

Entrepreneurship Education, Practice, and Professional Development Needs of Secondary Agriculture Teachers

Awoke Dollisso

Senior Lecturer, Deptt. of Agricultural Education and Studies,
Iowa State University, Ames, IA, 50011, USA.
Email: dollisso@iastate.edu

Vikram Koundinya

Post Doctoral Fellow,
University of Connecticut, Storrs, CT, 06268, USA.
Email: vikram.koundinya@uconn.edu

Abstract – The purpose of this study was to identify and describe secondary agriculture teachers' extent of entrepreneurship education, sources of entrepreneurship knowledge, use of classroom entrepreneurship projects, and entrepreneurship education professional development needs. A descriptive cross sectional survey of all secondary agriculture teachers in the state of Iowa in the United States was conducted. A majority of teachers who responded to this survey had taken one course each in economics (65%) and business (59%). Thirty-two percent had taken more than one economics course, while 25% had taken more than one business course. Very few (5%) had a minor in agribusiness. Sixty-four percent of teachers identified family business experience as their source of entrepreneurship knowledge, while 60% identified self-education through reading and other means. Agricultural sales was the most common classroom entrepreneurship project (61%), followed by greenhouse (57%), agricultural services (46%), crop production (46%), and landscape services (44%) projects. Teachers rated business incubation and growth, business plan development, business resourcing, opportunity analysis, and innovation as their top five professional development need areas. The findings have implications for designing entrepreneurship education professional development programs for agriculture teachers.

Keywords – Secondary Agriculture Teachers, Entrepreneurship Education, Classroom Teaching, Professional Development Needs.

I. INTRODUCTION/THEORETICAL FRAMEWORK

Entrepreneurship education has expanded rapidly over the past 20 years [1], with secondary and postsecondary educational institutions integrating entrepreneurship into their courses [2]. Entrepreneurship education is important as it provides students with knowledge and skills required for launching successful entrepreneurial ventures [3]. Entrepreneurship is seen as a uniquely personal trait that can strongly influence an individual's effectiveness [4], but [5] asserted that entrepreneurial action can be kindled in learners through education. [6] found entrepreneurship education to be important for positively influencing high school students to become future entrepreneurs. Even students who have a low level of entrepreneurial knowledge and abilities can make remarkable improvement through entrepreneurship education [3].

Entrepreneurship skills are very important for many agriculture careers (e.g., horticulture, floriculture, food science, dairy science, and others), and secondary agriculture teachers are uniquely positioned to teach entrepreneurship concepts to students who are in the formative years of their careers.[7] advocated that topics

such as entrepreneurship should be a part of strategic plans for agricultural education. Similarly, [4], [8], and [9] all identified entrepreneurship as a core component or key area to be included in an agricultural education curriculum. Secondary agriculture teachers themselves identified entrepreneurship as an important course unit to be taught in their school programs ([3]; [10]).

Students in secondary agricultural education programs are given opportunities to learn and hone their entrepreneurship skills through Supervised Agricultural Experience (SAE) programs [11]. SAE is one of the three components of the agricultural education model ([12]; [13]). Entrepreneurship, placement, research and experimentation, and exploration are the four major categories of SAE projects [12]. Among the four, entrepreneurship projects have been one of the traditional projects in SAE programs [14].

Despite recognizing the importance of entrepreneurship education in agricultural education programs, the extent to which entrepreneurship concepts are integrated into these programs appears variable. [2] found that 43% of secondary agriculture teachers who participated in his study integrated entrepreneurship concepts into their courses and almost 60% fostered their students' business ideas. But in the same study, [2] found that only a third of teachers who believed that entrepreneurship should be integrated into agricultural education curriculum were actually doing so. There could be many reasons for these results, including a lack of entrepreneurship knowledge on the part of teachers. A nationwide survey of 537 secondary and postsecondary agriculture teachers revealed that two thirds of teachers were integrating entrepreneurship into their instruction and felt that agriculture students should have entrepreneurship skills [15]. It is imperative for agriculture teachers who have been identified as *agripreneurs* [16] to be knowledgeable about entrepreneurship.

[17] Found that secondary agriculture teachers have a wide variety of professional development needs. A national study conducted by [15] revealed that secondary agriculture teachers are not comfortable with their entrepreneurship knowledge indicating a need for professional development. And, they can't teach what they are not knowledgeable about [18]. These results indicate a need for additional information on secondary agriculture teachers' entrepreneurship knowledge as well as their ability to teach entrepreneurship concepts to their students. This study explores the various aspects related to agricultural teachers' entrepreneurship knowledge. It identifies and describes high school agriculture teachers' extent of entrepreneurship education, sources through

which they acquire their entrepreneurship knowledge, types of entrepreneurship education projects they use in their teaching, and areas of need for professional development focused on entrepreneurship education. There are no known research studies that have researched this aspect related to agriculture teachers.

II. PURPOSE AND OBJECTIVES

The purpose of this study was to identify and describe high school agriculture teachers' entrepreneurship education, sources of knowledge, classroom activities, and professional development needs. The study had four specific objectives:

1. Identify the extent of agriculture teachers' entrepreneurship education.
2. Identify agriculture teachers' sources of entrepreneurship knowledge.
3. Identify what entrepreneurship projects agriculture teachers use in their classrooms.
4. Identify agriculture teachers' entrepreneurship education professional development needs.

III. METHODS

A descriptive survey design was used for this study. The researchers developed a questionnaire on the basis of entrepreneurship literature and entrepreneurship curriculum materials developed for secondary agriculture teachers by a university entrepreneurship initiative center. A panel of experts consisting of agriculture faculty with business backgrounds confirmed the face and content validity of the questionnaire. Results from five sections of the questionnaire are presented in this paper.

The total population for this study was 246 secondary agriculture teachers in the state Iowa in the United States; however, only 190 teachers had accessible e-mail addresses at the time of this survey. Further, 39 teachers opted out of the Survey Monkey, reducing the accessible population count to 151 secondary agriculture teachers. A link to a Survey Monkey online questionnaire was e-mailed to these 151 teachers, and weekly follow-up e-mails were sent to non respondents for four consecutive weeks. The final follow-up was sent from the state agriculture education coordinator's office in the department of education. Ultimately, 86 teachers responded to the survey yielding a response rate of around 57%.

Non response error was addressed by using an independent samples *t* test to determine whether there were any significant differences between early and late respondents. The first 50% of respondents were considered "early," and the last 50% of respondents were considered "late" [19]. This analysis showed no statistically significant differences at the 0.05 level of significance between the two groups.

The first three sections of the questionnaire (Tables 1, 2 and 3) focused on agriculture teachers' extent of entrepreneurship education, sources of entrepreneurship knowledge, and use of classroom entrepreneurship projects, respectively. Each of these three sections

contained a list of items, and teachers indicated which items were applicable to them. The fourth section (Table 4) focused on agriculture teachers' entrepreneurship education professional development needs. Nine topics were listed, and teachers indicated to what extent they needed professional development on each topic by using a scale ranging from 1 (*most needed*) to 10 (*least needed*). All nine were stand-alone topics and did not represent any construct together. Therefore, this was not considered a summated rating scale. In the fifth section, teachers provided demographic information such as age, gender, education, and teaching experience. All collected data were more factual rather than perceptual, so no statistical reliability computations were deemed necessary. Data were primarily analyzed using descriptive statistics such as frequencies and percentages.

IV. FINDINGS

Eighty-six teachers completed the online survey questionnaire, yielding a response rate of 57%. A majority (75%) of teachers were male. Fifty-five percent had a bachelor's degree, 43% had a master's degree, and the remaining 2% had a doctoral degree. Teachers' ages ranged from 21 to 61 years with a mean age of 41 years. Teaching experience ranged from 0.8 to 36 years with a mean of 16 years.

Objective 1: Identify the Extent of Agriculture Teachers' Entrepreneurship Education

A majority (59%) of teachers had taken one college business course, and only 25% had taken more than one business course. Similarly, 65% had taken one economics course, while only 32% had taken more than one economics course. Further, only 5% had a minor in agribusiness, 1% had a minor in economics, and a negligible number (3%) had a double major in business. No teachers had a double major in economics (Table 1).

Table 1: Extent of Agriculture Teachers' Entrepreneurship Education

Entrepreneurship education	Education		<i>n</i>
	Yes <i>f</i> (%)	No <i>f</i> (%)	
A course in business	44 (59)	31 (41)	75
A course in economics	49 (65)	26 (35)	75
Multiple economics courses	24 (32)	51 (68)	75
Multiple business courses	19 (25)	56 (75)	75
Minor in agricultural business	4 (5)	71 (95)	75
Minor in economics	1 (1.33)	74 (99)	75
A second major in business	1 (1.33)	74 (99)	75
A double major in business	2 (3)	73 (97)	75
A double major in economics	0 (0)	86 (100)	86

Objective 2: Identify Agriculture Teachers' Sources of Entrepreneurship Knowledge

Family business experience was a source of entrepreneurship knowledge for 64% of teachers, closely followed by self-education through reading and other

means (60%). Formal business classes and nonformal education were sources of entrepreneurship knowledge for 47% and 33% of teachers, respectively (Table 2).

Table 2: Agriculture Teachers' Sources of Entrepreneurship Knowledge

Entrepreneurship knowledge source	f (%)	n
Family business experience	53 (64)	83
Self-education through reading, etc.	50 (60)	83
Formal business classes/education	39 (47)	83
Nonformal business classes/ Extension	27 (33)	83

Objective 3: Identify What Entrepreneurship Projects Agriculture Teachers Use in Their Classrooms

Entrepreneurship projects used by at least 25% of teachers are listed in Table 3. The least used project type is also shown. Agricultural sales was the most common entrepreneurship project (used by 61% of teachers), followed by greenhouse projects with vegetables (57%), agricultural services (46%), crop production (46%), and landscape services (44%). Agricultural energy systems, used by only 3% of teachers, was the least common entrepreneurship project.

Objective 4: Identify Agriculture Teachers' Entrepreneurship Education Professional Development Needs

A majority (57%) of teachers indicated they would be interested in participating in entrepreneurship-related professional development programs. Teachers rated their need for various professional development topics on a scale of 1 (*most needed*) to 10 (*least needed*). The

researchers determined that the first three points on the scale indicated a greater need for professional development, and the percentages reported in this paragraph are the sum of these values. Teachers rated business incubation and growth (48.38%), business plan development (46.87%), business resourcing (46.37%), opportunity analysis (39.68%), and innovation (38.80%) as their top five entrepreneurship education professional development need areas (Table 4).

Table 3: Entrepreneurship Projects Agriculture Teachers Use in Their Classrooms

Entrepreneurship project	Yes	No	n
	f (%)	f (%)	
Agricultural sales	47 (61)	30 (39)	77
Greenhouse with vegetables	44 (57)	33 (43)	77
Agricultural services	37 (46)	43 (54)	80
Crop production	35 (46)	41 (54)	76
Landscaping service	34 (44)	44 (56)	78
Carpentry	28 (36)	49 (64)	77
Swine	27 (36)	49 (64)	76
Vegetable production	26 (35)	48 (65)	74
Agricultural processing	27 (34)	53 (66)	80
Agricultural mechanics	26 (33)	54 (67)	80
Poultry and poultry products	24 (32)	52 (68)	76
Floriculture	22 (28)	56 (72)	78
Forage production	20 (26)	57 (74)	77
Agricultural energy systems	2 (3)	75 (97)	77

Table 4: Frequency Distribution, Mean, and Standard Deviation Scores of Agriculture Teachers' Entrepreneurship Education Professional Development Needs

Professional Development Need Area	f										M	SD	n
	1	2	3	4	5	6	7	8	9	10			
Business incubation and growth	18	7	5	9	7	3	2	3	5	3	4.02	2.90	62
Opportunity analysis	3	13	9	7	7	5	5	8	4	2	4.83	2.59	63
Business plan development	16	9	5	11	2	7	4	6	2	2	4.05	2.72	64
Innovation	7	9	10	8	8	5	9	4	6	1	4.72	2.56	67
Commercialization	0	3	11	6	10	19	7	4	4	1	5.45	1.92	65
Intellectual property rights	1	6	3	2	6	7	16	10	8	0	6.20	2.22	59
Patenting process	3	3	4	9	5	8	10	15	7	3	6.16	2.39	67
Business resourcing (financing a business)	9	8	15	8	11	7	3	5	2	1	4.17	2.29	69
Business policies and regulations	3	10	5	6	8	3	9	6	15	4	5.88	2.82	69

Note. 1= most needed, 10= least needed.

V. CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Findings from this study are consistent with previous research that provided the theoretical framework for this study. Teachers who responded to this survey had a range of entrepreneurship knowledge, gained through formal and non formal education, and were interested in learning more about entrepreneurship through professional development. These teachers most likely took required 100- (freshman) or 200- (sophomore) level undergraduate courses such as macro- or microeconomics or business. Interest and emphasis in entrepreneurship education are relatively recent phenomena, so even if agriculture

teachers took these courses as undergraduates, their academic exposure to entrepreneurship may have been limited or nonexistent. However, most teachers in this study had entrepreneurship knowledge from family business experiences and supplemented it through self-education.

Most of these teachers are using agricultural sales projects for entrepreneurship education. The researchers offer an educated guess that these sales projects are prepackaged, low-risk fundraising activities that may be easier to manage than other entrepreneurial ventures. Selling products requires creativity but may not be truly entrepreneurial. Teachers should make sure that students have opportunities to develop their own ideas, create

innovative products, and experience the opportunities and risks that are inherent in entrepreneurship.

These teachers also reported using projects in agricultural services, crop production, greenhouse production, landscaping services, and carpentry, which are great opportunities to teach and learn entrepreneurship concepts. But, what is the area of emphasis? Are teachers using these projects to teach production agriculture, science concepts, entrepreneurship, or all of these? This is a possible topic for future research.

A majority (57%) of these teachers were interested in entrepreneurship education professional development, particularly in the areas of business incubation and growth, business plan development, and business resourcing (financing). [20] stated that teachers who continue their education through ongoing professional development promote higher levels of personal satisfaction and student achievement. We should continue to encourage and support teachers who educate themselves and use their own business experiences to teach entrepreneurship concepts, but it's important to remember that a significant number of agriculture teachers may not have previous personal or family business experiences and, therefore, may lack the confidence and motivation to teach entrepreneurship concepts. It is imperative that secondary agricultural education programs provide entrepreneurship education opportunities to these teachers through professional development, curriculum support, or both.

This baseline study shines some light on agriculture teachers' entrepreneurship education, sources of knowledge, classroom activities, and professional development needs. However, a deeper and broader understanding of entrepreneurship education in secondary agricultural education is needed. Future research should seek to answer the following questions, among others: To what extent do agriculture teachers teach entrepreneurship concepts? What curriculum materials are they using? What teaching strategies are used to teach agricultural entrepreneurship? What challenges and opportunities do agriculture teachers face in teaching entrepreneurship?

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AUTHORS' PROFILE



Awoke D. Dollisso

is a senior lecturer in the Department of Agricultural Education and Studies at Iowa State University. Currently, Dollisso's teaching and scholarship focuses on personal, professional and entrepreneurial leadership. Besides teaching in the area of leadership, Dollisso has also taught courses and published scholarly works in the area of presentation and sales strategies. His teaching and scholarship interests include study abroad courses and leading students to other countries for international experiences. Dollisso received his masters and PhD in Agricultural and Extension Education from Iowa State University.



Vikram Koundinya

is a postdoctoral fellow in the University of Connecticut's Office of Economic Development. His job includes developing evaluation plans and performance metrics for economic development and outreach programs. Koundinya previously worked for the Iowa State University researching and strengthening educational processes with a special focus on agricultural extension program evaluation, global extension, and leadership and entrepreneurship education for undergraduate agriculture students and high school agriculture teachers. Koundinya received his B.Sc. in agriculture from A.N.G.R. Agricultural University in India, and M.Sc. and Ph.D. degrees in agricultural and extension education from A.N.G.R. Agricultural University and Iowa State University, respectively.