Agricultural Education Research Summary Report

Dynamic Modeling of Illinois Agricultural Education Program Indicators

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This research project was funded by the

Illinois State Board of Education

under the direction of

Facilitating Coordination In Agricultural Education

with support provided by the

Illinois Agricultural Experiment Station

University of Illinois at Urbana-Champaign

August 2000

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Introduction

The primary purpose of this proposed project was to develop a dynamic model of the Illinois Agricultural Education program indicators related to predictions of program effectiveness. Dynamic modeling uses a computer program, in this case STELLA, to develop and simulate existing systems and then be able to predict future actions and trends. This proposed project will use the existing FCAE Incentive Funding data from the past ten years to determine if any possible predictions about program parameters can be projected ahead.

The premise of this investigation is that computer software which is now available can be used to design rather complex models such as environmental impact models and that this type of software may be able to create rather complex models for Agricultural Education programs in Illinois. While there is no guarantee that such complex concepts such as determining effective instructional programs can actually be effectively modeled, it does appear that certain parameters may be able to predict aspects of program success. These parameters could be identified as the FCAE Incentive Funding Indicators and therefore, may be able to predict certain educational program characteristics. This investigation is considered exploratory by nature in that while the information about agricultural education programs are readily available, it is not known which aspects of agricultural education programs they may be able to accurately predict, if any.

This research project was supported by a grant developed by the Facilitating Coordination in Agricultural Education project staff. This project was funded by the Illinois State Board of Education and supported by the Agricultural Experiment Station of the University of Illinois at Urbana-Champaign. The expected outcome of this research project injunction with other projects being researched is to establish a cooperative university agricultural education research plan for Illinois over the next five years.

Objectives

The overall goal of this proposed project will be to attempt to develop series dynamic models to predict aspects of Illinois Agricultural Education programs based upon the existing Incentive Funding data

The specific objectives of this proposed research project were:

1. To explore and determine the extent to which the data can be utilized as valid and reliable data for successful modeling procedures.

2. To develop dynamic model strategies for incorporating existing agricultural education program data to dynamic modeling techniques in order to determine if any Agricultural Education program characteristics can be assess and/or predicted.

3. To develop a series of written, computer-based simulated models based upon the Incentive Funding data that may be used to predict certain aspects of Agricultural Education programs in Illinois.

Methods

In order to complete the proposed project objectives, the following procedures were completed. The first step was to collect appropriate data from the Illinois Incentive Funding database and other existing sources and process the data so if can be used in a dynamic modeling process. Twenty-five agricultural education programs were randomly selected to create a representative database. One program was randomly selected form each of the twenty-five sections of Agricultural Education programs in Illinois. Variables were selected to represent each program in the data file. These variables are presented in the findings section of this research report. Data were coded and compiled in a spreadsheet format by student workers. The compiled data were checked for accuracy using a random code check.

The second step was to establish if there were any significant relationships between the compiled data. The relationships were established using simple correlation coefficients using a spreadsheet format and SSPS statistical analysis system. Correlation coefficient matrices were analyzed to determine if significant relationships did exist between programs and the variables. These relationships are reported in the findings section of this report.

The third procedure was to actively manipulate the program data and variables in a series of dynamic models to determine if any projections about program characteristics can be predicted. This process involved the development of computer simulation dynamic models similar to those used in environmental sciences and economics to cluster similar data and establish possible relationships between the clusters of data, to see if any possible predicts could be ascertained. The findings of the stage of the project are presented later in this report, however it should be noted here that the relationships between the variables were not sufficient to provide a

The final step was to develop recommendations and conclusions that may allow for future possible dynamic modeling opportunities.

Findings

The first part of this section is to report descriptive statistics of the representative sample of agricultural education programs selected for this study.

Description of the Programs Selected

Twenty-five agricultural education programs were randomly selected in order to establish a database of information. One program was randomly selected from each of the twenty-five designated sections of Illinois. Twenty-two of the programs were single teacher programs and three of the programs were multi-teacher departments. Nineteen of the teachers in the single teacher programs were male and four were female. The three multi-teacher departments selected had both male and female teachers. The total number of years of teaching experience ranged from one year to thirty-one years, with the mean (average) being fourteen years. The number of years of teaching experience in the current program was slightly less, with a mean of eleven years.

Eleven of the twenty-five programs reported teaching in a "block" schedule format. All but one of the eleven programs teaches in an eight-block format, with one program as a four-block format. The other fourteen programs teach under a more traditional daily class period format.

Enrollment data for the programs indicated that six of the twenty-five programs taught seventh and/or eighth grade students. The rest of the programs operated as traditional secondary level grades of ninth through twelfth. The number of students in the school ranged from 84 to 1630, with an average of 453 students. The number of agricultural education students ranged from 20 to a high of 175 and an average of 76 students.

The number of students active as FFA member ranged from 20 to 155, with an average number of 52 FFA members. The number of students with SAE activities in each program ranged from 0 to a high 87, with an average of 41 students participating. The number of alumni members ranged from eleven programs reporting 0 alumni members to a high of 133 members and an average of 20 alumni members across all twenty-five programs.

Relationships of Selected Variables

Table 1. presents the correlation coefficients for each of the selected, major variables used in this study. These coefficients represent the relationships of each pair of variables. The following general guidelines may be used to interpret the coefficients.

1. A positive coefficient indicates that one variables increases, so does the other one.
2. A negative coefficient indicates that as one variable increases the other variable decreases.
3. A 1.00 coefficient indicates a prefect relationship between the variables.
4. A coefficient that ranges from .80 to .99 indicates a very strong relationship.
5. A coefficient that ranges from .60 to .79 indicates a strong relationship.
6. A coefficient that ranges from .40 to .59 indicates a moderate relationship.
7. A coefficient that ranges from .20 to .39 indicates a slight relationship.
8. A coefficient that ranges from .00 to .19 indicates little or no relationship.

Table 1. The relationships of selected agricultural education program variables as indicated by correlation coefficients.

	Number of Teachers	Teacher Gender	Years of Teaching Experience	Years at School	Type of Class Scheduling	Number of 7 & 8 grade Ag. Students	Number of Students in High School	Number of Ag. Students in High School	FFA membership	Number of SAE participants	Alumni Membership	Difference in FFA membership 1992-2000
Number of teachers	1.00	**.83**	.00	-.03	.33	.44	.11	**.56**	.07	.30	-.14	-.18
Teacher gender		1.00	-.30	-.29	.27	.44	.16	**.53**	.03	.07	-.24	-.15
Years of Teaching Experience			1.00	**.91**	.16	-.17	-.03	.00	.21	.19	.02	.11
Years at school				1.00	.30	-.04	.10	.03	.03	.14	.03	-.05
Type of class scheduling					1.00	**.60**	.13	.23	.13	.35	.11	-.14
Number of 7 & 8 grade Ag. Students						1.00	.03	.12	.07	**.49**	-.01	-.06
Number of students in High School							1.00	**.43**	.09	-.26	-.23	**-.40**
Number of H. S. Ag. Students								1.00	.37	.02	-.25	-.15
Number of FFA members									1.00	**.41**	.10	**.49**
Number of SAE participants										1.00	.02	.12
Alumni membership											1.00	-.07
Difference of FFA Membership from 1992 -2000												1.00

Note: those correlation coefficients that are **bold** indicate a significant relationship (alpha < 0.05)

The data presented in table 1 indicates that very few of the variables have any relationship with the other variables. Most the significant relationships (in bold) would be expected, such as the number of years teaching and the number of years teaching in the current school (r=0.91). There are several relationships of interest, in that the number of students participating in SAE is related to the number of 7th and 8th grade students studying agriculture. However, the most important aspect of the data from this study and presented in table 1 is the lack of relationship between the variables. This does not allow for the inclusion of these types of variable in a modeling strategy designed to predict program success or development.

Modeling of the Variables

As indicated in the previous section, very few significant relationships between the variables could be determined. Not all of the variables used for this study were included in table 1. Only the major, selected variables are presented, as the other variables would not be of interest based upon the lack of relationships found among these major variables. Therefore it was not possible to establish dynamic models of the agricultural education programs based upon these variables and the data provided. This finding implies that using this type of data, it is not practical to be able to make projections about the variables. In other words, the data could not be used to predict any of the variables such as the number of FFA members or SAE participation. The implications of this finding that these data and variables could not be incorporated into a model are presented in the next section.

Conclusions and Recommendations

Based upon the findings of the research project the conclusions and recommendations were derived.

1. There does not appear to be any significant relationships between the variables and data used in this study. The implications imply that the data while useful, as descriptive data, are independent in value.

2. The findings of this study appear to imply that we need to consider other forms of data that describe agricultural education programs in Illinois. It appears that while this descriptive data is very useful as separate measures, we cannot use the data in a collective manner.

3. This study was not able to build any models to describe the agricultural education programs in Illinois. In agriculture there have been models developed to assist with the programs such as integrated pest management and waste management. The potential to develop models of agricultural education based upon relevant data seems very applicable, however this study implies that we need to broaden the nature and scope of the data we collect relative to agricultural education programs in Illinois.

4. We should continue efforts to model program of agricultural education in Illinois. Such models could prove to useful in that we may be able to predict local program success through appropriate modeling techniques. It is believed that these models could be used to improve agricultural education programs in Illinois.