

Article

Developing Youth Agricultural Entrepreneurship in Latin America and the Caribbean

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Abstract: Youth agricultural entrepreneurship programs lack cohesiveness in their curriculum content. The purpose of this study is to investigate an agricultural entrepreneurship curriculum framework for youth in Latin America and the Caribbean. Two quantitative studies guided our investigation. First, a Delphi panel study was used to identify the core competencies of a youth agricultural entrepreneurship program. An expert panel identified 45 knowledge, skill, and ability (KSA) items in a three-round Delphi panel. The KSAs with the highest final rankings included evaluating business opportunities, agricultural value chain, successful enterprises, local markets, evaluating funding options, business planning, budgeting, market assessment, and problem-solving. Second, we conducted a needs assessment (in Spanish) with rural youth from the Dominican Republic to determine their agricultural entrepreneurial intent and program training needs. Fifty-four Dominican students completed the Entrepreneurial Intent Questionnaire, revealing strong entrepreneurial intent (i.e., positive entrepreneurial attitudes, subjective norms, perceptions, and perceived behavioral control). Next, participants completed the Competency Questionnaire, based on the Delphi panel results, which showed that gaps existed between the KSAs' importance to agricultural entrepreneurship and students' capability of demonstrating those KSAs. The Youth Agricultural Entrepreneurship Curriculum (YAEC) framework was developed from the findings. The YAEC framework should be used to create and implement youth agricultural entrepreneurship programs in LAC.

Keywords: program development; small business; rural enterprise; curriculum development; KSAs; competencies; rural; youth



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1. Introduction

United Nations Sustainable Development Goals 4 and 8 promote youth entrepreneurial skills, growing microenterprises, and increasing youth employment [1]. However, challenges exist for youth entering the labor market because they lack experience and skills, while the labor market lacks jobs and apprenticeships [2,3]. Governments and nongovernmental organizations in Latin America and the Caribbean (LAC) encourage entrepreneurship programs to promote youth employment and reduce poverty [4–6]. The agricultural industry employs many rural youths and their families [7]. However, limited skills, a lack of training, and dismal future prospects can dissuade youth from participating in agriculture [2,3]. Addressing rural youths' training needs in agricultural entrepreneurship may be a solution for youth unemployment in agriculture.

Agricultural entrepreneurship highlights the rural natural environment and the unique challenges that rural entrepreneurs face [8]. Educating youth about agricultural entrepreneurship may attract and prepare them for agricultural professions. Youth agriculture entrepreneurship programs should develop youths' knowledge, skills, and abilities

(KSAs), but Dias et al. [8] found that there are inconsistencies in program content. A lack of consensus about the content of agricultural entrepreneurship training programs lessens the likelihood of youth acquiring the necessary KSAs to compete for agricultural jobs. Soliciting experts' input on youth agricultural competencies helps build a curriculum framework for future youth agricultural entrepreneurship interventions, which may lead to increased program, educator, and student success [9].

Agricultural entrepreneurship research in developing countries typically focuses on topical areas such as agritourism, organic farming, multifunctional agriculture, and direct marketing [10–14]. Encouraging agricultural entrepreneurship may increase revenue, resilience, and unity between food production and other services, which may reduce urban migration and dependence on subsidies [13,15].

Agricultural entrepreneurship programs include soft, technical, and business skills training [16–20]. Soft skills include self-efficacy, networking, persuasion, leadership, creative problem-solving, mindfulness, and creativity [20–24]. Technical skills usually include agricultural production, value-added production, and agritourism [17,19,25]. Business skills training varies but includes marketing, business strategy, business development, management, accounting, risk management, and ethics [16,19,26–29]. These variations show a lack of cohesiveness in the core areas needed for agricultural entrepreneurship, although we recognize that such programs need to be customized to individual communities.

Participation in agricultural entrepreneurship programs differs depending on participants' needs. Participation is influenced by age, educational background, marital status, residence, employment, and perception of training [17,30]. These characteristics should be considered when creating training program content. Measures of success may include training program attendance, knowledge retention, sales post-training, number of businesses created, incomes, and agricultural productivity [17,20–22,31]. When combined, technical, business, and soft skills become core competencies in agricultural entrepreneurship program curricula. Stone and Bieber stated that competencies are the “application of knowledge, technical skills, and personal characteristics leading to outstanding performance” [32] (p. 1). The lack of unifying foci in agricultural entrepreneurship program content identified within previous studies led us to explore specific KSAs, identified by an expert panel and verified by youths studying agriculture, to create the Youth Agricultural Entrepreneurship Curriculum (YAEC). Better conceptualizing youth agricultural entrepreneurship programs could increase business, competency, and resilience outcomes among youth.

Conceptual Framework

The conceptual framework for this study combines the constructs of positive youth development (PYD) and the Framework of Course Development Processes (FCDP) [33,34]. PYD prepares children and adolescents to increase their well-being through education and training experiences, prosocial involvement, and community engagement that build skills and knowledge or change norms [33,35,36]. PYD contains four constructs (assets, agency, contribution, and enabling environment) and is a common model in international development contexts [33,36,37]. PYD helps youth gain the skills needed to thrive, strengthen their environment, and build their capacity to increase their employability and civil society engagement [33,36–38]. Programs using PYD can positively influence behavior, physical and mental health, income, and employment through a slight norm or behavior change [33].

This study involves all four constructs of PYD. Agency encompasses youths' identity, self-efficacy, goal setting, perseverance, and future beliefs. Assets include youths' education, training, and skills. An enabling environment incorporates bonding, opportunities for involvement, support, prosocial norms, value and recognition, gender responsiveness, and physical and psychological safety into programs. Contribution refers to youth engagement with civil society and adults [33].

Graves's [34] Framework of Course Development Processes (FCDP) assists educators with directing and understanding course development. The FCDP has eight components: (1) defining the context, (2) articulating beliefs, (3) assessing needs, (4) formulating goals

and objectives, (5) conceptualizing content, (6) developing materials, (7) designing an assessment plan, and (8) organizing the course (see Figure 1; [34]). We focused on five components (i.e., defining context, articulating beliefs, assessing needs, formulating goals and objectives, and conceptualizing content) for this study.

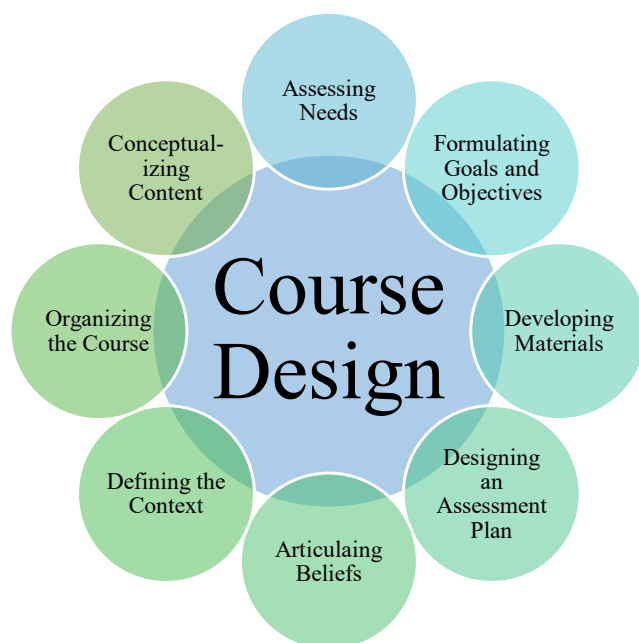


Figure 1. A framework of course development processes [32].

The FCDP components are interrelated. Defining the context includes student and other stakeholder input, the environment, the nature of the course and institution, the available resources, and the time to formulate context-based goals. Assessing needs is the process of gathering information about learners' proficiencies levels, intercultural competencies, interests, learning preferences, attitudes, goals and expectations, communication skills, and preferences [34,39]. Formulating goals focuses on a course purpose and intended outcomes; objectives delineate how the goals are achieved. Objectives should be specific, measurable, assignable, realistic, and time-bound while being student-centered [34,40]. Conceptualizing content involves considering the context, needs, students' backgrounds, and the course purpose; making choices about what to include, emphasize, and exclude from the course content; and organizing the content.

2. Materials and Methods

The purpose of this study is to investigate an agricultural entrepreneurship curriculum framework for LAC youth. The objectives are to (1) identify core competencies in a youth agricultural entrepreneurship program and (2) determine rural Dominican youths' entrepreneurial intent and program training needs.

Two quantitative methods [41] were used to investigate the purpose and objectives [42]. A Delphi panel study was used to assess objective one. A youth needs assessment was conducted to answer objective two. The Delphi panel study and needs assessment occurred from October to December 2022. The literature review, Delphi study, and needs assessment were used to create the YAEC framework.

2.1. Expert Delphi Panel

Delphi panel studies have been applied to curriculum development in many disciplines, situating it for use in this study [43–45]. The Delphi panel study included 20 experts who met inclusion criteria (i.e., university or private researchers, authors of refereed research in agricultural/youth entrepreneurship, small business leaders, or international

youth program leaders) and who have worked in the LAC region. Experts were purposively selected on the basis of the criteria and utilizing the snowball sampling techniques [46–48]. Recruitment was conducted through invitation emails through which the experts were able to indicate their ability to participate and nominate other experts [47].

A three-round Delphi study, using the Qualtrics platform, was used to identify KSAs for inclusion in the YAEC framework. The first round was exploratory in nature, followed by a converging second round and a consensus-building third round. The Delphi method provides a structured process for collecting and synthesizing knowledge from a group of experts through sequential questionnaires created from feedback and opinions obtained from prior responses [49,50]. Round one requested panelists' input for KSA items that should be included in a youth agricultural entrepreneurship program. Participants received personalized invitations and reminder emails to encourage round one completion [41].

The round-one KSA items were consolidated to remove duplicates for round-two inclusion. Round two required panelists to rate their agreement levels (5-point scale; 1 = strongly disagree, 5 = strongly agree) for each of the KSAs identified in round one. A $\geq 70\%$ agreement level was required to retain the item for round three. The agreement threshold was determined using frequency counts of agree or strongly agree for each item. KSA items were sorted into high ($\geq 70\%$ agreement) and low ($< 70\%$ agreement; those failing to meet the threshold) groups. Low KSAs were excluded from round three (consensus-building).

In round three, experts confirmed their agreement levels (5-point scale; 1 = strongly disagree, 5 = strongly agree) for each KSA item. Participants ranked the KSAs (1 = most important to 15 = least important) [50]. Items that received $\geq 70\%$ agreement were included in the final rankings.

2.2. Youth Needs Assessment

A youth needs assessment, using two instruments, was conducted with Dominican students at the Instituto Técnico de Estudios Superiores en Medio Ambiente y Recursos Naturales (ITESMARENA), a one-year agroforestry and natural-resources management institute. The needs assessment sought to measure rural youths' entrepreneurial intent and program training needs. ITESMARENA was purposively selected because of the school's interest in entrepreneurship, its rural location, and its agriculture-related curriculum. ITESMARENA has 76 students, aged 18 to 27 years, from all regions of the Dominican Republic and Haiti. A census was conducted at ITESMARENA. Fifty-four ITESMARENA students consented and participated following an information session on the study. The response rate was 71%.

Two paper instruments were administered in Spanish to improve comprehension and response rate and to prevent technological issues [41]. Participants were provided instructions (in Spanish). Following instructions, participants received Liñan et al.'s [51] Entrepreneurial Intent Questionnaire (EIQ), which focused on four constructs (entrepreneurial attitude, subjective norms, perceived behavioral control, and intention). The EIQ included 29 statements with 7-point scales (0 = totally unlikely/undesirable/ineffective/disagree/unimportant to 6 = totally likely/desirable/effective/agree/important) to measure each of the four constructs. Example statements included: entrepreneurial attitude (desirability of creating jobs for others, having a high income, taking calculated risks); subjective norms (agreement with becoming an entrepreneur among immediate family members, close friends, colleagues); perceived behavioral control (effectively defining my business idea and a new business strategy, creating and putting into operation a new venture); and entrepreneurial intent (intention to make any effort to become an entrepreneur, start a business in the future).

Respondents' entrepreneurial intent scores were determined by summing the four EIQ construct scores. The maximum score for entrepreneurial attitude was 72 (12 statements), those of subjective norms and perceived behavioral control were 36 points each (6 statements each), and that of entrepreneurial intention was 30 points (five statements). The

EIQ's overall ex post Cronbach's alpha was $\alpha = 0.88$. Cronbach's alpha ranged from 0.52 to 0.90 for each of the four EIQ constructs. Data analysis included 46 usable questionnaires out of 54 total (85% response rate).

After completing the EIQ, the Competency Questionnaire (CQ) was administered to determine rural Dominican youths' entrepreneurial program training needs at ITES-MARENA. The CQ required participants to indicate their agreement with their ability to demonstrate each KSA and the importance of each KSA for agricultural entrepreneurs. Respondents used 7-point scales (0 = strongly disagree, 6 = strongly agree; 0 = not important to 6 = highly important). CQ content was generated from the Delphi expert panel study; all materials were translated into Spanish by native speakers. Cronbach's alpha ranged from 0.85 to 0.97 (across KSA categories) for the ability rating scale and from 0.83 to 0.96 (across KSA categories) for the importance rating scale, indicating high internal consistency [41].

The Ranked Discrepancy Model (RDM) was used to determine output from the CQ [52]. RDM takes a natural approach to prioritizing training needs of a sample and is an appropriate method for these conditions: (a) cross-sectional data are gathered at one point from a sample or census of a target population, (b) data for each item are paired on two ordinal scales with an equal number of response anchors, and (c) discrepancies are assessed between two clearly identified conditions for each item [52].

Narine and Harder [52] reported that the first step in using the RDM is to determine the number of occurrences in the sample when participants' ability ratings are less than participants' importance ratings, which produces negative ranks (NR); more than participants' importance ratings, producing positive ranks (PR); or equal to participants' importance ratings, which produces tied ranks (TR). Analysis was conducted using a Wilcoxon rank test between paired responses [50]. The second step is to determine the number of occurrences for each rank type and convert them into percentages. The third step is to calculate the Ranked Discrepancy Score (RDS) using the formula [52]:

$$\text{RDS} = \text{NR}\% (-1) + \text{PR}\% (1) + \text{TR}\% (0) \quad (1)$$

The RDS was interpreted to represent respondents' capacity to demonstrate or perform KSAs. The RDS is a standardized score ranging from -100 to $+100$ with an equilibrium point at zero. KSAs that score below zero represent a greater training gap vs. KSAs above zero which represent lesser training need [50]. Finally, unweighted ranked responses are assigned relative weights (W) for negative ranks (WNR = -1), positive ranks (WPR = 1), and tied ranks (WTR = 0). SPSS Version 28 was used to determine ranks, and Microsoft Excel was used to add weights and calculate RDSs.

3. Results

3.1. Delphi Panel Study

The modified Delphi study had 20 participants for round one. The personal characteristics of the Delphi panel are in Table 1. Most of the participants had 11 to 20 years of experience, were between 40 and 60 years old and male, and worked in academia. All participants' careers included work in LAC.

3.1.1. Round One

Twenty participants suggested 185 items for inclusion in a YAEC framework. Items were sorted into three categories: knowledge, skills, and abilities (or characteristics). As a result, 30 knowledge items, 30 skills, and 18 abilities were derived from round one. Of the 30 knowledge items (Table 2), agricultural value chain had the most mentions ($n = 7$). Evaluating business opportunities ($n = 6$), economic principles and practices ($n = 5$), and finance ($n = 4$) round out the top knowledge items. Of the 30 skill items (Table 2), business planning and marketing received the most mentions ($n = 8$ each), followed by budgeting ($n = 6$) and accounting and communication ($n = 5$ each). The expert panel identified 18 abilities (Table 2). Cultural awareness received the most mentions ($n = 13$), followed by growth mindset ($n = 5$).

Table 1. Participant characteristics ($n = 20$).

Variables	Categories	<i>f</i>	%
Years of experience	>10	4	20
	11 to 20	7	35
	21 to 30	4	20
	31+	5	25
Age	≥39	5	25
	40 to 60	11	55
	61+	4	20
Gender	Male	15	75
	Female	5	25
Profession	Academia	12	60
	Industry	8	40

Table 2. Knowledge, skills, and abilities identified in round one.

Core Areas	Items	<i>f</i>
Knowledge	Agricultural value chain	7
	Evaluating business opportunities	6
	Economic principles and practices	5
	Finance	4
	Administration, business models, international markets	3/ea.
	Agricultural development, climate change, evaluating funding options, food safety, research methods, contracts	2/ea.
	Advertising principles and practices, farmer-to-farmer mobilization/collective actions, agronomy, value-added production, information communication technologies,	1/ea.
	intellectual property, intersectionality and diversity, land tenure, migration information, markets, entrepreneurship, social media, successful enterprises, organizational change	
	Business planning, marketing	8/ea.
	Budgeting	6
Skills	Accounting, communication	5/ea.
	Bookkeeping, leadership, networking	4/ea.
	Farm management, financial literacy, market assessment, mentorship, banking, customer/stakeholder relations	3/ea.
	Sales, conflict resolution, monitoring and evaluation, navigating power dynamics, project management, risk management, stress management	2/ea.
	Brand management, business pitch, community mapping, critical thinking, human resources, post-harvest handling, public speaking, foreign-language skills, value-chain mapping	1/ea.
	Cultural awareness	13
	Growth mindset	5
Abilities	Persuasive, punctual	3/ea.
	Problem-solving, organized	2/ea.
	Flexible, lifelong learner, persistence, curious, passionate, ambitious, creative, resilient, risk-taker, team player, decisive, self-awareness	1/ea.

3.1.2. Round Two

All 185 KSAs identified in round one were included in round two. Nineteen experts completed round two, which required panelists to rate their agreement levels for each KSA item from round one. A $\geq 70\%$ agreement level (agree or strongly agree) was required

(14 of 19) to retain the item for round three. There was a $\geq 70\%$ consensus for 19 of 30 knowledge items (Table 3), which were separated into high- and low-agreement groups to distinguish included vs. excluded items for round three. Knowledge of evaluating business opportunities received the highest agreement (100%), followed by value-added production, local/regional markets, agricultural value chain, successful enterprises, and contracts, which received 95% agreement each. The 19 knowledge items were rated and ranked for inclusion in the YAEC framework in round three.

Table 3. Round two agreement with KSAs for inclusion in the YAEC framework ($n = 19$).

Core Areas	Items	<i>f</i>	%
High knowledge (included in Rd 3)	Evaluating business opportunities	19	100
	Value-added production, local/regional markets, agricultural value chain, successful enterprises, contracts	18/ea.	95
	Evaluating funding options	17	89
	Business models, national markets, business regulations, social media usefulness	16/ea.	84
	Basic administration, economic principles and practices, agronomy	15/ea.	79
	Advertising, finance, information communication technologies, entrepreneurship	14/ea.	73
Low knowledge (excluded Rd 3)	Agricultural development, international markets, land tenure	12/ea.	63
	Farmer-to-farmer mobilization/collective actions, food safety, intellectual property, organizational change	11/ea.	58
	Climate change	10	52
	Intersectionality and diversity	7	37
	Research methods	5	26
	Migration information	4	21
High skill (included in Rd 3)	Business planning, market assessment	19/ea.	100
	Budgeting, leadership, networking, customer/stakeholder relations	18/ea.	95
	Business pitch, sales, critical thinking, value-chain mapping	17/ea.	89
	Bookkeeping, financial literacy, marketing, project management, risk management, communication	16/ea.	84
	Brand management, public speaking	15/ea.	79
	Accounting, farm management	14/ea.	73
Low skill (excluded Rd 3)	Post-harvest handling	13	68
	Conflict resolution, human resources, monitoring and evaluation, navigating power dynamics	11/ea.	58
	Mentorship	10	52
	Community mapping, banking	9/ea.	47
High ability (included in Rd 3)	Persistence, problem-solving	19/ea.	100
	Lifelong learner, growth mindset, creative, resilient, team player	18/ea.	95
	Passionate	17	89
	Curious, organized	16/ea.	84
	Flexible, ambitious, self-awareness	15/ea.	79
	Persuasive, decisive	14/ea.	73
Low ability (excluded Rd 3)	Cultural awareness	13	68
	Risk-taker, punctual	12/ea.	63

Ultimately, 20 of the 30 skill items reached $\geq 70\%$ consensus (14 out of 19 experts) in round two (Table 3). Business planning and market assessment received the highest agreement (100% each). Budgeting, leadership, networking, and customer/stakeholder relations each had 95% agreement. The expert panel rated and ranked the 20 skill items, confirming their importance for inclusion into the YAEF framework, in round three.

More than 70% consensus was achieved for 15 of 18 ability items (Table 3) in round two. Persistence and problem-solver received the most panel consensus (100% each). Lifelong learner, growth mindset, creative, resilient, and team player each received 95% agreement. The 15 ability items were included in round three.

3.1.3. Round Three

Fifteen panelists participated fully in round three. Round three produced a 15% ($n = 17$) attrition rate for knowledge items. Skill items were reduced by 25% ($n = 15$), and abilities decreased by 20% ($n = 16$). Sufficient panel input was gathered ($n \geq 13$) to conclude that the panel represented an expert community [53]. Additionally, 4 of 19 knowledge items did not reach $\geq 70\%$ agreement and were removed from the rankings. Knowledge of evaluating business opportunities was ranked number one overall and had the highest level of agreement (100%). Other top-ranked knowledge items included the agricultural value chain, knowledge of successful enterprises, local markets, and evaluating funding options (94% each). Next, 15 of 20 skills items achieved $\geq 70\%$ agreement among the expert panel. Business planning, budgeting, and market assessment had the highest level of agreement (93% each) and were ranked first. All 15 ability items (characteristics) achieved $\geq 70\%$ agreement (Table 4) in round three. Problem-solver was ranked first (100%), followed by creative, persistent, curious, resilient, and self-awareness (94% each) tying for second.

Table 4. Round three agreement and ranking of KSAs ($n = 15$).

Core Areas	Items	Ranks	%Agreed
Knowledge	Evaluating business opportunities	1	100
	Agricultural value chain	2	94
	Successful enterprises	2	94
	Local markets	2	94
	Evaluating funding options	2	94
	Value-added production	6	88
	Regional markets	6	88
	Business models	6	88
	Social media's usefulness	6	88
	Basic administration	10	82
	Finance	10	82
	National markets	12	76
	Agronomy	12	76
	Economic principles/practices	12	76
	Business regulations	15	71
Skills	Business planning	1	93
	Budgeting	1	93
	Market assessment	1	93
	Networking	4	87
	Bookkeeping	4	87
	Customer/stakeholder relations	4	87
	Leadership	4	87
	Risk management	4	87
	Critical thinking	9	80
	Communication	9	80
	Financial literacy	9	80
	Business pitch	12	73
	Marketing	12	73
	Project management	12	73
	Sales	12	73

Table 4. Cont.

Core Areas	Items	Ranks	%Agreed
Abilities	Problem-solver	1	100
	Creative	2	94
	Persistence	2	94
	Curious	2	94
	Resilient	2	94
	Self-awareness	2	94
	Lifelong learner	7	88
	Team player	7	88
	Flexible	9	81
	Decisive	9	81
	Passionate	9	81
	Ambitious	12	75
	Growth mindset	12	75
	Organized	12	75
	Persuasive	12	75

3.2. Youth Needs Assessment

Students who agreed to participate in the needs assessment characterized themselves as Dominican (69%), 18- to 20-year-old (52%) males (63%) (Table 5). Most reported that their father had completed vocational training (31%) and that their mother had completed university (30%) or secondary education (30%), with at least one parent working as a tradesperson (19%).

Table 5. Demographics of ITESMARENA students ($n = 54$).

Variable	Categories	<i>f</i>	%
Gender	Male	34	63
	Female	20	37
Country	Dominican Republic	37	69
	Haiti	9	17
Age	18 to 20	28	52
	21 to 23	19	35
	24 to 27	7	13
Father's level of school	Vocational training	17	31
	Primary	15	28
	Secondary	14	26
	University	8	15
Mother's level of school	University	16	30
	Secondary	16	30
	Vocational training	11	20
	Primary	8	15
Parents' professions	Did not answer	3	6
	Trades	10	19
	Education	9	17
	Did not answer	9	17
	Other	9	17
	None	8	15
	Business	7	13
	Law	6	11
	Homemaking	5	9
	Banking	4	7
	Agriculture	4	7
	Healthcare	3	6

3.2.1. Youth Entrepreneurial Intent

Table 6 shows the findings from the EIQ. The maximum score for entrepreneurial attitude was 72 (range = 35), with a mean of 64.95 ($SD = 7.49$). The relatively high mean score indicates that respondents perceive themselves as having strong, positive entrepreneurial attitudes. The maximum score for subjective norms was 36 (range = 18), while the mean was 30.02 ($SD = 4.11$). The high mean score demonstrates that respondents had strong, positive perceptions of the family and community support for them becoming involved in entrepreneurship. The maximum score for perceived behavioral control was 36 (range = 25), and the average score was 29.37 ($SD = 6.37$). The mean score indicates that many of the participants perceived that they could ably and effectively perform certain tasks as entrepreneurs. The maximum score for entrepreneurial intention was 30 (range = 24), while the mean score was 23.04 ($SD = 5.48$). These findings indicate that respondents held strong intentions of entering entrepreneurship as a career path.

Table 6. Descriptive statistics for the Entrepreneurial Intent Questionnaire ($n = 54$).

Item	Min.	Max.	<i>M</i>	<i>SD</i>
Entrepreneurial attitude ¹	37	72	64.95	7.49
Subjective norms ²	18	36	30.02	4.11
Perceived behavioral control ³	11	36	29.37	6.37
Entrepreneurial intent ⁴	6	30	23.04	5.48

¹ 7-point scale (0 = totally unlikely/not at all desirable to 6 = totally likely/desirable). ² 7-point scale (0 = totally disagree/not at all important to 6 = totally agree/very important). ³ 7-point scale (0 = totally ineffective to 6 = fully effective). ⁴ 7-point scale (0 = nothing to 6 = totally).

3.2.2. Ranked Discrepancy Scores (RDSs)

All the knowledge items produced negative RDSs, indicating that gaps existed between the item's importance to agricultural entrepreneurship and students' capability of demonstrating that knowledge (Table 7). The top three knowledge items with the largest gaps among this sample were finance (RDS = −84.00), value-added production (RDS = −68.75), and regional markets (RDS = −66.67). The lowest RDS value was for social media's usefulness (RDS = −25.00), indicating a lesser training need. Each skill item produced a negative RDS, indicating gaps between the importance and capability of demonstrating those skills. Budgeting (RDS = −71.43) had the greatest training need, followed by project management (RDS = −64.52) and sales (RDS = −62.50). Leadership required the least training (RDS = −31.25). All ability items had negative RDSs, signifying a need to address gaps for ability items. The greatest training needs were in the items of organized (RDS = −59.38), persuasive (RDS = −50.00), and team player (RDS = −48.28). Being curious had the lowest RDS (−6.67), indicating a lesser training need.

Table 7. Ranks/Ranked Discrepancy Scores for KSAs ($n = 54$).

Core Areas	Items	Ranks (%)			RDS
		NR	PR	TR	
Knowledge	Finance	88.00	4.00	8.00	−84.00
	Value-added production	75.00	6.25	18.75	−68.75
	Regional markets	76.67	10.00	13.33	−66.67
	Agricultural value chain	71.88	6.25	21.88	−65.63
	Local markets	70.97	9.68	19.35	−61.29
	Evaluating funding options	70.00	10.00	20.00	−60.00
	Evaluating business opportunities	64.52	6.45	29.03	−58.06
	Economic principles and practices	64.29	7.14	28.57	−57.14
	Business models	62.07	6.90	31.03	−55.17
	Basic administration	71.88	18.75	9.38	−53.13
	Business regulations	66.67	16.67	16.67	−50.00
	National markets	64.52	19.35	16.13	−45.16

Table 7. Cont.

Core Areas	Items	Ranks (%)			RDS
		NR	PR	TR	
Knowledge	Successful enterprises	54.84	16.13	29.03	−38.71
	Agronomy	41.38	6.90	51.72	−34.48
	Social media's usefulness	37.50	12.50	50.00	−25.00
Skills	Budgeting	75.00	3.57	21.43	−71.43
	Project management	70.97	6.45	22.58	−64.52
	Sales	68.75	6.25	25.00	−62.50
	Market assessment	66.67	10.00	23.33	−56.67
	Bookkeeping	68.75	12.50	18.75	−56.25
	Communication	65.63	9.38	25.00	−56.25
	Business pitch	65.52	10.34	24.14	−55.17
	Risk management	58.62	3.45	37.93	−55.17
	Networking	58.06	3.23	38.71	−54.84
	Business planning	62.50	9.38	28.13	−53.13
	Financial literacy	68.97	17.24	13.79	−51.72
	Critical thinking	61.29	9.68	29.03	−51.61
	Marketing	58.62	13.79	27.59	−44.83
	Customer/stakeholder relations	62.50	21.88	15.63	−40.63
	Leadership	46.88	15.63	37.50	−31.25
Abilities	Organized	78.13	18.75	3.13	−59.38
	Persuasive	59.38	9.38	31.25	−50.00
	Team player	58.62	10.34	31.03	−48.28
	Self-awareness	59.38	12.50	28.13	−46.88
	Persistence	46.67	3.33	50.00	−43.33
	Resilient	51.61	9.68	38.71	−41.94
	Decisive	53.33	16.67	30.00	−36.67
	Flexible	50.00	16.67	33.33	−33.33
	Growth mindset	37.93	6.90	55.17	−31.03
	Problem-solver	46.88	18.75	34.38	−28.13
	Ambitious	43.33	20.00	36.67	−23.33
	Lifelong learner	33.33	10.00	56.67	−23.33
	Creative	34.48	13.79	51.72	−20.69
	Passionate	32.14	14.29	53.57	−17.86
	Curious	23.33	16.67	60.00	−6.67

3.3. YAEC Curriculum Framework

The proposed YAEC framework (Figure 2) incorporates data from the literature review, the Delphi panel study, and the youth needs assessment. The YAEC framework may serve as a guide for future interventions to prepare youth for successful agricultural entrepreneur careers in LAC. The YAEC framework aligns with the four constructs of positive youth development [33] and the FCDP [34]. It should be used to create and implement youth agricultural entrepreneurship programs in LAC. Figure 2 outlines the goals, content, activities, outputs, outcomes, context, and assumptions used to inform curriculum development.

The YAEC framework goals provide direction for future interventions and narrow the subject matter to enable asset development which helps create an enabling environment. Graves's FCDP highlights the importance of developing program goals and objectives [34]. Youth agricultural entrepreneurship programs frequently aim to increase participants' agricultural productivity, entrepreneurial competencies, or business development. Bringing these goals under one program could reinforce their interconnectedness.

Content refers to the KSAs to be developed in program participants, with the proposed activities serving to structure the content. Together, content and activities promote participants' agency and community contribution because both are dependent on the par-

ticipants themselves. Validated competencies can build confidence and skill assets in youth participants [33,35].

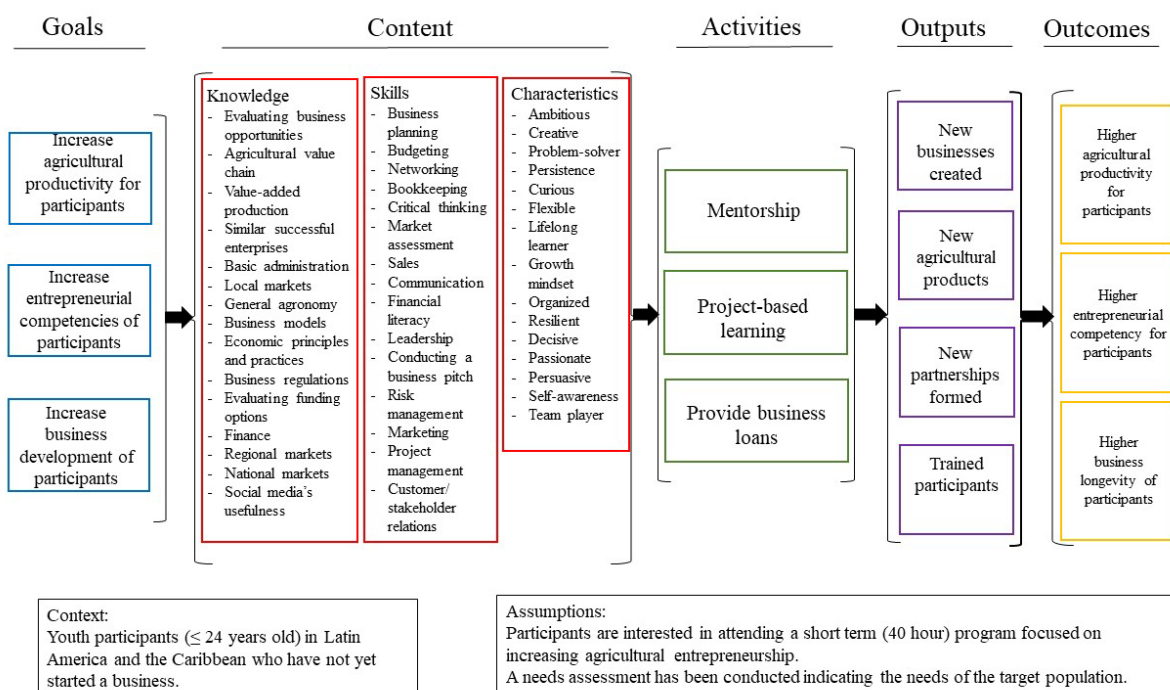


Figure 2. Youth Agricultural Entrepreneurship Curriculum (YAEC) framework for LAC.

Outputs are the physical products that can be created after curriculum implementation. Outcomes are the intended results of curriculum implementation. Together, outputs and outcomes contribute to youth agency and assets [33]. If the program is working as expected, there will be concrete outputs. These outputs include new businesses, agricultural products, partnerships, and participants for each cycle of the program. The YAEC framework outputs and outcomes represent youth participants' culmination of training, self-efficacy, goal setting, and perseverance. Outputs and outcomes also can serve to assess the effectiveness and impact of youth agricultural entrepreneurship programs.

Underpinning the YAEC framework are context and assumptions. Context includes youth participants with some agricultural entrepreneurship experience but who seek more specialized training and those with no previous training. The assumptions presume that a needs assessment was conducted and that prospective participants are interested in the training program. The training program can be fitted to a community's needs by including assumptions and content [34]. The needs assessment is vital because training programs rarely include all training needs in a single program; therefore, prioritizing training needs is paramount for success. Participant interest is critical because interested persons are more likely to be engaged, motivated, and satisfied with training [54,55].

4. Discussion

4.1. Delphi Panel Study

The Delphi panel study identified important KSAs for a youth agricultural entrepreneurship program. Among those KSAs was evaluating business opportunities, with which entrepreneurs decide to initiate or grow a business [56,57]. For example, when agricultural entrepreneurs want to diversify farm income through production, agritourism, or direct marketing, they should decide if the opportunity provides a competitive advantage before engaging in the diversified opportunity [58].

Business planning was identified as a key characteristic for youth to launch small to medium enterprises and a dimension of entrepreneurship skills [10,21,22,26,59,60].

Business planning can be vital to a successful business because it can help determine business priorities and increase intent [59,61]. Ambition increases self-perceived agricultural entrepreneurship ability [62–64], whereby higher ambition translates into higher entrepreneurial intent. We may infer that when there is a lack of ambition, the propensity to start a business will be lower. Agricultural entrepreneurs need ambition to decide whether or not to engage in business opportunities.

Our findings are aligned with previous entrepreneurship competency studies [16–18,20,65,66]. Ambitious, growth mindset, organized, and persuasive had lower consensus agreement (75%) than did other abilities/characteristics. In general, agreement levels for most KSAs shifted between rounds.

Several agricultural entrepreneurship programs include business and technical agricultural skills [16–18,67,68]. Such skills are usually taught as a part of a holistic training program for youth and adults. In the Delphi study, knowledge of the agricultural value chain was ranked second along with local markets. Regional markets was tied for sixth, while national markets and agronomy were tied for twelfth place. These knowledge items highlight the importance of acquiring specific knowledge for agricultural entrepreneurs. These knowledge items affirm previous findings from programs designed to develop farmers' entrepreneurship [16–18,67,68].

The Delphi panel study identified core KSAs to be included in a youth agricultural entrepreneurship program in LAC. Graves [34] highlighted the importance of conceptualizing program content. Identifying and prioritizing core competencies from vested stakeholders' perspectives helps us create programs with learner, content, and community needs in mind.

4.2. Youth Needs Assessment

The needs assessment highlighted the self-perceived entrepreneurial needs and intentions of the youth at ITESMARENA. The EIQ promoted students' agency through their perceptions of their agriculture entrepreneurial abilities while analyzing the norms surrounding entrepreneurship. The EIQ showed that some students had a high propensity for agricultural entrepreneurship, meaning that they might benefit from an entrepreneurship training program. For ITESMARENA students, training opportunities could be accomplished through school curricula or weekend programs. The high mean for entrepreneurial attitude indicates that students viewed entrepreneurship positively; however, the high perceived behavioral control (PBC) score contrasts the competency analysis that identified large discrepancies between KSA importance and capability. This could mean that the EIQ only targets PBC generally and does not target specific entrepreneurial skills.

The CQ helped us identify training needs regarding entrepreneurial KSAs among the selected Dominican youths. The knowledge items with the highest discrepancies were finance, value-added production, regional markets, agricultural value chain, local markets, and evaluating funding options. Students identified financial knowledge as their highest need, aligning with others' [65] identification of financial knowledge as a critical precursor to youth entrepreneurial success. This difference could mean that students were more comfortable with the information ranked highly by experts because of previous schooling or training. The difference could also mean that experts' prioritization may not be relevant for this sample.

The skill items with the largest discrepancies included budgeting, project management, and sales. Financial knowledge and business management are skills identified in previous works [65,66]. Financial components align with students' prioritization of financial knowledge. Although experts and youths valued these items nearly equally, their differences in prioritizing them emphasize the importance of incorporating multiple stakeholder groups' input in curriculum development processes.

The organized ability had the greatest RDS. Organization can affect business practices and is important for fostering entrepreneurship [20,23]. Some of the lower expert-ranked items had greater RDSs among the youth. This difference highlights that the prioritization of experts may not always match the needs of a particular population.

Social media's usefulness, leadership, and curious had the least training needs among all KSAs. These results were expected because most of the participants were considered Generation Z, who are digital natives and have an increased understanding of social media [69,70]. Students' diminished emphasis on leadership and curiosity could be because they already identify as leaders with sufficient curiosity or do not think it is possible to expand those abilities. The experts' opinions on the KSAs support leadership ability influencing entrepreneurship [7,8].

Overall, the results show a need to develop programs that address agricultural entrepreneurship content so that interested youth acquire the necessary knowledge, skills, and abilities to succeed as future agricultural entrepreneurs.

4.3. YAEC Framework

The YAEC framework aims to increase participants' entrepreneurial competencies, business acumen, and agricultural productivity. These goals are based on previous interventions in agricultural entrepreneurship which have focused on agricultural productivity, entrepreneurial capacity-building, and business outcomes [17,22,67,71]. To implement this framework, action is required. For example, instructional methods for the YAEC should include project-based learning and mentorship. Project-based learning helps students develop practical skills with the guidance of a teacher, facilitator, or trainer [26,71]. Also, financial support for participants to start their businesses is important for long-term success. Small business loans enable business start-ups [72–75].

Using the YAEC framework to create novel curricula attuned to the needs of the population that it serves better enables participants' entrepreneurial capabilities. The YAEC framework provides guidance for practitioners, scholars, and government agencies creating programs to scale up youth agricultural entrepreneurship. As users identify their goals and the target population's needs, they can pinpoint appropriate KSAs for their programs. Through mentorship, project-based learning, and financial support, participants may be enabled to create businesses that elevate their community's and personal business acumen. The YAEC framework will help strengthen communities through increased abilities among youth agricultural entrepreneurs.

4.4. Limitations

This study has limitations. There was a limited sample for the youth needs assessment, restricting the generalizability of the results. The limited sample resulted from a lack of time and resources to conduct the study. ITESMARENA students do not represent all LAC youth. However, the results provide some transferability because of participants' differing familial, educational, language, and cultural backgrounds.

Data-collector bias and characteristics were limiting factors that may have impacted the study's internal validity [41]. Because the researcher was the main data collector, their implicit bias about the need for agricultural entrepreneurship [76] and their characteristics may have influenced participants' responses [41]. A cultural divide and an increased power distance existed between the researcher and participants. These heterophilic characteristics could have decreased participants' willingness to speak openly and honestly with the researcher [76].

While the Delphi technique was used to create consensus among experts, some experts may not have been available to participate. Some attrition of panel members occurred throughout the study. While attrition is a concern of response bias, those who completed the study were not different from non-responders, because rounds two or three included others with similar experiences. One advantage of having a 20-person panel is the ability to account for attrition by overlapping experts' experience and field of study.

The youth needs assessment had several limitations. Respondent fatigue might have affected students' completion of back-to-back questionnaires. This could explain why 46 completed the EIQ while only 32 provided usable results for the CQ.

The EIQ had a low internal consistency for subjective norms ($\alpha = 0.59$; [41]), indicating that the questions were loosely related. This result could be due to students' pragmatic individualism making them less community-minded [69,70]. If a person is highly individualistic, they may not be influenced by the approval of their elders and peers. This finding confirms EIQ research that subjective norms may not significantly affect entrepreneurial intention [77,78]. However, removing subjective norms from the EIQ would remove an important construct of content validity. The overall internal consistency of the EIQ was $\alpha = 0.88$, signifying the importance of the subjective norms construct to maintain validity.

The YAEC framework aims to guide agricultural entrepreneurship program development in LAC. The YAEC framework has limitations because of the restrictions of the limitations in the Delphi study and youth needs assessment.

4.5. Implications

The YAEC framework can guide curriculum development professionals, extensionists, and educators in designing and implementing a youth agricultural entrepreneurship program at ITESMARENA and other locations in LAC. While the entrepreneurial interest and competencies of the ITESMARENA students are not generalizable, this study provides a guide for future needs assessments of LAC youth. The YAEC framework can be used to plan program objectives, content, activities, outputs, and outcomes for entrepreneurship programs targeting youth who have not started a business. This framework may augment more advanced programs. Because the YAEC goals, outcomes, and outputs are delineated, it provides guidance for monitoring and evaluating youth agriculture entrepreneurship programs. The YAEC framework creates possibilities to streamline programs across borders that share common content, activities, and success measures.

Future research could include an investigation of entrepreneurial teaching practices and methods. The investigation of agricultural entrepreneurial teaching methods could be conducted through quantitative and qualitative research. Because this research was quantitative, qualitative investigations could pinpoint information that was not incorporated in the quantitative analysis. Further research could also focus on the relationship between the identified KSAs and entrepreneurial intent. The relationships between competencies and entrepreneurial intent could inform future YAEC programs.

The next steps include the implementation of the YAEC framework and studying its effectiveness and impact. Studies could be conducted by both practitioners and researchers. The YAEC framework could be confirmed or adapted through tests across LAC regions.

5. Conclusions

This study identified the core competencies of a youth agricultural entrepreneurship curriculum using a modified Delphi technique and a youth needs assessment. Core competencies included expert-identified and student-verified knowledge items, skills, and abilities for a youth agricultural entrepreneurship training program. The Delphi study uncovered 45 core competencies for agricultural entrepreneurship which highlight the diverse needs of agricultural entrepreneurs who require proficiency in agriculture and business. These diverse competencies reaffirm that agricultural entrepreneurs face unique challenges [8].

Our studies found that rural youth from the Dominican Republic were interested in agricultural entrepreneurship, but they lacked training in its core competencies. This research suggests that youth in the Dominican Republic are willing to establish competencies in agricultural entrepreneurship. The differences between the students' and the experts' rankings of the competencies affirm the need for a context-informed curriculum [34]. Positive youth development enabled the students of ITESMARENA to take ownership of their assets and potential program to create their own enabling environment. The YAEC framework can be used to design and implement agricultural entrepreneurship programs in LAC. The YAEC framework provides a template for researchers and practitioners to curate relevant, cohesive interventions whose impact can be assessed across boundaries

and contexts. By participating in programs designed with the YAEC framework, youth in LAC may have increased community engagement, stronger interpersonal skills, and higher-performing agribusinesses. These outcomes could build more resilient communities and youth.

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