

Achieving program goals? An evaluation of two decades of the Apprenticeship in Ecological Horticulture at the University of California, Santa Cruz

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Abstract

The Apprenticeship in Ecological Horticulture (AEH) at the University of California, Santa Cruz, has been teaching people organic and ecological horticulture for 43 years. This paper examines the extent to which the program has met the goals of growing farmers and gardeners, and contributing to change in the food system. It also explores specific programmatic ways the AEH contributed to these outcomes. We surveyed program alumni from 1989 through 2008. Findings suggest that the program has successfully met its goals. According to alumni suggestions, the primary way the program contributed to these outcomes was by developing apprentice knowledge and skills through hands-on activities. In addition, other

educational components, not always explicitly addressed in similar programs, were also key. We use different learning theories to help understand the AEH's success and make recommendations for similar programs.

Keywords

Apprenticeship, adult education, beginning farmers, experiential learning, organic farming, sustainable agriculture, food systems

Introduction

The Apprenticeship Program in Ecological Horticulture (AEH) is a world-renowned program situated within the Center for Agroecology and Sustainable Food Systems (CASFS) at the University of California, Santa Cruz (UCSC). For over 40 years, the AEH has provided intensive, residential training in organic farming and gardening. In 1967, at a time when the concept of organic was in its infancy and a marginalized idea, students joined the efforts of Alan Chadwick to start an organic food and flower garden at UCSC. The program has grown and evolved since then,

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seemingly in tandem with the growing sustainable food movement. In 2010, the AEH involves a structured six-month program that includes an established curriculum with classroom education, in-field training, and a myriad of activities for apprentices to engage in and learn about working in a sustainable food system.

The AEH is one of many programs training people to grow food in a sustainable manner. As of 2009, there were 164 colleges or universities offering education or training in sustainable food systems topics in the U.S. (compiled from Thompson, 2009). This number does not include the many nonprofit and independent organizations, and informal apprenticeships and internships that exist. Recently there has been an increase in both the interest in and number of these types of programs (Grabau, 2008; SAEA, 2009; SAEA, 2007; Parr, Trexler et al., 2007; Parr & Van Horn, 2006; Bhavsar, 2002). Given the long history of the AEH, the program potentially has useful information to offer similar efforts, particularly newer ones and those looking to improve existing programming. The survey of AEH alumni conducted in 2009 can provide this type of information. As part of a larger comprehensive internal review of the AEH conducted by CASFS, the survey examined program outcomes and identified ways in which the program contributed to these outcomes.

The purpose of this paper is twofold. First, it explores the extent to which the program's action outcomes have been achieved. The desired action outcomes are defined as those that accomplish the overarching goal of the AEH and serve the mission of CASFS, and so we examine whether past apprentices are "farming and gardening" and working broadly to create a more sustainable food system. The second purpose is to explore the program's contribution to these action outcomes from the perspective of the alumni. To address this goal we identify both the most important programmatic components and learning outcomes that helped contribute to action outcomes. Programmatic components are defined as the direct or indirect educative aspects or structures that the

program offers people (class instruction, time with peers, etc.). Learning outcomes are defined as the personal and professional development that apprentices acquired through the program (skills, knowledge, etc.). We then use relevant learning theory to help interpret the findings and provide conceptual insights into how alumni descriptions about their development fit within the broader field of adult education. These insights can be used to improve the program's educational practice. In this way, practice can inform theory and theory can inform practice, in an iterative process.

Exploring program outcomes as well as how they were reached is important for several reasons. First, understanding whether the program is making an impact in the world once the apprentices graduate is an important part of being accountable to the AEH program goals and CASFS's mission, its participants, and its funders. It is also important to understand how the program contributes to such outcomes, since participants' behavior following their participation in the program and their perception of program aspects could be influenced by many factors. What can the program take credit for and what can it not? What can it do to improve outcomes? Understanding how the program contributed to these outcomes is a critical step in increasing the efficacy of the program. Finally, it is important to closely analyze and share the results of this study because few similar studies exist for programs such as the AEH.

Although the AEH is unique in its history, structure, and scope, findings from this evaluation can offer resources, insight, and inspiration to other programs such as similar beginner farmer programs, university-based sustainable agriculture programs, student farms, or other formal apprenticeship adult education models.

Background

History

In 1967, at a time of social and cultural turmoil, English horticulturist Alan Chadwick broke ground for a garden with students at the University of California, Santa Cruz. "It was a time of obvious

destruction,” recalls Jim Nelson, an early student of Chadwick’s. “The Vietnam war was raging, the world seemed preoccupied with artificiality and contrivance—students were hungry for something new that would help foster change, love of the earth, positive things” (Lindsey, 1997, pp. 1, 10). Chadwick and what became the Student Garden Project offered an ecological perspective, wherein people learned how to grow plants without any synthetic substances. Chadwick introduced a form of organic gardening called the “biodynamic/French intensive” method. He led UCSC students and others in an effort that historically could be considered one of the initiators of the organic farming and gardening movement in the U.S. (Brown, 2000).

Additional land came under cultivation in 1971, and in 1975 a year-long residential Apprenticeship in Ecological Horticulture was founded and offered through UCSC’s Extension program for students seeking intensive training in organic gardening and farming techniques. In 1980, as alternative agriculture gained popularity, the UCSC Environmental Studies Department proposed implementing the Agroecology Program, which incorporated the activities at the campus farm, Chadwick Garden, including the AEH. In 1993, the Agroecology Program changed its name to the Center for Agroecology and Sustainable Food Systems (CASFS) to recognize the social and environmental aspects of sustainable agriculture.

The program

Presently and for the recent 20-year period of this study (1989–2008), the Apprenticeship in Ecological Horticulture is a six-month, full-time, residential course in organic production and marketing. Over 30 (up to 39 starting in 1995) participants attend the program from April until the middle of October. Seven second-year apprentices (graduates of the previous Apprenticeship class who act as assistant instructors), four farm/garden managers, and one full- and one part-time coordinator constitute the core staff. The program takes place on a 25-acre parcel of land and the three-acre Chadwick garden.

Apprentices live on the farm as a semi-intentional community. First- and second-year apprentices grow, purchase, prepare, and eat meals together, clean common areas, and work together on the farm, gardens, orchards, greenhouses, and farm stand. Apprentices rotate chores and the responsibility of cooking and cleaning for their own community.

The apprenticeship model is the driving structure of the program, with an “I do, we do, you do” focus as the primary mode of instruction. The apprentices work on three main work sites where there are formal and informal talks, question-and-answer opportunities, and demonstrations. Each site has a different scale of production. The three-acre Alan Chadwick garden focuses on mixed annual and perennial production, including small-scale orchard management. A second hand-worked garden, located on the farm, is geared to a market-garden model and the production of flowers and herbs, along with vegetables and perennial plants. Lastly, the farm’s tractor-managed fields of row crops cover 10 acres, where apprentices learn about small-scale crop production using mechanical cultivation. Apprentices also learn propagation techniques and orchard care, and participate in marketing activities, such as selling produce and flowers through both a farm stand on campus and a Community Supported Agriculture format (which replaced wholesaling in 1996).

The Apprenticeship Program’s structure also integrates classroom instruction. Classroom time provides background information related to a range of production and marketing issues. Additionally, apprentices interact with the broader community and food system through field trips and talks by others working in sustainable food system areas, such as farmers, gardeners, scientists, policymakers, educators, sociologists, researchers, and naturalists.

Although the core program remained relatively stable throughout the study period, the program has changed since 1989. Primarily, it has steadily gained more structure and new elements. Classroom instruction, small-group crop talks and

seasonal topics, guided field walks, subrotation trainings, and responsibilities became more formalized and increased over time in an effort to ensure that every participant had the potential to receive the same instruction. By the mid-1990s the program included 300 hours of formal instruction to complement the 700 hours of work experience and in-field training. In 2003, staff developed a curriculum manual based on the program's main formal classes, trainings, and in-field demonstrations (Miles and Brown, eds., 2003). The curriculum was designed to support the Apprenticeship Program instruction and to assist other educational programs with instruction. In 2005, a complementary curriculum manual was developed that focused on small-scale marketing (Miles and Brown, eds., 2005). During this period, socio-cultural and political economic issues related to sustainable agriculture and food systems were integrated more explicitly into the curriculum.

The goal of the Apprenticeship in Ecological Horticulture, as stated on the CASFS website, has been:

... to increase the number and diversity of individuals who have a command of the fundamental skills and concepts associated with organic horticulture and agriculture, such that they will be prepared to actively participate in commercial or social service projects that aim to improve human health and environmental quality through organic practices (Center for Agroecology & Sustainable Food Systems, n.d. a).

This goal fits within the mission of CASFS, which has been "to research, develop, and advance sustainable food and agricultural systems that are environmentally sound, economically viable, socially responsible, non-exploitative, and that serve as a foundation for future generations" (CASFS, n.d. b).

Literature Review

Only a few published evaluations exist that explore how, or to what extent, programs similar to the AEH have achieved their outcomes. Of the

existing evaluations, the three reviewed here are very different in scope. One program had no follow-up with graduates after they left (Falls Brook Center, n.d.), and the second program was much less intensive than the AEH (Cocciarelli, 2009). The third program, and most similar evaluation, was of the Agriculture and Land-Based Training Association's (ALBA) Small Farmer Education Program, known as PEPA (Strochlic and Wirth, 2005). This evaluation included 35 graduates and found that 24 (69%) were independent farmers at some point after graduation and that 18 (51%) were independent farmers at the time of the evaluation. Respondents reported obtaining skills, confidence, self-esteem and connection to others from the program.

In part because there were few studies to which we could compare our results, we drew upon learning theory to help put our findings in context. We used Benjamin Bloom's (1956) theory of learning domains, David Kolb's (1984) experiential learning theory, and Jean Lave and Etienne Wenger's (1991) theory of situated learning to help contextualize the study and provide conceptual insights into how alumni claims about their development fit within the broader field of adult education.

Learning domains and potential program outcomes

Bloom, ed. (1956) and his colleagues provide a simplified framework for conceptualizing different forms of learning. While this framework is somewhat mechanistic, it provides a conceptual map to view learning. Bloom developed a taxonomy to view learning from three distinct domains: the cognitive, psychomotor, and affective. The cognitive domain refers to the process of acquiring content knowledge: memorization, comprehension, application, analysis, synthesis, and evaluation. The psychomotor refers to the physical and mechanical skills associated with the discipline. Lastly, the affective domain consists of the attitudes and feelings that accompany the learning process and resultant identity.

While the process of knowledge and skill acquisition (cognitive and psychomotor domains) is a standard focus for many adult agriculture education

programs, less attention is given to developing the affective (attitudes and values) that enable learners to bridge the gap between knowledge and action (Lieblein et al., 2007; Boyd et al., 2006). Drawing from Bloom's (1956) classifications, Geir Lieblein's teaching team created an agroecology program that emphasizes the importance of the affective domain, in addition to the cognitive and psychomotor. According to Lieblein et al. (2007), "an important part of the learning process builds on a foundation of personal attitudes and individual growth" (p. 40). In order to focus on the affective domain and address the learning goals therein, Lieblein et al. created an affective learning ladder that parallels the cognitive learning ladder. Within the dual learning ladder, "in each dual step, the individual learns more about the world and its complexity but also more about personal values and attitudes in connection to society and the environment" (p. 40). For example, in this process, the learner gains the confidence, values, and vision to move forward and apply his or her knowledge in action. Similarly, Boyd et al. (2006) describe how they see affect leading to action:

The interrelationships between cognition and affect cause a learner to further internalize the information and promote a change in attitude, belief, and values that would instill a desire to improve the condition of international agriculture and other relevant agricultural education content areas. (p. 29)

How people learn: The process and context

Kolb's (1984) theory of experiential learning is cited by Lieblein et al. (2007) and others as perhaps the most relevant practical theory for those working in adult agricultural education. While the theory is frequently used to better understand the role of hands-on learning activities in developing the cognitive domain, the theory is equally relevant to applications linking cognitive, psychomotor, and affective development.

Kolb's premise states that a learner constructs knowledge when he or she creates meaning from his or her experience. Experiential learning

suggests that a learner cycles through a process that engages a concrete experience, reflective observation, abstract conceptualization, and then active experimentation. This cycle provides an opportunity for the learner to change or affirm the meaning made from prior experiences, opening the possibility for the learner to produce new knowledge.

While Kolb's process focuses largely on the individual learner, it is important to have a theoretical framework that accounts for the social dimensions of learning. We draw from Lave and Wenger's (1991) situated learning theory, which is based on research from a variety of apprenticeship models. Their research highlights the importance of social interactions and the activity-oriented environment of the learner. In situated learning, understanding develops within the whole person in his or her environment through participation, rather than passively to an individual who absorbs factual knowledge.

According to Lave and Wenger (1991), ideally a learner is situated in meaningful and production-based work, a context where he or she is able to practice and experiment alongside peers and masters. They refer to this type of participation as both legitimate and peripheral. In this context, the learner is not only developing his or her knowledge and skills through the work, but also is developing his or her identity as a competent practitioner or master in the field within a larger work-related community of practice.

Methods

Survey development

The survey was developed collaboratively with CASFS management and AEH staff, with some input from alumni. Overall, 17 alumni and others (who had done some type of apprenticeship elsewhere) pretested a survey draft and 9 people pretested the computer-based draft.

In the first few pretests, we asked how the program helped people do what they did after graduating in an open-ended manner. We then generated and

tested quantitative questions along with an open-ended question in several of the following pretests. Pretests suggested the quantitative question captured general responses and the open-ended question allowed for further qualification.

Survey implementation

The identified survey population was all past apprentices since the founding of the UCSC Student Garden Project (the precursor to the AEH) in 1967. When developing the survey, the past apprentice total was estimated at 1,200. The sample was drawn from an alumni database that was created in 1997 and updated most recently for fundraising efforts and alumni activities, focusing on those graduating between 1991 through 2008. The database had email addresses for 648 people, which constituted the survey sample. The survey was implemented between June 18 and July 20, 2009. The process for implementing the survey was strongly influenced by Dillman, et al. (2009).

For the analysis reported in this paper, we only included responses from people who graduated during the 20-year period from 1989 to 2008. People from earlier years were excluded for two reasons. First, the program has evolved considerably since its inception in 1967. To maintain consistency with exploring if and how the program has met its goals and served the CASFS mission, and to control for the large changes in the program, we chose a period of time where there were consistent programmatic characteristics. Secondly, we had far fewer email addresses for people who graduated from the program before 1989; hence the most recent 20-year period provided a larger sample.

Limitations

Contacting people through email can be limiting due to spam filters, lack of name recognition, and fear of phishing schemes. An online survey can be limiting in that not everyone has a computer (or a new enough computer), or an internet connection, to be able to take it. Given the methods used to identify alumni, we were most likely to contact more recent alumni and people who are active in

farming and gardening in some way, since these alumni may have been more motivated to keep in touch.

Additionally, results looking at outcomes could potentially overrepresent those who are active in the field of food systems. People may have opted out of the survey since we said in the introductory letter that we want to know what they are doing currently. Two email responses to the solicitation letter hint at the possibility that people may have assumed that we did not want to hear from them if they were not doing work related to what they learned in the program. However, we identified several survey nonrespondents who are very active in sustainable food system and farming activities.

Finally, the response rate may have included fewer farmers than others working in the food system, since the survey was active in June and July, two busy farming months.

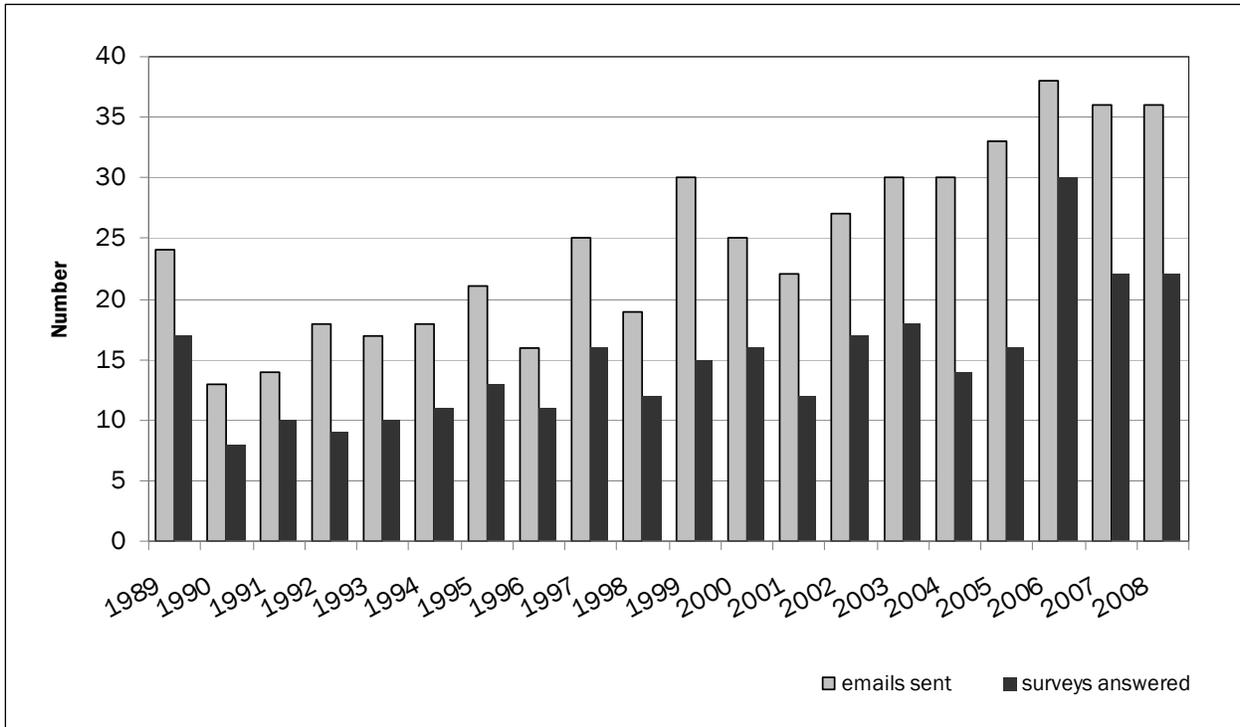
Response rate

Figure 1 shows the number of people who received an email and the number of people who responded to the survey, by year of graduation from the program. For most years, we had email addresses for at least half of the cohort (20 people or more). For 17 of those years, at least 25 percent of the class responded (10 people or more). The response rate for people who were sampled and who participated in the last 20 years was 58 percent. Overall, 37 percent of all the people who went through the program in the last 20 years answered the survey.

Data coding

There were several open-ended qualitative questions asked in this survey. Coding was approached from a grounded theory orientation (Strauss & Corbin, 1990; Glaser, 1992). Researchers reviewed the responses and identified themes from the data. The majority of coding was done by one researcher, followed by a check for at least face validity of codes by a second, and occasionally third, researcher. In cases where codes were revised, data were reanalyzed.

Figure 1: Number of alumni asked to participate in the study, and number of survey respondents, by graduating class (n=299)



Who responded?

Respondents were generally European-American, under 30 years of age while in the program, from a middle- or upper-middle-class background, and had at least a college degree when they started the program (see table 1). Although data are not available to confirm actual demographic representativeness, AEH staff believed this was reasonably representative of the people who went through the program.

Findings

Were the goals met and mission served?

In the survey, we looked at several types of action outcomes that meet the different goals of the AEH program and that serve the CASFS mission. We asked people what type of work they have done since leaving the program (paid, self-employed or start-up) in the sustainable food and agriculture system. For those who said they did some type of work, we asked them to list these jobs, and identify

which ones they are currently doing. We then reiterated the jobs they listed to ask if any of them “involved farming, gardening or growing food with organic or sustainable methods.” Additionally, we asked, “Did you initiate, create or start any of these jobs or efforts?”

When people responded that they did some “work”(as defined above) after graduating, we asked a series of questions about that work. One was to inquire how many years and months they performed farming or gardening work since graduating and whether they had owned a farm.

Regarding education activities, we asked “Did any of the work you’ve listed include education programs or activities as part of your formal goals?” and “Have any of your jobs or work efforts involved training future teachers or trainers of sustainable food and agriculture system-related topics?”

Table 1. Characteristics of Survey Respondents

	Survey Sample	
	n	Perent
Gender (n=268)		
Female	149	55.6%
Male	119	44.4%
Ethnicity (n=299)		
African American	4	1.3%
Asian American	10	3.3%
European American	221	73.9%
Hispanic/Latino	10	3.3%
Native American/American Indian	6	2.0%
Other	23	7.7%
Age During Program (n=265)		
19–25	85	32.1%
26–30	98	37.0%
31–35	45	17.0%
36–40	14	5.3%
41 and older	23	8.7%
Family Class (n=263)		
Wealthy	5	1.9%
Upper-middle-class	65	24.7%
Middle-class	136	51.7%
Working-class	43	16.3%
Low-income/poor	13	4.9%
Don't know	1	0.4%
UCSC Student? (n=299)		
Before?	39	13.0%
During?	9	3.0%
After?	7	2.3%
Ever a UCSC student	55	18.4%
Education Before Program (n=268)		
High school graduate	4	1%
Some college or A.S.	35	13%
College graduate	172	64%
Some graduate study	18	7%
Graduate degree	39	15%

We also asked if they did any volunteer or personal activities related to creating a more sustainable food and agriculture system. The basic responses to these questions are listed in table 2, below.

Primary goal: Are people farming and gardening? The answer is yes. Over 80 percent of respondents have done some type of paid or vocation-related

Table 2: Activities respondents have done since graduating from the Apprenticeship Program (n=299)

	Yes	Percent
Work in Sustainable Food System		
Field	262	87.6%
Farming or Gardening Work	245	81.9%
Owned a farm	95	31.8%
Initiated a job	126	42.1%
Initiated a job or effort	144	48.2%
Education Goals	196	65.6%
Train Trainers	114	38.1%
Currently Working in Food Systems	216	72.2%
Currently Farming or Gardening	193	64.5%
Volunteer	240	80.3%
Personal activities	296	99.0%
Work in Food Systems or Volunteer	287	96.0%
Both Farm and Garden and Education Goals	187	62.5%

work since graduating. Sixty-five percent are still doing this work.

Regarding the larger CASFS mission of “is the program impacting the food system?” Again, the answer appears to be yes. Eighty-eight percent of graduates reported working in the field of sustainable food and agriculture systems in some way after graduating. Seventy-two percent reported *currently* working in this area. The types of jobs they listed are coded in table 3 below.¹

¹ Job type was coded from open-ended questions in which people were asked to list the work (paid, self-employed or start-up) they’ve done in the sustainable food and agriculture system field since graduating from the AEH Program. Not all people responded in an easily codable manner. Some people listed where they worked or a general job title. Thus, we could not always tell if a job included education or farming and gardening activities. Therefore, the numbers of people identified as “farming and gardening” differ here than they do when people *selected* “farming and gardening” as a job option. The numbers on types of jobs are most revealing if viewed relatively—to see the differences between categories.

Table 3: Percent of people identified as working in the following areas, based on brief job descriptions (n=299)

Job or Vocational Area	Percent
Food Production	65.6%
Education	34.8%
Landscaping/Gardening	25.4%
Retail	15.1%
NGO	16.7%
Had other kinds of jobs (listed below)	38.5%
Consulting	6.4%
Networks/working groups	6.0%
Art/Media	4.7%
Research	6.0%
Resource conservation/restoration	4.7%
Organic Certification	5.0%
Dining & Restaurant	4.3%
Supplier	2.7%
Government	4.7%
Health	2.7%
Flower Production	2.7%
Processing	1.3%

Additionally, 42 percent of alumni reported having created new jobs that did not previously exist.

The mission of CASFS regards education as a large part of contributing to the creation of a more sustainable food system. The survey data show that 66 percent of respondents have had education goals as part of their food system–related work, and 63 percent have had both farming or gardening and education goals (this work could have been at the same time or different jobs). Thirty-eight percent reported they have trained people who will become trainers.

We asked people to identify what the general or broad educational goals were for their jobs. Most of these fell into teaching about some aspect of food production, while teaching about larger food system–related issues was also present.

Additionally, paid work was not the only marker of contributing to change. We asked people if they had done anything related to creating a more sustainable food system through volunteer (80

percent) or personal activities (99 percent). When looking at how many people either worked in the field of sustainable food systems or volunteered in some manner, we find that almost all the respondents (96 percent) have contributed in some way.

Program Contribution

To try to understand how the program contributed to people’s activities after graduation, and the goals being met, we asked people three questions. Two questions addressed how people felt the program contributed to their postgraduation activities. The last one specifically inquired about program components, and asked people to describe which aspects made the biggest contribution to their postgraduation activities.

How did the program contribute to actions?

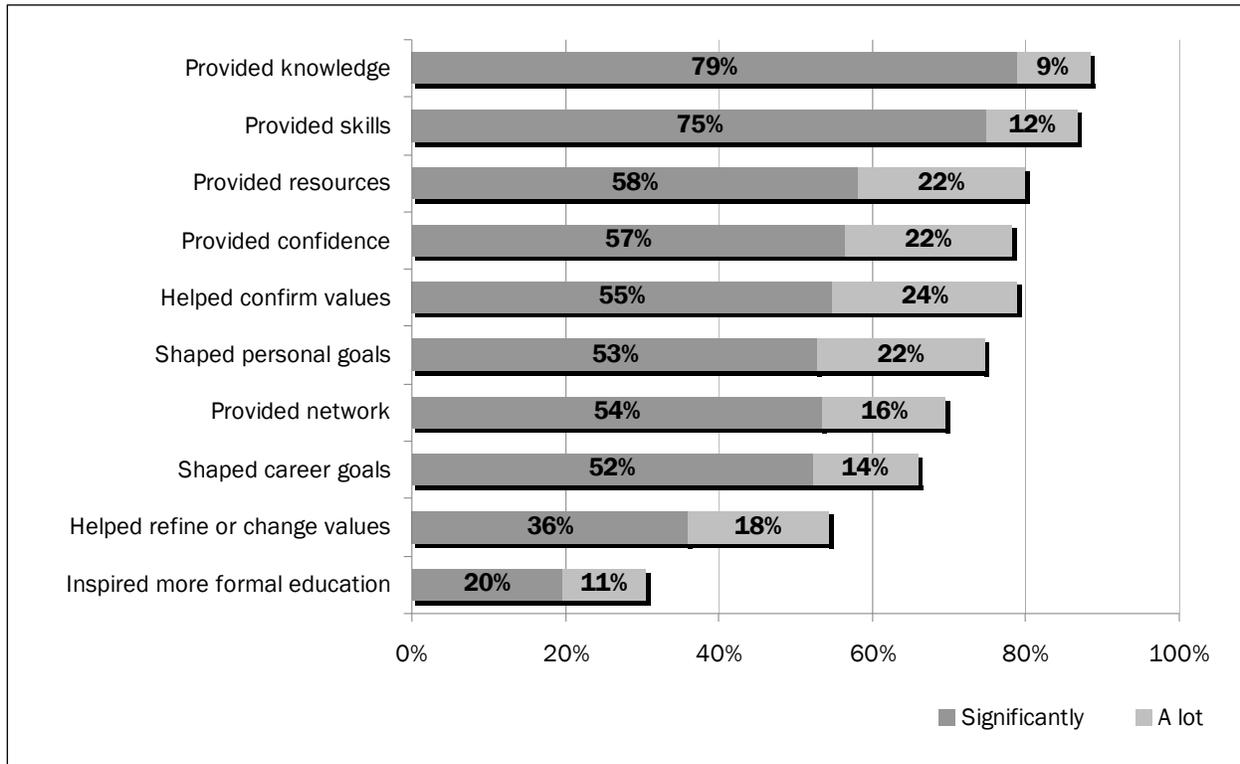
To explore how the program contributed to people’s actions (and the program meeting its AEH goals—and CASFS mission), we asked an open-ended question: “How did the Apprenticeship Program contribute to any of the sustainable food and agriculture activities you’ve described earlier?” We then asked, “To what extent did the Apprenticeship Program contribute to any of the work, volunteer or personal activities you’ve describe earlier?” This was a closed-ended question where people rated 10 items on a 5-point scale from “a significant amount,” “a lot,” “somewhat,” “a little,” to “not at all” (see figure 2).

The results from these two questions are grouped according to domains of learning: cognitive, psychomotor, and affective (Bloom, ed., 1956).

Cognitive domain

The question about knowledge was rated highest for helping people do their work or other sustainable food system–related activities. Seventy-nine percent said the knowledge they received from the program contributed significantly, and 9 percent said “a lot.” The open-ended question provides information about types of knowledge. As would be expected, many people reported that the useful knowledge was related to content on soils, compost, and other horticultural topics. Respondents also gave credit to learning about the food

Figure 2: Percent of respondents who said the following learning outcomes contributed “significantly” or “a lot” to their work, volunteer or personal activities after graduating (n=299)



system or the larger context that agriculture fits within. The following quote provides an example:

... [The program] gave me a deep understanding of the food system and how organic and sustainable practices and local food systems are not just about the food I put in my mouth, they affect the farm worker/families, genetic diversity, health and retention of arable farm land, clean air and water, ecosystems on and off of the farm, food security and access to fresh, healthy foods, etc. This deeper systematic understanding has made it easier to stand firm in my commitment to organic/sustainable/local as a consumer and as a farmer/gardener.

Psychomotor domain

The skills question in the survey elicited the second-highest level of response. Seventy-five percent of respondents said the program

contributed significantly to their postgraduation activities by providing skills, and 12 percent said it provided “a lot” of skills. Most qualitative responses simply mention that they got “skills,” or put a qualifier in front of “skill” (e.g., “real,” “invaluable,” etc.).

Affective domain

Several of the questions that explored the extent to which the program contributed to respondents’ postgraduation sustainable food system activities fall into the affective domain. These included “provided confidence,” “helped confirm values,” “shaped personal goals,” and “helped refine or change values.” All of these were considered to have contributed to their actions either “significantly” or “a lot,” for over 60 percent of the respondents (except for “helped refine or change values,” for 54 percent of respondents).

The two most frequently endorsed affective items were “provided confidence” and “helped confirm

values.” Close to 80 percent of respondents rated “provided confidence” and “helped confirm values” as having contributed either “significantly” or “a lot” to their current activities. Here are a couple of examples:

- The Apprenticeship Program provided hands-on experience with all aspects of organic gardening and confidence to apply these skills to school garden sites.
- Living in such an amazing setting in which the infrastructure was set up to allow us to live our values to an extreme degree was extremely inspiring, and encouraged me to pursue a high level of sustainability and food justice elsewhere in my life and work. First and foremost, the Apprenticeship Program is leading me, by example, towards practicing sustainability and justice and mindfulness in my life and work.

Other affective themes appeared in the open-ended question of “how the program contributed” that were not asked in the quantitative questions. The most frequent themes mentioned were that people felt inspired (they used that term specifically, n=22), and people were emotionally triggered to want to take action. Approximately 22 people either stated or described that they were “motivated” by the program, “empowered,” or that it helped them make a commitment to the field in some way. There were a total of 41 people who responded to at least one of these two themes.

- [The program] inspired me to continue to pursue this challenging career path.
- The resources and education is nothing in comparison to the inspiration and drive to make a difference and the tools on how to do it.
- Pure motivation for achieving a goal that seems so daunting on the grand scale.
- It has made me a far more informed and motivated activist and advocate in the

cause of planetary sustainability, broadly considered.

What components of the program were most important?

To understand what specific components of the program most helped people do what they did after graduating, we asked the open-ended question: “What aspects of the Apprenticeship Program were most important for helping you to do any of the employment, volunteer or personal activities you stated earlier?” This question was qualified with the following example: “Please state any aspect or experience from the Apprenticeship—whether a formal part of the curriculum or not. Examples: doing field work, talking with peers at meals, the diversity of other participants, living on the farm, running the market cart, etc.”

When the 243 responses were analyzed, all practical work was grouped under the header “hands-on” (n=180 / 74%). Within “hands-on,” two distinct themes emerged: (1) field and garden work (n=100 / 41%); (2) the business management of the farm, specifically plant sales, market cart and CSA management (n=58 / 24%). Prompts for this theme were “doing field work” and “running the market cart.” Respondents referred to hands-on work in various contexts, from different farm and garden sites to market cart and CSA work. This theme was the most common. The second most frequent theme was “living experience” (n=113 / 47%). The “living experience” referred to living on the land, at the edge of cultivated fields and living in the community with approximately 38 other apprentices. The prompt for this theme was “living on the farm.”

Third in frequency was “working/sharing with peers” (n=98 / 40%). Respondents expressed the importance of interacting with their peers through working or socializing. Interactions with peers, building relationships, and creating networks with other apprentices were all components that were subgrouped under this theme. In addition, respondents expressed the importance of the diversity of other participants. This could have meant the diversity of prior experiences that peers brought, and/or the diversity of their backgrounds

(cultural, linguistic, racial, age, class, etc.). It is possible the respondents referred to “diversity of other participants” because it was in the prompt, although it is unclear as to what respondents meant when articulating “diversity of participants.”

Fourth in frequency was thematically classified as “coursework” (n=94 / 39%). This theme consisted of formal activities focused on content knowledge and skill development. References such as curriculum, instruction, the classroom, lectures, and field trips fit within this theme. In this process we were conservative in order to distinguish between what was designed as formal curricular instruction and what were less intentionally designed and informal parts of the apprentice experience.

Fifth in frequency was the theme titled “working/sharing with master farmers/gardeners (instructors) and second year apprentices” (n=67 / 28%). Similarly to the logic of the theme related to peers, this theme arose from respondents’ comments about the time and interactions with instructors and second-year apprentices. Explanations of the importance of building relationships with instructors and second-years and their appreciation for the instructors’ teaching style were coded within this section.

The sixth most frequent theme expressed by the respondents as important speaks to the “sum of the parts” (quote from respondent) of the program, the “overall experience” (n=40 / 16%). Comments such as: “all of the above,” “all of them,” “the entire package,” are examples of what we coded under the “overall experience.”

For the sake of analysis, we developed and separated the program components that participants in the survey determined the most important. In individuating the program components, the data indicated a noteworthy caveat. Seventy-seven percent of the survey respondents articulated the importance of two or more program components of the five most frequently noted components listed above. This is indicative of the interrelated nature of the program

and is mirrored in the sixth most frequent theme of overall experience.

Discussion

Action outcomes: Did the program meet its goals?

Overall, results of the survey suggest the AEH program succeeded in meeting its stated goals for the period 1989–2008, while contributing substantially to the mission of CASFS. Results suggest that a significant number of alumni are going on to successfully farm, garden, and engage society in broad, unique, and active ways that help create a more sustainable food system.

The numbers of alumni who entered farming and gardening professionally are impressive, given how difficult an occupation it is to enter and stay in as an employee or business owner. Over 80 percent of alumni reported having worked in the field of farming and gardening, and 65 percent cited currently having a related job.

The prevalence of education as a significant work-related activity for alumni substantially supports the CASFS mission by adding a multiplier effect to existing efforts to increase awareness and activity in sustainable food systems. As many as 66 percent of alumni reported having integrated educational goals into their sustainable food system–related work, and 38 percent reported training future agrifood system trainers. These findings suggest that alumni are extending what they learned in the apprenticeship by making new educational opportunities available to others over a wide range of settings, both formal and nonformal. In addition, if we include volunteer activities, almost all respondents have done something to help change the food system since graduating, thus further serving the CASFS mission.

Over 42 percent of alumni reported creating new jobs, primarily by starting their own businesses. Given that employment opportunities within the organic and sustainable field remain relatively small compared to the larger agriculture and horticulture industries, it is expected that alumni would need to create new work opportunities for themselves. It is

unknown if one of the reasons alumni have been able to create new jobs is a consequence of their degree of affluence and having opportunities and access to resources for starting businesses (e.g., capital). Nonetheless, this display of new job creation by alumni demonstrates a special way in which alumni are making an impact on the broader society and food system. This innovative behavior can play a potentially important role in pushing new social movements from the margins toward the mainstream of society.

In sum, these alumni professional behaviors show that the AEH program has achieved a measure of success at meeting its programmatic goals while actualizing the mission of CASFS: to help create a more sustainable food and agriculture system.

What contributes to action outcomes?

In viewing these programmatic results, we now shift toward exploring what might help explain alumni postprogram activities and their perceptions of the program's educational value and effectiveness. Given that the survey study was not experimental, there is no way to identify the causal variables that led to alumni performance or perceptions. For example, an individual's decision or ability to work in the sustainable food system is influenced by many factors, and we are unable to assume a direct relationship between the program structure and ultimate outcomes. By returning to the learning theory introduced in the literature review and relating it to key findings, however, we can make educated guesses about which aspects of the AEH contributed in what ways to the educational development and professional success of alumni.

The study's findings and theory suggest that developing learners' knowledge and skills through hands-on learning activities is key for a program such as the AEH. Alumni suggestions reinforce the importance of the commonly identified components of an experiential agricultural education program. Within this, the development of practical knowledge and skills through hands-on, field-based training stood out as one of the single most important aspects of the program.

However, in addition to developing apprentices' knowledge and skills, alumni identified the importance of developing their affective domain. Almost 80 percent of alumni suggested both that the program provided confidence and that their values were confirmed, whereas 54 percent suggested their values were refined or changed. While improved confidence is often aligned with the development of knowledge and skill, confirming, refining, or changing values is not. Additionally, 75 percent of alumni suggested the program shaped personal goals, and there was a distinct theme of being inspired or motivated to action that contributed toward their future activities. These examples of affective development likely came through experiences that directly engaged apprentice emotions and attitudes towards their self-efficacy, life purpose, and perhaps most importantly, the philosophical, ethical, and civic dimensions of agriculture and food systems. The ALBA evaluation (Strochlic & Wirth, 2005) also found that the alumni's affective development supported them in being independent farmers.

Given that development in the cognitive and psychomotor domains is frequently the central focus of adult agricultural training programs, we must ask "what opportunities are missed by neglecting the development of learners' affective domain?" Leiblien et al. (2007) argued that unlike the cognitive and psychomotor, the affective domain has the potential to compel learners to bridge the gap between knowledge and skills, and the behavioral changes and actions that are needed to create more sustainable agriculture and food systems. We believe that the substantial affective component of the AEH program is a critical element contributing to alumni having a high rate of innovation and professional activity in the field.

What program components contributed most?

We identified program components that likely helped achieve previously described learning results. "Hands-on" had by far the greatest endorsement for helping people do what they are doing in the world (60%). Four others were in the same range: residential (38%), working with peers (33%), coursework (32%), and working with

teachers (22%). These primary program components are integral elements of two learning theories applicable to this type of education.

The program's self-description explains the pedagogical style of 700 hours dedicated to hands-on training and 300 hours dedicated to class time. Two of the most frequently cited program components were "hands-on" and "coursework," commonly referred to as the practical and theoretical. Not only were these components cited as important by respondents, their percentages roughly mirrored the teaching time ratio used in the program. This diversity of approaches fits well with Kolb's (1984) model of experiential learning, showing that the program is not simply a production-oriented technical training facility, nor is it predominantly academic, but rather it effectively combines components of each to facilitate apprentices making the most of their diverse educative experiences. Although respondents did not specifically mention reflectively observing their experiences and experimenting with their abstract conceptualizations, it does not mean that these processes were not happening.

Besides hands-on learning and curriculum-related activities, respondents stated that the living experience and working and sharing with peers were the other highest-rated components of the program. Apprentices' ability to develop intimate and long-term observational relationships with the biophysical environment, soil, crops, and constantly changing seasonal conditions on the farm was likely a crucial part of what made the practical learning on the farm as powerful as it was. However, respondents similarly recognized how living on the farm provided important opportunities to develop and maintain intensive work and recreational relationships with peers in their apprentice community. Notable within this finding is that among those program components alumni suggested as being the most important, their "peer work and sharing relationship" was cited more often than the relationships they built with the master farmers and gardeners. This correlates well with situated learning theory and

highlights the extent to which peer-to-peer relationships are important within adult agricultural education contexts.

Lave and Wenger's (1991) situated learning theory provides a plausible explanation for why the social aspects of the living experiences and work with peers were so frequently cited as two of the most important educational aspects of the program. According to situated learning theory, knowledge production and learning are located in a field of social interaction. This idea expands on Kolb's (1984) experiential learning theory in important ways that may improve our understanding of why respondents have contributed to the goals of the AEH as well as they have. While Kolb suggests that knowledge is produced when learners construct meaning from experience, situated learning theory adds that learning is an integral and inseparable aspect of social practice, explained as a process of participation between individuals, their environments (culture, artifacts, tools, etc.) and a "community of practice." Apprentices live, work, eat, sleep, and relate to each other every day, creating a community of practice, wherein they are performing the lifestyle and work of a farmer and gardener. Through the apprenticeship, participants practice legitimate forms of meaningful production work and do so in ways that are consequential, but not set under a high-stakes production environment.

Within a community of practice, a learner develops a form of social membership. As a participant-apprentice works and engages with both the community and the environment, the participant can begin to envision herself or himself as a member of the practice community and ideally moving from novice to mastery. This is imperative for an individual setting out to find a profession in the sustainable food system. The AEH provides an incubator, wherein apprentices can explore and practice their membership as part of a community of sustainable agriculture and food system practitioners. Time to explore and practice this membership in a supportive environment is a critical part of constructing an identity as an organic farmer, gardener, or agrifood system

professional. We believe this process of membership or identity construction is a crucial piece of what has provided past apprentices not only effective knowledge and skills, but just as important, the spirit and durability to practice their profession in a marginalized field of work—the sustainable food system—and deal with the difficulties of working in such a field.

Even though we discuss these program components separately for analytical purposes, it is important to remember that they create a complex whole. The following alumni comment exemplified this concept:

The Apprenticeship Program contributed to ALL of the sustainable food and agriculture activities that I have done. It gave me both the theoretical and practical skills to grow good food, it gave me insight and perspective on community food systems, food justice, and the breadth and depth of this type of work, it exposed me to so many models that feed the formation of my own choices in work and personal life...literally everything that I have done professionally (and so so much personally) since the Apprenticeship Program has been influenced by it and my time there at CASFS.

As reflected in the above quote, as many as 77 percent of the respondents described more than one of the main program components listed above as helping them. Our conclusion is that the integration of these program components contributed to the learning outcomes, and ultimately to the respondents' action outcomes.

Conclusion and Suggestions

AEH has been successful at both meeting its goals and addressing the mission of CASFS. The desired outcomes, to help people farm and garden, or contribute to the creation of a sustainable food system by other means, appears to have been realized in significant ways. The AEH contribution to these outcomes was primarily seen by survey respondents as providing the knowledge and skills

necessary through hands-on activities. However, the AEH contribution was more than just those standard elements. It also provided a significant affective component—confidence, confirmation or changes in values, goal clarification, motivation, and inspiration—which appears to have a substantial connection to action. Furthermore, the methods or program components that helped people reach these outcomes fit within experiential learning theory: the integration of practice and theory, or hands-on fieldwork and coursework. Situated learning theory helps us understand how program participants are supported in a holistic manner, providing the foundation for innovating in a less-than-secure future work arena.

These findings lead to several suggestions that can be utilized both by the AEH and other similar programs. First, recognize the important success of existing program design. When speaking of program design, one of the ironies of the AEH program is that its pedagogy and curriculum design were artifacts of both a traditional apprenticeship model and a more contemporary counterculture. While the apprenticeship model has had great influence on the program structure, many novel components developed through trial and error and as adaptations to the practical realities of what was required to serve a diverse learning community interested in social change. The staff developed these novel components as practitioners, not academics, and without training in the field of education. Practice is as important as theory. However, we suggest an ongoing dialogue between practice and theory, where lessons from each can help better inform the other and ultimately improve program design and outcomes.

A second recommendation based on the findings is that programs could intentionally design activities and assessment that develop all the domains of people's learning, without neglecting the affective domain. Making a conscious effort to connect attitudes and values to knowledge and skill-building is likely to have important positive effects on the likelihood that learners will take what they have learned and actively use it in the world. Lieblein et al. (2007) make suggestions that seem appropriate

for university programs and curricula, such as “...provide the incentives and safe space for people to clarify their own attitudes through role play, case studies, open-ended situations, and in-depth discussion in the learning community” (p. 43). More vocational or trade-oriented apprenticeship models might include journaling or semistructured discussion questions during or after fieldwork that connect ethics, values, emotions, and the subjective to the knowledge and skills people are developing.

A third suggestion would be to experiment with implementing each of the different aspects of Kolb’s experiential learning theory—in a systematic way. University programs typically emphasize the theoretical over the practical, whereas on-farm programs typically emphasize the practical over the theoretical. Given the findings of this study, we recommend that the best learning outcomes result from a balanced and functional integration of the two. Additionally, implementing “reflective observation” could look much like the suggestions offered for increasing affective learning. Intentionally implementing “active experimentation” could involve providing space for people to implement ideas generated through what they are learning—whether on a small section of independently managed field or in extracurricular activities outside the program in the context of projects in the surrounding community.

Fourth, when creating programming it is important to take into account the relationship apprentices have with the “field of social interaction,” which includes intimacy with the land and biophysical learning environment, but just as importantly, to take into account the quality of their time with each other as a peer group as well as their teachers as a cohesive community of practice. Many of the peer-to-peer experiences reported in this study occurred outside the official coursework, which suggests that it is important not to underestimate the educative value that recreational time on the farm has for individuals and the community as a whole. We recommend that programs explore what characterizes various levels of community membership and create ways to assess where

learners are developmentally along the path—from outsider novice to full member with mastery.

Including these concepts can happen in many ways. Nonresidential programs can find ways to connect people beyond fieldwork and classroom time. Meals can be shared, formally and informally. Short tours and overnight field trips can make use of farms both near and far. Any program can facilitate social interaction (within or outside the field and class) and create developmental assessments to support learners’ self-assessments, peer assessments, and instructor assessment, from the start of the program to its completion.

The study’s findings also offer suggestions for future research. First, further explore the contribution of the affective realm in bridging learning and action. What role do inspiration and motivation play in facilitating learning and taking action? How are these states best cultivated in individuals and community? Second, we believe it is worth exploring how other program aspects can create an effective “community of practice” incubator. Not all programs can be residential, so how can others get similar outcomes with other methods?

In summary, exploring AEH’s program outcomes has not only shown the program’s contributions to growing farmers, gardeners, and food system change, it provides insight as to how an educational program can contribute to these outcomes. Experimenting with the findings and suggestions can provide programs, particularly new ones, with even more support for success. 

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