

IMPACT OF A PROFESSIONAL DEVELOPMENT PROGRAM FOR AGRICULTURAL EDUCATION TEACHERS IN COSTA RICA

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Abstract

The purpose of this study was to assess the impact of a professional development program for agricultural education teachers in Costa Rica. This time series follow-up study assessed the impact of a five-day workshop that focused on agricultural and environmental topics at three points over a two-month period. The 13 participants in the workshop served as the population-sample. The results revealed that the workshop was beneficial to the participants. A majority of the participants felt "slightly prepared" or "better prepared" to teach the content to their students upon completion of the workshop. Participants reported that the lesson plans developed at the workshop were helpful and that they planned to use them. A majority of the participants felt "slightly prepared" or "better prepared" to share the workshop contents with their colleagues, and most of them had done so in some manner within two months after the workshop.

Theoretical Framework

Fifty-one agricultural high schools were started in Costa Rica in the 1970s. These schools officially called "Colegios Tecnicos Profesionales Agropecuarios" (CTPAs) were part of a larger system of technical high schools established throughout the country (Crawford & Gonzalez, 1978). Each CTPA provided the students with a basic education and a vocational education focus in agriculture as part of a plan to increase agricultural production nationally (World Bank, 1985). In 1992, the Costa Rican Ministry of Public Education initiated a new curriculum for the CTPAs to reflect changes in agriculture to be implemented by 1994. In addition to agricultural technology, the new curriculum emphasized agricultural diversification, sustainable agriculture, and preparation for employment in the service sector (Ministerio de Educacion Publica, 1992).

This call for curriculum reform was spurred by and paralleled growing national concern regarding degradation of the environment. Pressure on the natural resources base to increase agricultural production had resulted in readily apparent degradation of the environment throughout Costa Rica (Quesada, 1990). It was believed that agricultural practices could be modified to reduce environmental damage (World Resources Institute, 1992) and that

CTPAs could help by developing more responsible agriculturists by infusing environmental education into the curriculum. Hungerford and Volk (1990), researchers studying curriculum in environmental education, found that environmental education programs can influence behavior of those participating and lead to greater environmental responsibility.

The mandate for major change in the agricultural education curriculum offered by the CTPAs highlighted the need for teacher in-service education. Agricultural education teachers desired to grow professionally and had identified their greatest needs for training as keeping up-to-date with agricultural technology and educational and sociological developments (Caliva, 1990). The Ministry of Public Education, through the Centro de Investigacion y Perfeccionamiento para la Educacion Technica, had attempted to provide in-service education for CTPA teachers. However, the lack of funds had limited the scope of such an effort.

The need for CTPA teacher in-service education was confirmed by a national needs assessment (Valazquez, 1993), and the University of Costa Rica's Atlantic Regional Center (UCRARC) accepted the challenge to develop and test a model professional development program to meet this need. The model program focused on CTPA

teachers in the Atlantic Region with implications for regional offerings by University of Costa Rica centers to serve the more than 400 agricultural education teachers in Costa Rica's technical high schools. This new undertaking, in cooperation with the Ministry of Public Education, matched UCRARC's desire to build on its strengths and provide a service to the agricultural community. The model professional development program was designed as a five-day workshop offered at UCRARC with 13 selected agricultural education teachers from seven CTPAs in the Atlantic Region participating. (Originally 22 were selected but for various reasons only 13 attended.)

Social reconstructionist theory and Ralph Tyler's rational model were used to guide the development of the workshop evaluated in this study. Reconstructionism advocates a strong relationship between what is taught and issues facing society. It also encourages learners to be actively engaged in solving problems facing society (McNeil, 1996). The workshop was designed to effect change by updating teachers and ultimately reforming the curricula of CTPAs. The rational model is called an ends-means approach because the objectives, which are based on needs of the learners, influence the selection and organization of learning opportunities and identifies the desired outcomes (Tyler, 1949).

Objectives (desired outcomes) of the workshop were: (1) to up-date teachers on agricultural and environmental developments impacting curricula at CTPAs, (2) to prepare the participants to teach the information and materials received at the workshop to their students, and (3) to develop plans for participants to share the workshop information and materials with their home CTPA colleagues. Content for the workshop focused on agricultural and environmental topics, including sustainable agriculture. Pedagogy was interspersed with these topics to help the participants expand their knowledge of teaching and learning. The participants also developed and shared lesson plans for use in teaching their students and participants made plans for sharing the workshop information and

materials with their home CTPA colleagues. There are few opportunities for professional development in Costa Rica and the concept of "sharing" what was learned at workshops was entirely foreign to the participants. The workshop featured a variety of learning experiences, including interaction with resource persons, small group work, field trips, games, role-playing, and discussion.

Purpose and Objectives

The purpose of this study was to assess the impact of a model professional development program. The objectives were: (1) to identify the perceived benefits participants received from the workshop, (2) to determine the extent that participants felt prepared to teach the workshop content to their students, (3) to determine the extent that participants felt prepared to share the workshop information and materials with their colleagues, (4) to determine the value and use made of the lesson plans developed by the participants, and (5) to determine the extent that participants had shared the workshop information and materials with their home CTPA colleagues.

Methods and Procedures

The research design included a time series follow-up after the workshop to assess the impact of the professional development program (Brookes, 1997). The objective-oriented evaluation model, an approach that targets the extent to which objectives of the program are achieved (Worthen & Sanders, 1987), was used to guide the research. The 13 teachers from seven CTPAs who participated in the workshop served as the population-sample for the study. The participants were selected by school officials to represent their CTPAs by attending the workshop.

Follow-up activities were planned to encourage participants to apply what they gained from the workshop and to assess the impact at three points over a two-month period. The first assessment was made as the final activity of the workshop to measure the benefits teachers perceived they gained by attending the workshop. A four-point Likert-type scale was used to measure the degree of satisfaction (benefit) for 28 items: 1 = none, 2 = slightly, 3 = satisfactory, and 4

= great. Data were also collected regarding the participants' perceived level of preparation (unprepared, slightly prepared, better prepared, well prepared) to teach their students and to share with their colleagues the information and materials from the workshop.

Visits were made by one of the workshop leaders/researchers to each of the participants at their home CTPAs 7 to 10 days after the end of the workshop. The purposes of these visits were to encourage participants to apply the information and materials gained at the workshop in their home CTPAs and to collect additional data. Participants were provided a questionnaire to complete and then interviewed. Participants were again asked to indicate their perceived level of preparation to teach their students and to share the workshop information and materials with their colleagues.

A third assessment was made two months after the end of the workshop. The instrument for this assessment was left with each workshop participant in a sealed envelope during the on-site visits described above with instruction for completing it two months after the end of the workshop. These completed instruments, which were collected by UCRARC staff from the teachers' at the participants' home CTPAs, included the same measures used during the interview visits. They also included questions to identify the primary method participants had planned and actually used to share the workshop information and materials with their colleagues.

Demographic data were collected from each participant at the beginning of the workshop. All instruments (administered in Spanish) were developed by the researchers in concert with the workshop staff to validate the content in relation to the workshop objectives and activities. The Cronbach alpha coefficients calculated for the instruments were all above .70, indicating acceptable instrument reliability (Fraenkel & Wallen, 1993). Descriptive statistics, including percentages, means, and standard deviations were used to analyze the data.

Findings

Characteristics of Participants

Of the 13 participants, 72.9% were teachers (one was a coordinator and one was a teacher-administrator); 84.6% (11) were male, all but one were married; 61.5% were between 26 and 40 years of age; 61.5 % had between 12 and 24 years of teaching experience; 53.8% had a bachelor or higher degree; 84.6% had specializations in technical agriculture (with little or no pedagogical training); and 69.2% had received their highest degree from either the University of Costa Rica or the National University of Costa Rica.

Participants' Perceived Benefits from the Workshop

As the final activity of the five-day workshop, participants were asked to rate their satisfaction with (benefits from) the workshop. The means and standard deviations for the 28 benefit statements are shown in Table 1. All except three statements had means above 2.5, mid-point on the four-point scale, suggesting that participants perceived the workshop as beneficial to them. In addition to being satisfied with their decision to attend the workshop, benefits with the highest means included obtaining new teaching materials, exchanging ideas, obtaining information to share with colleagues, and learning from interaction with others. High ratings for these items suggest that the participants were interested in transferring the workshop information and materials to their home CTPAs where they would share it with colleagues and teach it to their students, two of the desired outcomes from the workshop. In addition, when compared to initial expectations for the workshops, the participants had not anticipated these interactions as being helpful. The three items with means below 2.5 were related to increasing the participants' prestige, likelihood for promotion, and improvement in salary, benefits that may not be immediate results expected from a five-day professional development program.

Table 1
Participants' Perceived Benefits from the Workshop (N = 13)

Benefit	Mean*	S. D.
1. Pleased with my decision to attend	4.00	0.00
2. Obtained new teaching materials to take home	3.77	0.44
3. Exchanged ideas with other professionals	3.69	0.48
4. Obtained information to share with colleagues	3.69	0.48
5. Learned from interaction with others	3.62	0.51
6. Reviewed my commitment to my profession	3.69	0.63
7. Helped maintain my current abilities	3.69	0.48
8. Informed of new developments	3.62	0.51
9. Allowed me to meet the needs of my school	3.62	0.51
10. Contemplated changing emphases of my job	3.62	0.65
11. Helped me to better serve my students	3.54	0.52
12. Helped me meet curriculum changes demanded	3.62	0.51
13. Improved my service to my community	3.46	0.66
14. Improved my ability to follow current guidelines	3.54	0.52
15. Improved my service to my students	3.39	0.51
16. Learned/could have learned from home colleagues	3.62	0.65
17. Reflected on my professional responsibilities	3.46	0.52
18. Learned about UCRARC teacher training capacity	3.31	0.63
19. Developed professional knowledge/skills	3.46	0.52
20. Stimulated me to improve my classroom routine	3.39	0.87
21. Helped me be more competent in my job	3.54	0.66
22. Sharpened my perspective of my role/practice	3.46	0.52
23. Stimulated by my colleagues' ideas	3.54	0.52
24. Improved my teaching skills	3.23	0.73
25. Developed my leadership capabilities	3.08	0.64
26. Increased my prestige	2.31	0.95
27. Increased my likelihood for promotion	2.08	1.04
28. Improved my potential salary	1.58	0.67

*Scale: 1 = None, 2 = Slight, 3 = Satisfactory, & 4 = Great

*Participants' Preparation to Teach
 Workshop Content to Their Students*

Table 2 reports data on how well the participants perceived themselves to be prepared to teach the content areas covered in the workshop at two points in time: at the end of the workshop and two months after the workshop. A majority of the participants felt "slightly prepared" or

"better prepared" to teach the content to their students upon completion of the workshop. The percentage of teachers who felt "better prepared" or "well prepared" to teach the workshop content decreased over the two-month period for four of the six areas. The two areas where the percentages increased were "concepts and action in environmental protection" and "importance

of agriculture.” Perhaps these were broader concepts, and teachers could see more ways to infuse them into their curricula.

Table 2
Participants’ Perceived Level of Preparation to Teach Workshop Content Areas (N varied from 11 to 13)

Content Area	Perceived Preparation (%)							
	End of Workshop				Two Months After			
	UP	SP	BP	WP*	UP	SP	BP	WP*
Sustainable Agriculture								
Land use in watershed Management	0.0	61.5	15.4	23.1	0.0	72.7	18.2	9.1
Protected areas and sustainable development	0.0	61.5	23.1	15.4	0.0	72.7	27.3	0.0
Environmental Protection								
Concepts and action in environmental protection	0.0	46.2	23.1	30.8	0.0	27.3	72.7	0.0
Legislative aspects of environmental protection	0.0	69.2	23.1	7.7	9.1	63.6	27.3	0.0
Agriculture								
Importance of agriculture	0.0	46.2	15.4	38.5	9.1	27.3	54.5	9.1
Structural adjustments in Agriculture	7.7	53.8	38.5	0.0	36.4	45.5	18.2	0.0

*UP = Unprepared, SP = Slightly Prepared, BP = Better Prepared, WP = Well Prepared

Level of Preparation to Share Workshop Content with Colleagues

Table 3 reports how well the participants felt they were prepared to share workshop information and materials with their colleagues at the end of the workshop and two months later. A majority of the participants felt “slightly prepared” or “better prepared” to share the workshop content with their colleagues. The percentage of the participants who perceived themselves as “better prepared” or “well

prepared” decreased for four of the six content areas between the two observations. The two with increased percentages were “land use in watershed management” and “concepts and action in environmental protection.” The percentage of teachers who felt “well prepared” immediately after the workshop ranged from 15.4 to 38.5 for six of the content areas; however, none of the teachers felt “well prepared” two months after the end of the workshop.

Table 3
Participants' Perceived Level of Preparation to Share Workshop Information and Materials with Colleagues by Content Area (N varied from 12 to 13)

Content Area	Perceived Preparation (%)								
	End of Workshop				Two Months After				
	UP	SP	BP	WP*	UP	SP	BP	WP*	
Sustainable Agriculture									
Land use in watershed Management		0.0	53.8	23.1	23.1	0.0	41.7	58.3	0.0
Protected areas and sustainable development		0.0	53.8	30.8	15.4	8.3	50.0	41.7	0.0
Environmental Protection									
Concepts and action in environmental protection		0.0	30.8	46.2	23.1	0.0	16.7	83.3	0.0
Legislative aspects of environmental protection		0.0	61.5	23.1	15.4	16.7	58.3	25.0	0.0
Agriculture									
Importance of agriculture		0.0	38.5	23.1	38.5	8.3	50.0	41.7	0.0
Structural adjustments in Agriculture		8.3	50.0	25.0	16.7	33.3	50.0	16.7	0.0

*UP = Unprepared, SP = Slightly Prepared, BP = Better Prepared, WP = Well Prepared

Use of Lesson Plans Developed by and Shared Among the Participants

One of the objectives of the workshop was to help the participants develop pedagogical skills. This was accomplished, in part, by involving the participants in the development of lesson plans to be used upon their return home to infuse the workshop content into their curricula. Observations were made 7 to 10 days and two months after the workshop to assess the perceived value and the use made of the 12 lesson plans developed by and shared among the participants. The data in Table 4 reveal that all of the participants saw the development and sharing of lesson plans as helpful to them and that they had reviewed several of the lesson plans since the end of the workshop. Over three-fourths of the participants had reviewed one to six plans two months following the end of the workshop and a majority of them thought

they would use one to nine of the plans over the next two years. Two months after the end of the workshop, all of the participants said they planned to develop additional lesson plans from the workshop content over the next two years.

Methods Used by Participants to Share Workshop Materials with Colleagues

During the workshop, participants developed plans for sharing the workshop information and materials with colleagues at their home CTPAs. Since sharing is a new concept in Costa Rica, there was no established means of doing so at their CTPAs. In addition, there are social disincentives for trying to do so. Observations were made at 7 to 10 days and at two months following the workshop to determine methods teachers planned to use or had used in sharing workshop information and materials with their colleagues.

Table 4
Participants' Responses to Questions about Value and Use of Lesson Plans
 (N = 13)

Questions/Responses	Percent	
	7 – 10 Days After	Two Months After
Was development of lesson plans helpful to you?		
Yes	100	100
No	0.0	0.0
How many lesson plans have you reviewed since the end of the workshop?		
1 – 3	61.5	23.1
4 – 6	23.1	61.5
7 – 9	15.4	15.4
10 – 12	0.0	0.0
How many of the lesson plans to you think you will use over the next two years?		
1 – 3	7.7	0.0
4 – 6	30.8	30.8
7 – 9	38.5	38.5
10 – 12	23.1	15.4
Unsure	0.0	15.4
Do you plan to develop more lesson plans over the next two years using materials from the workshop?		
Yes	76.9	100.0
No	23.1	0.0

Table 5 shows that over three-fourths of the participants planned to use methods that actively engaged their colleagues in learning (e. g., activities, projects meetings, discussions); however, less than one-half (46.1%) of the participants had actually used such methods two months after the end of the workshop. About one-third of the participants reported actually sharing workshop information and materials by distributing duplicated copies, leaving

copies in the library with bulletin notices of availability. Almost one-fourth (23.1%) of the participants had not shared the information and materials with their home colleagues two months after the end of the workshop. The shift from planned methods that would have engaged colleagues to methods with less interaction confirmed the earlier finding that some participants did not feel prepared to teach their colleagues.

Table 5
Primary Method Participants Planned to Use or had Used to Share Workshop Information and Materials with Colleagues (N = 13)

Method	Percent	
	Planned to Use 7 – 10 Days After	Actually Used Two Months After
Activities/projects	46.1	30.7
Meetings/discussions	30.8	15.4
Distribute copies	15.4	23.1
Leave in library/bulletin notices	7.7	7.7
No plans (7 – 10 days)/ Not disseminate yet (2 months)	0.0	23.1

Conclusions

The workshop sponsored by UCRARC for CTPA agricultural education teachers in the Atlantic Region of Costa Rica was a successful professional development program. All three of the desired outcomes of the workshop were achieved to some degree. Participants saw the workshop as a beneficial professional development program. It provided an opportunity for them to become informed on new developments important to workshop partners and to obtain new materials that would help them in their work. Most participants perceived that they were somewhat prepared to teach the workshop content to their students. They indicated that the development of lesson plans during the workshop was helpful to them and that they planned to infuse a number of them into their curricula, especially the more general and introductory topics. Additional time and/or teacher training may be needed to help for teachers to infuse the more specific content from professional development programs into their CTPAs' curricula.

The desired outcome that workshop participants would serve as "teachers of teachers" by sharing the workshop information and materials with their home CTPA colleagues was partially achieved. A gap was observed between participants' plans to actively engage their colleagues in the workshop content and what actually happened. "Teachers teaching teachers" was a new concept to the participants and the

sharing with colleagues may have become more of a concern over time, influencing a number of the participants to take a more passive approach to dissemination.

The UCRSA workshop merits consideration as a model to follow for developing future professional development opportunities for CTPA teachers. Reconstructionism guided the efforts to connect educational programs with societal issues (McNeil, 1996). The rational model approach, which began with needs identification and tied program planning, implementation, and evaluation to the objectives (Tyler, 1949), facilitated the impact assessment process. In addition, the objective-oriented evaluation model (Worthen & Sanders, 1987) served as an appropriate guide for assessing the impact of the workshop. These models should be used as references for guiding development and evaluation of similar professional development programs for CTPA teachers.

Recommendations

1. Future workshop participants should be carefully selected according to the likelihood of their ability to gain from the workshop and their ability to share information with colleagues upon their return home.
2. Planners of future professional development initiatives should work closely with directors of CTPAs to ensure greater participation in workshops. Involvement of the directors

- as well as teachers (potential participants) in planning such workshops should be encouraged.
3. Future professional development initiatives for CTPA teachers should be designed to provide participants with in-depth experiences with agricultural and environmental topics. Workshops could be designed to focus on only one or two priority topics to provide teachers more time on task with new concepts.
 4. CTPAs should be encouraged to send a team of two or three teachers to workshops. A team approach would provide a support network for sharing of skills and materials with colleagues when the participants return home.
 5. The approach described in this study merits consideration for replication at other University of Costa Rica regional centers to expand professional development opportunities for agricultural education teachers in Costa Rica.
 6. Indications were that post workshop follow-up with the teachers was beneficial. Additional research is recommended to examine the value of such practices. The use of time series assessment to measure impact of professional development events for teachers is encouraged.

References

Brookes, L. W. (1997). *An approach to providing professional development with an environmental education component to agricultural education teachers in Costa Rica*. Unpublished doctoral dissertation, Iowa State University, Ames.

Caliva, J. (1990). *An assessment of the professional competencies needed by 4-S teachers/advisors in Costa Rica*. Doctoral dissertation, Iowa State University Library, Ames, IA.

Crawford, H. R., & Gonzalez, R. R. (1978). *Programa comprensivo para el desarrollo de educacion agricola en Costa Rica 1980 – 1984*. San Jose, Costa Rica: Universide de Costa Rica, y Ames, IA., U. S. A.: Iowa State University.

Fraenkel, J. R., & Wallen, N. E. (1993). *How to design and evaluate research in education*. New York: McGraw-Hill.

Hungerford, H. R., & Volk, T. (1990). Changing learner behavior through environmental education. *The Journal of Environmental Education*, 21(3), 8-21.

McNeil, J. D. (1996). *Curriculum: A comprehensive introduction*. New York: Harper Collins.

Ministerio de Educacion Publica. (1992). *Plan de estudios para la educacion tecnica*. Agosto, San Jose, Costa Rica.

Quesada, M. C. A. (Ed.). (1990). *Estrategia de conservacion para el desarrollo sostenible de Costa Rica*. Ministerio de Recursos Naturales, Energia y Minas. Republica de Costa Rica. San Jose, Costa Rica: Servicios Litographicos.

Tyler, R. W. (1949). *Basic principles of curriculum and instruction*. Chicago: The University of Chicago Press.

Valazquez, L. (1993). *Resultados (preliminarios) de las entrevistas dirigidas a educadores agricolas en los colegios agropecuarios y a especialistas en el aras de educacion agricola*. Unpublished draft of survey findings.

World Bank, The. (1985). *Education in Costa Rica: A contingency approach for a collaborative system*. Ames, IA. Unpublished.

World Resources Institute. (1992). *The 1992 information please environmental almanac*. Boston: Houghton Mifflin.

Worthen, B. R., & Sanders, J. R. (1987). *Educational evaluation: Alternative approaches and practical guidelines*. New York: Longman.