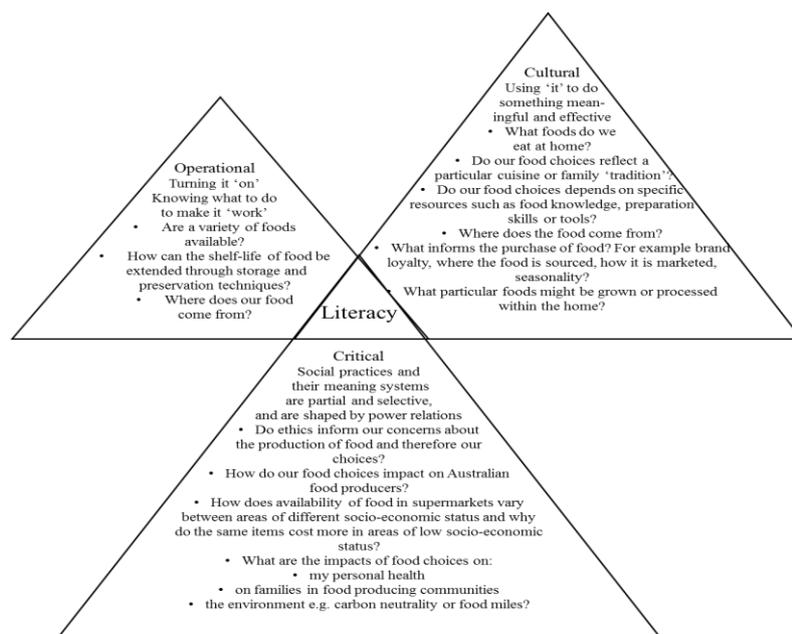


# The use of evidence-based models in food education in secondary schools

## Introduction

Since reporting on her work four years ago, Renwick (Renwick K 2013) challenged home economics teachers to reflect on their pedagogy and teaching philosophy by proposing the use of evidence-based health behavioural models to guide their program design and teaching. Cognisant of teachers' wariness to maintain their professional autonomy, Renwick encouraged teachers to consider critical pedagogies aligned with health education and based on the social ecology theories of Bronfenbrenner, the work of Freire and upheld by the principles of the Ottawa Charter. Further, in recognition of their ongoing care and support of their students, she argued that the application of these critical pedagogies would offer teachers a framework to create humanism in their teaching and address social inequities amongst students.

Beginning with the social ecological theory of Bronfenbrenner, she outlined the evolution of the social ecological theories and positioned the health pedagogy work of Green with her own adaptation of a critical food literacy model (Fig 1). Based on the three dimensional health literacy model developed by Green (Green B 2012, Green B 1999a), Renwick adapted this model to incorporate the operational, cultural and critical dimensions exemplified by a food focus, for consideration by home economics teachers. In this adaptation titled 'Conceptualising critical food literacy: Healthy literacy- the globalisation of our food supply', she explained how each dimension raises typical food literacy questions. These questions accommodate everyday challenges faced by students and their families, such as meeting the needs of the individual and the family at the same time satisfying the environmental impact that food production, use and waste may pose to the environment. Renwick proceeded to explain how the model is adapted to incorporate the key knowledge and skills prescribed by the HPE and Technologies curriculum to fulfil learning outcomes for students that are meaningful and instrumental in them becoming informed consumers and decision-makers.



**Fig 1. Conceptualising critical food literacy: Health literacy – the globalisation of our food supply (Renwick K 2013)**

## **The use of evidence-based models**

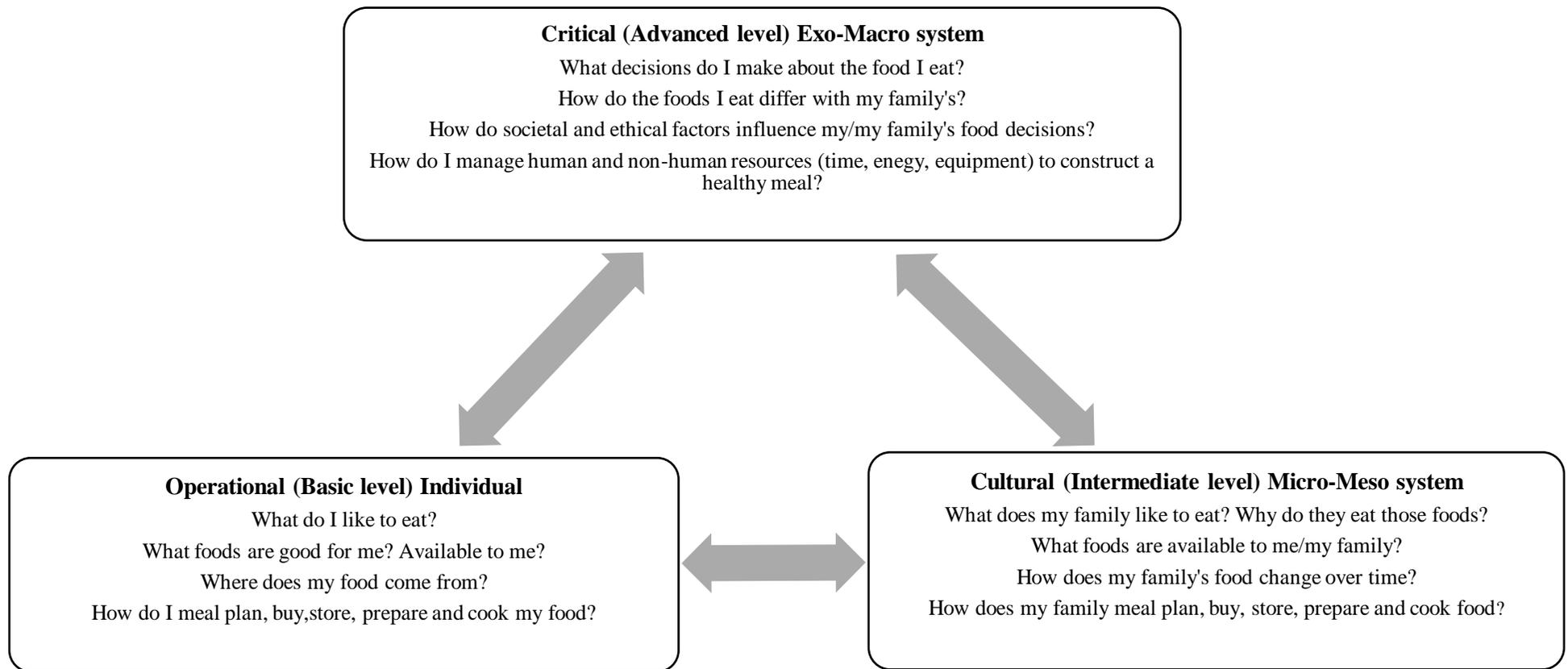
All programs purporting to improve health behaviours require a rationale based on evidence. An evidence-based model substantiates and guides program design and helps teachers identify learning outcomes and program evaluation. Further, models help teachers to cultivate a learning environment where students engage actively, rather than passively, and can direct their own learning as part of the process that may be described as 'differentiated learning' (Tomlinson CA 2013). This substantiates Renwick's position and those of others (Smith MG 2009, Nutbeam D 2008) that students should feel encouraged to be active learners, skilled and confident in their ability to critically analyse 'what shapes that world' (Steinberg S and Kincheloe J 1998).

## **A new food literacy model for school and community food educators**

'Food literacy' models often use a tiered approach to present basic, intermediate and advanced levels of food literacy in order to accommodate the developmental needs of program users, such as students in schools and (often disadvantaged) young people in the community.

Based on adaptation of Renwick's model and Slater's (Colatruglio S and Slater J 2014) framework, a food literacy model (Fordyce-Voorham S and Lai Yeung W-L T 2016, Fordyce-Voorham S 2015) has been developed for use in a sequential food skills program in a school (for example, from Years 7–10). A feature of this model is its purpose-built and generic design for use by teachers or community food educators throughout Australia, irrespective of mandated curriculum.

Here, the model (**Fig 2**) is designed to be sufficiently generic to accommodate local, national and global food education curricula in school settings and equally could be successfully used by practitioners in non-formal settings in community food programs.



**Fig 2: A proposed model for food literacy<sup>1</sup>.** (Fordyce-Voorham S, 2015)

1. An adaptation from Green's 3D (Green B 1999b) literacy model and Renwick's model (Renwick K 2013) Conceptualising critical food literacy: Health literacy – the globalisation of our food supply incorporating Bronfenbrenner's Ecological Systems Theory. The proposed model for food literacy integrates concepts based on Bronfenbrenner (Bronfenbrenner 1979, Paquette D and Ryan J 2001), Green (Green B 1999b) and Renwick (Renwick K 2013)

The proposed questions are suggestions and exemplify possibilities for other questions at each level (operational, cultural and critical) of the model. The inter-directional arrows indicate the non-hierarchical structure of the model; instead a lesson at any year level may include any one of the questions featured in one of more of the (operational, cultural and critical) levels. How the questions can be adapted and applied are described through an example of a mapping exercise of a new subject of senior food education in the Victorian school curriculum; VCE Food Studies (**Table 1**).

**Table 1: Mapping of VCE Food Study Design (Units 1-4) with the Food Literacy Model**

<b>VCE Food Studies Units 1-4 (with Learning Activities) mapped with Fordyce-Voorham’s Food Literacy Model</b>				
<b>Unit Descriptors</b>	<b>Outcomes</b>	<b>Assessment</b>	<b>Mapping with FL Model<sup>1</sup></b>	<b>Examples of Activities</b>
<p><b>Unit 1: Food Origins</b>  <b>AOS 1:</b> Food around the world  <b>AOS 2:</b> Food in Australia</p>	<p><b>O/C 1</b>            Demonstrate adaptations of selected food from earlier cultures in contemporary uses  <b>O/C 2</b>            Demonstrate use of indigenous ingredients            Demonstrate understanding of migrant cuisines that have influenced Australia</p>	<p><b>O/C 1:</b> Range of practical activities with records that reflect on 2 of the practical activities using ingredients found in earlier cultures  <b>O/C 2:</b> A range of practical activities with records that reflect on two of the practical activities using ingredients indigenous to Australia and/or ingredients introduced through migration</p>	<p>Where does my food come from? <b>(O)</b>            How does my family’s food change over time? What does my family like to eat? Why do they eat those foods? What foods are available to me/my family? <b>(C)</b>            How do historical and socio-cultural factors influence past and current eating patterns? <b>(Cr)</b></p>	<p><b>O/C 1 Research task:</b> Your meal on a plate or bowl- research the evolution of eating tools and equipment throughout the ages. From hands to forks, chopsticks to splayds and sporks! How have eating tools changed the way we eat?  <b>Stimulus material:</b> use search engine to identify the ‘History of Food’</p>
<p><b>Unit 2: Food Makers</b>  <b>AOS 1:</b> Food Industries  <b>AOS 2:</b> Food in the Home</p>	<p><b>O/C 1:</b> Apply the process of developing new food products using design briefs  <b>O/C 2:</b> Developing food products that suit the</p>	<p><b>O/C 1:</b> Design and develop a practical food solution in response to a need in the food industry or school community  <b>O/C 2:</b> Design and develop a practical food solution in response to</p>	<p>Where does my food come from? <b>(O)</b>            What foods are available to me/my family? <b>(C)</b>            How do I manage resources to construct a meal that meets my/family’s requirements? <b>(Cr)</b></p>	<p><b>O/C 1 Sensory Analysis Task:</b> Replicate a commercial food product – compare the home-baked  <b>O/C 1</b> Use the <a href="#">Foodwise</a> and <a href="#">Eco Friendly Food</a> websites to determine the amount of money and production costs spent on food wastage and project savings on Australia’s economy if Australians bought locally.</p>

	various needs of individuals in our society	a need in a domestic or small-scale setting		<p><b>Learning activity/assessment idea:</b> conduct a focus group on minimising paddock to plate expenses. Create an infographic or presentation to peers on how they can minimise food wastage.</p> <p><b>O/C 2 Research task:</b> Food Waste in the home Read the article and conduct a cost and plate waste analysis of class families</p> <p><b>Stimulus material</b> <a href="#">Love Food Hate Waste Victoria</a>: this web site site contains lots of ideas for recipes, consumer information, tips and more. Recommended!</p>
<p><b>Unit 3: Food in Daily Life</b> <b>AOS 1:</b> The Science of Food <b>AOS 2:</b> Food Choice, health and wellbeing</p>	<p><b>O/C 1:</b> Production of safe and nutritious meals <b>O/C 2:</b> Producing healthy meals suitable for children and families</p>	<p><b>O/C 1:</b> A range or practical activities and records of two practical activities related to functional properties of components of food <b>O/C 2:</b> A range or practical activities and records of two practical activities related to healthy meals for children and families <b>AND</b> one or combo of complementary tasks</p>	<p>What foods are good for me? <b>(O)</b> How do I plan, buy, store, prepare and cook healthy meals <b>(O)</b> What does my family like to eat? Why do they eat those foods? <b>(C)</b> What decisions do I make about the food I eat? How do the foods I eat differ with my family's? <b>(Cr)</b></p>	<p><b>O/C 2 Research analysis task:</b> tempting fussy eaters. How to broaden kids' acceptance of wide variety of food. <i>Use stimulus article <a href="#">How overly fussy eating can send you blind</a> (16/10/16 <a href="#">The Age</a>)</i> <i>Conduct a vox populi survey of students' families and their own food neophobia with the question 'What do I like to eat?'</i></p> <p><b>O/C 2 Research analysis task <a href="#">Scurvy. Scourge of the sea, resurfaces in city landlubbers</a> (30/11/16 <a href="#">The Age</a>)</b> Identify the influences on an individuals' decision <b>not</b> to eat fruit and vegetables. What is the impact on a person's health and overall wellbeing? Be a problem solver and imagine that you are the individual's care provider: outline a series of meals that include more vegetables. How would you address the constraints identified in the article (eg cooking vegetables too long that they become unpalatable and mushy)</p>

				<p><b>O/C2 Learning activity/assessment idea:</b> conduct a focus group or create a survey to evaluate the influences of issues on an individual's or a family's eating patterns. Issues include food miles, eco-friendly food, 'ugly' food, plastic-free packaging, 'fair trade' food.</p>
<p><b>Unit 4: Food Issues, Challenges and Futures</b>  <b>AOS 1:</b> Environment and Ethics  <b>AOS 2:</b> Navigating food information</p>	<p><b>O/C 1:</b> Demonstrate understanding of sustainable and ethical food choices  <b>O/C 2:</b> Recipes that reflect the Australian Dietary Guidelines</p>	<p><b>O/C 1:</b> A range or practical activities and records of two practical activities related to sustainable and/or ethical food choices  <b>O/C 2:</b> A range or practical activities and records of two practical activities related to healthy food choices based on the Australian Dietary Guidelines and AGTHE <b>AND</b> one or combo of complementary tasks</p>	<p>Where does my food come from? What do I like to eat?          What foods are good for me? Available to me? <b>(O)</b>          What does my family like to eat? Why do they eat those foods? What foods are available to me/my family? <b>(C)</b>          What decisions do I make about the food I eat? How do societal and ethical factors influence my/my family's food decisions? <b>(Cr)</b></p>	<p><b>O/C 1: Learning activity/assessment idea:</b> compare food wastage around the world with Australia: use the <a href="#">What the world eats in a week</a> as a stimulus to compare the amount of food consumed by people in different countries.          Look at the issue of food equity: <a href="#">Oxfam</a> teacher resources          Food insecurity in Australia can be found from the <a href="#">Institute of Australian Family Studies</a></p> <p><b>O/C 1 Practical Activity 1:</b> Meatless Meals- vegetarian options  <a href="http://www.foodskillsaustralia.com.au/2016/01/28/eat-less-meat-make-yours-a-meat-free-monday/">http://www.foodskillsaustralia.com.au/2016/01/28/eat-less-meat-make-yours-a-meat-free-monday/</a></p> <p><b>O/C 1 Practical Activity 2:</b> Sustainable Seafood- is your seafood choice sustainable? Should I buy orange roughy (deep sea perch) Design, prepare and evaluate a recipe using a 'less favoured but more sustainable fish variety'  <a href="http://www.sustainableseafood.org.au/">http://www.sustainableseafood.org.au/</a></p> <p><b>O/C 2 Design Brief:</b> solve a daily food issue facing a construction worker: design, prepare and evaluate a tasty lunch that will fulfil their sensory and dietary requirements. Take into consideration: ADG 5 <a href="#">Store food safely</a> and the <a href="#">AGTHE</a>          Use the <b>stimulus material</b> <a href="#">Junk food temptation leading to unhealthy nation</a> (27/09/16 The Age)</p>

				<p><b>O/C Activity 2 Research Analysis:</b> Legumes and flatulence</p> <p>Conduct a research analysis to test the hypothesis 'Do legumes cause flatulence?'</p> <p>Higher-ordered stimulus material Rose, S <a href="#">Process for reducing flatulence in legumes</a><sup>2</sup> and Winham, D <a href="#">Perceptions of flatulence from bean consumption</a></p> <p>Practical Approach with recipes (consumer friendly version) Polak, R <a href="#">Legumes: Health benefits and culinary approaches to increase intake</a><sup>2</sup>.</p> <p><b>Assessment task I</b> (higher ordered): create a journal article that reviews the literature cited</p> <p><b>Assessment task II:</b> Conduct food tests based on recommendations (control and experimental)</p> <p>Use the suggested resources below to create a mini journal article following the format: Introduction, Method, Results, Discussion, Limitations, Recommendations, Conclusion.</p> <p>Consumer information and Practical activity: Polak, R <a href="#">Legumes: Health benefits</a><sup>2</sup>.</p>
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## Concluding comments

A recent study (Ronto R et al. 2016) found that home economics teachers have a good understanding of food literacy, expertise in nutrition and food knowledge and cooking, which make them well-placed to develop adolescent food literacy. In the study, two levels of food literacy were identified. At the basic level of food literacy, teachers highlighted the importance of teaching students' basic food skills essential for independent life, which endorses the findings of a previous study of home economics teachers (Fordyce-Voorham S 2016). At the second level of food literacy, they nominated developing their students' higher-ordered skills that encompass critical thinking about contemporary food issues to develop their consumer competencies. These nominated higher-ordered skills align with Renwick's critical literacy skills and the work of other home economics researchers (Pendergast D and Dewhurst Y 2012, Fordyce-Voorham S 2015). These skills are required to develop students' level of understanding of food literacy and their ability to use them in the classroom and externally in the marketplace as informed consumers.

The proposed Food Literacy Model extends the previous models (Colatruglio S and Slater J 2014, Renwick K 2013) with its specific focus on food literacy. The Model offers teachers an evidence-based framework on which to plan and evaluate their skill-based programs. Further, the questions outlined at each level exemplify how the Model can be used in its current form or adapted for use by practising teachers and food educators in the community to suit the learning requirements of the young people in their care.

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