore ways to support students overall or holistic well-being, understanding what digital resources are available in tackling post-secondary food insecurity is vital.

**1.3 Purpose of Study/Objective:**

This scoping review examines existing digital resources that aim to address or alleviate food insecurity in post-secondary settings, with particular attention to their accessibility, usability, and availability. Due to the increased utilization of technology and digital resources within an academic and overall social setting, it is important to explore existing published research to address post-secondary food insecurity. This scoping review is guided by the following overarching research question: What digital resources are available to address or alleviate food insecurity within a post-secondary setting?

Several key concepts related to this scoping review are used throughout the literature in different ways. To provide clarity and to ensure consistency, Table 2 outlines the definitions of key terms as they are applied in this scoping review.

**Table 2**  
*Definitions of Key Terms*

| <b>Term</b> | <b>Definition</b>   | <b>Usage in Scoping Review</b>   |
|-------------|---|--|
| Addressing  | Is defined as giving attention to or deal with a matter or problem (Cambridge Dictionary, 2023).      | In this scoping review, addressing will refer to increasing recognition of food insecurity and finding ways to improve it. |
| Alleviate   | Is defined as making something bad such as pain or problems less severe (Cambridge dictionary, 2024). | In this scoping review, the term alleviate will refer to ways that decrease the prevalence and burden of food insecurity.  |

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|                         |  |  |
|-------------------------|--|--|
| Digital resource        | Informational or service-based assets accessed through technology, including online food-bank appointment systems, meal-planning platforms, community food-sharing networks, and educational materials that aim to address or alleviate food insecurity among post-secondary students (World Health Organization, 2021). | In this scoping review, the term refers loosely to resources like websites, apps, and other online resources that aim to address food insecurity.                        |
| Food insecurity         | Is defined as inadequate access, adequacy, availability, and stability of food (Nikolaus et al., 2019) or having reduced access to quality or quantity of food (Batchelder et al., 2025).  | In this scoping review, food insecurity refers specifically to those who encounter economic or structural barriers preventing access to sufficient and nutritious foods. |
| Post-secondary students | Is defined as students who have completed high school and have moved onto a post-secondary education at a university, college or other recognized post-secondary institution (Government of Canada, 2021).   | In this scoping review, post-secondary students refer specifically to those enrolled in a recognized post-secondary institution.   |

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## **Chapter 2: Literature Review**

Before exploring digital resources aimed at addressing food insecurity in post-secondary settings, it is important to establish a foundation of current knowledge on this topic. This includes understanding what food insecurity is, how it affects the general population, how it uniquely impacts post-secondary students, and what supports and programs are already available to students. Throughout this chapter, the conceptual framework that will be utilized for conducting this scoping review will be described and how it is relevant to the topic. This chapter will also cover an overview of the main topics and concepts of this scoping review, including what is already known about post-secondary food insecurity, and existing programs and supports aimed at addressing food insecurity. Lastly, this chapter will identify and explain the gaps that exist within the literature on the topic of digital resources that are available to students to address or alleviate food insecurity, and how that impacts policy and program implementation and evaluation.

### **2.0 The Social Determinants of Health**

Food insecurity among post-secondary students is best understood through the social determinants of health framework, which emphasizes the interconnected factors influencing health at both individual and community levels, beyond the scope of traditional healthcare. Not only do the social determinants of health consider the domains of economic stability, but it also focuses on the domains of education, social and community context, healthcare, and built environment (See Figure 1; Lines et al., 2022). The impact food insecurity has on the domains of the social determinants of health affects the intermediary determinants, which are the conditions students grow, live, work and age. Food insecurity within post-secondary settings not only impacts the physical health of students, but it also impacts academic performance, mental health,

and can decrease the sense of community belonging leading to social isolation (Batchelder et al. 2023; Campanera et al. 2023; Hagedorn-Hatfield et al. 2022; Maynard et al. 2018). Taking all of these factors into consideration, it is important to reflect on the social determinants of health as food insecurity within a post-secondary setting can have many harmful impacts on the students individually, and on the community as a whole. Focusing on improving food insecurity on campuses can then create a cycle of improvement in the outcomes of physical health, mental health, academic performance, and community belonging. The conceptual framework of the social determinants of health can provide a roadmap to developing or evaluating interventions that aim to address or alleviate food insecurity on post-secondary campuses, which supports the development of policies and programs that address the root causes of health problems.

To guide this review, the social determinants of health framework adapted and operationalized by Lines et al. (2022) is used to contextualize factors influencing health outcomes. This framework highlights how determinants intersect to shape health outcomes, while its layered approach is useful for exploring barriers to health at multiple levels. Please see Figure 1 for a visual representation of the social determinants of health conceptual framework by Lines et al. (2022).

**Figure 1**

***Visual Representation of the Social Determinants of Health Conceptual Framework***



From Lines et al. (2022)

## **2.1 Key Concepts**

### ***2.1.1 Food Insecurity***

Food insecurity exists when households or individuals experience inadequate access, adequacy, availability, and stability of food (Nikolaus et al., 2019) or have reduced access to quality or quantity of food (Batchelder et al., 2025). Food insecurity within the context of high-income countries can be characterised by frequent compromises in dietary quality, reducing quantities, skipping meals resulting in hunger, and anxiety associated in access to food, which can be contrasted to low- and middle-income countries who often experience episodes of

deprivation of food, hunger, and starvation (Ejebu et al., 2019; Mook et al., 2020). Ejebu et al. (2019) explains that food insecurity has a higher prevalence in specific population sub-groups, such as households with children, single-parent households, and Black, Hispanic, and Indigenous households. There has been a rise in food insecurity globally due to an increased cost of living caused by factors such as climate change, conflict, and COVID-19 (Sison, 2023). It is also important to consider the geoeconomic factors that impact food security. Tariffs put in place by Governments can cost each household an additional \$1900 per year, which can have a negative impact on vulnerable populations such as students, seniors, and low-income families (Second Harvest, 2025). In 2024, more than 295 million people experienced acute levels of hunger which is an increase of 13.7 million people globally from 2023 statistics (UNHCR, 2025).

Food insecurity impacts millions of people globally. While there is a significant focus on the impacts of food insecurity in low- and middle-income countries, there is increasing recognition that food insecurity also exists in high-income countries (McKay et al., 2025). High-income countries such as Canada and the United States often measure food insecurity through a food security survey that categorises food insecurity into severity levels, which allows governments to create programs aiming to address food insecurity (Mook et al., 2019). However, concerns have been raised regarding the effectiveness of food security surveys as barriers to participation such as stigma, literacy challenges, language barriers, or limited access may result in underrepresentation of certain populations, leading to potential underestimation of food insecurity prevalence (University of Toronto, 2023). It is also important to consider how the severity levels are categorized in terms of their access to services and programming. However, in terms of data collection and statistics, comparing data from both Canada and the United States

can be helpful to adopt programming and services that seem to be effective in addressing or alleviating food insecurity.

### ***2.1.2 Post-secondary Food Insecurity***

Financial strain is a common issue among post-secondary students that creates vulnerability leading to access to food and other basic needs (Maynard et al., 2018). Maynard et al. (2018) explain that from 2006 to 2016, tuition fees for Canadian post-secondary institutions rose by 40% on average. As educational costs rise, students may be required to allocate a greater proportion of their financial resources towards tuition, leaving fewer resources available for basic necessities such as adequate and nutritious food. This is often the first time many post-secondary students are living on their own, meaning they are learning first-hand how to pay bills, buy groceries, cook for themselves on a consistent basis, and budget their money effectively. Budgeting is especially important if students are not working and plan to live on student aid or scholarships, as they may not have a consistent income each month (Batchelder et al., 2023). Although this is a common factor for many individuals to consider as they move out of their parents' houses, food insecurity is often more prevalent in post-secondary students compared to those the same age who do not choose to continue their education (Wang et al., 2023). This can be due to the increasing costs of tuition fees, the cost of living increases in cities where post-secondary institutions are located, or other financial or emotional stressors students may face, such as unemployment (Batchelder et al., 2023).

### ***2.1.3 Barriers to Food Access***

When it comes to food insecurity, there are different types of access that can be impacted for post-secondary students. Barak and Korzun (2023) explain the types of access being economic, physical, and social. Economic access involves factors such as affordability, income,

and poverty which can have larger impacts on vulnerable post-secondary students (Barak & Korzun, 2023). Physical access is often related to infrastructure and facilities, such as roads and transportation (Barak & Korzun, 2023). Although post-secondary students may have accessibility issues with roads and other transportation, it is also important to include access to on-campus supports as a barrier as they often have inconvenient hours of operation or other issues that can impact physical access (Idehai et al., 2024). Lastly, Barak and Korzun (2023) describe social access as ensuring people have the necessary resources within society for nutritious and culturally appropriate foods.

When considering other barriers to access, it is also important to include the feelings of stigma and shame associated with food insecurity and accessing supports. Food Banks Canada (2024) notes that a significant gap exists between those experiencing food insecurity and those who are actually seeking assistance. A key theme that has emerged when attempting to address this gap is the feelings of stigma and shame related to accessing a food bank, and this is an extremely hard emotional obstacle to overcome (Food Banks Canada, 2024). Although providing assistance through short-term, down-stream solutions like food banks and other food insecurity services is an important strategy to alleviate the negative effects of food insecurity, it ignores a key factor resulting in food insecurity even in high-income countries namely, the ineffectiveness of policies addressing food insecurity as a social determinant of health (Pollard & Booth, 2019). With this considered, another barrier to accessing healthy and high-quality food is the lack of government policies that address the root causes of food insecurity, rather than relying on short-term solutions like food banks (Holmes et al., 2018). Mendly-Zambo and Raphael (2018) explain that while responses to food insecurity like food banks are well-intentioned, they often depoliticize food insecurity and give a false impression the government is responding to the issue

effectively. While down-stream solutions like food banks serve an important role in mitigating emergency need, they represent often times an ineffectiveness in policy regarding food insecurity. An example of an effective up-stream policy to help address food insecurity at its roots, would be expanding non-repayable student financial aid and aligning this funding with cost-of-living fluctuations across Canada. These programs would address the economic disparities that underly food insecurity among post-secondary students.

## **2.2 What We Know About Student Food Insecurity**

### ***2.2.1 Causes and Consequences***

Food insecurity is a social determinant of health that can lead to or result from a range of stressors (McKay et al., 2025). Food insecurity impacts a variety of social, economic, and life-stage groups and post-secondary students tend to experience it at a level that exceeds the average of their local communities (Loofbourrow & Scherr, 2023). Loofbourrow and Scherr (2023) also explain that post-secondary students have a unique set of circumstances that alter their food security, which includes characteristics like income level, location, race, program type, and if they were a first-generation post-secondary student. It is important to recognize that even if students have high levels of financial literacy going into higher education, if they face financial constraints such as high costs of housing, health, transportation and food, financial literacy alone will not be enough to keep students from suffering from financial burden (Loofbourrow & Scherr, 2023). A research study through the University of British Columbia by Yau et al. (2025) found that high housing costs, expensive groceries, tuition costs, and increased cost of living through inflation have caused a significant rise in food insecurity rates throughout their student body as students struggle with limited job opportunities, reduced time for work, and limited

loans, scholarships and bursaries. Overall, the common themes found within the literature of the causes of post-secondary student food insecurity are high expenses and low income or supports.

Food insecurity creates many risks to physical, emotional, and mental health among affected post-secondary students. Loofbourrow and Scherr (2023) share that students impacted by food insecurity often have poorer academic performance, and students experiencing food insecurity are 3.5 times more likely to drop out compared to those who are not food insecure. Research done by El Zein et al. (2019) found students experiencing food insecurity often experience lower sleep quality, higher perceived stress, and higher risks of disordered eating which all put students at higher risk for chronic physical and mental illnesses. Maynard et al. (2018) similarly conclude that students who are food insecure tend to purchase foods of poorer quality, as they are often less expensive. These types of foods include more processed or fast foods, which are positively associated with obesity and the development of noncommunicable chronic diseases (Jardim et al., 2021).

### ***2.2.2 Populations Most Affected***

McKay et al. (2025) found that students from ethnic minority groups and undergraduate students are more likely to experience food insecurity compared to other students. Students who are financially independent and are recipients of scholarships and student aid are also at higher risk of food insecurity (McKay et al. 2025). Batchelder et al. (2023) found that the prevalence of food insecurity differs between institutions, degree, demographic group, and student type. Both non-white and first-generation students are also known to have higher rates of food insecurity as well as non-traditional students, such as those who are older, work full-time, have dependents, and those who live off campus (Batchelder et al., 2023). There has also been an increase of enrollment of international post-secondary students across Canadian campuses leading to

increased research on the impact food insecurity has on international students. Hanbazaza et al. (2021) explains that post-secondary international students have reported issues to obtaining sufficient food, including lack of family support, food preparation skills, lack of time due to poor time management skills and a busy schedule, scarce financial literacy or limited knowledge of expense tracking, limited food availability, living in a food desert or a food swamp, and low knowledge on supports and services provided by the institution. Students also faced issues with a lack of culturally appropriate foods including availability, acceptability, affordability, and accessibility (Hanbazaza et al., 2021). Lastly, Loofbourrow and Scherr (2023) explain that students who come from a background of low socioeconomic status are also known to be more significantly impacted by food insecurity.

## **2.3 Existing Supports and Programs**

### ***2.3.1 Campus-based Food Banks/ Pantries***

Campus food pantries and other campus-based supports are one strategy to help address food insecurity among post-secondary students and have been utilized as safety net programs for alleviating the effects of food insecurity (Idehai et al., 2024; Pradhananga et al., 2025). There are other on-campus resources available to address food insecurity, including on-campus food sharing hubs and gardens, meal deliveries, local food bank visits, farmers' markets, and meal voucher programs. There are also campus-based food literacy programs that exist to support post-secondary students. These programs focus on providing students with the skills and knowledge to make informed food choices, ways to promote food stability and healthy eating habits, and an understanding of food systems (Food For Thought, 2025).

The main goal of all of these programs is to decrease the impact food insecurity has on students by providing them with adequate nutrition for free, or at a reduced price. Not only do

these food pantries and other resources supply food for students, but many also offer personal hygiene products and other essential items students may need throughout their studies. These programs are seen to have many benefits as they provide students with the necessities to succeed. Idehai et al. (2024) reported that with increased visits to food pantries, perceived health increased, depressive symptoms decreased, and sleep quality increased. Martinez et al. (2022) also reported that students health and wellness improved as they increased their visits to food insecurity supports on campus.

Although campus-based food insecurity programming has their strengths, they also have limitations. Martinez et al. (2022) explains that food pantries are good for filling the gap until more effective long-term solutions are implemented. Pradhananga et al. (2025) states that only a small proportion of students actually report utilizing food pantry resources on campus due to lack of awareness that these programs exist. There also were reports that state the hours of operation were often inconvenient for student access (Pradhananga et al., 2025). Lastly, there is often an issue of social stigma and embarrassment experienced by students when thinking of accessing campus-based programming which often leads to low utilization.

### ***2.3.2 Governmental Programs***

National governments have different programs, initiatives, and supports to help alleviate food insecurity for post-secondary students. For example, the Canadian government offers financial assistance such as grants and loans to support agricultural projects that aim to address food insecurity by producing goods available to students (Government of Canada, 2025). The United States government has a program called the Supplemental Nutrition Assistance Program (SNAP) where students are eligible to access food stamps and other assistance to access food (U.S Government Accountability Office, 2024).

Although programs like the ones provided by the Canadian and United States governments seem helpful as they increase access to food for students, these programs also have limitations. For example, the agricultural programs supported by the Government of Canada will benefit students in the future, as the funding is available to create crops and areas for food production. This takes time and does not impact those currently experiencing food insecurity. With the United States Government's SNAP program, there are instances when students don't meet the eligibility criteria and are denied access to this program. There is need for more policy and program evaluation and implementation that will benefit current students despite eligibility.

## **2.4 Gaps In the Literature**

Throughout this literature review, it has become evident there is significant research on food insecurity in a post-secondary setting in terms of the causes, consequences, physical campus-based programming, populations that are impacted, and the barriers to food access that post-secondary students face. However, in terms of digital resources available for post-secondary students that aim to address or alleviate food insecurity, there is little literature and knowledge available. Swanson and Walker (2015) recognize the increased preference and utilization of technology and digital resources within the post-secondary population as they access not only educational resources such as their learning management systems, but also social media and other peer connection networks. As technology advances and becomes more widely utilized and available among post-secondary students, it is important to consider the resources and supports available digitally.

This scoping review aims to identify the literature available on digital resources aimed at addressing post-secondary food insecurity. The goal of this scoping review is to inform researchers about the knowledge gap that exists on this topic to encourage them to tackle

unexplored topics such as this. By examining and understanding the knowledge gaps that exist on the topic of digital resources utilized for post-secondary food insecurity and encouraging innovation, this scoping review can help provide valuable information for practical applications and decision-making for policy and program evaluation and implementation.

## **2.5 Summary and Connections to Study**

This literature review found there is significant literature on the impact food insecurity has on post-secondary students, which groups of students may be more at risk of experiencing food insecurity, the programs available within an institutional setting and what resources are provided by the government, and the barriers students experience to accessing food and food insecurity resources. The literature revealed that food insecurity poses significant risks to the physical, emotional, and mental health of students, putting them at higher risk of noncommunicable chronic diseases. Students coming from low socioeconomic backgrounds, international students, and non-white students are some of the most at risk of experiencing food insecurity in a post-secondary setting. Finally, the most common supports provided to students are food banks and pantries. While these resources have benefits as they provide students with the necessary food and essentials they need, the utilization rate is low due to factors such as inconvenient hours of operation, and feelings of stigma and embarrassment. Additionally, food pantries were initially created as a way for individuals to gain short-term emergency access to food in times of need (Mitchell & Prescott, 2022). However, food pantries are now being utilized as long-term supports within communities and on campuses worldwide. This change from emergency use to continuous support, does not address the reasons as to why students are food insecure in the first place, and may not be as impactful as initially expected.

However, the literature lacks information on the digital resources available to students for addressing food insecurity. Without knowledge on these types of resources, institutions and government bodies are unable to evaluate or implement effective programming, as technology has become a resource highly utilized by post-secondary students. This scoping review responds to the knowledge gap by increasing awareness on the topic of how digital resources can be used to address food insecurity within a post-secondary setting which can result in improved policy and programming for students.

## **Chapter 3: Methodology**

### **3.0 Epistemology:**

Throughout this scoping review, a subjectivist epistemology has been followed. Using a subjectivist understanding of knowledge throughout this scoping review is important as it recognizes that knowledge is constructed and shaped through each individual's perspective, experiences, and beliefs (Levers, 2013; The PhD Centre, 2023). An understanding of epistemological perspectives is vital for grounding and justifying the methodology of a scoping review. For example, Thomas et al. (2019) provides researchers with a table that explains how epistemological foundations and considerations impact each step of a scoping review. Table 3 outlines how the subjectivist epistemology impacts each step of this specific scoping review and the practical implications.

### **3.1 Conceptual Framework:**

Throughout this scoping review, a conceptual framework of the social determinants of health was utilized. By applying a social determinant of health framework in this scoping review, a more comprehensive understanding of the social factors that influence health and health equity can be achieved. By utilizing this framework in terms of food insecurity, it provides a better understanding of how to identify the gaps in effective programming, and policies that could be utilized to address health disparities caused by food insecurity within a post-secondary setting. Figure one by Lines et al. (2022) visualizes the existing domains that shape what is included in the social determinants of health.

Alongside Figure 1 (presented in Chapter 2), Table 3 adapted by Thomas et al. (2019) outlines what utilizing a conceptual framework of the social determinants of health looks like throughout the steps of this scoping review.

**Table 3*****Influence of a Subjectivist Epistemology and Conceptual Framework for the Social Determinants of Health on Methodology***

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| <b>Scoping Review Stage</b>       | <b>Epistemological Influence</b>  | <b>Conceptual Framework</b>  | <b>Practical Implications</b>   |
|-----------------------------------|---|--|---|
| Formulating the Research Question | Assumes knowledge is constructed through lived experience, beliefs and social context (The PhD Centre, 2023). | Guides the framing of food insecurity as a multi-level issue influenced by social, institutional, and structural determinants. | Research question explores multi-level barriers to food insecurity supports among post-secondary students.      |
| Identifying Relevant Studies      | Relevance is based on contextual and experiential value, not objective generalizability.                      | Helps identify studies across levels such as individual experiences, institutional responses and policy impacts.               | Broadened search strategy aims to include diverse sources like qualitative, mixed methods, and grey literature. |
| Study Selection                   | Informed by interpretation of meaning, not just rigid criteria.   | Used to assess whether studies address the social determinants involved in food insecurity.                                    | Transparent and reflexive selection process with an inclusion criterion that is aligned with the framework.     |
| Charting the Data                 | Data is shaped by context and interpretation; data is not neutral.  | Ecological levels used as organizing categories for charting determinants and barriers.  | Charting includes concepts relevant to different social determinants of health levels.                          |
| Collating and Summarizing         | Knowledge is synthesized through interpretive processes that reflect the complexity of knowledge.             | Framework helps categorize findings revealing gaps at each layer.  | Descriptive summary and mapping of findings across the ecological model.  |

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|             |  |  |  |
|-------------|--|--|--|
| Reflexivity | Researcher's values, assumptions, and positioning shape the process. | Framework supports critical reflection on researcher's roles in systems affecting food insecurity. | Reflexive journaling used throughout to document influence of positionality and decision-making. |
|-------------|--|--|--|

(Adapted from Thomas et al. (2019) and tailored to my research approach)

### 3.2 Research Questions:

This scoping review aims to address the overarching research question of what digital resources are available to address or alleviate food insecurity within a post-secondary setting guided by the following three sub-questions:

1. How are digital resources being used to address food insecurity for post-secondary students?
2. In what ways are digital resources supporting efforts to alleviate food insecurity for post-secondary students?
3. Have these resources been deemed to be usable, accessible, and available to post-secondary students?

These questions utilize the social determinants of health as a guiding framework, while also aiming to provide information on the knowledge gap that exists on the topic of digital resources utilized for the treatment and prevention of food insecurity within post-secondary students.

### 3.3 Methodology:

The proposed scoping review has been conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews. In order to effectively utilize the JBI scoping review methodologies, the researcher is required to be a certified member through JBI. Myself, and two of my committee members (LV and SV) received our certifications in the JBI

methodologies in 2025. Hadie (2024) utilizes knowledge on scoping reviews to compare and contrast the different scoping review guidelines including those from Arksey and O'Malley (2005), Levac et al. (2010), and JBI (Peters et al., 2024). Hadie (2024) explains the JBI methodology is known for its meticulous and transparent approaches involving structured search strategies, emphasis on stakeholder engagement, and clear reporting. Although the Arksey, O'Malley and Levac guidelines have been widely adopted, they are now being seen as outdated and under criticism for lack of standardization within their respective methodologies which lack transparency and rigour (Hadie, 2024). The JBI guidelines aim to standardize the scoping review process leading to more consistent, transparent and rigorous findings and reporting (Hadie, 2024; Peters et al., 2024).

This scoping review has followed the methodological framework outlined by the Joanna Briggs Institute, and Preferred Reporting Items for Systematic Reviews and Meta-Analyses extensions for Scoping Reviews (PRISMA-ScR). The intent of the PRISMA-ScR is to help readers and authors develop a greater understanding of core concepts, key items, and relevant terminology to report for scoping reviews (Tricco et al., 2018). Table 4 highlights the 9 steps outlined by Peters et al. (2024) required to ensure rigorous and transparent results.

**Table 4**

***JBI Scoping Review Framework Steps***

| <b>Step</b> | <b>JBI Framework</b>  |
|-------------|---|
| Step 1.     | Defining and aligning the objective/s and question/s  |
| Step 2.     | Developing and aligning the inclusion criteria with the objective/s and question/s          |
| Step 3.     | Describing the planning approach to evidence searching, selection, extraction, and charting |
| Step 4.     | Searching for the evidence  |
| Step 5.     | Selecting the evidence  |

- 
- Step 6. Extracting the evidence
  - Step 7. Analysis of the results
  - Step 8. Presentation of the results
  - Step 9. Summarizing the evidence in relation to the purpose of the review, making conclusions and noting any implication of the findings
- 

(From Peters et al. (2024))

To develop a comprehensive search strategy, preliminary key concepts and related search terms included in Table 5 were identified based on the research questions on this scoping review and current literature on the topic. Considering the growing relevance and interest on the topic of food insecurity, both peer-reviewed and grey literature have been explored to present a broader and more inclusive picture of the issues of post-secondary student food insecurity. It is important to keep in mind that terms like digital health technology can be difficult to define. Despite our best efforts to operationalize this, there is always a chance we may have missed a term that could be relevant to this topic. These search terms guided the database search process and have been refined in consultation with a Health sciences subject librarian.

**Table 5**

***Preliminary Key Concepts and Example Search Terms***

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| <b>Concept</b>          | <b>Examples of Keywords</b>  |
|-------------------------|--|
| Food Insecurity         | “food insecurity”, “nutrition insecurity”, “hunger”, “food poverty”                                    |
| Post-secondary Students | “college students”, “university students”, “undergraduates”, “graduate students”, “tertiary education” |
| Digital Resources       | “digital interventions”, “online platforms”, “mobile apps”, “technology-based”, “eHealth”, “mHealth”   |

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The following inclusion and exclusion criteria on Table 6 were developed in accordance with JBI guidelines to ensure the relevance and focus of the scoping review. These criteria have been applied during the literature screening stage.

**Table 6**

***Inclusion and Exclusion Criteria***

| <b>Criteria</b> | <b>Inclusion</b>   | <b>Exclusion</b>   |
|-----------------|--|--|
| Population      | Studies focused on post-secondary students   | Studies focused on populations other than post-secondary students, or where students are not a clearly identified subpopulation, digital interventions that target k-12, general public, or older adults without any post-secondary student relevance.   |
| Concept         | Studies discussing digital resources designed to address or alleviate food insecurity                                      | Studies that do not mention digital resources, any intervention that is not digital (e.g. in-person workshops, printed flyers, physical food banks/pantries without a digital component), resources that are only used for data collection or institutional tracking (e.g. surveys or database software not used to support or engage students) , apps or digital tools that are commercial, unaffordable, or unavailable to students due to geographic or institutional restrictions. |
| Context         | Programs or interventions aimed at food insecurity within post-secondary institutions or targeting post-secondary students | Studies that do not mention food insecurity or do not explicitly aim to reduce, address, or assess food insecurity (e.g. general health and wellness apps without a food or nutrition aspect), tools that are not student-   |

|                       |  |   |
|-----------------------|--|---|
|                       |  | facing, (e.g. internal university dashboards used only by administrators or researchers).   |
| Study Type            | Full text peer reviewed articles and grey literature                             | Opinion pieces, commentaries, or surveys, or database software not designed to support or engage students, conference proceedings, or presentations. Articles without an abstract and/or full text. |
| Language<br>Timeframe | English<br>From the years 2010- 2025 due to rapid evolution of digital resources | Non-English articles<br>Resources published or evaluated before 2010  |

(Adapted by Peters et al. (2024) and tailored to my scoping review topic)

A systematic search using the highlighted databases in Table 7 was conducted to search for relevant literature. With the help of a Health Sciences subject librarian from the University of Lethbridge, all peer-reviewed studies and grey literature that met the inclusion and exclusion criteria have been included in the data selection, extraction, and analysis. Grey literature has been explored through government policy documents, reports from non-profit and student organizations, institutional repositories, and targeted web searches, as these sources often provide insight into food insecurity among post-secondary students not captured in peer-reviewed literature. A comprehensive search strategy was initially developed for MEDLINE in consultation with a health sciences subject librarian and subsequently adapted for the use of the other databases in Table 7. The full search strategies for each database are provided in Appendix A.

**Table 7**

***Utilized Databases***

| <b>Database</b> | <b>Focus</b> | <b>Why</b> |
|-----------------|--------------|------------|
|-----------------|--------------|------------|

|   |   |  |
|---|---|--|
| Web of Science  | Multidisciplinary- science, social sciences, education.   | Strong for trend mapping and citation tracking.  |
| CINAHL (Cumulative Index to Nursing and Allied Health Literature) | Nursing, allied health, public health, student health.  | Good for health-related student support programs and campus-based care.  |
| ERIC (Education Resources Information Center)                     | Education, student affairs, post-secondary education.   | Ideal for campus-based initiatives, student wellness programs, and digital literacy.   |
| ProQuest Nursing and Allied Health Premium                        | Nursing, allied health, and related health sciences journals, dissertations, and evidence-based practice content. | Useful for identifying research on food insecurity and health outcomes from the perspective of nursing and allied health disciplines.  |
| MEDLINE   | Biomedical and life science database including medicine, public health, nursing, and other related fields.        | Essential for identifying peer-reviewed studies on the health impacts of food insecurity as well as interventions and policy-related research within post-secondary and broader populations. |
| APA PsycINFO  | Psychology and behavioural science literature including mental health, social, and educational aspects.           | Relevant for capturing studies on the psychological and social impacts of food insecurity among post-secondary students.   |

### 3.4 Peer Reviewed Literature Search

A OneNote library was compiled and provided by the health science subject librarian utilizing the databases provided in Table 7 and the search strategies provided in Appendix A. This library was then uploaded into the Covidence software where all 1471 sources were available for title and abstract screening.

Full-text review was conducted by two reviewers who are certified in JBI scoping review methodologies utilizing Covidence software for systematic and scoping reviews. Utilizing

Covidence software has helped in data management, data extraction, and categorizing based on inclusion and exclusion criteria. After screening the first 100 titles and abstracts, both reviewers met to review any conflicts or areas of confusion in terms of the inclusion and exclusion criteria. After the first 100 sources were screened, both reviewers had an agreement rate of 92%. In the case of disagreement, both reviewers met and came to a consensus. A third reviewer who is also JBI certified for scoping review methodologies was available in the case a consensus was not met by the two reviewers; this was not needed. After all titles and abstracts were screened, and all conflicts were resolved, 1471 texts were deemed irrelevant, and 90 sources remained for full-text screening.

Similarly to the title and abstract screening process, the two JBI certified reviewers screened the 90 full texts independently using the provided inclusion and exclusion criteria in Table 6. When conflicts arose, both reviewers met and went through the sources to determine if they met the inclusion criteria leading to extraction. After all conflicts were resolved, 78 sources were deemed irrelevant and were excluded leaving 12 sources for extraction. A PRISMA-ScR flow diagram of this process can be found in Appendix D.

### ***3.4.1 Peer Reviewed Data Charting***

Using the data extraction template on Covidence, data from peer-reviewed sources were systematically extracted to support the objectives of this scoping review. Table 8 outlines the data items extracted from peer-reviewed studies, along with their definitions.

**Table 8**

#### ***Peer-Reviewed Literature Data Extraction Framework***

| <b>Data Item Extracted</b> | <b>Definition</b>  |
|----------------------------|--|
| Title                      | The full title of the publication as reported by the authors |
| Author(s)                  | The individual(s) credited as authors of the publication     |

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|   |   |
|---|---|
| Year of Publication                         | The year the study was published  |
| Country of Origin                           | The country in which the study was conducted or where the intervention took place                         |
| Aim of Study                                | The stated objective(s) or research question(s) of the study  |
| Target Population                           | The characteristics of the study population, including participant group and relevant demographic details |
| Sample Size                                 | Number of participants included in the study  |
| Study Design                                | The overall design of the study (e.g., qualitative, quantitative, mixed methods)                          |
| Methodology/Methods                         | The data collection and analysis methods used in the study  |
| Intervention Type, Comparator, and Details  | Description of the intervention examined, including any comparator or controls or key components          |
| Duration of Intervention                    | The length of time over which the intervention was implemented  |
| Outcomes and How They Were Measured         | Outcomes reported and the tools or methods used to measure them   |
| Key Findings Relevant to the Scoping Review | Primary findings directly related to the scoping review objectives  |
| Additional Comments                         | Supplementary information not captured in any data item above.  |

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### 3.5 Grey Literature Search

Grey literature can be defined as any resource not controlled by a traditional, peer-reviewed publishing market (Peters et al., 2024). These can include webpages, reports, government documents, and documentaries (Peters et al., 2024). Because scoping reviews aim to map all knowledge on a specific topic, utilizing grey literature is important to ensure as much knowledge that exists on the topic is captured as possible. Grey literature searching ensures all non-peer-reviewed sources are included and extracted. Grey literature was utilized throughout this scoping review using two methodologies.

### ***3.5.1 Google Grey Literature Search***

The first grey literature methodology used was utilizing Google and Google Scholar. Google searches were conducted utilizing the Google Chrome browser in incognito mode with browser location services disabled, and personalized searching turned off utilizing the “pws=0” command to minimize personalization. Searches were conducted using an IP address in Lethbridge, Alberta. These actions were to ensure the study did not include any search bias due to previous search histories, and personalized search results.

Five separate search strategies utilizing similar search terms to those utilized in the peer-reviewed literature search were created and utilized for this search. These search strategies can be found in Appendix B. Each of the five searches utilized different search terms to ensure all terms related to the topic were covered.

Within each search, the first 150 results were screened initially from the title and description to determine which sources were irrelevant. Once all 150 results were title and description screened, each result was screened in its entirety to determine its relevance to the scoping review. Within the 5 searches, a total of 750 sources were screened, 546 were deemed irrelevant from title and description screening leaving 204 full sources to be screened. Out of the 204, 192 were deemed irrelevant leaving 12 to be extracted for the scoping review.

### ***3.5.2 Citation Chasing***

The second methodology utilized for the grey literature portion of this scoping review was citation chasing, otherwise known as backward citation searching. Citation chasing is the process in which the references cited in the included peer-reviewed sources are reviewed for inclusion in the study (Peters et al., 2024). Citation chasing was utilized to ensure relevant sources were not missed in the peer review, and initial grey literature searches.

Within the 12 peer-reviewed sources included in this scoping review, 453 citations were screened for relevant titles. In doing so, 441 sources were deemed irrelevant, and 12 sources moved onto full-text screening. Out of the 12 full screened sources, two met the inclusion and exclusion criteria, and were included in the scoping review.

### ***3.5.3 Grey Literature Data Charting***

Using a data charting framework similar to the peer-reviewed in Table 8, data from the grey literature will be charted systematically to support the objectives of the scoping review. Table 9 outlines the items extracted from the grey literature, along with their definitions.

**Table 9**

#### ***Grey Literature Data Extraction Framework***

| <b>Data Item Extracted</b>                           | <b>Definition</b>  |
|--|--|
| URL  | The web address where the digital resource was accessed.                                 |
| Organization/Author(s)                               | The organization or individual(s) responsible for developing or publishing the resource. |
| Country of Origin                                    | The country in which the organization is based or where the resource is utilized.        |
| Source Type  | The type of grey literature source.  |
| Name of Digital Resource                             | The title or name of the digital resource or program.                                    |
| Platform Type  | The format or platform through which the resource is delivered.                          |
| Purpose of the Resource                              | The stated objective of the resource   |
| Target Population/Intended User(s)                   | The population the resource is designed to serve.  |
| How The Resource Addresses Food Insecurity Digitally | A description of how the digital tool or platform is used to address food insecurity     |
| Notable Strengths or Gaps                            | Key strengths, limitations, or gaps identified in the resource.                          |

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Equity/Accessibility Considerations

Considerations related to equity and accessibility including barriers to use.

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### 3.6 Data Analysis

Following data extraction, the included sources were analyzed utilizing a descriptive and thematic approach consistent with JBI scoping review methodologies. Extracted data was organized into analytic categories to support both peer-reviewed and grey literature data. These categories focused on the types of digital resources identified, their functions and purposes, target populations, accessibility and equity considerations, reported outcomes, ethical and privacy considerations, and gaps within the literature.

While most peer-reviewed and grey literature can be analyzed utilizing similar categories, it is important to note that peer-reviewed studies are more likely to report measured outcomes in comparison to grey literature. Grey literature often only describes intended impacts that aren't supported by results.

Reflexive journaling supported the data analysis process by documenting how I as the researcher interpreted study findings and how the social determinants of health framework applied to the findings during data synthesis. Examples of journal entries can be found in Appendix C.

Table 10 outlines the analytic categories used to guide the combined peer-reviewed and grey literature data analysis and synthesis.

**Table 10**

***Analytic Categories Used to Guide Data Synthesis***

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| <b>Analytic Category</b>  | <b>Definition</b>  |
|---------------------------|--|
| Type of Digital Resources | Classification of digital resource identified within the literature such as mobile |

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|   |   |
|---|---|
|   | applications, learning management systems (LMS), or other online platforms.   |
| Functions and Purposes of The Digital Resources     | The primary function and intended purpose of the digital resource, including how they aim to address or alleviate food insecurity.  |
| Target Populations                                  | Identification of the specific target populations within a post-secondary setting such as undergraduate students, graduate students, international students, or students experiencing financial insecurity. |
| Accessibility and Equity Considerations             | Considerations related to accessibility and equity including digital access, inclusivity, cost, and barriers to access.   |
| Institutional Context and Ownership                 | Institutional context in which the resources were developed or implemented including ownership by institutions, student organizations, or external partners.  |
| Integration Into Campus Systems                     | How the digital resources are integrated into existing campus systems or services such as student services, food banks, or wellness supports.   |
| Reported Outcomes                                   | Outcomes reported in relation to the digital resources including perceived effectiveness, usage, or impact on food insecurity.  |
| Ethical, Privacy, and Stigma-Related Considerations | Identification of ethical considerations, privacy concerns, or stigma-related issues associated with the use of the resource.   |
| Gaps and Opportunities Identified                   | Identification of gaps in existing digital resources or opportunities for future development or research.   |

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Consistent with the JBI scoping review methodology (Peters et al., 2024), a formal critical appraisal of included studies was not conducted. The purpose of this scoping review was to map the breadth, characteristics, and conceptualization of literature on digital resources aiming to address or alleviate food insecurity among the post-secondary student population, rather than

to evaluate the interventions' effectiveness or to determine the strength of the evidence. A scoping review aims to provide an overview of existing knowledge regardless of its quality, only excluding studies that do not fit the inclusion criteria set out by the research team (Peters et al., 2024). All studies meeting inclusion criteria were retained within this scoping review to support the comprehensive mapping of the existing literature on the topic.

### **3.7 Methodological Rigour**

There are many ways rigour has been considered throughout the planning, and execution of this scoping review. Starting from the initial planning of the review, two of my committee members (LV and SV) and I participated in the JBI scoping review methodology certification course so we could understand the methodology and utilize it appropriately. When creating both the broad and sub-research questions, we utilized the population, concept, context (PCC) framework to ensure the questions were clear and concise. The overarching research question was refined as a team to ensure specificity. Rigour is considered when utilizing an interdisciplinary team of researchers similar to those within this scoping review. Our research team consisted of experts in Public Health, Nursing, and Education. Not only were the reviewers certified in scoping review methodologies, but they have also conducted and published their own scoping reviews prior to this.

Once our protocol was completed, it was registered utilizing Open Science Framework (OSF) to ensure transparency and to reduce bias.

Our search strategies were developed and conducted utilizing a Health Science subject librarian. This ensures methodological rigour as they are experts in systematic searching, and ensures comprehensive coverage of all relevant search terms, databases, and literature. Our health science subject librarian also ensured transparency and reproducibility by documenting

the exact search strings utilized in each database (which can be found in Appendix A). Lastly, consultation with a Health Sciences subject librarian supported the development of the search strategy, including the selection of appropriate terms, filters, and synonyms.

Grey literature searches were conducted utilizing the same search terms curated by the health sciences subject librarian to ensure a complete scope of literature. Preventative measures were also utilized in the grey literature search to prevent bias such as using incognito mode, disabling location services, and disabling personal web searches using the code “pws=0” to minimize personalized results due to recent search histories.

During peer-review literature screening, two reviewers screened titles, abstracts, and full texts independently and processed conflict resolutions together. This ensures there was no bias of one individual doing all screening of peer-reviewed sources on their own.

PRISMA-ScR was utilized throughout this scoping review including the utilization of the flow diagram (found in Appendix D) to map the flow of information including the number of studies included and excluded at each stage of data screening, and by including the 20-item checklist (found in Appendix E) to ensure all reporting items are covered.

When identifying all the ways methodological rigour was considered throughout this scoping review, it is important to note that reproducibility was at the forefront. Every step was meticulously documented and communicated through the committee to ensure rigour.

### **3.8 Ethical Considerations:**

Scoping reviews are a type of literature review of published research and can include peer-reviewed literature, or others, such as gray literature (Peters et al., 2024). Scoping reviews are different as they follow a prescribed procedure set out by the Joanna Briggs Institute. Authors

are required to be certified in the JBI scoping review methodology and are required to use a structured search strategy with an emphasis on stakeholder engagement (Peters et al., 2024).

The University of Lethbridge currently uses the University of Alberta's research ethics board when those at the University of Lethbridge intend to do research on human participants. The University of Alberta (2024) has research ethics boards for research that is conducting interviews or focus groups (REB 1), when research is utilizing surveys and questionnaires as data collection (REB 2), when non-invasive health research is being done such as chart reviews (REB 3), and when invasive research is being done including administration of drugs, vaccines, or other health products (REB 4). Although this scoping review does not involve human participants, ethical considerations were upheld through transparent and rigorous methods, accurate representation of evidence, respect for original sources, and attention to equity, inclusivity, and responsible knowledge translation. Data will be presented according to JBI procedures by including Author(s), year, country, article type, study aim/purpose, study population and sample size, design and methods, study outcomes/recommendations, and key findings. By ensuring transparent and rigorous practices are upheld throughout this scoping review, ethical considerations will be met.

## Chapter 4: Results

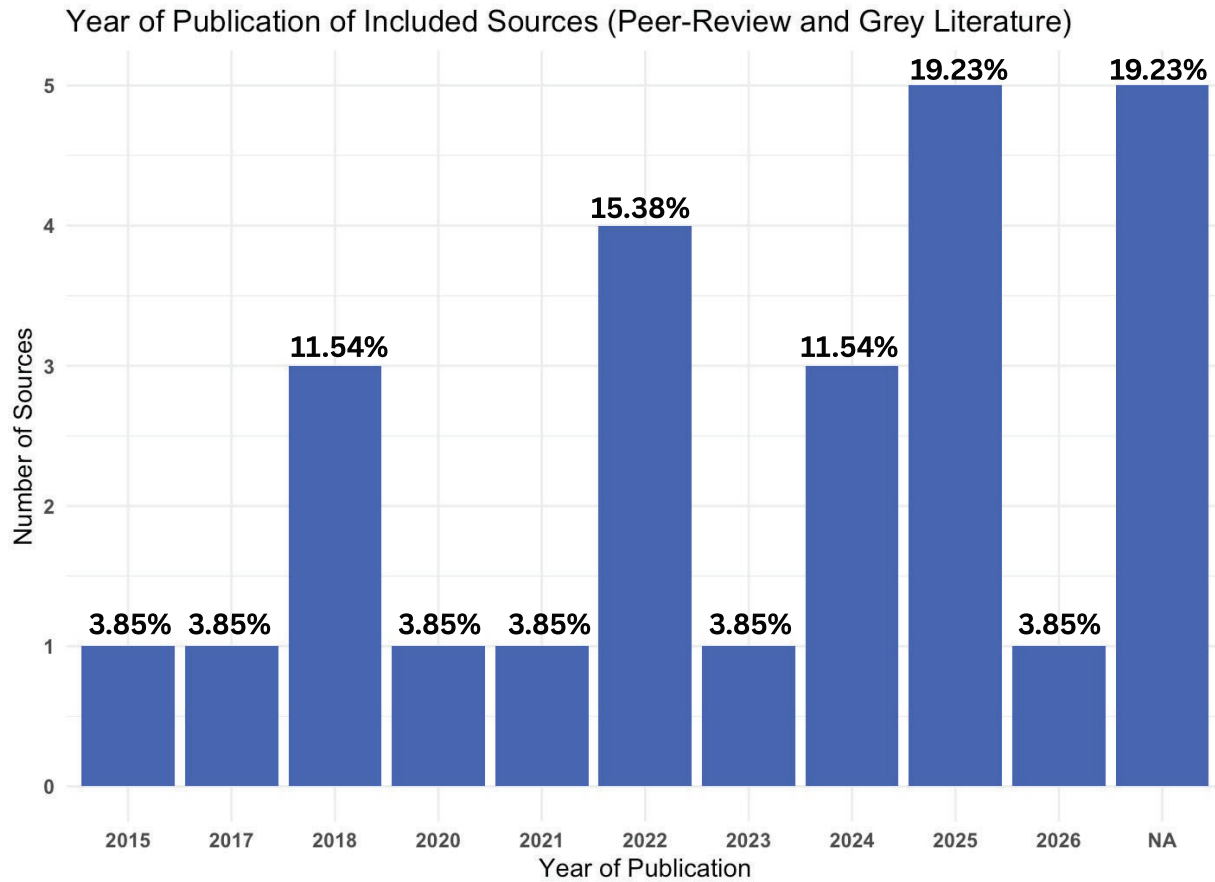
### 4.0 Overview of Included Studies

Over the course of the scoping review a total of 2764 sources were reviewed with 26 that met all eligibility and moved onto extraction. Of the total sources identified, only 0.94% met the inclusion and exclusion criteria outlined in Table 6 and were included in this scoping review. Out of the 2764 screened studies, 1561 were peer-reviewed screened on Covidence with 12 sources that met eligibility after full text review by two reviewers. 1203 of the reviewed sources were grey literature consisting of Google searches and citation chasing where 14 sources met the inclusion criteria and were extracted.

Due to the evolving nature of technology and digital resources, only sources published between 2010, and present were included within this scoping review. When looking at both peer-reviewed and grey literature combined, the oldest source was published in 2015 (Fleak, 2015), and the newest published in 2026 (Montclair State University, 2026). A total of five sources did not include a publication date which all consisted of grey literature. Figure 2 presents the numerical distribution of the years of publication throughout the peer-reviewed and grey literature combined.

**Figure 2**

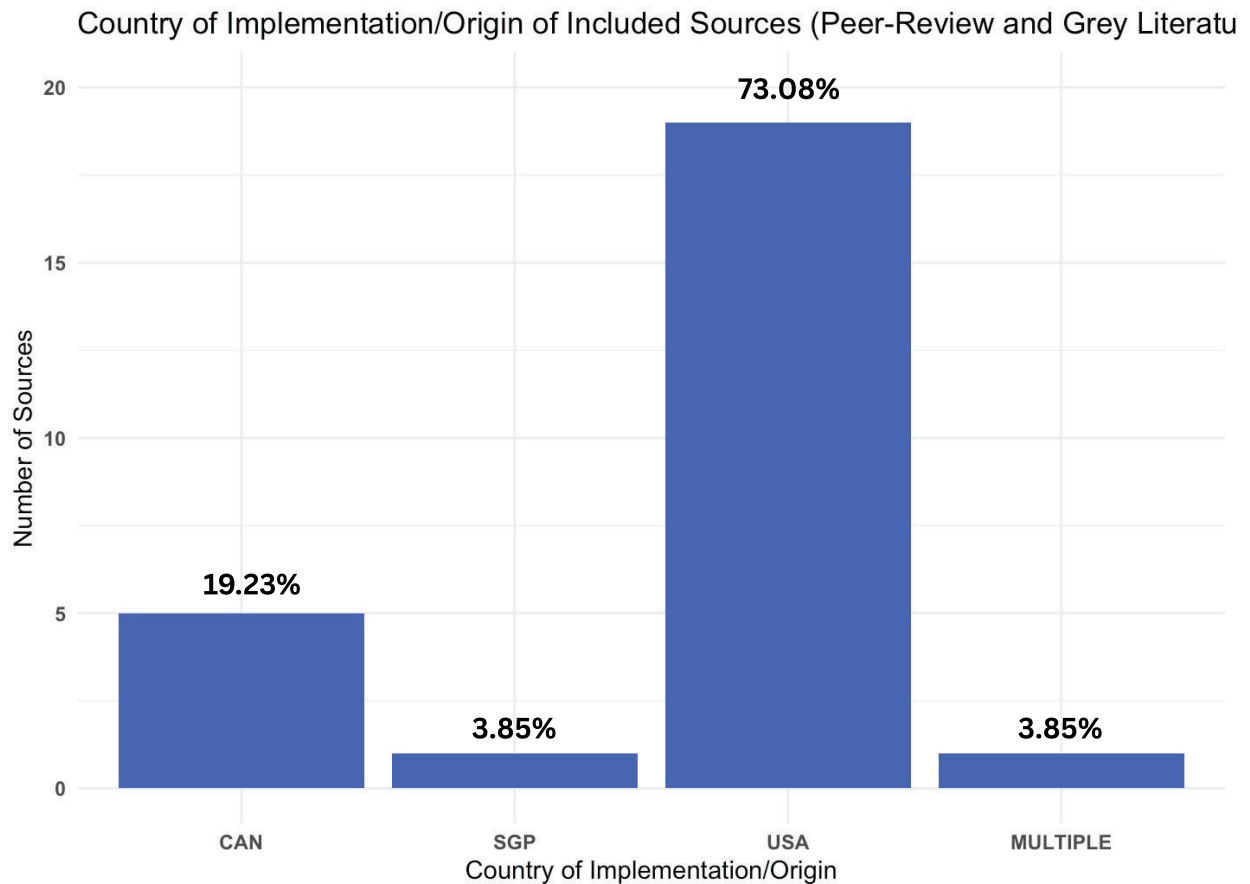
***Visual Representation of the Years of Publication of Included Sources***



Out of the 26 included sources, 19 were implemented or published within the United States, five were implemented or published in Canada, one source was published in Singapore (Leu et al., 2022), and 1 source included program implementation within both Canada and the United States. Figure 3 presents the numerical distribution of the countries of implementation or origin throughout both peer-reviewed literature and grey literature combined.

**Figure 3**

***Visual Representation of the Country of Implementation/Origin of Included Sources***



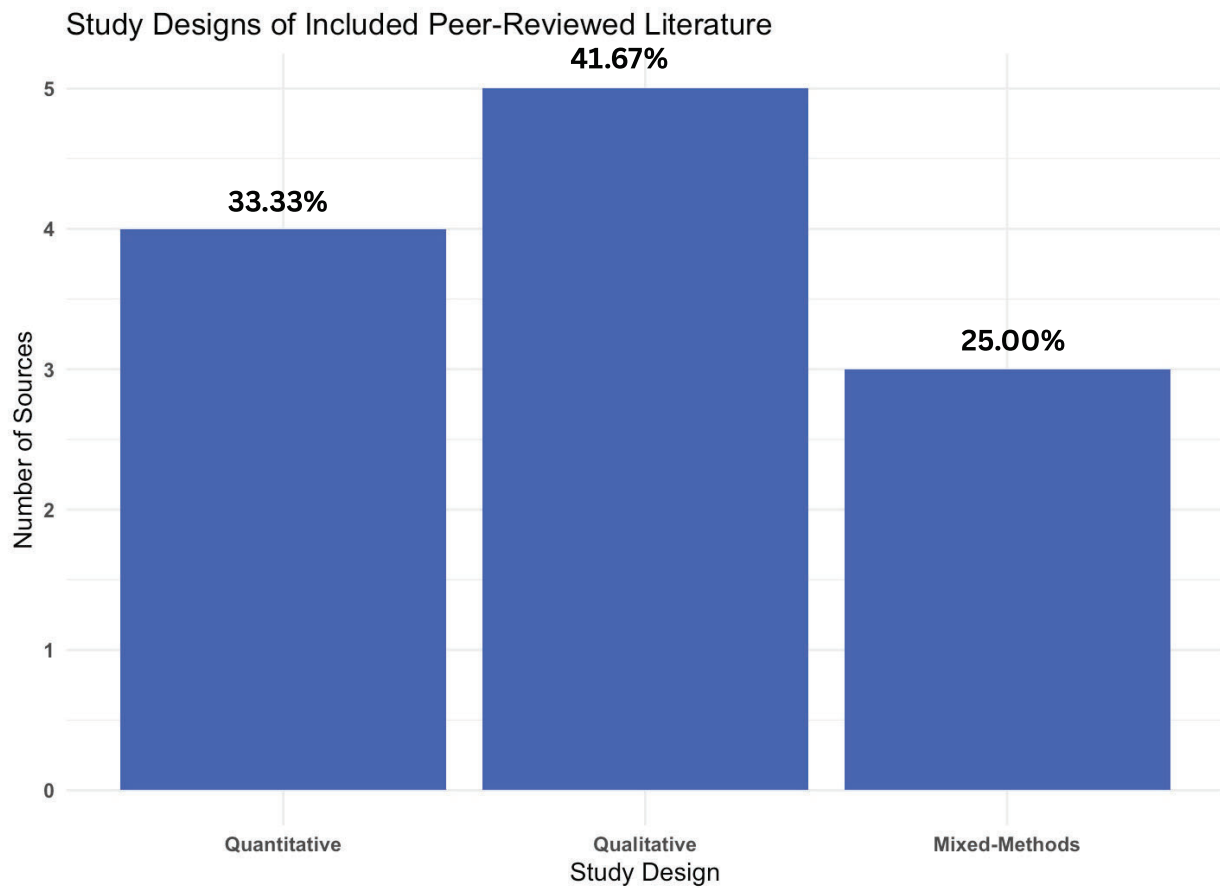
***4.0.1 Peer- Reviewed Literature***

Utilizing the search strategies produced by the health sciences subject librarian (Appendix A), a total of 1561 peer-reviewed sources were uploaded into Covidence to be title and abstract screened. Between the two independent reviewers, a total of 90 sources moved onto the full text screening stage. Once full text screening was done by both independent reviewers, a total of 12 sources moved onto the extraction phase. This screening process is shown in Appendix D through the PRISMA-ScR flow diagram made through Covidence software.

Research methodologies between the included 12 peer-reviewed sources was close to equally distributed with 33.3% (n=4) of studies employing a quantitative research methodology, 41.6% (n=5) of studies utilizing a qualitative research methodology, and the final 25% (n=3) of studies applied a mixed methods methodology. Figure 4 shows a visual representation of the distribution of methodologies throughout the included peer-reviewed literature. The extraction charting table for the included peer-reviewed literature can be found in Appendix H.

**Figure 4**

***Visual Representation of Research Designs of Included Peer-Reviewed Literature***



#### ***4.0.2 Grey Literature***

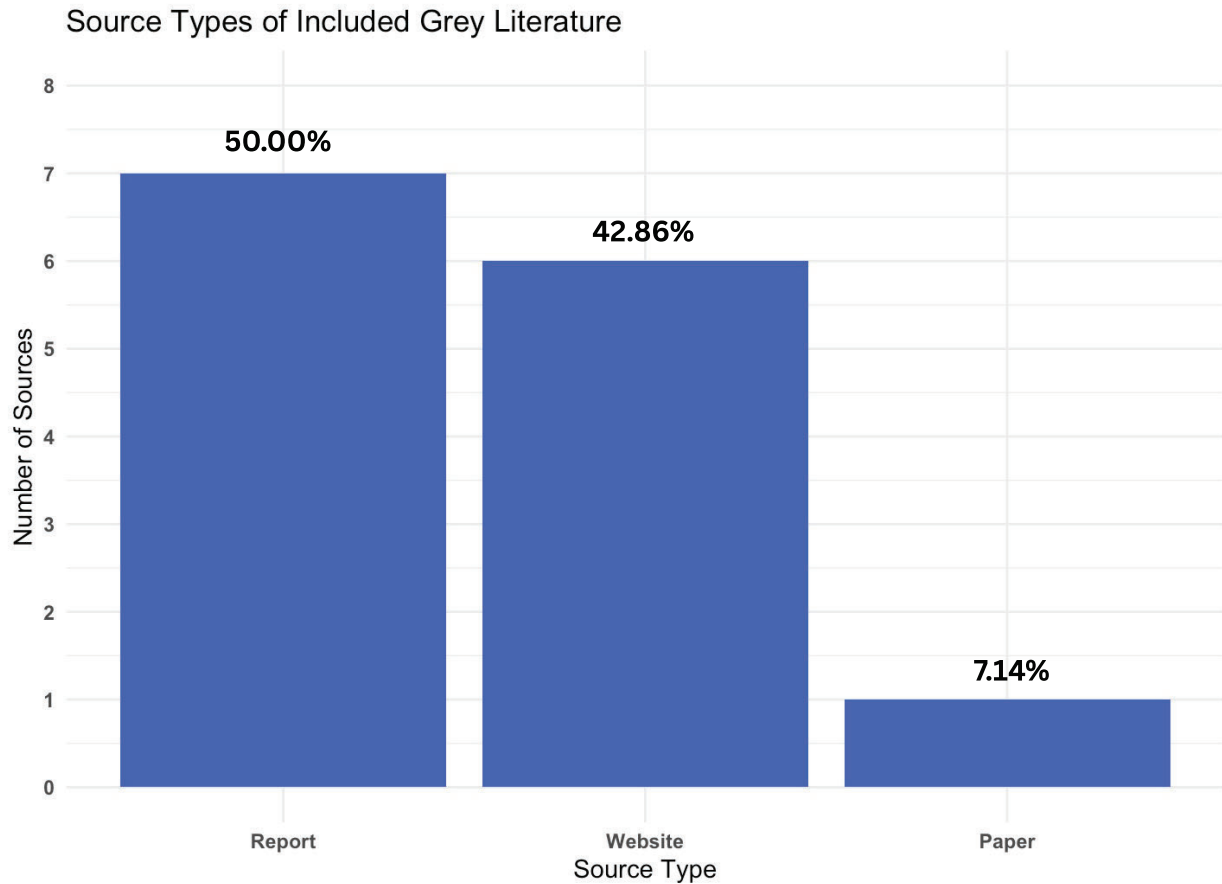
Utilizing similar search terms and strategies (found in Appendix B) used for the peer-reviewed literature search, five Google searches were done by the primary reviewer screening the first 150 results of each search resulting in a total of 750 results initially screened. Once title and description screening were completed based off of the inclusion and exclusion criteria (found in Table 6), 204 results moved onto full source screening. After full source screening was done, a total of 12 sources met the inclusion and exclusion criteria and moved onto the data extraction phase. This screening process is shown in Appendix F as a PRISMA-ScR flow diagram.

Once all peer-reviewed literature was selected for extraction, citation chasing was done to find any additional sources that could be included in this scoping review. Out of 453 cited references within the 12 peer-reviewed sources, 12 met inclusion criteria after title screening. Two sources were found to meet full inclusion and exclusion criteria once full text screening was complete. This screening process is shown in Appendix G as a PRISMA-ScR flow diagram. It is important to note there is not a universally accepted protocol for grey literature searches in JBI scoping reviews. Despite our best efforts and utilizing search strategies developed by the subject expert librarian, some sources may have been missed. Also looking at the feasibility of conducting this search, the protocol for the grey literature search was reasonable to do as one student in the timeline we had.

Out of the 14 included grey literature sources, 50% (n=7) of the sources were reports or blog posts, 42.8% (n=6) of the sources were websites, and the final 7.1% (n=1) of grey literature consisted of a research paper (Silvis et al., 2018). Figure 5 presents a visual representation of the distribution of the types of grey literature included in this scoping review. The data extraction charting for the grey literature can be found in Appendix I.

**Figure 5**

***Visual Representation of Grey Literature Types***



**4.1 Types of Digital Resources**

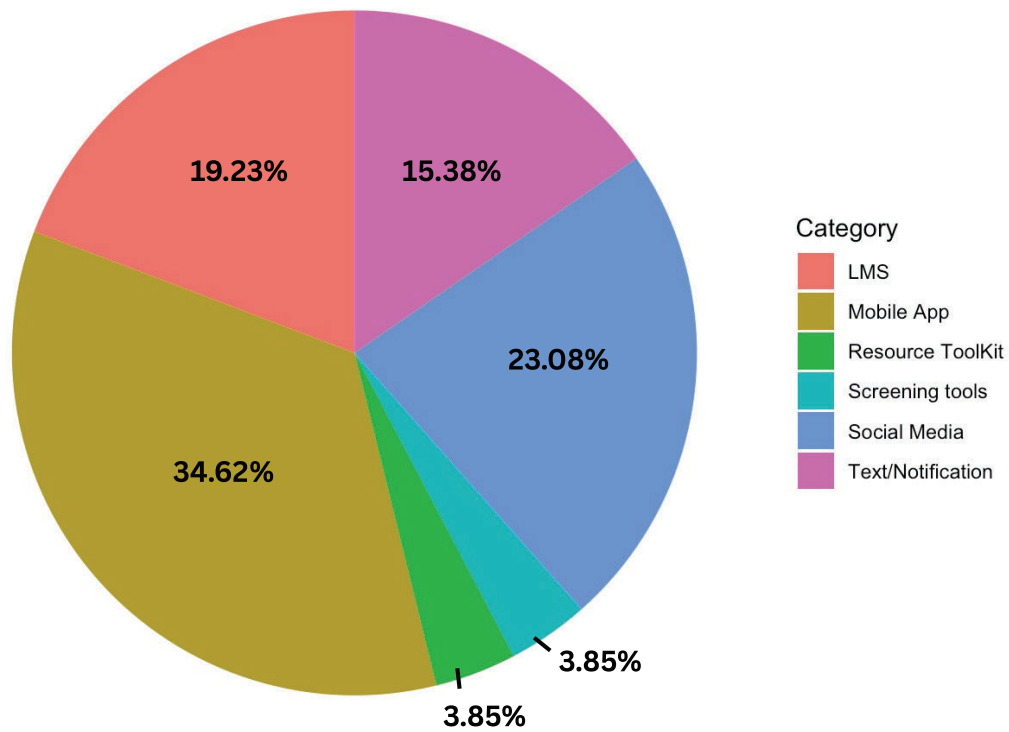
When looking at the combined results of all 26 sources (both peer-reviewed, and grey literature), 23.08% (n=6) of the sources utilize social media (Instagram, Facebook, and Twitter) to address food insecurity, 15.38% (n=4) sources utilize text messaging or other notification service, 3.85% (n=1) of sources utilize a screening tool (Li et al., 2024), 34.62% (n=9) of the included sources utilize a mobile app, 19.23% (n=5) utilize their campuses learning management system, and finally, 3.85% (n=1) of sources provide students with a resource tool kit to address

food insecurity (Matsuba, 2022). Figure 6 will present a visual representation of the numerical distribution of digital resource types across the combined peer reviewed and grey literature.

**Figure 6**

***Visual Representation of Digital Resource Types for Peer-Reviewed and Grey Literature***

Digital Resource Types (Peer-Reviewed & Grey Literature)



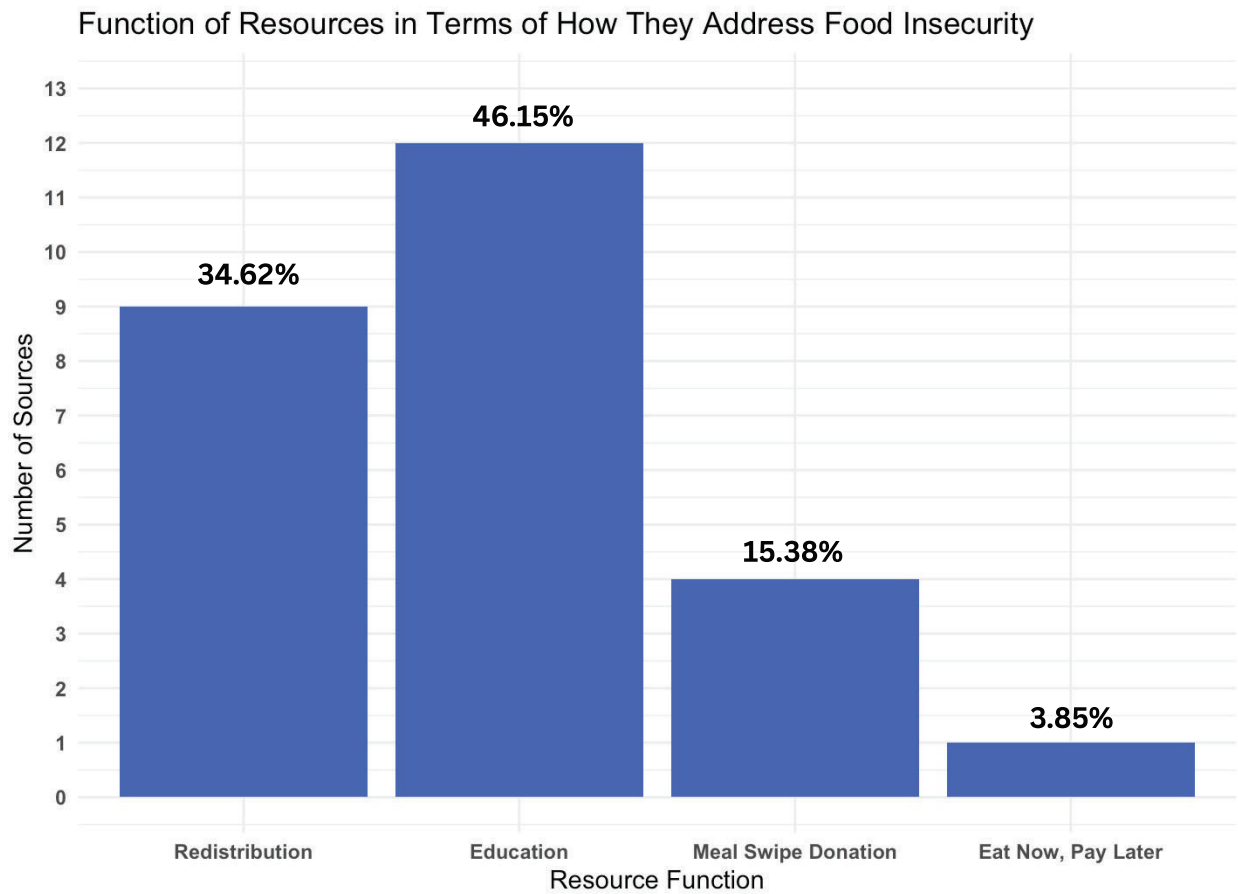
**4.2 Functions and Purposes of Digital Resources**

The extracted literature shows four themes on how these digital resources function to provide students with support in terms of food insecurity. 34.6% (n=9) of the resources notify students when leftover food is available to them after catered events. 46.1% (n=12) of resources function by providing students with resources (Food bank hours, dieticians on campus, off-campus resources, and scholarship/bursaries available), and educational toolkits, 15.4% (n=4) of

resources allow students, faculty, or community members to donate meal swipes to food insecure students, and finally, the last 3.8% (n=1) of resources provide a partnership between restaurants and students where students can access food now and pay after graduation (Swenson He, n.d.). Figure 7 shows the numerical distribution between the digital resources and their function in terms of addressing post-secondary food insecurity.

**Figure 7**

***Visual Representation of the Functions of Digital Resources in Terms of How They Address Food Insecurity***



**4.3 Target Populations within Post-Secondary Settings**

When reviewing both the peer-reviewed and grey literature, the resources mainly focused on the same overarching main population of students as a whole. 3.8% (n=1) of sources focused on students within their respective nursing program (Bydalek et al., 2020), and 11.5% (n=3) of

the sources focused on students aged between 18 and 26 years old. The other 84.6% (n=22) of studies did not specify if they were focusing on specific subgroups such as international students, graduate students, undergraduate students, indigenous students, or first-generation students. Rather, these sources focused on food insecure students and the student population as a whole.

#### **4.4 Accessibility and Equity Considerations**

Across the included sources, accessibility considerations were addressed similarly. All resources were free for students to access, and generally did not have barriers to access, unless students didn't have access to a phone or computer.

While the majority of resources were open access, some resources required students to sign up, confirm eligibility, and have formal sign-up processes (Fleak, 2015; Hamada et al., 2024; Li et al., 2024; Swenson He, n.d.; Umaña et al., 2022). Many programs also utilized resources students already had access to such as learning management systems, or text messaging and social media. Others utilized mobile apps and online tool kits. Very few sources mentioned offering multilingual options, whereas one explicitly mentioned offering multiple language options to support international students whose first language is not English (Free Food Alert, n.d.).

Equity considerations were not explicitly stated throughout the included sources. While some resources were designed to support students who were struggling financially, or with their mental health, no studies explicitly discussed design choices that might impact marginalized student populations differently.

#### **4.5 Institutional Context and Ownership**

Across the included sources, most digital resources were institution-led, or at least institution supported as they provide both physical and online resources to support post-

secondary students. This information was explicitly described in almost every source but was implied in the others as they were institution websites.

While the majority of resources were institution-led, specific resources have been created or led by student organizations with support of staff, faculty, or campus administration. However, the study conducted by DeLoach and Dickason (2023) reported that their institution was hesitant to support the initiative.

Ownership structures were not consistently described throughout any of the sources, as many of them only mentioned investing into the program, or donating to the cause.

#### **4.6 Integration Into Campus Systems**

Between the included sources, there are no significant patterns that exist in terms of how the resources are integrated into campus systems. The only pattern shown here consistently, is how most of the resources provide information on the supports provided by the institution to students who may need them but are not aware they exist.

A few of the sources utilize the learning management systems utilized on campus already (Butler, 2017; Embry-Riddle Aeronautical University, n.d.; Frank, 2022; Montclair State University, 2026), and some are standalone platforms that don't integrate into institutions at all. Integration into campus systems was not explicitly mentioned throughout most of the sources. However, it was implied when they utilize learning management systems or operate and offer resources for food insecure students on campus.

#### **4.7 Reported Outcomes**

The main patterns shown within the included sources in terms of reported outcomes, is the fact that many of the sources did not include outcomes on how the digital resource impacted food insecurity. The majority of the sources measured food insecurity prior to the

implementation of the digital resource but failed to measure it after. Sources often measured use of on campus resources, or impressions on social media postings, but there were no explicit results on the direct impact on food insecurity among the target population.

#### **4.8 Ethical, Privacy, and Stigma-Related Considerations**

Ethical and privacy-related concerns were infrequently addressed throughout the included sources. Ethics and anonymity were addressed in terms of research ethics but were not addressed consistently throughout the literature.

Stigma was addressed throughout more of the sources, as they utilized strategies such as colourful imagery, positive messaging, and student testimonials (Li et al., 2024). Many sources mentioned that increasing social media posts about food insecurity supports also reduces stigma around the use of resources.

#### **4.9 Gaps and Opportunities**

##### ***4.9.1 Demographic Gaps***

When analyzing the included results of this scoping review, there are many gaps and future research opportunities that arise. Starting with the number of resources that met the inclusion and exclusion criteria of this study, only 0.9% (n=26) of the screened studies were included for extraction. This shows there are many future research opportunities for this topic.

Looking at the distribution of sources across their geographic location, 73% (n=19) of the studies were published in the United States, 19.2% (n=5) of the resources were published within Canada, and the final 3.8% (n=1) of sources were published in Singapore (Leu et al., 2022). This shows a major gap and opportunity for other countries to explore how food insecure post-secondary students are supported within their country in terms of digital resource access.

Lastly, there are opportunities for future program planning and implementation in terms of digital resources to support food insecure post-secondary students, as 46.1% (n=12) of the digital resources focus on supporting students through resource sharing and education only. This provides opportunities to implement and evaluate other digital resources that could aim to address post-secondary food insecurity in other meaningful ways.

#### ***4.9.2 Analytic Gaps***

When completing the data analysis stage of this scoping review, it is evident there is a significant gap in the understanding of if these digital resources actually address or alleviate food insecurity among the post-secondary student population. This provides opportunities for future research to measure food insecurity prior to implementation of resources or programs, and then after to see the impact it has had on food insecurity.

Lastly, there is a significant gap in our understanding of how these resources consider accessibility, equity, ethics, and privacy in terms of how the students interact with the resources themselves rather than how the research is done. This provides researchers opportunities to consider equity, diversity, and inclusivity as well as stigma, ethics, and privacy when it comes to research on sensitive topics like food insecurity.

## Chapter 5: Discussion

### 5.0 Summary of Key Findings

This scoping review identified several key findings related to the use of digital resources to address or alleviate food insecurity among the post-secondary student population. The first key finding is the considerable geographic concentration of the literature, with the majority of studies conducted in the United States and Canada. Only one study was identified outside of North America (Singapore) (Leu et al., 2022).

It was also identified through this scoping review there are significant gaps in the understanding of the outcomes the digital resources have on food insecurity. Other outcomes such as food bank usage, social media post impressions, and utilization of resources were often presented, but there was no mention of how these outcomes may have addressed or alleviated food insecurity in their target population. Often times student food insecurity is measured prior to the implementation of the digital resource, but often times is not measured after.

An important pattern that surfaced during this scoping review, is how the majority of the studies and resources included, did not mention how they support accessibility, equity, and inclusivity to ensure their resources can be utilized by anyone who needs them.

Lastly, the scoping review identified mobile apps, and the use of social media were consistently utilized compared to the other options, and these resources aimed to address or alleviate food insecurity mostly by providing food redistribution services, and resource education. The prominent use of mobile apps and social media platforms suggests that institutions may be utilizing these modes of communication to reach students efficiently. Given the high rates of smartphone use and social media engagement among post-secondary

populations (Swanson & Walker, 2015), these resources may represent accessible and reliable mechanisms for distributing food insecurity resources and information.

## **5.1 Interpretation of Findings**

The goal of many public health programs such as those focused on in this scoping review, is to help improve the health and well-being of those who need it. This scoping review has shown that there is a pattern that the included studies disproportionately focused on American and Canadian post-secondary students. By over-sampling on populations like the United States and Canada, rather than studying how digital programs are addressing food insecurity on populations across the world, the results are unintentionally being skewed and showing bias. The American Psychological Association (2010) notes over 80 percent of research studies conducted focuses on western, educated, industrialized, rich and democratic (WEIRD) populations, such as the United States and Canada. While the concentration of studies in these countries may be partly due to their large post-secondary student populations and established research institutions, the limited representation of other high-income contexts (Australia, the United Kingdom, or Nordic countries) restricts cross-national comparison. It is also important to consider that food insecurity among this population could be a problem solely for developed countries like Canada and the United States. Poorer countries might not consider post-secondary food insecurity a significant problem to explore, and other developed countries like those in the European Union may not have as significant of a prevalence of food insecurity due to free or lower costs of education. Furthermore, the absence of literature from lower- and middle-income countries limits understanding of how digital food insecurity resources operate within different social, economic, and policy environments. As a result, it is unfair to assume that the findings from U.S. and Canadian institutions are transferable across the global context.

This overrepresentation of certain contexts often results in interventions being evaluated within narrow settings, with limited clarity on whether outcomes are transferable to other populations. This is seen consistently throughout this scoping review, which limits our ability to understand the effectiveness, and usability of these digital resources. Proper evaluations on these resources are critical as these outcomes often form the evidence used for practice, policy, and funding decisions (Crocker et al., 2024). Without reliable outcome data and evaluation findings, it is difficult for evidence-based decisions to be made about effective public health programming.

Although the programs included in this study aim to address or alleviate food insecurity by reducing barriers post-secondary students face, many of the resources may be unintentionally creating additional barriers to access by not considering accessibility, inclusivity, and equity when developing, implementing, or evaluating their digital resources (Government of the United States n.d.). Throughout this scoping review, we learn technology and digital resources as a whole are not neutral, meaning these tools are shaped by human decisions that can impact the users, or target population in both positively and negatively. These resources can privilege or may create additional barriers to certain sub-populations such as those who may not speak English, those who live on or off campus, those who attend online programs, or those who may not have access to transportation. Technology can also differ based on its anonymity which can impact those with stigma and surveillance concerns. With the limited discussion about accessibility, stigma, and privacy throughout the included sources, it is shown that the way these resources are designed is important to shape student access and experiences. Ensuring programs and resources are accessible allows users not only improves their experience, but it will also ensure the goal of the program can be met.

As mentioned in the introduction, technology is a resource that has increased in popularity among post-secondary students (Swanson & Walker, 2015). Resources such as mobile apps and social media are tools that aid in communication and can be leveraged to make health information accessible and available to those who utilize technology (Canadian Mental Health Association, n.d.; Kanchan & Gaidhane, 2023; Public Health Agency of Canada, 2016) As the use of digital resources increases, the opportunity for resources to utilize resources that will be more accessible to post-secondary students. This is seen as the majority of the included resources utilized social media or a mobile app to address food insecurity throughout this population.

## **5.2 Implications for Practice**

Practitioners looking to improve food insecurity by utilizing digital resources on post-secondary campuses can utilize the results found throughout this scoping review to ensure their resources are effective. When designing and implementing a digital resource aiming to address or alleviate food insecurity, practitioners should prioritize equity and accessibility- informed designs. This could include offering multiple languages, utilizing high contrast colours so text is easier to read, and adding captions when videos or audio recordings are included. This ensures everyone within the target population can access the resource without barriers and utilize it to the fullest capabilities.

Practitioners should also consider how they deliver and communicate about the program to reduce possible stigma felt by program users. They can do this by allowing anonymous or low-barrier access when possible, integrating food supports to look more like broader student wellness services, and evaluating stigma multiple times throughout the duration of the program to find ways to improve student experiences.

Lastly, considering the increased utilization of technology among the post-secondary population (Swanson & Walker, 2015), practitioners should utilize some sort of digital means in terms of addressing food insecurity within their institution. The scoping review indicates utilizing social media and mobile app programs has had a positive impact on students' utilization of food insecurity resources, so practitioners should take consideration about utilizing social media and other digital means to not only promote their current resources, but also to provide students with other means of support.

### **5.3 Implications for Policy**

These findings highlight the need for additional policy responses that consider more than just individual interventions and integrate a Social Determinants of Health (SDoH) perspective. Food insecurity among this population is shaped by broader factors such as increased cost of living, income instability, raising tuition costs, and housing affordability. Institutional responses such as food banks can be important and helpful. However, they function as more downstream approaches rather than addressing root causes. Policy approaches should include upstream interventions such as financial aid reform, minimum wage policies for student employment, systemic efforts to reduce food costs, and affordable housing initiatives. Looking at student food insecurity through a broader Social Determinants of Health lens may support more sustainable and equitable solutions by addressing underlying root causes that contribute to food insecurity within the context of post-secondary students.

Secondly, institutions or funding agencies should require outcome reporting, clearer definitions of food insecurity and what improvements would look like, and more transparent program goals. With clearer outcome reporting and program goals, institutions can increase their understanding of what is working in terms of reducing food insecurity throughout their student

body and can test different aspects of the program and actually understand if it made a difference or not. Understanding outcomes is also very important to investors as they like to know where their money is going and making sure it is making a difference in student wellness.

#### **5.4 Implications for Future Research**

This scoping review highlights several important gaps in the existing literature that warrants further research. There were patterns throughout the data that show outcome evaluation is often lacking which results in a significant lack of understanding in the effectiveness of the programs currently running. There is a need for more longitudinal methodologies to understand how these programs impact student food insecurity over a longer period of time. As of right now, most included literature focuses on more descriptive data such as impressions on social media posts and attendance of physical resources like food banks.

Future research should prioritize equity and accessibility-informed approaches to better understand not only how food insecurity resources are utilized by diverse student populations, but also how they can improve current programs to enhance the experience of students. There is also a need for more student-centered research where the lived experiences of students are considered when developing programs that impact students. Student-centered research can give valuable perspectives on access, experiences, stigma, access barriers, and the comparison of program assumptions versus student realities on how effective the program is.

Lastly, the current literature on food insecurity supports is heavily dominated by U.S. researchers. Future researchers within Canada and other countries should prioritize this type of research to enhance the understanding of how programming might differ between countries, and how support could be changed to benefit student experience and wellness.

## 5.5 Strengths and Limitations

This scoping review has several strengths that should be acknowledged. This scoping review utilized the comprehensive JBI methodologies with three reviewers certified in utilizing them. The JBI methodologies resulted in a comprehensive, search strategy that could be replicated by other researchers.

The included sources utilized a balanced mixture of methodologies and resource types which provides a vast understanding of the types of digital resources offered to support students, and how they function.

Lastly, this scoping review identified unexplored gaps within the included literature such as limited outcome data, and integration of accessibility and stigma considerations. This is important as it guides future research to consider these as they evaluate their own programming.

When considering the strengths of this scoping review, it is also important to reflect on the limitations that exist. These limitations reflect gaps within the existing literature rather than weaknesses of the scoping review itself.

There is a significant concentration of literature based in the United States and Canada which impacts how we look at the effectiveness of the resources as we try to integrate them into other communities. There was also limited outcome reporting throughout the included sources which impacts our understanding on the effectiveness and usability of these digital sources in how they address or alleviate food insecurity among the post-secondary population.

It is also important to consider the rapidly evolving digital landscape and how research is always being published on topics like digital health. This is a limitation because new sources are being published frequently, meaning there may be sources that were published following the

conclusion of our literature search that might meet the inclusion and exclusion criteria of the scoping review.

Lastly, the exclusion of non-English sources can be considered a limitation as the scoping review loses the opportunity for additional literature on this topic that could have been conducted in non-English speaking countries.

Taking both the strengths and limitations of this scoping review into consideration, it highlights the patterns and gaps found within the already existing literature which can highlight the need for additional research.

## Chapter 6: Conclusion

### 6.0 Summary of the Study

Food insecurity was originally known as a global health issue among low-, and middle-income countries around the world (World Health Organization, 2024). However, food insecurity has not only increased prevalence in wealthy countries specifically but has become an increasing concern in the post-secondary student population (McKay et al., 2025). The purpose of this scoping review was to map the current literature that exists on how post-secondary students facing food insecurity are being supported utilizing digital food insecurity resources, their accessibility, usability, and availability. This was done utilizing the JBI scoping review methodology, promoting a consistent approach to literature reviews.

An initial search strategy was created by a health sciences subject librarian based off both the inclusion and exclusion criteria, and the provided research questions. Two JBI certified reviewers initially screened the provided sources by title and abstract, following a full text screening to establish eligibility. A grey literature review was also done by one of the reviewers utilizing similar search terms to those used for the peer-reviewed search. The primary grey literature search was done utilizing Google, where 5 separate searches of the first 150 results were first screened by title and description, following a full source screening for eligibility. Citation chasing was also utilized to determine if the peer-reviewed sources had utilized eligible studies in their research.

Once studies were screened and met the inclusion and exclusion criteria, extensive data extraction and analysis was done utilizing the frameworks highlighted in Table 8, 9, and 10. These studies were utilized to compile the key findings highlighted in Chapter 4 and 5.

These key findings consisted of patterns of geographic oversaturation throughout the United States that impacts how programs should be implemented throughout the rest of the world. Patterns also showed outcome data was often not included on how the digital resources impacted student food insecurity. This results in a gap of knowledge on if these resources are effective in addressing and alleviating post-secondary food insecurity. Lastly, the sources included highlighted gaps in considerations of accessibility, stigma, and inclusivity. These show the need for additional research that puts these considerations at the forefront of their evaluation, and program implementation to ensure all students can access the resources without barriers.

## **6.1 Key Contributions**

This scoping review contributes to the existing literature by systematically mapping the digital resources that exist to address or alleviate post-secondary food insecurity. By mapping this information across diverse resource types including both peer-reviewed, and grey literature, this review provides a clear understanding of how food insecurity is currently being addressed digitally within a post-secondary setting.

A key contribution of this study is how it identified important gaps in the literature such as a lack of outcome reporting, inconsistent consideration of accessibility, stigma, and inclusivity, and minimal evaluation of stigma and privacy concerns among students accessing the resources.

This review also contributes by providing an evidence-informed map of literature that can be used to guide future research, institutional practice, and policy development related to food insecurity among post-secondary populations. The findings may support institutions in reflecting on existing programs and interventions and identifying opportunities for improvement such as increasing equity and student-centered interventions.

## **6.2 Researcher Growth and Reflexive Development**

Throughout this research process, I became increasingly aware of how my academic knowledge and personal values shaped both my interest in this topic, and my interpretation of the literature. I was initially drawn to the topic due to my background in public health and studying equity and inclusivity and how it differs in diverse populations. I viewed food insecurity as a structural issue rooted in broader social and economic determinants, rather than an individual problem.

Engaging with the literature throughout this scoping review expanded my appreciation for the complexity of the resources available to students and the responses of institutions. While I entered this project with a strong focus on upstream solutions, I developed a greater understanding of the roles and importance of downstream supports such as campus food pantries. This process required ongoing reflexive consideration of how my alignment with the social determinants of health framework shaped what I prioritized and how I critiqued the literature I interacted with.

The scoping review methodology also strengthened my appreciation for methodological rigour. Being reflexive throughout this process reinforced the importance of transparency in how research is conducted and interpreted.

Ultimately, this thesis has shaped me not only as a scholar, but as a public health professional. It deepened my commitment to equity-informed research while also strengthening my ability to critically engage with evidence in a methodologically sound way.

## **6.3 Final Reflections**

Food insecurity remains a complex challenge within post-secondary institutions, with impacts on student health, academic success, and overall well-being. Despite the growing

awareness of the issue, responses within post-secondary settings often remain reactive and short-term focused.

This scoping review demonstrates that while a wide range of digital resources exist to address food insecurity, there is limited evidence regarding their effectiveness, accessibility, and long-term impact. The findings suggest that current approaches may insufficiently address systematic barriers faced by students experiencing food insecurity.

Addressing food insecurity among the post-secondary student population requires a shift from short-term emergency solutions to more equity and student-oriented resources that focus on sustainable resources and initiatives based on root causes of post-secondary food insecurity. Continued research, institutional partnerships, and policy implementation will be essential to developing sustainable and effective solutions that support post-secondary students meaningfully.

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## Appendix A

### Search Strategies Created by the Health Sciences Subject Librarian

#### MedLine:

1. ((food\* or nutri\*) adj4 (secur\* or insecur\* or "lacking secure" or inadequa\* or "lacking adequate" or insufficien\* or poverty or stress\* or depriv\* or access\* or desert\* or rescu\* or recover\* or salvag\* or afford\* or literac\*)).mp.
2. (hunger\* or hungry).mp.
3. exp Food Insecurity/ or exp Nutritional Deficiencies/ or exp Poverty/ or exp Hunger/
4. 1 or 2 or 3
5. ((colleg\* or universit\* or vocational\* or undergraduate\* or graduate\*) adj3 student\*) or ((tertiary or higher or "post-secondary" or postsecondary) adj3 educat\*)).mp.
6. exp College Students/ or exp Colleges/
7. 5 or 6
8. (((digital\* or tech\* or internet) adj3 intervention\*) or (instruction\* or education\*) adj3 tech\*) or (online adj3 platform\*)).mp.
9. ("mobile device\*" or "mobile phone\*" or "mobile telephone\*" or cellphone\* or "cell\* phone\*" or smartphone\* or "smart phone\*").mp.
10. ((mobile or computer) adj1 (app or apps or application\*)).mp.
11. ("mobile technolog\*" or "short messag\*" or "text messag\*" or texting or "electronic messag\*" or "social media\*").mp.
12. ("mobile health" or mhealth or "m-health" or "electronic health" or health or "e-health" or "digital health" or "health education").mp.
13. exp Electronic Health Services/ or exp Mobile Applications/ or exp Computer Applications/ or exp Internet/ or exp Mobile Devices/ or exp Text Messaging/ or exp Digital Media/ or exp Health Education/
14. 8 or 9 or 10 or 11 or 12 or 13
15. 4 and 7 and 14
16. Limit 15 to yr="2010 -Current"

#### Web of science:

1. TS=(((food\* OR nutri\*) NEAR/4 (secur\* OR insecur\* OR "lacking secure" OR inadequa\* OR "lacking adequate" OR insufficien\* OR poverty OR stress\* OR depriv\* OR access\* OR desert\* OR rescu\* OR recover\* OR salvag\* OR afford\* OR literac\*)))
2. TS=(hunger\* OR hungry)
3. #1 OR #2
4. TS=(((colleg\* OR universit\* OR vocational\* OR undergraduate\* OR graduate\*) NEAR/3 student\*) OR (tertiary OR higher OR "post-secondary" OR postsecondary) NEAR/3 educat\*))
5. TS=(((digital\* OR tech\* OR internet) NEAR/3 intervention\*) OR ((instruction\* OR education\*) NEAR/3 tech\*) OR (online NEAR/3 platform\*))

6. TS=("mobile device\*» OR "mobile phone\*» OR "mobile telephone\*" OR "cellphone\*» OR "cell\* phone\*" OR "smartphone\*» OR "smart phone\*")
7. TS=((mobile OR computer) NEAR/1 (app OR apps OR application\*))
8. TS=("mobile technolog\*» OR "short messag\*» OR "text messag\*» OR texting OR "electronic messag\*» OR "social media\*»)
9. TS=("mobile health" OR mhealth OR "m-health" OR "electronic health" OR ehealth OR "e-health" OR "digital health" OR "health education")
10. #5 OR #6 OR #7 OR #8 OR #9
11. #3 AND #4 AND #10

**APA PsychINFO:**

1. ((food\* or nutri\*) adj4 (secur\* or insecur\* or "lacking secure" or inadequa\* or "lacking adequate" or insufficien\* or poverty or stress\* or depriv\* or access\* or desert\* or rescu\* or recover\* or salvag\* or afford\* or literac\*)).mp.
2. (hunger\* or hungry).mp.
3. exp Food Insecurity/ or exp Nutritional Deficiencies/ or exp Poverty/ or exp Hunger/
4. 1 or 2 or 3
5. ((colleg\* or universit\* or vocational\* or undergraduate\* or graduate\*) adj3 student\*) or (tertiary or higher or "post-secondary" or postsecondary) adj3 educat\*)).mp.
6. exp College Students/ or exp Colleges/
7. 5 or 6
8. (((digital\* or tech\* or internet) adj3 intervention\*) or ((instruction\* or education\*) adj3 tech\*) or (online adj3 platform\*)).mp.
9. ("mobile device\*" OR "mobile phone\*" OR "mobile telephone\*" OR cellphone\* OR "cell\* phone\*" OR smartphone\* OR "smart phone\*").mp.
10. ((mobile or computer) adj1 (app or apps or application\*)).mp.
11. ("mobile technolog\*" OR "short messag\*" OR "text messag\*" OR texting OR "electronic messag\*" OR "social media\*").mp.
12. ("mobile health" OR mhealth OR "m-health" OR "electronic health" OR ehealth OR "e-health" OR "digital health" OR "health education").mp.
13. exp Electronic Health Services/ or exp Mobile Applications/ or exp Computer Applications/ or exp Internet/ or exp Mobile Devices/ or exp Text Messaging/ or exp Digital Media/ or exp Health Education/
14. 8 or 9 or 10 or 11 or 12 or 13
15. 4 and 7 and 14
16. limit 15 to yr="2010 -Current"

**CINAHL:**

(MH "Food Security+" OR MH "Food Deserts" OR MH "Nutritional Status" OR MH "Poverty+" OR MH "Hunger") OR ((hunger\* OR hungry)) OR (((food\* OR nutri\*) N4 (secur\* OR insecur\* OR "lacking secure" OR inadequa\* OR "lacking adequate" OR insufficien\* OR poverty OR stress\* OR depriv\* OR access\* OR desert\* OR rescu\* OR recover\* OR salvag\* OR afford\* OR literac\*)))) AND (((colleg\* OR universit\* OR vocational\*

OR undergraduate\* OR graduate\*) N3 student\*) OR ((tertiary OR higher OR "post-secondary" OR postsecondary) N3 educat\*)) OR (MH "Students, College+" OR MH "Students, Undergraduate" OR MH "Colleges and Universities+")) AND ((digital\* OR tech\* OR internet) N3 intervention\*) OR ((instruction\* OR education\*) N3 tech\*) OR (online N3 platform\*)) OR (("mobile device\*" OR "mobile phone\*" OR "mobile telephone\*" OR "cellphone\*" OR "cell\* phone\*" OR "smartphone\*" OR "smart phone\*")) OR (((mobile OR computer) N1 (app OR apps OR application\*)) OR ("mobile technolog\*" OR "short messag\*" OR "text messag\*" OR texting OR "electronic messag\*" OR "social media\*")) OR (("mobile health" OR mhealth OR "m-health" OR "electronic health" OR ehealth OR "e-health" OR "digital health" OR "health education")) OR (MH "Mobile Applications" OR MH "Internet-Based Intervention" OR MH "Educational Technology" OR MH "Telehealth+" OR MH "Internet+" OR MH "Cellular Phone+" OR MH "Health Education+"))

**ERIC:**

((food\* OR nutri\*) N4 (secur\* OR insecur\* OR "lacking secure" OR inadequa\* OR "lacking adequate" OR insufficien\* OR poverty OR stress\* OR depriv\* OR access\* OR desert\* OR rescu\* OR recover\* OR salvag\* OR afford\* OR literac\*)) OR ((hunger\* OR hungry)) OR (DE "Food" OR DE "Nutrition" OR DE "Poverty" OR DE "Hunger" ) AND ((DE "College Students" OR DE "College Freshmen" OR DE "College Seniors" OR DE "College Transfer Students" OR DE "First Generation College Students" OR DE "Graduate Students" OR DE "In State Students" OR DE "On Campus Students" OR DE "Out of State Students" OR DE "Preservice Teachers" OR DE "Two Year College Students" OR DE "Undergraduate Students" OR DE "University Students" OR DE "Colleges" OR DE "Agricultural Colleges" OR DE "Business Schools" OR DE "Cluster Colleges" OR DE "Commuter Colleges" OR DE "Dental Schools" OR DE "Developing Institutions" OR DE "Experimental Colleges" OR DE "Law Schools" OR DE "Library Schools" OR DE "Medical Schools" OR DE "Minority Serving Institutions" OR DE "Multicampus Colleges" OR DE "Noncampus Colleges" OR DE "Predominantly White Institutions" OR DE "Private Colleges" OR DE "Public Colleges" OR DE "Religious Colleges" OR DE "Rural Colleges" OR DE "Single Sex Colleges" OR DE "Small Colleges" OR DE "Two Year Colleges" OR DE "Universities" OR DE "Upper Division Colleges") OR (((colleg\* OR universit\* OR vocational\* OR undergraduate\* OR graduate\*) N3 student\*) OR ((tertiary OR higher OR "post-secondary" OR postsecondary) N3 educat\*)) ) AND (((digital\* OR tech\* OR internet) N3 intervention\*) OR ((instruction\* OR education\*) N3 tech\*) OR (online N3 platform\*)) OR (("mobile device\*" OR "mobile phone\*" OR "mobile telephone\*" OR "cellphone\*" OR "cell" phone\*" OR "smartphone\*" OR "smart phone\*")) OR (((mobile OR computer) N1 (app OR apps OR application\*)) ) OR (("mobile technolog\*" OR "short messag\*" OR "text messag\*" OR texting OR "electronic messag\*" OR "social media\*")) OR (("mobile health" OR mhealth OR "m-health" OR "electronic health" OR ehealth OR "e-health" OR "digital health" OR "health education")) OR (DE

"Electronic Learning" OR DE "Internet" OR DE "Access to Internet" OR DE "Educational Technology" OR DE "Instructional Systems" OR DE "Performance Technology" OR DE "Handheld Devices" OR DE "Tablet Computers" OR DE "Health Education" OR DE "Comprehensive School Health Education" OR DE "Nutrition Instruction"))

**ProQuest:**

(noft((food\* OR nutri\*) NEAR/4 (secur\* OR insecur\* OR "lacking secure" OR inadequa\* OR "lacking adequate" OR insufficien\* OR poverty OR stress\* OR depriv\* OR access\* OR desert\* OR rescu\* OR recover\* OR salvag\* OR afford\* OR literac\*)) OR (noft(hunger\*) OR noft(hungry)) OR (MAINSUBJECT.EXACT ("Food security") OR MAINSUBJECT.EXACT("Food deserts") OR MAINSUBJECT.EXACT("Nutritional status") OR MAINSUBJECT.EXACT ("Poverty") OR MAINSUBJECT.EXACT("Hunger"))) AND (l(noft(colleg\*) OR noft(universit\*) OR noft(vocational\*) OR noft(undergraduate\*) OR noft(graduate\*)) NEAR/3 noft(student\*)) OR ((noft(tertiary) OR noft(higher) OR noft("post-secondary") OR noft(postsecondary)) NEAR/3 noft(educat\*)) OR | (MAINSUBJECT.EXACT ("College students") OR MAINSUBJECT.EXACT("University students") OR MAINSUBJECT.EXACT ("Colleges & universities"))) AND (((noft(digital\*) OR noft(tech\*) OR noft(internet)) NEAR/3 noft(intervention\*)) OR ((noft(instruction\*) OR noft(education\*)) NEAR/3 noft(tech\*)) OR (noft(online) NEAR/3 noft(platform\*)) OR (noft("mobile device\*") OR noft("mobile phone\*") OR noft("mobile telephone\*") OR noft(cellphone\*) OR noft("cell\* phone\*") OR noft(smartphone\*) OR noft("smart phone\*")) OR ((noft(mobile) OR noft(computer)) NEAR/1 (noft(app) OR noft(apps) OR noft(application\*))) OR (noft ("mobile technolog\*") OR noft("short messag\*") OR | noft ("text messag\*") OR noft(texting) OR noft ("electronic messag\*") OR noft("social media\*")) OR (noft("mobile health") OR noft(mhealth) OR noft("m-health") OR | noft ("electronic health") OR noft(ehealth) OR noft ("e-health") OR noft("digital health") OR noft("health education")) OR (MAINSUBJECT.EXACT ("Software") OR MAINSUBJECT.EXACT("Internet") OR MAINSUBJECT.EXACT("Educational technology") OR MAINSUBJECT.EXACT ("Telemedicine") OR MAINSUBJECT.EXACT("Cellular telephones") OR MAINSUBJECT.EXACT ("Health education")))) AND od(20100101-20251031)

## Appendix B

### List of Grey Literature Search Strategies

1. ("food insecurity" OR "food insecure" OR hunger)  
AND  
("college student" OR "university student" OR "post-secondary")  
AND  
(digital OR technology OR "online program")
2. ("food insecurity" OR hunger)  
AND  
("college" OR "university")  
AND  
("mobile app" OR texting OR mhealth OR ehealth OR "digital health")
3. ("food insecurity" OR hunger)  
AND  
(campus OR university OR college)  
AND  
("online resource" OR website OR app OR "digital tool")
4. ("food insecurity")  
AND  
("higher education" OR "post-secondary")  
AND  
(intervention OR program)  
AND  
(digital OR online)
5. ("student food insecurity")  
AND  
(university OR college)  
AND  
("online support" OR "digital platform" OR technology)

## Appendix C

### Examples of Reflexive Journal Entry

#### Interpretation of Institutional Responses

During the data analysis phase, I became aware that many post-secondary institutions utilized campus food pantries as a primary long-term response to student food insecurity. Through my application of the social determinants of health framework, I interpret these initiatives as more downstream interventions that address the immediate need of students, rather than focusing on an upstream approach that addresses the root causes of food insecurity among post-secondary students such as tuition cost, housing costs, or income instability.

I recognize that my prior education in public health predisposes me to recognize and prioritize upstream interventions. As a result, I was cautious to not dismiss the value of food banks and pantries as supports for food insecure students. I reflected on the importance of how institutions need to conceptualize these programs while also analysing their positioning and support to broader contexts such as upstream approaches.

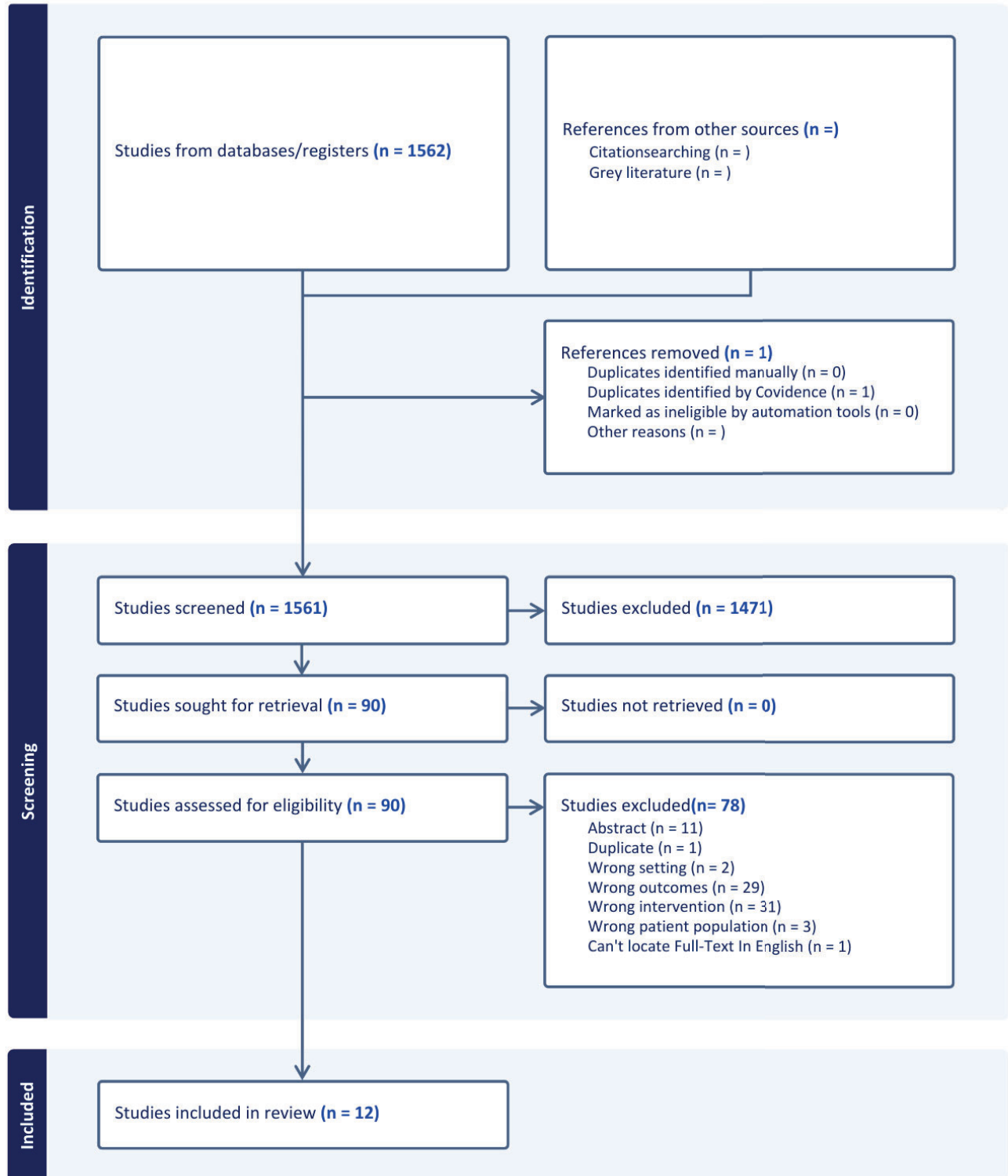
#### Equity and Inclusivity Considerations in Screening and Analysis

Throughout the data analysis phase I also noticed that many studies conceptualized post-secondary students as a population as a whole rather than looking at it as smaller sub populations. Given my epistemology and conceptual framework for this scoping review, I am attentive to how social positioning, culture, and vulnerability of sub populations shape experiences. I found myself questioning studies that did not separate its findings by subgroups such as international students, racialized students, or first-generation students.

I recognize that my focus on inclusivity and equity may have heightened my sensitivity to this in the literature. While I did not exclude studies on the basis of inclusivity and equity, I intentionally documented the absence and gap of this within my analysis. This awareness reinforced the importance of not treating post-secondary food insecurity as a uniform experience between all students and has shaped how I frame my recommendations for program, policy, and future research.

## Appendix D

### PRISMA-ScR Flow Diagram for Peer-Reviewed Literature



## Appendix E

### PRISMA-ScR 20- Item Checklist

| SECTION                   | ITEM | PRISMA-ScR CHECKLIST ITEM   | REPORTED ON PAGE # |
|---------------------------|------|---|--------------------|
| <b>TITLE</b>              |      |   |                    |
| Title                     | 1    | Identify the report as a scoping review.  | i                  |
| <b>ABSTRACT</b>           |      |   |                    |
| Structured summary        | 2    | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.   | iii                |
| <b>INTRODUCTION</b>       |      |   |                    |
| Rationale                 | 3    | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.  | 5                  |
| Objectives                | 4    | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 7                  |
| <b>METHODS</b>            |      |   |                    |
| Protocol and registration | 5    | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.  | 36                 |
| Eligibility criteria      | 6    | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status) and provide a rationale.   | 27-28              |
| Information sources*      | 7    | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.   | 28-29              |

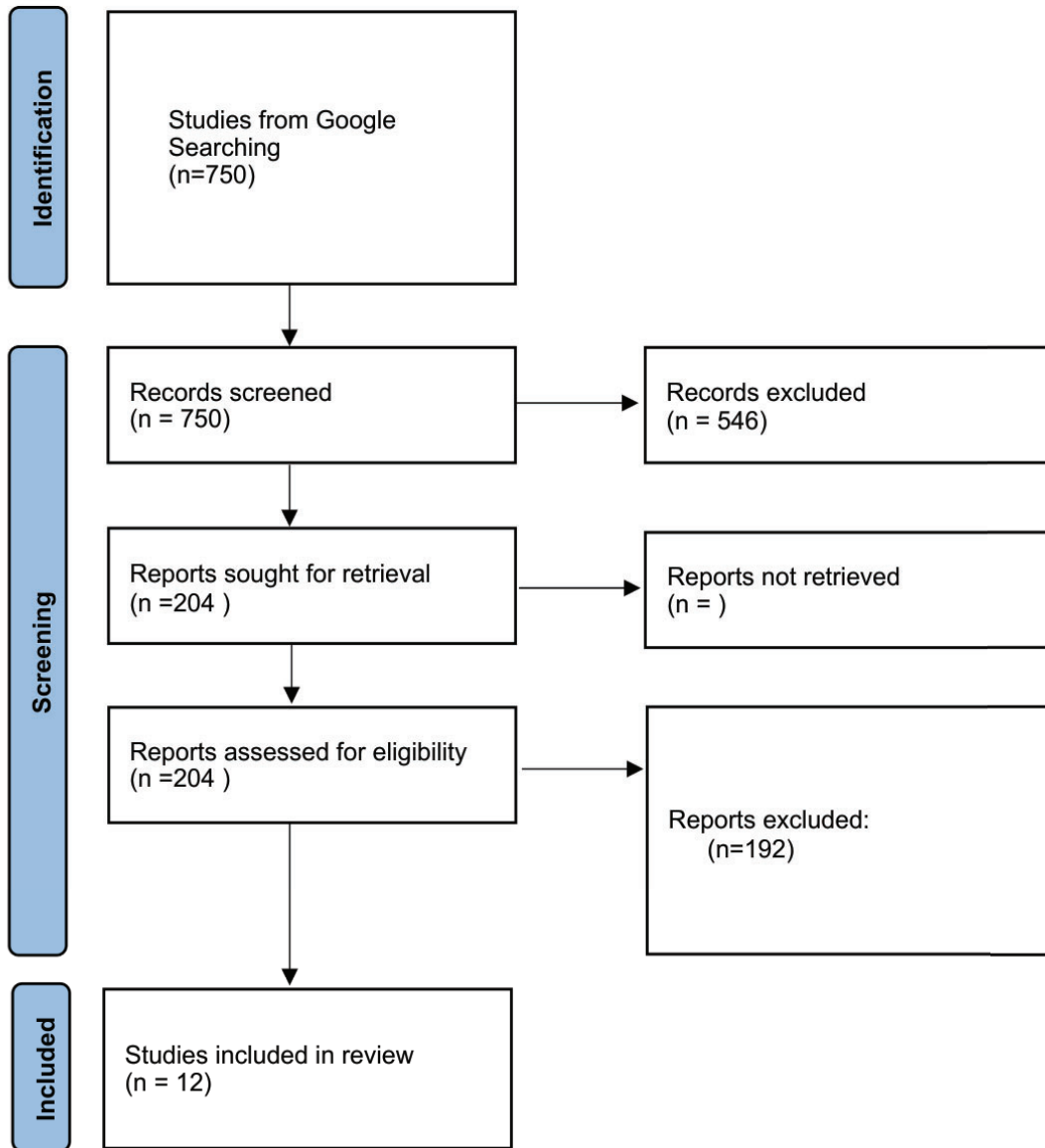
|   |    |  |                       |
|---|----|--|-----------------------|
| Search  | 8  | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.  | 71-74                 |
| Selection of sources of evidence†                     | 9  | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.  | 28-29                 |
| Data charting process‡                                | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 30-31 & 33-34         |
| Data items  | 11 | List and define all variables for which data were sought and any assumptions and simplifications made.   | 30-31 & 33-34         |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).  | n/a<br>rational 35-36 |
| Synthesis of results                                  | 13 | Describe the methods of handling and summarizing the data that were charted.   | 34-35                 |

| <b>SECTION</b>                                | <b>ITEM</b> | <b>PRISMA-ScR CHECKLIST ITEM</b>   | <b>REPORTED ON PAGE #</b> |
|---|-------------|--|---------------------------|
| <b>RESULTS</b>                                |             |  |                           |
| Selection of sources of evidence              | 14          | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 77, 81 & 82               |
| Characteristics of sources of evidence        | 15          | For each source of evidence, present characteristics for which data were charted and provide the citations.  | 83-95                     |
| Critical appraisal within sources of evidence | 16          | If done, present data on critical appraisal of included sources of evidence (see item 12).   | n/a                       |
| Results of individual sources of evidence     | 17          | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.  | 39-50                     |

|                      |    |   |       |
|----------------------|----|---|-------|
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives.  | 39-50 |
| <b>DISCUSSION</b>    |    |   |       |
| Summary of evidence  | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 51-52 |
| Limitations          | 20 | Discuss the limitations of the scoping review process.  | 56-57 |
| Conclusions          | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.                                       | 58-61 |
| <b>FUNDING</b>       |    |   |       |
| Funding              | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.                 | n/a   |

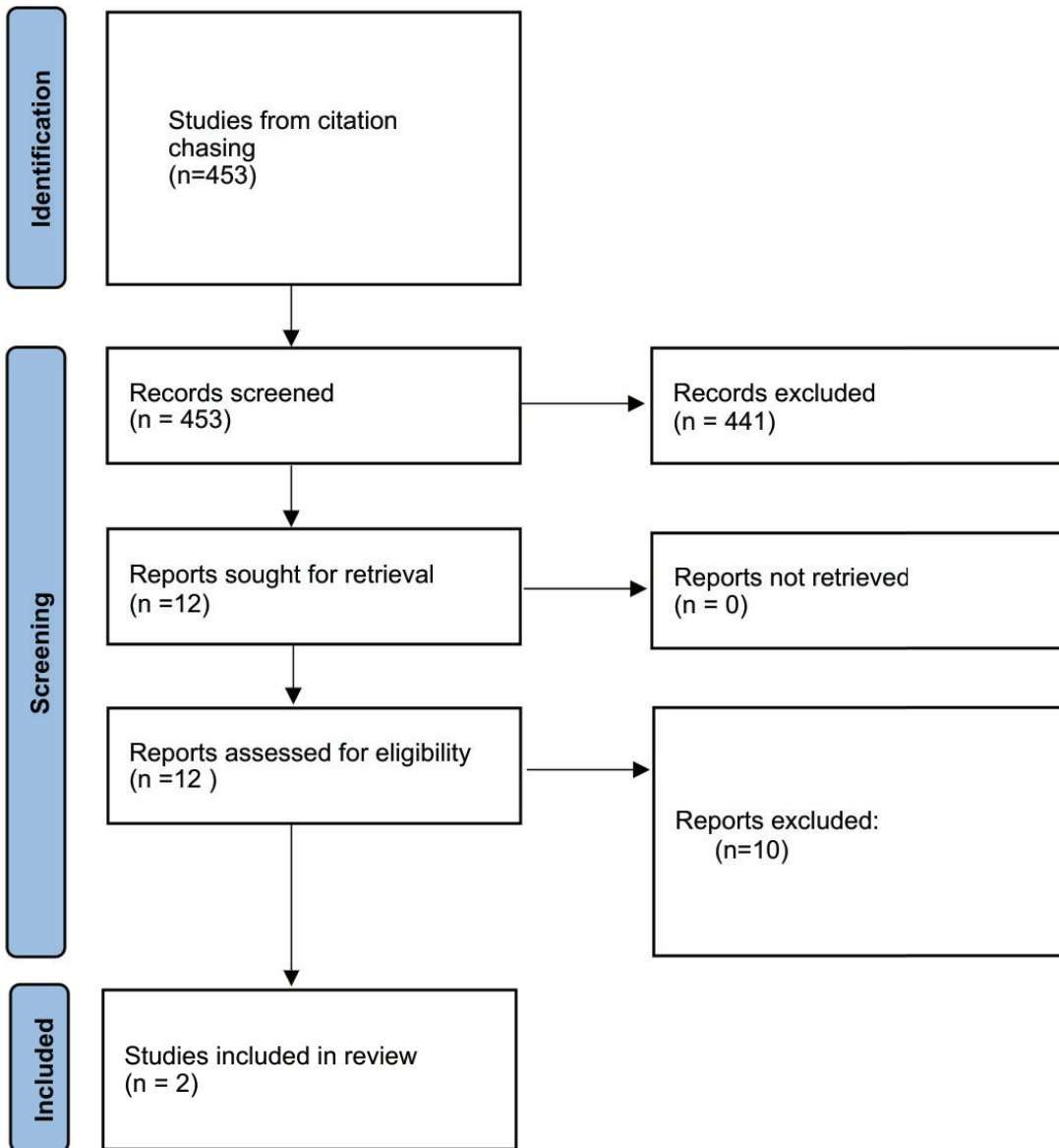
## Appendix F

### PRISMA-ScR Flow Diagram for Google Grey Literature



## Appendix G

### PRISMA-ScR Flow Diagram for Citation Chasing



## Appendix H

### Peer-Reviewed Literature Data Extraction Table

| Author, Year of Publication | Country | Study Aim(s)   | Study Design  | Methodology   | Digital Intervention   | Outcomes  | Key Findings  | EDI Considerations  |
|-----------------------------|---------|--|---|---|--|---|---|---|
| Altomare & Payton (2024)    | USA     | To plan a logic model and pilot interventions around food recovery and food insecurity on a college campus.  | A combination of logic model development and program planning design. | Constructed a formal logic model and measured amounts of food and drink waste, plastic utensil waste, and dining hall attendance. | Social media was utilized to notify students about food activates.   | No official outcomes provided on how the digital intervention impacted student food insecurity.   | This study reflects a pattern in post-secondary food insecurity initiatives where digital components are utilized as additions to physical, downstream programs like food drives or food pantries.  | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| Barr-Porter et al. (2024)   | USA     | To test the feasibility of a community-based pilot program combining a cooking curriculum and a semester-long text messaging program to improve health-related | Pre-post pilot intervention without a control group.                  | Qualtrics surveys utilizing validated survey items measuring diet quality, food insecurity, and mentally healthy days.            | Text messaging program was provided to students within the study in addition to the cooking classes. These text messages included on-campus resources. | 23.3% of the subsample reported the text messages were valuable. Unclear if the text messages alone addressed food insecurity, or if the cooking class had an impact as well. | This study reflects a digital approach embedded in a behaviour change program. It shows that digital resources can be integrated into multi-component interventions to improve student experiences. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |

|                       |     |  |  |  |  |  |   |   |
|-----------------------|-----|--|--|--|--|--|---|---|
| Butler (2017)         | USA | quality of life, food security, and diet quality among college students.<br>The purpose of this study was to develop a framework for post-secondary institutions to partner with community-based organizations to improve student well-being and outcomes with an emphasis on non-academic needs such as hunger, homelessness, and other barriers. | Mixed Methods: Qualitative through semi structured interviews, quantitative through two surveys developed from interview data. | Mixed methods blending qualitative insights with quantitative survey data to create a conceptual framework for partnerships. | Utilizing the institutions learning management system to connect students to resources on food insecurity. | No outcomes were reported; this was a recommendation to post-secondary institutions.                                 | Partnerships with community-based organizations were associated with improved student outcomes, including access to basic needs supports such as food assistance, advising, and social services. These partnerships helped reduce non-academic barriers to student success, particularly for students experiencing economic insecurity. | It was identified that the privacy of students would be considered as they would be able to access resources using the learning management system they already have access to online. Ethics and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| Bydalek et al. (2020) | USA | To assess the prevalence and significance of food insecurity among junior and senior undergraduate nursing   | Mixed-methods descriptive design: Combines an online survey (quantitative) with open-ended qualitative items                   | Data collection: Online survey via Qualtrics with both quantitative food security status items and qualitative               | Regardless of participation within the study, all students received educational materials via              | There were no reported outcomes on the effectiveness of the educational materials shared via email and social media. | Food insecurity was high among this population, highlighting the need for institutional awareness and strategies.   | Other than the fact that all students received the educational materials despite their participation in the study, ethics, privacy,   |

|                           |     |   |   |   |   |   |  |   |
|---------------------------|-----|---|---|---|---|---|--|---|
| DeLoach & Dickason (2023) | USA | students, documenting how widespread food insecurity is in this population. | regarding personal experiences of food insecurity.    | open-ended experience questions.<br>Analysis: Descriptive statistics for quantitative data; thematic analysis drawn from qualitative responses. | email, and social media on topics such as food insecurity, and availability of resources. | There were no reported outcomes in regard to the effectiveness of the social media posting. | This study highlights how digital platforms are being utilized to communicate and create visibility among students on the supports that are available to them. | The author states that utilizing social media to communicate the availability of supports than reduce social stigma. Ethics and privacy were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| Cardinal et al. (2021)    | USA | To examine social media communication strategies                            | Quasi-experimental observational design with pre-post | Social media analysis: Collected data from multiple   | Social media was utilized to provide resources and  | As impressions (views and engagement) on social media                                       | The utilization of social media platforms may increase the reach   | Ethics, privacy, and stigma were not considered within this study,  |

|              |     |   |  |   |   |   |   |  |
|--------------|-----|---|--|---|---|---|---|--|
| Frank (2022) | USA | used by a college food pantry and analyze pantry utilization before and during the COVID-19 pandemic, with a focus on how digital communication can support emergency preparedness and engagement of Generation Z students. | comparison of social media metrics and pantry utilization across two time periods (pre-COVID vs. during COVID).                                | platforms (e.g., Instagram, Twitter, Facebook) used by the college food pantry<br>Statistical comparisons:<br>Two-way ANOVA for social media engagement metrics before vs. after COVID-19<br>onset t-test for pantry utilization comparing spring 2019 to fall 2020 semesters<br>Socioecological model applied to interpret findings. | information about available resources prior to COVID-19 and after.  | platforms increased, the utilization of the food bank also increased.   | and engagement of students with food pantries and other resources.  | as well as consideration of equity, inclusivity, and diversity among students.   |
|              |     | To present and evaluate a low-cost instructional technology approach using a university learning management system (LMS)  | Descriptive observational program evaluation (no control group), examining early implementation and uptake of an LMS-based food rescue system. | Program developed using the MAP-IT framework (Mobilize, Assess, Plan, Implement, Track).<br>Implementation  | A notification program was utilized using the already existing learning management system notifying students when | Does not include explicit results on the impact the program had on food insecurity. However, student feedback and attendance were generally positive. | Messaging focused on the benefits of utilizing free food (waste reduction) may have helped reduce stigma around accessing food. Utilizing a learning management | Mentions how positive associations around free food being a benefit to reduce waste can reduce stigma, and the program does not identify as hunger relief to |

|                      |        |   |  |   |                                  |   |   |   |  |
|----------------------|--------|---|--|---|----------------------------------|---|---|---|--|
| Hamada et al. (2024) | Canada | to connect students with high-quality excess food on campus in order to reduce both food waste and food insecurity. | Systems design / prototype description. It focuses on how the application is structured rather than on quantitative intervention evaluation. | : Students self-enrolled in an LMS program that broadcast announcements when surplus food from campus events was available. Data sources: LMS analytics (enrollments, announcement posts, access patterns) and student satisfaction survey. | a surplus of food was available. | No measures of how food insecurity outcomes changed throughout the study. | COOKNOOK exemplifies a digital tool designed to support food planning and decision making, which can be conceptually relevant to food insecurity solutions by helping individuals optimize meal preparation and use available food resources effectively. | Ethics and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. | also reduce the stigma associated with the program. Ethics and privacy were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
|                      |        |   |  |   |                                  |   |   |   |  |

|                   |           |  |   |   |   |  |   |   |   |  |
|-------------------|-----------|--|---|---|---|--|---|---|---|--|
| Leu et al. (2022) | Singapore | food access and food preparation behaviors.  | To understand young adults' perceptions of how online and real-life social influences affect their food and physical activity choices, especially the role of social media and social networks. | Qualitative Study.  | Focus group discussions with purposive sampling. Analysis: Thematic analysis with both deductive and inductive techniques to identify core themes related to digital and real-life social influences. | The government created health campaigns where students would use social media to receive coupons or discounts on food. | Students faulted the program as they did not offer a wide enough range of food. No numerical outcome data on food insecurity impact.  | The study highlights the complex role of digital environments in shaping young adults' food choices, which is important for understanding how digital exposure intersects with social factors affecting health behavior.    | Some students did not participate in the social media campaign as they did not want their personal profiles to be associated with the campaign. Ethics and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. | shares available timeslots rather than a student's whole calendar to preserve privacy. |
| Li et al. (2024)  | USA       | To test the usability and acceptability of a web-based screening tool (SNAP For-U) designed to help urban college students understand eligibility for and navigate the application | Formative usability and acceptability testing using a mixed methods approach (think-aloud protocol, semi structured interviews, and a validated usability scale).                               | Participants tested a prototype of a web-based SNAP screening tool using a standardized think-aloud method. Semi-structured interviews were conducted to gather | Web-based screening tool that is designed to reduce barriers to program enrollment.   | No outcome data was reported on how this program specifically impacted food insecurity.                                | Participants reported that the web-based SNAP tool largely fulfilled its objective of supporting college students in understanding SNAP and potentially encouraging applications. | Colourful imagery, positive messaging, facts, and testimonials were utilized throughout this screening tool to reduce stigma. Ethics and privacy were not considered within this study, as well as consideration of equity. |   |  |

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| Mukigi (2018) | USA | process for the Supplemental Nutrition Assistance Program (SNAP).  |   | qualitative feedback. A 10-item System Usability Scale (SUS) questionnaire measured usability quantitatively. Audio recordings and field notes were systematically reviewed; quantitative SUS scores were analyzed via Wilcoxon signed-rank and sign tests |  |  | High perceived usability suggests web-based tools could be useful digital intervention strategies to address barriers to federal food assistance uptake in post-secondary populations.                    | inclusivity, and diversity among students.  |
|               |     | To evaluate the acceptability and effectiveness of a text-based intervention designed to improve college students' dietary habits, stress management behaviors, and awareness of food assistance | Randomized controlled intervention design with pre-post measurements. | Sampling & Assignment: Stratified random sampling into two groups (intervention vs control). Data Collection: Pre- and post-online surveys assessed dietary intake (fruit & vegetable consumption,   | Text-based health messages focused on promoting healthier dietary habits, stress-management behaviors, and awareness of food assistance resources. | The study did not directly report on if the program improved student food insecurity. However, it did report that an increased awareness of resources was found. | Improvements suggested that text-delivered messages can promote positive dietary habits, enhance stress management behaviors, and increase awareness of food assistance resources among college students. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |

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| Qamar et al. (2023) | USA | resources in relation to food insecurity. | To describe the development and implementation of a food security awareness campaign targeting college students using social media | Descriptive case report of a campaign rather than a traditional empirical research design. | Tracking of digital engagement and campaign reach as indicators of visibility and awareness. | sugar-sweetened beverage consumption, mealtime behavior), perceived stress, hours of sleep, and awareness of food assistance resources. Measures also included baseline demographic data. Statistical Analysis: Repeated measures ANOVA to analyze changes over time between groups. | Digital awareness campaign delivered via social media platforms to engage college students around food insecurity topics. | No data was reported on the outcome the program had on food insecurity. | Digital engagement can raise awareness about food insecurity issues among college students using social media platforms. The campaign described how strategic social media content may connect students | Content throughout the program was developed to reduce stigma. Ethics and privacy were not considered within this study, as well as consideration of equity, inclusivity, and |
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|  |  | and related strategies to raise awareness of food insecurity and available resources on campus. |  |  |  |  | with information about food insecurity and resources available on campus. | diversity among students. |
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## Appendix I

### Grey Literature Data Extraction Table

| Author, Year of Publication                                      | Country | Intervention               | Purpose/ Goal of Intervention   | Outcomes                                      | EDI Considerations  |
|--|---------|----------------------------|---|---|---|
| Sandra Matsuba (British Columbia Institute of Technology) (2022) | Canada  | Website Blog post          | Gives students a website that provides all information on resources aimed to help with food insecurity such as Emergency Food Funds, Food exchange program referrals, and community food network. | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| California State University, Fullerton (2025)                    | USA     | Mobile App                 | Notifies students when food is available from events where they can come in and take what they need.  | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| CBORD (n.d.)   | USA     | Student mobile application | Students can digitally donate their unused meal plan swipes on the GET CBORD application where the meals are pooled and distributed to students who are food insecure.                            | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| Bill Fleak (Columbia University) (2015)                          | USA     | Mobile App                 | Students can register to receive donated meals through the  | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as   |

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| Embry-Riddle Aeronautical University (n.d.) | USA        | Learning Management System                    | app, and students can donate meals through the app.<br>Allows all campus food resources to be in one place, allows students to confidentially request food items or meal swipes, allows community members to donate digitally. | No outcomes on food insecurity were reported | consideration of equity, inclusivity, and diversity among students.<br>Confidential ordering and pickup is said to recognize privacy of students.<br>Ethics and stigma were not considered within this study, as well as equity, inclusivity, and diversity among students. |
| Free Food Alert (n.d.)                      | USA/Canada | Email alerts, Mobile application, and website | Alerts food insecure students when free food is available for students to pick up on campus.   | No outcomes on food insecurity were reported | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.   |
| Humber Polytechnic (n.d.)                   | Canada     | Mobile App                                    | Facilitates communication between food suppliers and students to provide food insecure students with food that would otherwise be wasted.  | No outcomes on food insecurity were reported | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.   |
| Justin Sibbet (2025)                        | Canada     | Mobile Application                            | Alerts students when free food is available on campus, allows for those who want to donate food to fill out a form to donate.  | No outcomes on food insecurity were reported | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.   |
| Lakehead University (2025)                  | Canada     | Second Harvest's Food Rescue App              | Leftover food is donated to the resource centre and  | No outcomes on food insecurity were reported | Ethics, privacy, and stigma were not considered within this study, as well as   |

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| Montclair State University (2026) | USA | Program via LMS (Canvas) | notifications are sent to students when donations are available.<br>Students are alerted when food is available on their LMS systems, they also have access to a registered dietician for free to help with assistance on things like where to shop/how to shop, and how to find budget friendly, nutritious foods. | No outcomes on food insecurity were reported  | consideration of equity, inclusivity, and diversity among students.<br>Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students. |
| Silvis et al., (2018)             | USA | Notification service     | Notifies students when food is available to be picked up from events on campus.   | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.  |
| Swenson He (n.d.)                 | USA | Mobile App               | Allows post-secondary students to search for restaurants that will provide meals to them while only paying after they graduate.   | No outcomes on food insecurity were reported. | Ethics, privacy, and stigma were not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.  |
| Umaña et al., (2022)              | USA | Text messaging program   | Sends text messages to post-secondary students providing them with information about SNAP (CalFresh)  | No outcomes on food insecurity were reported  | Utilized stigma-reducing language throughout their resource.<br>Ethics and privacy were not considered within this study, as well as consideration of  |

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| <p>Gloria Dawson (University of New Hampshire) (2017)</p> | <p>USA</p> | <p>Meal swipe program</p> | <p>benefits when they are eligible.<br/>         Allows for faculty, staff, alumni, parents, and students to donate meal swipes to students in need. Meals are added directly to student meal plans.</p> | <p>No outcomes on food insecurity were reported</p> | <p>equity, inclusivity, and diversity among students.<br/>         Since students swiped their meal cards like every other student, stigma and privacy are considered.<br/>         Ethics was not considered within this study, as well as consideration of equity, inclusivity, and diversity among students.</p> |
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