

8-1-2008

Learning Styles of Farmers and Others Involved with the Maine Potato Industry

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Recommended Citation

Johnson, S. B., Carter, H. S., & Kaufman, E. K. (2008). Learning Styles of Farmers and Others Involved with the Maine Potato Industry. *The Journal of Extension*, 46(4), Article 17. <https://tigerprints.clemson.edu/joe/vol46/iss4/17>

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August 2008 // Volume 46 // Number 4 // Research in Brief // 4RIB7



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Abstract

The article reports on the learning preferences of Maine Potato Industry representatives. Using the Gregorc Mind Styles™ approach to examine learning styles, we categorized potato farmers, university/government employees, allied industry personnel, and others involved in the potato industry into four learning styles: Concrete Sequential, Concrete Random, Abstract Sequential, and Abstract Random. The plurality of potato farmers were Concrete Sequential, while the plurality of university/government employees and allied industry personnel were Abstract Random. The difference in learning styles of the deliverers and the recipients of the information can result in poor communication and a less than optimum learning environment.

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Introduction

Discrepancies between the learning styles of program participants and Extension educators can influence the level of participant understanding and learning, ultimately serving as a barrier for reaching targeted outcomes and program goals. While researchers have investigated the learning styles of Extension professionals (Baker, Hoover, & Rudd, 1998; Rollins & Yoder, 1993), Extension volunteers (Hoover & Connor, 2001), and even 4-H members (Rollins & Scholl, 1992), little research has been conducted on learning styles of adult participants in Extension. Iddings and Apps (1992) found that farmers have diverse learning preferences, but more research is needed to understand the preferred learning styles of target populations for specific programs. One place to begin this line of research is with the Maine potato industry.

The University of Maine Cooperative Extension (UMCE) potato program serves clientele within the Maine potato industry by providing research-based information on pest management, production, agronomy and other components. Traditional UMCE potato programming has included: workshops, demonstrations, conferences, and lectures. While the content of these programming efforts is consistent with the needs of the industry, the value of these educational endeavors may be limited if program delivery is not consistent with participants preferred learning styles.

Theoretical Framework

Learning Styles

A learning style is the way a person perceives, absorbs, processes, and retains information. Individuals develop, through experience, one or more preferred learning styles. Adult learning groups typically include people with a wide range of different learning styles, and these differences affect the learning process. Instructors of these groups should not place learners in a particular learning style category, but instead use learning styles to explain the learning that is occurring in the formal and non-formal educational setting (Rogers, 1996). This is an important concept for both formal and non-formal educational processes and one which educators should be aware of because it is vitally important to know the best way that the program participants will learn.

Gregorc (2005), internationally recognized in the field of learning styles, created the Mind Styles™ model. The model provides an organized way to understand how the mind works and is built on two factors: perceptual quality and ordering ability.

The two facets of perceptual quality are concrete and abstract. The concrete perceptual quality registers information directly through the five senses. This interpretation of the senses is recognized as an organization of facts, not hidden meanings or relationships between ideas. The abstract perceptual quality utilizes intuition and imagination that cannot be perceived directly through the five senses. While the concrete perceptual quality deals with what is observed in the present, the abstract perceptual quality deals with what cannot be seen but may come out of what is seen to be present.

The two facets of ordering ability are sequential and random. The sequential ordering ability allows learners to organize information in a step-by-step manner using a logical train of thought. The random ordering ability allows learners to organize information in segments or "chunks" that require no particular order.

Most people have some contribution of both facets of perceptual quality and both facets ordering ability. Even so, people generally have one facet of perceptual quality and one facet of ordering ability that are more dominant than the others. The four combinations of dominant perceptual and dominant ordering are: concrete-sequential (CS), concrete-random (CR), abstract-random (AR), and abstract-sequential (AS). Each individual is a combination of both facets of perceptual quality and both facets ordering ability, but each has a dominant or preferred learning style.

Adult Learning

Adult learning theory further supports Gregorc's (2005) Mind Styles™ model. Martorella (1996) discusses formal and informal (or non-formal) contexts and their respective roles in facilitating learning. Many of the concepts that individuals learn come through informal (non-formal) channels of experience, while others come through systematic channels of instruction (formal education) such as school, job-training programs, Extension programs, etc. Concepts are perceived and interpreted as either concrete or abstract.

Seevers, Graham, Gamon, and Conklin (1997) identified three factors that predict teaching effectiveness: (1) the knowledge of the instructor, (2) the ability to plan instruction, and (3) the interactions between the learner and the instructor. Effective educators need to be knowledgeable in their instruction area, but they also need to understand their audience, select appropriate teaching methods for the situation, and know how to use those methods effectively.

Adult educators often deal with diverse audiences, and as a result they need to understand and build upon participants' past knowledge and experience. Each unique characteristic of the learner is something that can be used as an educational opportunity. An awareness of learner differences is also helpful in tailoring program instruction in a way that is relevant and applicable to the respective group. Place (2001) contends that if the instructor is not aware, or does not choose to become familiar with the background of the audience, then the instructor is not providing the best education for their audience and learning opportunities will be lost.

Participants in adult education activities have their own set of experiences that they bring with them, and these individual experiences affect learning. As participants acquire new information, they do so in the context of their past experience. Adults learn best in informal environments, and there should be opportunities for them to establish their own set of rules and policies. Variety is important in adult learning activities, so instructors need to vary teaching approaches to facilitate interest in the learning process (Birkenholz, 1999).

Methods

Members of the Maine potato industry, including farmers, university/government employees, allied industry personnel and others, were given a questionnaire to assess their personal learning style (DePorter, 1992). The questionnaire was distributed at the 2006 Annual Maine Potato Conference, and 70 out of 125 attendees completed the questionnaire, for a response rate of 56%. The same questionnaire was mailed to the 270 potato farmer clients on the conference mailing list but not in attendance. Among the non-attendees, 47 questionnaires were returned, for a response rate of

17%.

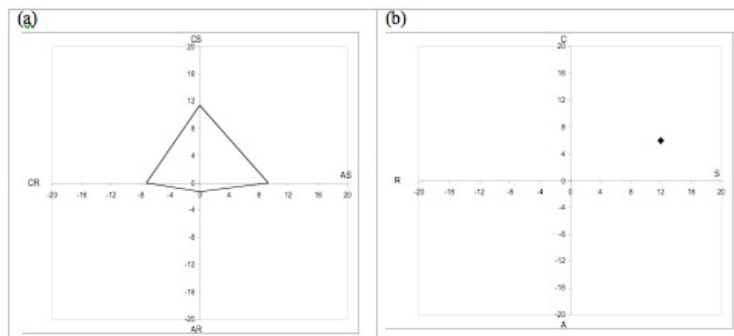
The questionnaire consisted of 15 questions, with each requesting two responses, for a total of 30 responses per questionnaire. The responses were analyzed and categorized by learning style code: CR, CS, AR, or AS (DePorter, 1992). Analysis of the responses of each individual yielded an area chart of the contributions of CR, AR, AS, and CS learning styles to the overall learning style of that individual (Figure 1a).

While the area chart is beneficial for the individual learner, it is less beneficial for the instructor, because it does not lend itself to analysis of the entire population of learners. To address this issue, a novel approach was developed to analyze the population of learners. The area charts developed from the questionnaires were reanalyzed to result in an individual datum point (Figure 1b). This analysis identifies the dominant learning style from the area chart.

As an example, Figure 1b is reanalyzed data from Figure 1a, where the random and sequential facets for the ordering quality are the negative and positive X coordinate and the abstract and concrete facets of perceptual quality are the negative and positive Y coordinate. The data displayed in Figure 1a (CS-11, AS-10, AR-2, CR-7) were reformulated to subtract the combined random elements (AR and CR; 2 + 7) from the combined sequential elements (CS and AS; 11 + 10) to give an X coordinate measuring ordering quality ($\{11+10\} - \{2+7\}$; 12) of 12. The Y coordinate, measuring perceptual quality, was developed from subtracting the combined abstract elements (AR and AS; 2+10) from the combined concrete elements (CS and CR; 11+7) to give a Y ($\{11+7\} - \{2+10\}$; 6) of 6. The datum point (12, 6) in Figure 1b is located in the upper right quadrant, thereby identifying the individual's dominate learning style as concrete-sequential. Identifying the dominant learning for each individual learner lends itself to analysis of the population of learners. This analysis of the population of learners is of value to the instructor as the teaching techniques can be tailored to the makeup of the group of learners.

Figure 1.

Learning Style for a Selected Individual in Attendance at the 2006 Annual Maine Potato Conference: (a) Area Chart of the Contribution of Concrete-Random (CR), Abstract-Random (AR), Abstract-Sequential (AS), and Concrete-Sequential (CS), (b) Reanalyzed Data into a Single Learning Style Datum Point



Findings

There were 117 growers, university/government employees, allied industry personnel, and others who participated in the study, for an overall response rate of 30%. The learning style of the plurality of farmers was concrete sequential (42%); conversely, the learning style of the plurality of university/government employees was abstract random (53%). The plurality of the learning style of allied industry personnel was abstract random (40%), and the plurality of the learning style of those falling into the category of others was concrete random (38%). The overall responses of this sample of the Maine potato industry were concrete sequential, 37%; concrete random, 25%; abstract sequential, 21%; and abstract random, 18% (Table 1).

Table 1.

Breakdown of Learning Styles by Group Involved with the Maine Potato Industry

Group	Concrete Random		Concrete Sequential		Abstract Random		Abstract Sequential		Total	
	#	%	#	%	#	%	#	%	#	%
Farmers	20	28	30	42	4	6	18	25	72	62
University/Government	1	6	5	29	9	53	2	12	17	15
Industry	3	20	5	33	6	40	1	7	15	13
Others	5	38	3	23	2	15	3	23	13	11
Total	29	25	43	37	21	18	24	21	117	100

While the overall responses appear somewhat balanced, the clear dominance of different styles

between the information providers and the information receivers/users is apparent. In fact, the dominant learning styles of the information providers and the information receivers were polar opposites. Further breakdown of the data into abstract and concrete facets of perceptual quality confirms the divergence in learning styles. Seventy percent of the farmers prefer concrete approaches compared to 35% of the university/government personnel. Similarly with the random and sequential facets for the ordering quality, 67% of the farmers prefer sequential approaches compared to 41% of the university/government personnel.

Conclusions

The findings from the study reported here suggest ways for improving educational programming for the Maine potato industry. The preferred learning style of farmers in the study is concrete sequential. They relate best through educational opportunities that incorporates hands-on experiences with clear directions and a step-by-step learning process. In comparison, university/government personnel have a preferred learning style of abstract random. They prefer those educational opportunities that they can relate to personal experiences, relationships and are nonlinear in their structure (Butler, 1986).

It is recommended that Extension personnel involved in programming for this audience begin to rethink their traditional modes of delivery. More hands-on demonstrations and participation-style programs should be incorporated into the UMCE potato program efforts to better align teaching styles with learning styles. Instead of presentations given in meeting rooms, using a traditional lecture delivery method, Extension programming to potato program clientele could be held on growers' farms. Information could be delivered by a farmer and his staff, with potato program staff aiding the delivery.

Currently, an example of this recommendation is underway. A Worker Safety Protection program was delivered as a mock farm inspection. Rather than holding this program in a conference room, it was held in a potato farmer's storage building. The information was delivered via participation by the farmer and his staff. Instead of a PowerPoint presentation, information was delivered as an actual inspection of records and equipment, and how corrective measures were taken when regulations were not complied with. The better alignment of the teaching styles of the UMCE staff and the learning styles of those involved in the potato industry will result in improved retention and application of information, which will benefit the Maine potato industry.

Identifying individual learning styles has implications for program delivery within the Cooperative Extension system in general. For programs to be successful, presentation and learning experiences must be differentiated based upon the learning styles of the participants (Baker, Hoover, & Rudd, 1998). With the differences in learning styles of the farmers and the university/government personnel, it is no wonder that there can be communication issues between farmers and the people who are supposed to serve them.

In conducting needs assessments on subjects of Extension programming, Extension professionals also need to examine ways to discover their clients learning styles to tailor their programming efforts to those styles. Whether these differences are identified through formal research (similar to the study reported here), or through informal assessment by Extension educators, assessment should be done of all Extension clientele groups, and the findings should be applied to the improvement of Extension programming.

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