Teachers' understanding of food literacy: A comparison between in-field and out-of-field home economics teachers

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Teachers' understanding of food literacy: A comparison between in-field and out-of-field home economics teachers

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Abstract

Teacher content knowledge influences effective teaching practice. It enables effective understanding, application and teaching of concepts, alongside confidence and competence to apply this to broader world contexts. In Australian secondary schools, food literacy education is mainly taught through home economics subjects, making teacher content knowledge of this concept important. This study investigated and compared the understanding of food literacy of in-field and out-of-field Queensland home economics teachers. A survey was conducted of 117 Queensland Year 7–10 home economics teachers who teach Design and Technologies. Of these, 78% (n = 72) were in-field and 21% (n = 19) were out-of-field teachers (26 participants did not provide demographic data). Inductive qualitative data analysis was performed followed by triangulation with contemporary literature, to identify similarities and differences in their understanding of food literacy. Respondents aligned food literacy with food knowledge, skills and critical thinking; however, few identified connections between food literacy and families. All definitions lacked reference to the influence of attitudes, emotions, culture, society, politics and economics on food consumption. In-field teachers indicated a greater depth and complexity in their understanding in comparison to out-of-field teachers. This has implications for teaching effectiveness, student learning and professional learning needs of the broad spectrum of home economics teachers in the current workforce.

Keywords: Home Economics, food literacy, out-of-field teaching, Design and Technologies

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Introduction

The need to understand content knowledge and how to teach effectively is of concern to all educators. In the field of Home Economics, the increasing focus on food literacy in the wider community has prompted the exploration of how home economics teachers define and understand the concept of food literacy and, subsequently, how this area of content knowledge translates into the concomitant learning experiences for students in classrooms. The purpose of this paper is to gain an understanding of what home economics teachers, both in-field and out-of-field, understand about food literacy and the implications of this understanding.

Content knowledge

Shulman (1986) categorised teacher content knowledge into three interrelated sections:

1) knowledge of subject matter
2) pedagogical content knowledge
3) knowledge of the curriculum.

He argues that each learning area varies in its required content knowledge, with each encompassing unique facts and phenomena, and why they are worth knowing. Teachers need to be able to define such concepts and make them understandable, while also supporting students in understanding why they are worth knowing and how to connect them to the broader world. Although the 'what' and 'why' of content knowledge is important, 'how' it is represented, explained and demonstrated is also crucial. This is known as pedagogical content knowledge. Teacher curriculum knowledge is crucial for the identification of the 'what, why and how' to guide teaching practice.

Based on the work of Shulman (1986) described above, to be able to teach food literacy effectively,

teachers need to be able to define such a concept while making it understandable, relatable and applicable to varied real-world contexts.

This study considered how in-field and out-of-field home economics teachers define food literacy to determine variations, omissions and additions in content knowledge and, as a result, highlighted the professional development required to enhance teacher content knowledge in this topic.

Out-of-field teaching in Home Economics

A major barrier to effective food literacy education in Home Economics is the deficiency of in-field home economics teachers available to teach the subject (McCuaig, 2012). Since the late 1990s the number of tertiary institutions offering initial teacher-education programs with a specialisation in Home Economics has been reducing (Pendergast, 2001). This has reduced the number of in-field home economics teachers within Australia, which is of concern given the ongoing demand for expert educators in the field (Ronto et al., 2017b).

To be able to teach food literacy effectively, teachers need to be able to define such a concept while making it understandable, relatable and applicable to varied real-world contexts.

Du Plessis (2020) defines an in-field teacher as having studied the pedagogical methodology and content specific to a learning area, enabling them to gain field expertise, in this case, in home economics education. Conversely, a teacher is considered to be teaching out-of-field when they are teaching a subject that they have not undertaken as a major or minor within their initial teaching qualification. Consequently, they have not undertaken pedagogical methodology and content training specific to the subject they are teaching out-of-field (Weldon, 2016). It is argued that without specialist training, out-of-field teachers lack the required pedagogical content knowledge specific to the learning area, which challenges their capacity to deliver comprehensive learning experiences, consequently impacting student outcomes (du Plessis, 2015).

It has been argued that out-of-field teaching is beneficial to education. Teacher shortages in Technologies subjects, for example, Home Economics, are especially noted, making out-of-field teaching essential to subject delivery to prevent its elimination from the school curriculum (Hobbs, 2013).

Food literacy

The origin of food literacy

The concept of food literacy began to emerge in the literature during the early 2000s as a derivative of Nutbeam's (2000) concept of health literacy. Health literacy communicates the knowledge, skills and cognitive ability an individual requires to be empowered to act autonomously when addressing their personal health. It also expresses that individuals must have the ability to critically analyse health information to be able to make informed decisions regarding their health. There is a relationship between substantiated health literacy and greater personal health status (Nutbeam, 2000). This relationship has also been applied to an individual being food literate.

It is postulated that individuals with sophisticated food literacy would experience a reduction in nutrition-related disease as they have the skills and knowledge to engage in healthy food behaviours (Ronto et al., 2017a). Based on this premise, the definitions of food literacy that emerged in the literature incorporated the three critical aspects of Nutbeam's (2000) health literacy model (Pendergast et al., 2011):

- functional literacy (communication of information)
- interactive literacy (development of personal skills)
- critical literacy (cognitive skill development, and personal and community empowerment).

The many definitions of food literacy and its components

According to Cullen et al. (2015), early food literacy definitions were mostly based on opinion, not evidence. To resolve this concern, Vidgen and Gallegos (2014) constructed an agreed definition through an intensive Delphi study. To date, this definition is still the one most cited in literature (Truman et al., 2017). Vidgen and Gallegos (2014, p.54) state:

> Food literacy is the scaffolding that empowers individuals, households, communities or nations to protect diet quality through change and strengthen dietary resilience over time. It is composed of a collection of inter-related knowledge, skills and behaviours required to plan, manage, select, prepare and eat food to meet needs and determine intake.

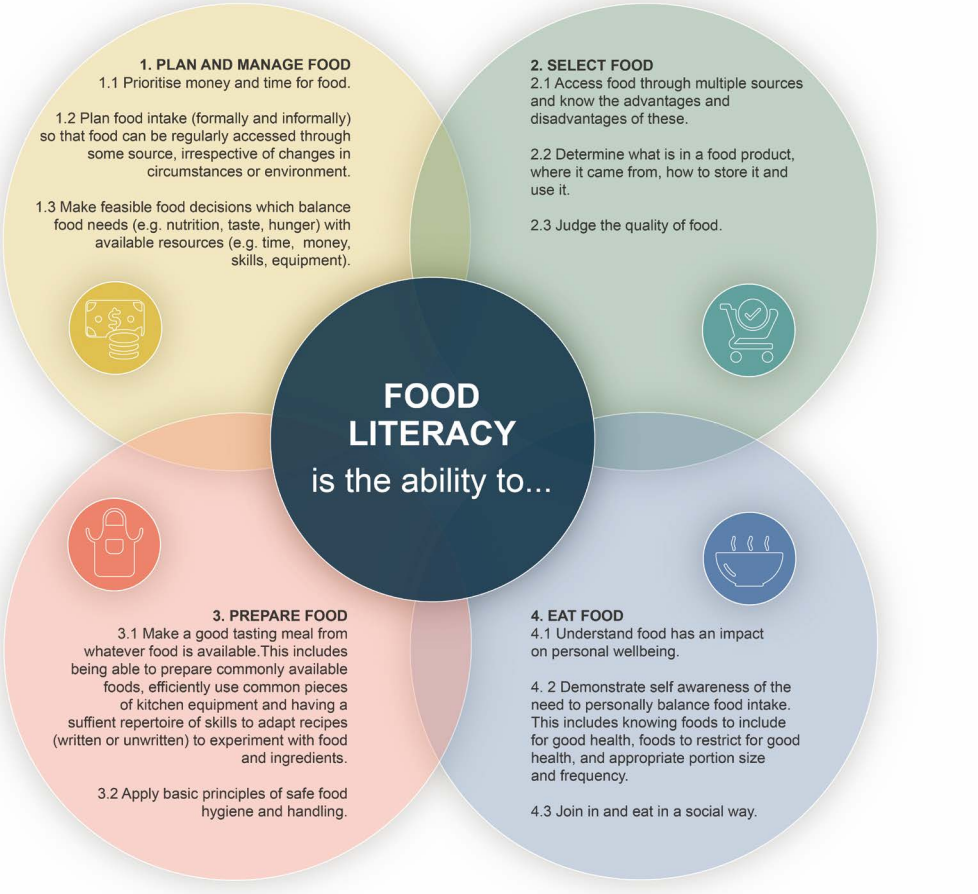
Vidgen and Gallegos (2014) elaborated this definition through four domains and eleven concepts of food literacy, as shown in Figure 1. This diagram visualises the interlinked domains of planning and managing, selecting, preparing and eating food, while outlining the skills and abilities required to achieve food literacy competency. The Vidgen and Gallegos (2014) model is accessible and comprehensive, making it easy to interpret and apply. Despite this, they recommended that this model be further examined in relation to the connection between food literacy and social connectedness, sustainability and food security.

Cullen et al. (2015) extended the Vidgen and Gallegos (2014) definition by encompassing aspects of economics, culture, ecology, sustainability, society, the environment and politics. The goal of this revision was to extend beyond the concepts of nutrition and cooking skills to enable a more holistic perspective on what it means to be food literate. This is explained as follows:

> Food literacy is the ability of an individual to understand food in a way that they develop a positive relationship with it, including food skills and practices across the lifespan in order to navigate, engage, and participate within a complex food system. It's the ability to make decisions to support the achievement of personal health and a sustainable food system considering environmental, social, economic, cultural, and political components (p.143).

Although this definition fills the voids highlighted by Vidgen and Gallegos (2014), it does not provide a consensus definition of food literacy. Without the latter, educators and policymakers find it challenging to develop and assess food literacy programs. Truman et al. (2017) identified this deficiency and conducted a scoping review to support filling this void. Their study identified six main themes surrounding food literacy. Rather than redefining food literacy, they contrasted the emerging themes against the Vidgen and Gallegos (2014) definition and

Figure 1. The four domains and eleven concepts of food literacy by Vidgen and Gallegos (2014, p.55)



Note: Adapted with permission from the original authors.

It's the ability to make decisions to support the achievement of personal health and a sustainable food system considering environmental, social, economic, cultural, and political components.

The aspects of food literacy are inextricably linked and do not act as distinct entities.

identified that the latter lacked references to the influence of culture on food literacy. The themes that emerged were:

1) skills and behaviours: physical actions involving food
2) food/health choices: informed food choices
3) culture: societal influences on food
4) knowledge: understanding and seeking information about food
5) emotions: attitude and motivational influences on food
6) food systems: complexity of the food cycle.

Perry et al. (2017) began to scope out the aspects and attributes of food literacy as they too identified that this was crucial to enable the development of food literacy programs and associated assessments. They proposed that food literacy encompasses intrinsic and extrinsic components, whereby the former refers to individual influences and the latter to broader social influences. Perry et al. (2017) included food skills, food and nutrition knowledge, and self-efficacy and confidence with food as intrinsic components of food literacy. They identified ecologic factors such as sociocultural influences, food systems, infrastructure and population-level determinants. Food decisions, which encompasses dietary behaviours, fell between intrinsic and extrinsic components.

Despite the aligned, yet varied definitions provided above, all authors agree that the aspects of food literacy are inextricably linked and do not act as distinct entities (Cullen et al., 2015; Perry et al., 2017; Truman et al., 2017; Vidgen & Gallegos, 2014). While there have been many global iterations of food literacy, this paper focusses on those presented as they represent the evolution of the term from a purely public-health perspective by Vidgen and Gallegos (2014) to include the ecologic influences on food, such as culture, environment, attitudes, economics, ethics and systems (Cullen et al., 2015; Perry et al., 2017; Truman et al., 2017).

Food literacy and the *Australian Curriculum*

The concept of food literacy continues to evolve in the informing literature with a universally agreed-upon definition and model yet to emerge. Despite its strong presence in the literature, the term 'food literacy' does not appear in Version 8.4 of the *Australian Curriculum*, developed by the Australian Curriculum, Assessment and Reporting Authority (ACARA)—the most current curriculum at the time of this study (ACARA, n.d.-a; ACARA, n.d.-b). This is not surprising, considering this version of the curriculum was launched in 2015, preceding the most prominent research in this field. Although absent from the *Australian Curriculum*, the underlying concepts of food literacy straddle the key learning areas of Health and Physical Education, and Design and Technologies (ACARA, n.d.-a; ACARA, n.d.-b; Ronto et al., 2017a). In Australia, home economics teachers draw from both these learning areas.

In Health and Physical Education, food literacy is addressed through the focus area of 'Food and nutrition', one of twelve focus areas for this core subject (ACARA, n.d.-c). Within Design and Technologies, food literacy is often enacted under the contexts of 'Food and fibre production' and 'Food specialisations'. It is intended that the theoretical nutrition knowledge gained in Health and Physical Education be translated into practical skill development within Design and Technologies (ACARA, n.d.-b). This divide demonstrates the cross-curriculum nature of food literacy education between Health and Physical Education, and Design and Technologies that persists in the Australian context. ACARA (n.d.-d) labels this as the Curriculum Connection 'Food and wellbeing'.

The study: Queensland home economics teacher understanding of food literacy

This study sought to investigate Queensland home economics teachers' definitions of food literacy and to compare the concomitant understandings between in-field and out-of-field home economics teachers. The potential contribution of this research is to understand the teacher workforce in order to upskill all home economics teachers in their understanding of food literacy thus enhancing student outcomes alongside their ability to become food literate through home economics education.

Methods

Method

This research formed part of a larger study into food literacy education in Queensland secondary schools (McManus, 2021). The research engaged an exploratory case-study methodology to generate theory regarding in-field and out-of-field home economics teacher understandings of food literacy. This phenomenon is yet to be explored in the literature and, therefore, an exploratory focus provided a baseline for developing propositions for further investigation into out-of-field teaching of food literacy in Home Economics (Cohen et al., 2018; Yin, 2018).

Collection of digital survey data through LimeSurvey occurred January–February 2021. Respondents were asked to provide general demographic data along with a response to the following question: *In your own words, how would you describe food literacy?* The survey contained a total of four components, two of which are reported in this paper and two of which are not. The questions in this study were presented as the first questions respondents were asked to complete. Figure 2 illustrates the survey structure in its entirety while detailing sections reported on within this paper.

Participants and sampling

Participants included all individuals who identify as Queensland secondary school home economics teachers of students in Years 7–10 Design and Technologies/Home Economics. A home economics teacher was defined as:

- in-field home economics teachers who are currently teaching Home Economics
- qualified teachers who are teaching Home Economics out-of-field
- in-field home economics teachers who are not currently teaching Home Economics.

Participants were recruited via purposive sampling though Home Economics Institute of Australia (Queensland) [HEIA(Q)] social-networking systems, which provided members with the online survey link. Snowball sampling was enabled to permit participants to share the survey link with home economics teachers who were not HEIA(Q) members.

Ethics approval was gained from the Griffith University Human Ethics Research Committee (GU Ref no: 2020/958). Digital informed consent was obtained prior to participants completing the survey.

Data analysis

Responses to the survey question along with the corresponding demographic statistics pertaining to in-field or out-of-field teaching status and years of home economics teaching were extracted from LimeSurvey into a .csv file for insertion into Leximancer for data analysis. The data were cleaned and incomplete responses removed to enhance data validity. The extracted file was also compared to LimeSurvey to ensure accuracy in data extraction. Each participant was allocated a code for reporting purposes commencing at '1', which has been included within the results following each respondent quote. Demographic data were inserted into IBM SPSS Statistics Version 27.0.1.0 for quantitative analysis. Leximancer V4.51.07 was used for qualitative data analysis. Quantitative data analysis encompassed frequency calculation to report on participant demographics.

Two inductive analyses were conducted through Leximancer:

- The first produced a concept map to permit examination of all respondents' personal definitions of food literacy to compare variations between them and the definitions present in literature.
- The second analysis produced a concept map to compare personal definitions between in-field and out-of-field home economics teachers to determine if variations were present between the two groups.

The concept maps illustrate theme and concept interconnectivity through inductive processes (Leximancer, 2021). The Leximancer inductive analyses of the qualitative data were performed to permit the emergence of themes without application of predetermined propositions, as suits an exploratory study (Glaser & Strauss, 1999; Corbin & Strauss, 2008; Yin, 2018).

Each concept map was analysed in relation to the emergent overarching five themes in the first and second analyses respectively and their embedded concepts and how they emerged from the provided personal definitions of food literacy:

- Leximancer concept maps are heat mapped, which means the most prominent themes appear in red circles, followed by orange, blue and green through the colour spectrum.
- The overarching themes appear in large text at the centre of the circle and the concepts encompassed within each theme appear in dark smaller text.
- Grey lines between concepts indicate dominant relationships between concepts within the analysed text, and the larger the dot positioned at their centre, the higher the frequency of the concept's appearance in text.

Each concept map is accompanied by a tabular output that outlines the encompassed themes in order of dominance. The frequency of appearance of each theme is presented, followed by the associated concepts in order of frequency. Leximancer also organises relevant quotes from the text so they may be extracted to contextualise results (Leximancer, 2021).

To conclude the data analysis, the findings from Leximancer analysis were triangulated with contemporary literature to cross-reference data interpretation to support conclusions, while also

Figure 2 illustrates the survey structure in its entirety while detailing sections reported on within this paper.

Figure 2. The survey structure

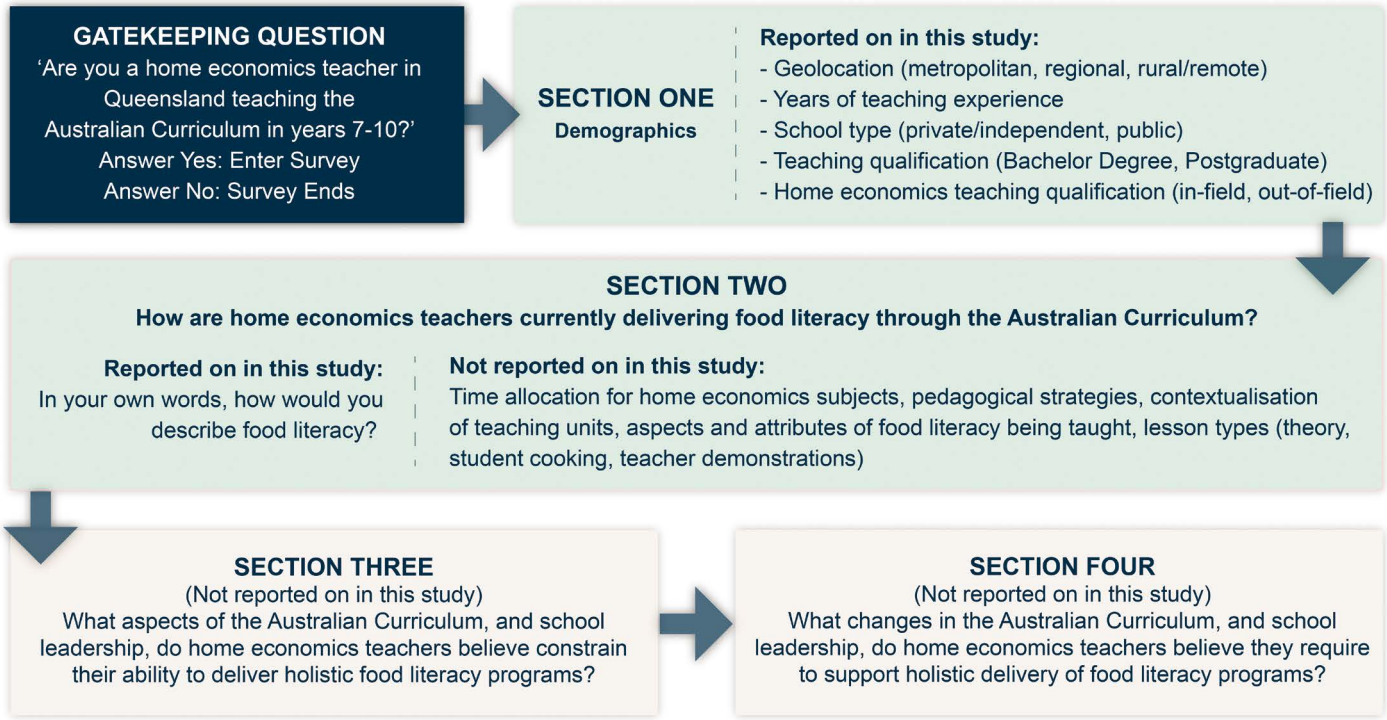
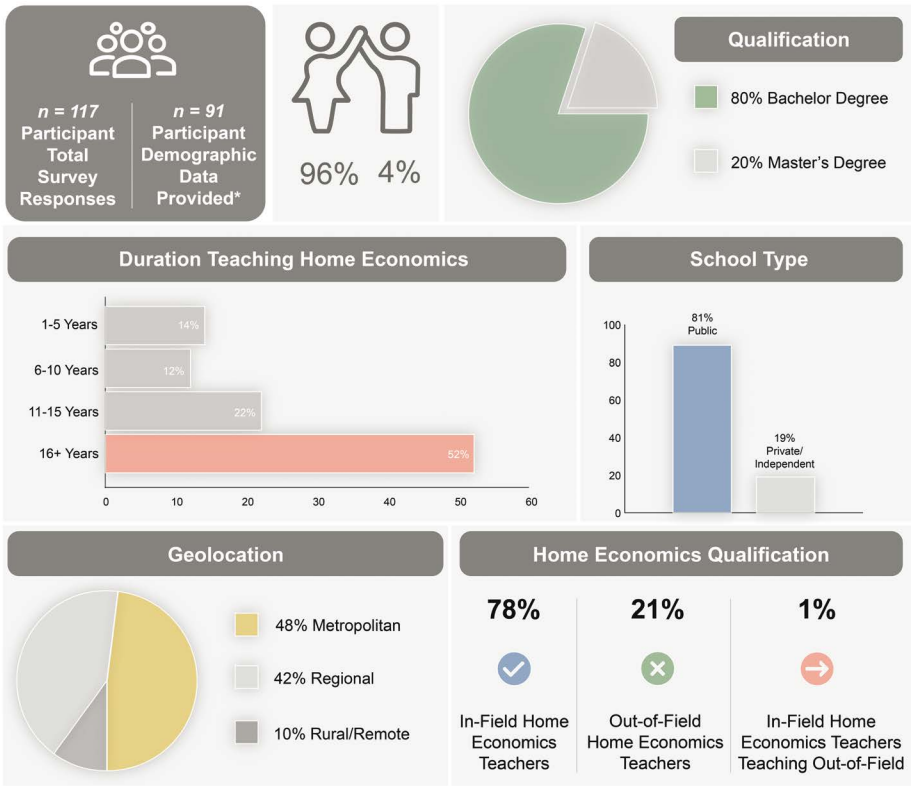


Figure 3. Respondent demographic data



*** Demographic data are based upon the 91 participants who responded to the demographic questions.**

identifying aspects of alignment and divergence from known data (Cohen et al., 2018).

Findings

Respondent demographics

As shown in Figure 3, the survey yielded 117 responses, which showed that:

- 96% were female
- 80% were bachelor-degree qualified
- the majority had been teaching home economics subjects for 16 or more years (51%), with 22% having taught home economics subjects for 11–15 years
- 81% of respondents were employed by public schools
- 48% were teaching in metropolitan geolocations
- 78% (n = 72) were teaching in-field and 21% (n = 19) were teaching out-of-field.

Accurate demographic statistics describing the home economics teacher population in Queensland were not accessible from the HEIA(Q), Education Queensland or the Queensland College of Teachers. Consequently, population representativeness could not be assessed; therefore, the results from this study are considered to be representative of the study respondents as a single case entity bound by the demographics of the participants who enrolled. This renders direct extrapolation of results to the Queensland home economics teacher population inappropriate; rather, the results should be seen as a theoretical baseline for further research.

Figure 3 illustrates the respondent demographics for this study.

Home economics teachers' definitions of food literacy

To analyse the personal food literacy definitions provided by home economics teachers, Leximancer was utilised to perform conceptional and relational analyses. As illustrated in Figure 4, the themes of *Critical thinking and application, Skills and knowledge, Home economics* and *Family health* emerged as being dominant within definitions. Table 1 presents the frequency for each theme listed within the definitions alongside the concepts relating to each of these themes.

As illustrated in Figure 4, the themes of Critical thinking and application, Skills and knowledge, Home economics and Family health emerged as being dominant within definitions.

Figure 4. Themes and concepts present in respondent food literacy definitions (whole of cohort analysis)

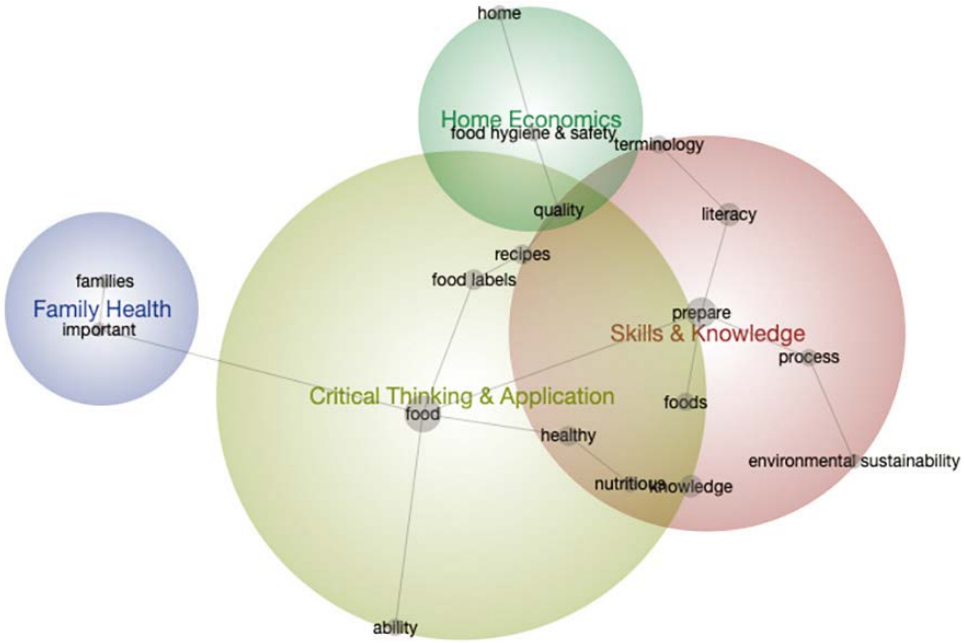


Table 1. Themes and related concepts in respondents' food literacy definitions (whole of cohort analysis)

Theme	Theme frequency	Concepts* (in order of frequency)
Critical thinking and application	57	Food, labels, healthy, recipes, ability
Skills and knowledge	38	Prepare, literacy, knowledge, foods, terms, process, nutritious, environmentally
Home economics	5	Home, hygienically, quality
Family health	3	Important, families

* As identified and labelled by Leximancer

Theme: *Critical thinking and application*
The theme of *Critical Thinking and Application* received the highest frequency (n = 57) within the home economics teachers' food literacy definitions.

Theme: *Skills and knowledge*
As indicated in Table 1, the frequency for *Critical thinking and application* was followed by *Skills and knowledge* (n = 38). Leximancer prioritised *Skills and knowledge* to be the most prominent theme within the analysed definitions, as indicated by the red colour. It encompasses the highest number of concepts and although receiving a lower frequency than *Critical thinking and application*, the responses placed greater emphasis on this theme while overlapping greatly with the latter.

When considering the theme of *Skills and knowledge* from the 'knowledge' perspective, it is embedded with concepts surrounding knowledge of methods of food preparation, terminology associated with food and cooking, food nutritional value, food groups, food sustainability practices, economic impacts on food, and food properties. For example:

> food literacy includes the **language** of food, including **understanding** of basic foods and food cookery terms. It includes **food preparation** and **storage terms** as well as language and associated **knowledge** of nutritional values of food, basic food groups, properties of different foods, preparation techniques and cookery terms (Respondent 37)

> a breadth **of knowledge, skills and attributes** that enables the acquisition, preparation and consumption of foods that fulfills physical, social, emotional wellbeing, whilst also being ethically and environmentally conscious (Respondent 7).

The theme of Critical thinking and application received the highest frequency (n = 57) within the home economics teachers' food-literacy definitions.

From the 'skills' perspective, the theme of *Skills and knowledge* expresses the application of skills in food preparation and cooking within respondent definitions:

> a **set of skills** that enable people to seek, recognise and process through preparing and cooking a range of foods that are healthy, nutritious and tasty whilst being cost-effective at the same time (Respondent 34).

Interaction of *Critical thinking and application* and *Skills and knowledge*
The above example (34) demonstrates the intersection between the themes of *Skills and knowledge* and *Critical thinking and application*, as also shown in Figure 4. The theme of *Critical thinking and application* incorporates the ability to apply food literacy knowledge and skills through engagement of critical-thinking processes to informed food choices, such as analysis of food labels and recipes. The definitions suggest the desired goal as the creation of healthy and nutritious foods. For example:

> food literacy is the **understanding** about making healthy food choices, **being able to prepare** foods through **interpretation** of recipes**,** and **knowledge** of ingredients, cooking terms and equipment, being able to **make informed choices** about issues associated with food: diets, nutrients, sustainability, marketing and promotion, food security (Respondent 59)

> **read** food labels, recipes. Make good **food choices**. **Critique** food information (Respondent 15).

Theme: *Home economics*
As illustrated in Figure 4, the theme of *Home economics* also interlinks with *Critical thinking and application* and *Skills and knowledge*. This is due to some respondents positioning Home Economics as the specialist teaching area for the delivery of food literacy education:

> anything related to food in **home economics** … (Respondent 43)

> understanding food technology and **home economics** terms … (Respondent 41).

Theme: *Family health*
The isolated theme of *Family health* expresses that respondents position food literacy as being important for families through the embedded concepts of 'important' and 'families'. The home economics teacher definitions linked *Family health* to the theme of *Critical thinking and application*, through the concept of 'food', which is the central concept between all other concepts and themes within the concept map in Figure 4. For example:

> [food literacy] it is very **important**. The majority of Australia's biggest killers are diet related. There are too many **families** still living on takeaways (Respondent 62)

> the understanding of food and how it plays an important role in individuals' health and the health of their families; including being a critical consumer (Respondent 6).

Concept: *Quality*
The concept of 'Quality' is positioned central to

the interlinked themes of *Skills and knowledge, Home economics* and *Critical thinking and application*. Leximancer identified that home economics teacher definitions often related the concept of 'quality' to other concepts such as 'hygiene', 'nutritious', 'home', 'recipes', 'labels', 'knowledge', 'literacy', 'prepare' and 'food'. This indicates the multifaceted representation of the concept of 'quality', which suggests that respondents believe that food literacy requires 'quality' within these concepts. For example:

> Food literacy is about **understanding** how to nourish your body to ensure that you can **maintain optimum health** and wellbeing throughout all stages of life and **minimise the risk** of developing nutrition-related health conditions which may lead to premature death or deterioration of **quality** of life. Food literacy is **knowing** about the essential nutrients and which food sources provide these nutrients, how to read food labels, how to select fresh produce based on the season and economic factors, how to prepare food at home safely and hygienically and so on (Respondent 50).

Variations in food literacy definitions between in-field and out-of-field home economics teachers

Following analysis of the food literacy definitions as a single cohort, the definitions were analysed according to respondent qualification as being an in-field or out-of-field home economics teacher. The definitions and their alignment to respondent qualification were inserted into Leximancer to determine if in-field and out-of-field home economics teachers varied in their food literacy definitions. Different themes emerged in comparison to the findings from the initial analysis (shown in Table 1) due to the independent variables of 'in-field' and 'out-of-field' being associated more heavily with some themes/concepts than others.

As indicated by Figure 5 and Table 2, configuration of the data in this way altered the emerging themes and their associated concepts. For example, as shown in Figure 5, variations were evident between the two groups, as evidenced through the distanced proximity of the red topic titles. This indicates that each group varied in their connections with the themes and concepts within the concept map. The proximity of a theme (coloured circle) to either the 'in-field (qualfied) home economics teacher' or the 'out-of-field of home economics' teacher nodes indicates prominence of that theme within the definitions provided by that cohort.

Theme: *Knowledge, understanding and application*

From a knowledge perspective, out-of-field teachers made connections between food literacy and related terminology and understanding sources of food information such as labels and recipes. For example:

> knowing that all food is not the same in terms of health and nutrition. Also knowing the most common ways that this information is distributed in our society, e.g., **nutrition labels, recipes** (Respondent 79)

> ability to **read** and **understand** food labels, nutritional content, **follow recipes** appropriately to ensure safety and nutritional value is maintained; **costing** of foods to enable appropriate budgeting; **understanding** nutritional requirements of age groups according to the *Australian Guidelines for Healthy Eating* (Respondent 1)

> **word**s specific to food (Respondent 92).

The researchers identified that the application of critical thinking skills was embraced more fully by in-field home economics teachers, as evidenced by their more complex views of food literacy that include knowledge, application and interpretation, which are components of critical thinking. For example:

> **knowledg**e of food, nutrition, kitchen and cookery **skills/techniques** and the ability to then **apply** them (Respondent 58)

> relates to the required **knowledg**e and **skills** needed to select foods to meet various nutritional requirements … **understanding** the types/functions of food and having the skills to **make wise choices** to ensure a healthy diet … includes an understanding of and ability to **interpret information**, e.g., food labels, recipes and **apply** that knowledge in **decision making** and food **preparation**. Being **food literate** is a basic life skill which is becoming more and more complex and essential!! (Respondent 60).

Theme: *Preparation skills*

Out-of-field home economics teachers also focussed on *Preparation skills* within their provided definitions. This theme encompassed a focus on skills regarding the ability of students to prepare and process foods to create healthy and nutritious options:

> Food literacy is the ability to **understand** healthy nutritious foods and how to **prepare** them (Respondent 82)

In-field home economics teachers were the only group to embed the theme of Family health within their definitions.

skills that help you make healthy food choices, and **techniques** to **prepare** healthy meals (Respondent 85).

The theme of *Preparation skills* was also evident within in-field home economics teacher food literacy definitions. However, the definitions of in-field home economics teachers tended to be more complex than out-of-field home economics teacher definitions. They showed interconnection between the themes of *Preparation skills*, *Family health, Food sustainability* and *Knowledge, understanding and application,* which was absent in many out-of-field home economics teacher definitions. The nexus between food, knowledge and ability was embraced more fully by in-field home economics teachers.

Theme: *Literacy skills*

The theme of Literacy skills was more commonly related to out-of-field home economics teacher definitions. Out-of-field home economics teachers represented literacy in its literal form by linking food to literacy through skills in reading and comprehension, and information interpretation.

Theme: *Family health*

In-field home economics teachers were the only group to embed the theme of *Family health* within their definitions, and as indicated previously, this was interconnected with other themes to form complex definitions. The theme of *Family health* positioned food literacy as being essential for acquisition and provision of food knowledge and skills for individual, family and community health. The key concepts encompassed within this notion included the safe and hygienic preparation of food within homes to ensure the health of consumers, alongside the need to achieve personal and family health to enhance quality of life by applying food skills,

Figure 5. Comparison of in-field (qualified) home economics teacher and out-of-field home economics teacher definitions of food literacy

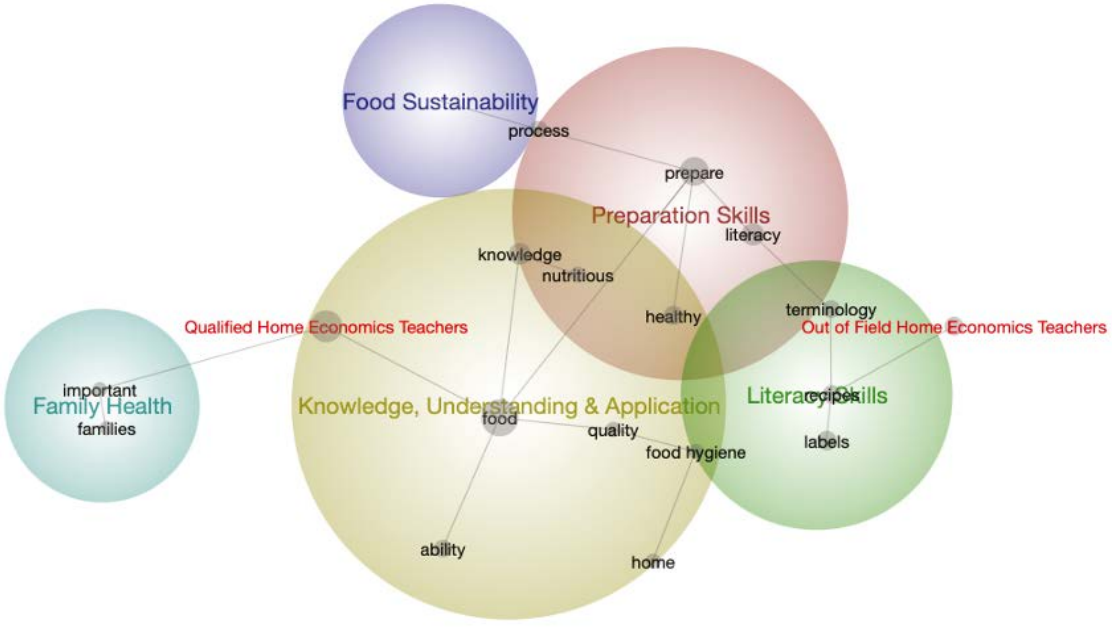


Table 2. Frequency of themes and related concepts in respondents' food literacy definitions 'in-field' (qualified) home economics teachers vs. out-of-field home economics teachers)

Theme	Theme frequency	Concepts* (in order of frequency)
Knowledge, understanding and application	57	Food, knowledge, ability, nutritious, home, quality
Preparation skills	35	Prepare, literacy, healthy, foods, process, nutritious
Literacy skills	14	Labels, recipes, terms, hygienically
Family health	3	Important, families
Food sustainability	2	Environmentally

* As identified and labelled by Leximancer

knowledge, and critical thinking to make healthy food choices. For example:

> the understanding of food and how it plays an important role in **individuals' health** and the **health of their families**. Including being a **critical consumer** (Respondent 6)

> food literacy is about understanding how to **nourish your body** to ensure that you can **maintain optimum health** and wellbeing throughout **all stages of life** and minimise the risk of developing nutrition-related health conditions which may lead to **premature death** or deterioration of **quality of life**. Food literacy is knowing about the essential nutrients and food sources that provide these nutrients, how to read food labels, how to select fresh produce based on season and economic factors, **how to prepare food at home** safely and hygienically and so on (Respondent 50).

Theme: *Food sustainability*

The theme of *Food sustainability* was connected only to in-field home economics teacher definitions. Respondents who included sustainability aspects within their definitions recognised the link between food and contemporary sustainability concerns, and the need for individuals to practise environmentally considered behaviours and actions when preparing, consuming and disposing of food. These respondents conveyed the importance of individuals acquiring the required skills and knowledge to recognise how their food interactions have an environmental and ethical impact, and how sustainability processes can lessen this impact. The emerging sentiment was that through knowledge of food sustainability and ethics, food literate individuals will be more conscious of their impact when interacting with food. For example:

> a breadth of knowledge, skills and attributes that enables the acquisition, preparation and consumption of foods that fulfills physical, social, emotional wellbeing, whilst also being **ethically and environmentally conscious** (Respondent 7)

> knowledge and understanding of how our food is produced and distributed and its availability to consumers, the nutritional value of foods and how to prepare them for safe consumption, as well as how food contributes to and **impacts on the health of people and the environment** (Respondent 8)

> knowledge of the broad process and application of sourcing, preparing, serving and sharing food in an **environmentally and sustainable way** for good health and wellbeing (Respondent 45).

Discussion

In-field teachers who have comprehensive and proficient pedagogical content knowledge enhance student learning due to greater teaching self-efficacy (du Plessis, 2015; Hobbs, 2013; Weldon, 2016). Home Economics has a unique pedagogical content knowledge required to teach the subject effectively and safely. A comprehensive understanding of food literacy forms one component of the pedagogical content knowledge required to effectively teach Home Economics.

Home economics teacher understandings of food literacy

When analysed as a single cohort, home economics teacher definitions of food literacy provided the dominant emerging themes of *Skills and knowledge, Critical thinking and application, Home economics,* and *Family health*. When comparing these themes and their embedded concepts with the definitions and aspects of food literacy presented by Vidgen and Gallegos (2015), Cullen et al. (2015), Perry et al. (2017) and Truman et al. (2017), there were clear similarities (food and nutrition skills, behaviours and knowledge; critical thinking, application, sustainability; and family health) and differences (ecological influences on food such as systems, politics, economics and culture; and social and food attitudes). One addition was that respondents positioned *Home Economics* as the vessel of delivery for food literacy education, which is recognised in the literature (Ronto et al., 2017a).

A comprehensive understanding of food literacy forms one component of the pedagogical content knowledge required to effectively teach Home Economics.

Respondent references to food and nutrition skills, behaviours and knowledge were very prominent. These components included understanding and seeking information about food to inform physical food interactions, the need for students to develop food and nutritional theory knowledge and terminology, food sustainability, preparation knowledge and skill, and hygiene and safety.

The importance of individuals making informed food decisions to enhance wellbeing and consumption of a healthy well-balanced diet was also evident, as was the need for individuals to acquire and apply relevant food literacy skills and knowledge through critical-thinking processes, in order to create nutritious and healthy food products. The ability to analyse food labels and recipes through this process was also distinct.

The connections shown by respondents between food knowledge, skills, critical thinking and application reflect contemporary food education literature.

These concepts reflect the literature by Vidgen and Gallegos (2014), Cullen et al. (2015), Truman et al. (2017) and Perry et al. (2017). Therefore, it may be considered that many respondents were well versed in these aspects of food literacy.

The connections shown by respondents between food knowledge, skills, and critical thinking and application reflect contemporary food education literature. For example, Lichtenstein and Ludwig (2010) state that an interconnection between food knowledge and skills is crucial for individual food self-efficacy. This is reflected in several studies surrounding food literacy education in which the nexus between food skills, attitudes and behaviours, alongside the necessity of critical thinking and practical skill development and application, is crucial for the development of food literacy to achieve healthy food interactions for health and wellbeing (Hawkes et al., 2015; Lichtenstein & Ludwig, 2010; Lai-Yeung, 2011; Pendergast et al., 2011; Pendergast & Dewhurst, 2012; Ronto et al., 2017b; Sadegholvad et al., 2017).

The inclusion of food sustainability within responses was encouraging as food systems are a major climate change contributor (United Nations, 2022; Jaglo et al., 2021; World Bank, 2021). The United Nations Sustainable Development Goals heavily embed aspects related to unsustainable food practices (United Nations, 2015). Accordingly, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2022) states that 'Education for Sustainable Development' is a key component of quality education and major driver to achieve the *2030 Agenda for Sustainable Development* (UNESCO, 2022). UNESCO (2020) also acknowledges that past educational practices urgently need to be transformed to address unsustainable living practices. This is reflected within the food literacy literature by Cullen et al. (2015), Perry et al. (2017) and Truman et al. (2017).

Food literacy competency also benefits families, communities and beyond (Nanayakkara et al. 2017). Vidgen and Gallegos (2014), Cullen et al. (2015), Truman et al. (2017) and Perry et al. (2017) all consider food literacy to extend beyond the individual level. In this study, the theme of *Family health* was present, yet isolated, and appeared in low frequency only in connection with in-field home economics teacher responses. Consequently, it may be argued that some home economics teachers require education to understand how families and beyond are interconnected with food literacy. Respondents who recognised this link indicated that food literacy was important to family health and wellbeing in developing skills to become critical consumers.

The aspects of food systems, and social, economic, cultural, and political influences on food were not explicit within the definitions that emerged in this study. The domain of 'eat food' forms a major social facet of the food literacy model by Vidgen and Gallegos (2014), who also acknowledge the economic concept of financial influences on food, for example, budgeting and shopping. Cullen et al. (2015, p.143) recognise the importance of food systems through their definition that indicates that individuals need to be able to 'navigate, engage, and participate' within contemporary and complex food systems which encompass social, economic, cultural and political components. This is also reflected by Truman et al. (2017) and Perry et al. (2017).

Notably absent from respondent definitions was the aspect of food attitudes, which encompasses self-efficacy, confidence, and emotional and motivational influences on food. Cullen et al. (2015) position food literacy as important to the development of positive food relationships, and Truman et al. (2017) explain that attitude and motivation influence food consumption. Perry et al. (2017) present food attitudes from the perspective of self-efficacy and confidence when interacting with food. They align with Truman et al. (2017) through inclusion of attitudinal and motivational influences on food, which impact an individual's desire to consume healthy foods.

Variations between responses of in-field and out-of-field home economics teachers

The responses were also analysed to consider variations in definition between in-field home economics teachers and out-of-field home economics teachers.

Compared to in-field home economics teachers, definitions of food literacy provided by out-of-field teachers suggest they may be limited in home economics pedagogical-content knowledge. Consequently, educational quality may decrease as out-of-field teachers may not understand how to contextualise food education to address contemporary food concerns. Out-of-field home economics teachers focussed dominantly on the theme of *Literacy skills*. A literal application of 'literacy' was evident due to respondents referring to the concepts of information interpretation,

terminology, reading and comprehension skills, and understanding food-information sources. Out-of-field teachers also connected to the theme of *Preparation skills* within their definitions. However, the nexus between food knowledge and preparation skills through application of critical-thinking skills was absent, indicating that the out-of-field home economics teachers in this study framed food literacy quite literally as cooking food, understanding terminology, reading recipes and applying general literacy skills.

Comparatively, in-field home economics teachers defined food literacy with more complexity, through inclusion of concepts such as food sustainability, ethics, family health, environmental impacts, knowledge, and critical thinking and application of knowledge and skills. In-field teachers showed evidence of understanding the food literacy nexus.

When applying research by du Plessis (2015; 2020) regarding out-of-field teacher pedagogical-content knowledge, the above evidence indicates alignment with out-of-field home economics teachers being limited in food literacy content knowledge. As a potential consequence, students may not be receiving rich learning experiences from out-of-field teachers due to gaps in the pedagogical content knowledge of those teachers, which may impact student learning outcomes (du Plessis, 2020; Hobbs, 2013). A key attribute of highly effective teachers is their comprehensive subject area knowledge (Weldon, 2016). The evidence presented indicates a greater depth and complexity within in-field home economics teacher definitions than those of out-of-field home economics teachers. Consequently, it may be surmised that the in-field home economics teachers in this study have a greater potential to deliver rich food literacy learning experiences in comparison to their out-of-field counterparts.

Limitations

Following discussion with Education Queensland, the Queensland College of Teachers, and the Home Economics Institute of Australia (Qld), it was determined that exact home economics teacher demographics for Queensland were not available. Therefore, this study could not be assessed for representativeness of the Queensland home economics teacher population. As a result, the findings have been discussed as a single cohort bound by the participants of this study.

Furthermore, there was no preliminary assessment of potential participants' understanding of the concept of food literacy before selection as a participant in this study. However, this study provides a baseline for further research.

It was also not possible to determine how many individuals this survey reached compared to the number of participants. Despite this, further studies can expand on the outcomes while also supporting the generation of strategies to consider and mitigate potential concerns surrounding out-of-field home economics teaching within Australia and beyond.

Implications for future research and teaching practice

The Australian home economics teacher workforce is characterised by a teacher shortage. In many instances the only option for some schools to maintain home economics subjects is to allocate out-of-field teachers. Without out-of-field teachers, many home economics programs would cease to operate, and out-of-field teaching is a sound strategy to mitigate this situation.

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However, based on evidence from this study, out-of-field home economics teacher professional development is critical to enable optimal food literacy education.

It would also be beneficial for in-field home economics teachers to enhance their understanding of the concept.

Mentoring of out-of-field staff in home economics pedagogical-content knowledge by in-field and experienced home economics teachers is also crucial. It is unlikely that home economics teacher-workforce shortages will be addressed immediately; therefore, it is imperative to support and nurture the teachers who are supporting the discipline to sustain the intended enactment of the curriculum in the school curricula. Advocating for the return of home economics as a teaching area to tertiary education is also critical to address home economics teacher shortages.

Furthermore, to support all home economics teachers in food literacy education, the development of an evidence-based food literacy framework encompassing a comprehensive definition with clearly defined aspects and attributes is a priority. This may enhance home economics teacher food literacy content knowledge, while also providing a framework from which multiple learning areas can draw in order to support cross-curriculum food education.

Conclusion

When considering the food literacy definitions, respondents indicated a strong alignment with food knowledge, skills and critical thinking. The aspects of cooking, food safety and hygiene, terminology, food storage, nutrition, planning, recipe interpretation, and health and wellbeing were also well represented.

In contrast, few respondents made connections between food literacy extending beyond the individuals to families, and all definitions lacked reference to the influence of attitudes and emotions towards food and how they impact food consumption. Similarly, connections were not made with the cultural, social, political and economic influences on food. Therefore, it is vital that the home economics teacher workforce be provided with professional development, for which the outcomes of this study can act as a guide, to enhance content knowledge regarding these aspects of food literacy.

Differences in food literacy definitions provided by in-field and out-of-field home economics teachers are evident. In-field teachers indicated a greater depth and complexity in their understanding of food literacy, and out-of-field teachers focussed more on the literal application of food literacy through the education of students in food terminology, cooking food, reading recipes, and applying general literacy skills. Consequently, to optimise student experiences and learning it is imperative that out-of-field home economics teachers are supported through professional development alongside mentoring by qualified and experienced home economics teachers.

Mentoring of out-of-field staff in home economics pedagogical-content knowledge by in-field and experienced home economics teachers is also crucial.

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