

Enhancing Food And Nutrition Curricula In Higher Education By Assigning Collaborative Food System Assessment Projects

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ABSTRACT

Student engagement in higher education is important. Some professional healthcare programs, however, can become quite focused and competitive, limiting the potential for positive student engagement and for students to see how their field of study fits within larger systems. Food system assessments are an ideal way to see the interconnectedness of all parts of a food cycle for a city or region. This case study describes food system assessments conducted by 165 undergraduate students in their first year of a Food and Nutritional Sciences program. Using collaborative, problem-based learning and a photovoice approach, the goal was to help students appreciate the entire food cycle, not just the consumption aspect that dominates much of nutrition education and practice. Students gleaned information about food production, processing, distribution, and waste from their site visits. They also calculated the food miles and CO₂ emissions for two foods purchased in their assigned neighborhood. With their final reports, students submitted electronic versions of photographs, which were viewed and discussed during in-class focus groups. The potential for home/community food production prompted the most discussion. While logistics and collaborative learning presented some challenges, this participatory and reflective learning experience promoted positive student engagement among students in higher education. Educators in other university programs may consider enhancing their curricula by assigning collaborative food system assessment projects.

Keywords: Food System Assessment; Higher Education; Student Engagement

INTRODUCTION

*M*ost students in higher education want to be engaged in their learning and most professors cherish the moments when positive student engagement is at its peak. In professional healthcare programs, however, education can become quite focused and competitive, limiting the potential for positive student engagement and the ability of students to see how their work fits within larger systems. For example, some students who aim to become Registered Dietitians find it hard to move beyond biological utilization of nutrients or lifestyle recommendations. To remedy this, 165 undergraduate students were asked to work collaboratively in conducting food system assessments of local neighborhoods as part of their first-year course in a Food and Nutritional Sciences program. The goal was to broaden their understanding of the entire food cycle and its relationship to environmental and population health. This case study report describes the context within which this project was developed, the literature upon which it was based, the project itself, the findings that emerged from the students' reports and class discussions, benefits and challenges, as well as recommendations on the value of adding this type of assignment into university curricula.

CONTEXT

Students enrolled in the Food and Nutritional Sciences program at Brescia University College in Western University (London, Canada) take courses in clinical and community nutrition, food service, and food science. Education about the entire food cycle occupies a small part of the curricula, but this was not always the case. Historically, Brescia offered a comprehensive program in Home Economics where students gained a broader understanding of food and the systems of which it is a part. Indeed, until 1962, this small college produced much of its own food, including fodder crops for animals that were kept on the property. In the early years, when the student population was much smaller, professors “often went straight from lecture room to kitchen in harvest season” (Skidmore, 1980, p. 24) to can and preserve food. In line with many other university programs across North America, however, name changes and increasing specialization have left a comprehensive degree in Home Economics a thing of the past.

New terms, such as ‘culinary nutrition’ (Condrasky & Hegler, 2010) and ‘civic dietetics’ (Wilkins, Lapp, Tagtow, & Roberts, 2010), attempt to refocus the dietetics profession on broader issues associated with food and recapture the essence of the early discipline of Home Economics. Many individuals and organizations have also called for a return to Home Economics education and reclamation of its broader social and environmental roots (Clancy, 1999; Heart and Stroke Foundation of Ontario, 2011; Gussow, 1999; Lichtenstein & Ludwig, 2010; Veit, 2011). Food system assessments provide an opportunity to bring back some of that perspective.

In the community, many food and nutrition programs have a very narrow focus and treat youth as passive recipients of education or services (Nault, Fitzpatrick, & Howard, 2010). This might stem from the ideology of ‘nutritionism’ that has permeated much of current dietary advice and nutrition education (Scrinis, 2008). Given that the author values equally her professional identities as a Registered Dietitian and a Professional Home Economist, she asked students to use ‘systems thinking’ and to see food within ‘the bigger picture’. To enhance student engagement, she also interacts with students on projects outside the classroom and creates assignments that are timely, relevant, and thought-provoking. With this in mind, the goal of this assignment was to help students understand and appreciate the entire food cycle, not just the consumption aspect that dominates much of nutrition education and practice.

BACKGROUND

Student engagement has been defined as “a binding of students to each other, to meaningful learning activities, and to the institution” (Krause, 2005). Universities are very interested in student engagement and monitor the results of the National Survey of Student Engagement (Indiana University Centre for Postsecondary Research, 2011). Students are surveyed in their first and final years about their perceptions of university life – from participating in class or playing varsity sports to working with faculty members outside of class or voting in elections.

Collaborative learning - a key contributor to student engagement - is “the instructional use of small groups or teams where peer interaction plays a key role in learning” (Yazici, 2005, p. 217). In many faculties, team learning increases student involvement, improves problem-solving and communication skills, and enhances student achievement (Yazici). Furthermore, problem-based learning, initiated by Dr. John Evans and colleagues at McMaster University in Hamilton, Canada, has been adopted by professional programs as well as disciplines beyond the realm of healthcare. Spronken-Smith (2005) provides an example in the field of geography. Key aspects of this approach that also apply to a food system assessment include “problem-solving and making reasoned decisions in unfamiliar situations; reasoning critically and creatively; acquisition of integrated, applied and extensive knowledge; development of collaboration and team working skills” (Matheson & Haas, 2010); and the opportunity for students to reflect on the learning process and the content gained through working on the problem (Spronken-Smith, 2005).

Photovoice, a participatory research method pioneered with rural women in China, provides additional support for learning as visual images form the basis of discussions where participants can share their expertise and knowledge (Wang & Burris, 1994). With roots in Friere’s education for critical consciousness, feminist theory, and documentary photography, it has been adapted to many population groups (Wang & Redwood-Jones, 2001; Catalani

& Minkler, 2010). It has the potential to enhance youth empowerment at the individual level (Strack, Magill, & McDonagh, 2004). Photovoice, therefore, supports additional layers of learning and complements the reflective component of a problem-based learning approach.

PROJECT DESCRIPTION

This project occurred within *Fundamentals of Human Nutrition*, a first-year, eight-month course which focuses primarily on the sources, chemical nature, metabolic interactions, and physiological roles of nutrients. The author's lectures on food security, world hunger, agriculture, and sustainability make up about a one-quarter of the content. The learning objectives that match this content are to discuss local, national, and global food and nutrition issues; appraise micro- and macro-level environments within which food choices are made; and demonstrate leadership skills through effective and efficient group work. The author was responsible for the Food System Assessment project (the subject of this study); her colleague (who team-taught the course) administered a Diet Record Assignment in the second semester of the course.

Food system assessments are an ideal way to see the interconnectedness of all parts of a food cycle for a city or region. The author investigated those conducted by a department of urban and environmental planning (University of Virginia, 2006), a community food security coalition in California (Pothukuchi, Joseph, Burton, & Fisher, 2002), and a poverty response committee in Richmond, British Columbia (Govender, Herath, Solorzano, & Coyne, 2006). She also read an overview of community food assessments (Pothukuchi, 2004) and found that other student groups had completed similar projects. The Community Food System Assessment Guide for British Columbia produced by the Centre for Sustainable Community Development (Miewald, Barbolet, Cuddeford, Kurbis, de la Salle, & Whiting, 2007) helped her create the foundation for the assignment. In addition, she addressed two key elements of positive youth development: 1) Engagement in active, participatory and reflective learning experiences and 2) the inclusion of a diversity of activities that address multiple learning styles (Perkins & Borden, 2003).

The objectives were for students to develop a better understanding of food systems, evaluate the built environment for access to healthy food, and create strategies to improve food security. An additional goal was to have them explore their new city (and its food system) during the first two months of their arrival on campus and discover new friends by working collaboratively with classmates who had different life experiences.

Each group (n = 47) was provided with assignment guidelines (6 pages, available from the author upon request) and a boundary map of one of 15 elementary schools within a 2.5 km radius of campus. This constituted the neighborhood within which the students were to conduct a food system assessment. Reports were to include the following subheadings: Demographics, Production, Processing, Distribution, Consumption, and Waste. Open-ended questions helped to guide their investigation. Demographic (e.g., age, income) and consumption (e.g., rates of selected health conditions) data were to be taken from Census Tract Profiles (Statistics Canada, 2010). Information about food production, processing, distribution, and waste was to be gleaned from site visits. Students were also asked to calculate the food miles and CO₂ emissions for two foods purchased in the neighborhood. Each group submitted an electronic version of a photograph taken in their neighborhood, which was viewed and discussed during in-class focus groups.

FINDINGS

Projects were assessed as follows: 20% on format (e.g., language clarity), 70% on content (e.g., ability to integrate learning and demonstrate critical thinking), and 10% on references (e.g., credibility, format). A high-ranking project was well-written and presented and included in-depth analyses. Appendices might include detailed maps of their neighborhoods where they identified, for example, vacant land, community gardens, and grocery stores. Projects that received a lower mark presented a limited assessment of the neighborhood food system and included few references, resulting in papers that were short in length and 'light' in content. Some of these groups saw this project a merely a 'needs' assessment, without taking into account neighborhood strengths and assets. The following is an interpretive summary of the findings that emerged from the written reports and the focus group discussions.

Demographics

This was a relatively small section of most reports. While some understood that socioeconomic factors directly influence the diet quality and health status of individuals, many merely copied and pasted the data from the assigned government website without including additional analysis on how this might be linked to issues of food security. For example, the number of female lone-parent families was higher in each neighborhood and these families lived with lower incomes than their male lone-parent counterparts; however, this was rarely mentioned.

For those who did connect socioeconomic status to community food production, many assumed there was no need for community gardens in high income areas of the city, as these residents had enough money to drive to a supermarket and buy their food. Home/community gardens were seen as primarily beneficial for individuals with low income. Some groups noted that although their neighborhoods may have been food insecure (based on income) and disproportionately affected by chronic diseases associated with malnutrition, they also noted that these same residents rated their ‘sense of community belonging’ higher than the provincial average. This, they suggested, would be helpful in implementing strategies to alleviate food insecurity.

Several groups thought that students could be hired to look after home gardens if their owners did not have the time, ability, or inclination to do so. A couple of groups suggested pairing students (paid or volunteer) with seniors, as they noted issues with transportation (Figure 1) and production (e.g., decreased physical ability of older residents). They believed this would also provide an opportunity for intergenerational learning.



Figure 1: Challenges Faced By Seniors

Production

This occupied the biggest section of the students’ reports and prompted the most discussion during the focus groups. A consistent theme that emerged was that of ‘potential’ – the potential to grow more food, the potential for gardens to improve residents’ physical and mental health, the potential for gardens to serve as outdoor classrooms, and the potential for gardens to enhance the safety and overall atmosphere of the neighborhood. The students (especially those with international backgrounds) were shocked at the amount of land available (public and private) that could be used for food production. One group was pleased to find a window garden in their neighborhood school (Figure 2).



Figure 2: School Window Garden

Some neighborhoods were adjacent to farmland on the outskirts of the city, so the students deduced that the soil in the neighborhood would also be suitable for growing food. Only two groups suggested rooftop gardens. Students noted available water resources as essential supports for future community gardens, but also recognized potential challenges (e.g., privately owned land, high-density housing, residents' lack of interest, heavily-treed neighborhoods, possible restrictions on areas that might be environmentally protected). Several groups assumed that parking lots could not be used to grow food. Some groups with schools in high-density neighborhoods assumed that food production was impossible for people living in apartments, while others interviewed apartment rental managers to find out which buildings offered, or were close to, community gardens.

In addition to site visits, students searched city websites to find information on community gardens (sites, cost, etc.), a local food charter, and bylaws on growing food in the city. One group learned from residents in one community about a community garden that failed. This prompted much discussion in their focus group, as many had not considered this a possibility.

Processing

Many groups stated that no food processing occurred in their neighborhoods, making this the smallest section of most reports. Food processing was assumed to be large canning or manufacturing facilities, employing large numbers of individuals, and producing copious quantities of waste – all of which were considered inappropriate for residential neighborhoods. They did note that there were such facilities in other parts of the city, but only a few groups suggested that micro-processing is/might be happening in their neighborhoods.

A few groups found that a local community resource centre offers canning workshops and others recommended that food hubs be set up in schools, churches, or community centres to teach residents how to cook and preserve food. Some of the groups realized, however, that a major drawback to home canning is lack of adequate and appropriate storage space. One group suggested root cellars as a solution.

Distribution

This section was well done by all groups. Many of them mapped out the locations of grocery stores, convenience stores, restaurants, street vendors, community kitchens, food banks, and farmers' markets on their neighborhood maps. With the exception of a couple of groups who had strictly residential neighborhoods, many groups were surprised to find significantly more fast food restaurants and convenience stores than grocery stores. They also noted the proximity of fast food outlets and convenience stores to the school and thought this was not supportive of healthy eating. While some groups believed that the number of food service establishments within such a small area was an indicator of high demand; others realized that this increased density was primarily found in poorer neighbourhoods. During the focus groups, they discussed how a higher density of fast food restaurants had been linked to obesity, and that increased access to convenience stores was associated with decreased fruit and vegetable consumption. Suggested solutions ranged from providing more nutrition education to reducing the number of fast food restaurants.

Although farmers' markets were often suggested as a way of increasing access to healthy food, one student (whose father was a farmer) countered this by saying that markets require a lot of time and effort from farmers who sell there, as they need to take a day off work to sell the food while the farm work 'piled up'. She said they also needed to set up very early in the morning and, if demand was low, they sometimes returned home with much of what they trucked to the market in the first place. Many students were surprised to learn this.

For their 'food miles / CO₂ emissions' calculations, many students were surprised not so much by the level of emissions, but by the distances travelled. They commented that even if their calculations resulted in small amounts of emissions, the damage to the environment would be significantly greater when taking into account the volume of food transported around the world to every grocery store in the country.

Consumption

This was a smaller component of the papers, as most students merely copied the data from the Statistics Canada website. A few had literature which showed that participants of community gardens consumed more fruits and vegetables than their neighbors who did not garden. One group came up with a very creative idea - they prepared seven nutritionally balanced meals from produce taken from their parents' home garden (and some purchased at a local farmers' market) for less than the cost of two take-out meals. They wanted to highlight the importance of skill-building as well as nutrition education.

Waste

Students made a good attempt at this section, but many looked at the city's overall waste management strategy rather than food waste specifically. For those who did look at strategies to deal with food waste, they were surprised that the city does not have an organic waste stream. They discovered articles in our local paper which revealed a delay in the city's plan to implement a 'Green Bin' program. One focus group was the scene of a lively discussion about the pros and cons of an organic waste stream, especially if compostable material was trucked away from homes, after which homeowners would then purchase it from a store and transport it back to their gardens.

Several groups explored the city's website and those of local ecological associations to learn about the cost of compost bins and how to compost. They were astonished to learn that a significant amount of food is wasted and had not considered this as another step in the food cycle. Two groups investigated vermi-composting and recommended it to their peers as a solution to food waste. The students commented that composting would give each individual in the household a sense of responsibility for the environment and would also educate future generations.

In summary, the discoveries and suggestions made by these predominantly 17- and 18-year-old food and nutrition students were derived from their site observations and interpretations of the literature and were, for the most part, new to them.

BENEFITS

This Food System Assessment project obliged students to consider how individual consumption is influenced by social, economic, political, and environmental factors – a step towards recreating the broad approach to education practiced by early Home Economists. Many photographs captured this interconnectedness (Figure 3). Students also used key mental activities as outlined in the *National Survey of Student Engagement* (i.e., analyze a particular situation, synthesize information gleaned from a new experience, apply concepts to practical problems, and make judgements about the value of information and how others interpreted data) (Indiana University, 2011).



Figure 3: Play, Live, Grow

Students also met the specific learning objectives of the course that were associated with this assignment. They discussed current food and nutrition issues and appraised micro- and macro-level environments within which food choices are made. Focus groups, as part of the photovoice component, promoted student engagement through a participatory and reflective learning experience that complemented the problem-based learning approach. Many students commented that their observational skills were enhanced as a result of completing this assignment and that they would view their home neighborhoods from a different perspective. Finally, most students were able to demonstrate leadership skills through effective and efficient group work.

In terms of evaluation, it is important that assessments do not undermine the principles of problem-based learning (Pengelly, 2010); therefore, the only question on the exam that related to this project referenced a course reading entitled *Principles of a Healthy, Sustainable Food System* (American Dietetic Association, 2010). Alternatively, informal feedback was received from students before and after class, as well as during the author's office hours. Student learning was also assessed during the focus group discussions by monitoring the depth and breadth of the discussions. More formally, an anonymous course evaluation at the end of the term assessed the author's teaching skills in several areas (e.g., displays enthusiasm, encourages students to speak freely, uses examples and illustrations effectively, etc.). Open-ended comments were also solicited on the professor and on the course. Having used what the students wrote in their reports (and discussed during the focus groups) to inform her lectures and class discussions during the second semester, the author concluded that students were engaged with this project and her lectures as they rated her teaching skills at 6 (out of a possible score of 7). The primary areas of discontent revealed in the students' course evaluations were class format (three hours once/week on Friday mornings), summative evaluations (i.e., exams), and group work. The students provided no negative comments about the food system assessment assignment *per se*.

CHALLENGES

Collaborative learning is not always successful (Yazici, 2005) and there may be a period of adjustment for students starting to learn through problem-based learning (Pengelly, 2010). This was evident in this project, as some groups experienced interpersonal conflicts and some students did not 'pull their weight'. A team contract signed by all members, as well as individual and team counselling, helped to arrive at workable solutions. While no one said they had difficulty accessing a digital camera, it may have been helpful to have one for students to borrow. Teams who had a car found it easier to get to and around their assigned neighborhoods (especially if they were large and sparsely populated), rather than relying on public transit provided through their student identity cards. The project was worth only 20% of their final mark for the course, but required a substantial amount of time to complete. (They were given approximately two months but were also carrying full course loads at the time.) Students were randomly assigned to focus groups; hence, it was possible to have groups from the same (or similar) neighborhoods. While this offered the opportunity to confirm findings, there was less chance to make comparisons between neighborhoods. Given that the author facilitated the focus group discussions, students were probably more likely to speak positively about the experience. Lastly, a targeted evaluation (e.g., pre- and post-tests) would have provided more useful information for other educators; however, some recommendations are included below.

RECOMMENDATIONS

Motivations for learning can differ significantly among university students of different ages and backgrounds; therefore, this type of project may be more applicable for upper-year classes, where a smaller number of students would make supervision and assessment more manageable and more interaction with the professor could occur. First-year students are dealing with a significant life transition and the challenging nature of a problem-based learning assignment with assigned group partners may have added to that stress. Graduate students could facilitate the focus group discussions, allowing students in the class to speak more freely. It would also be helpful to use census tracts rather than boundary maps from the website of the local school board. These would be more manageable areas to assess and would more closely match the demographic and consumption data available. Students could also interview community members and experts in the area of food system assessments to enhance their understanding of the community and promote an appreciation for the value of food system assessments at all levels.

CONCLUSION

Food system assessments provide an opportunity to promote positive student engagement in higher education. They also encourage students, particularly in Food and Nutrition programs, to think about food in its broader context and appreciate the many systems of which it is a part. Furthermore, problem-based learning, along with a photovoice approach, contributes to deeper learning as students reflect on both content and process.

With Home Economics removed from classrooms, millions are now food illiterate. Consequently, there is a need to take a more comprehensive approach to food and nutrition education at all levels and in all disciplines, including medicine, where there continues to be an insufficiency of nutrition education in the curriculum (Adams, Kohlmeier, & Zeisel, 2010).

Following this assignment, some students rented plots in community gardens, participated in ‘kitchen talks’ on the development of a national food policy, and attended meetings on the implementation of a local food charter. Two approached the author to discuss graduate education. Granted, this was only a small percentage of the whole group, but it is an indication that student engagement was enhanced through this project. Future surveys of these students can explore whether, from the perspective of their final year, it promoted an enhanced understanding of the broader food system and their professional role within it.

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NOTES