Teaching and Education Commentaries

The Knowledge and Skills Required to Be a Successful Entrepreneur

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Abstract
Entrepreneurship has become an important topic at universities, especially in developing countries where the job market has become saturated and wages are low compared to the developed world. To strengthen its entrepreneurship curriculum, Zamorano University asked its alumni what knowledge and skills are required to be a successful entrepreneur. To analyze the responses, data mining techniques were employed. Interpretation of the results of word frequencies, associations, and a dendrogram yielded nine thematic areas that should be the focus of entrepreneurship programs at universities, according to actual entrepreneurs and experts working in agriculture. While some of the themes were expected, such as discipline-specific and business administration knowledge, other themes, such as resilience to a changing business environment, were sort of a surprise.

1 Entrepreneurship

"*The activity of setting up a business or businesses, taking on financial risks in the hope of profit*"
~ Oxford Languages (2021)

The field of entrepreneurship has come a long way over the last 30 years, to the point of becoming a formal discipline. Universities have developed complex curriculums, which are often accompanied by entrepreneurship opportunities. At some point, students present their ideas to sponsors or compete for funding to launch their businesses. In some of the most successful cases, universities have also established centers dedicated to the topic of entrepreneurship (Morris and Liguori 2016).

While entrepreneurship can take many forms, there is a growing trend of start-ups related to agriculture and climate, and investors have paid attention. According to PwC (2021), venture capital invested in climate tech has increased fivefold over the past decade.
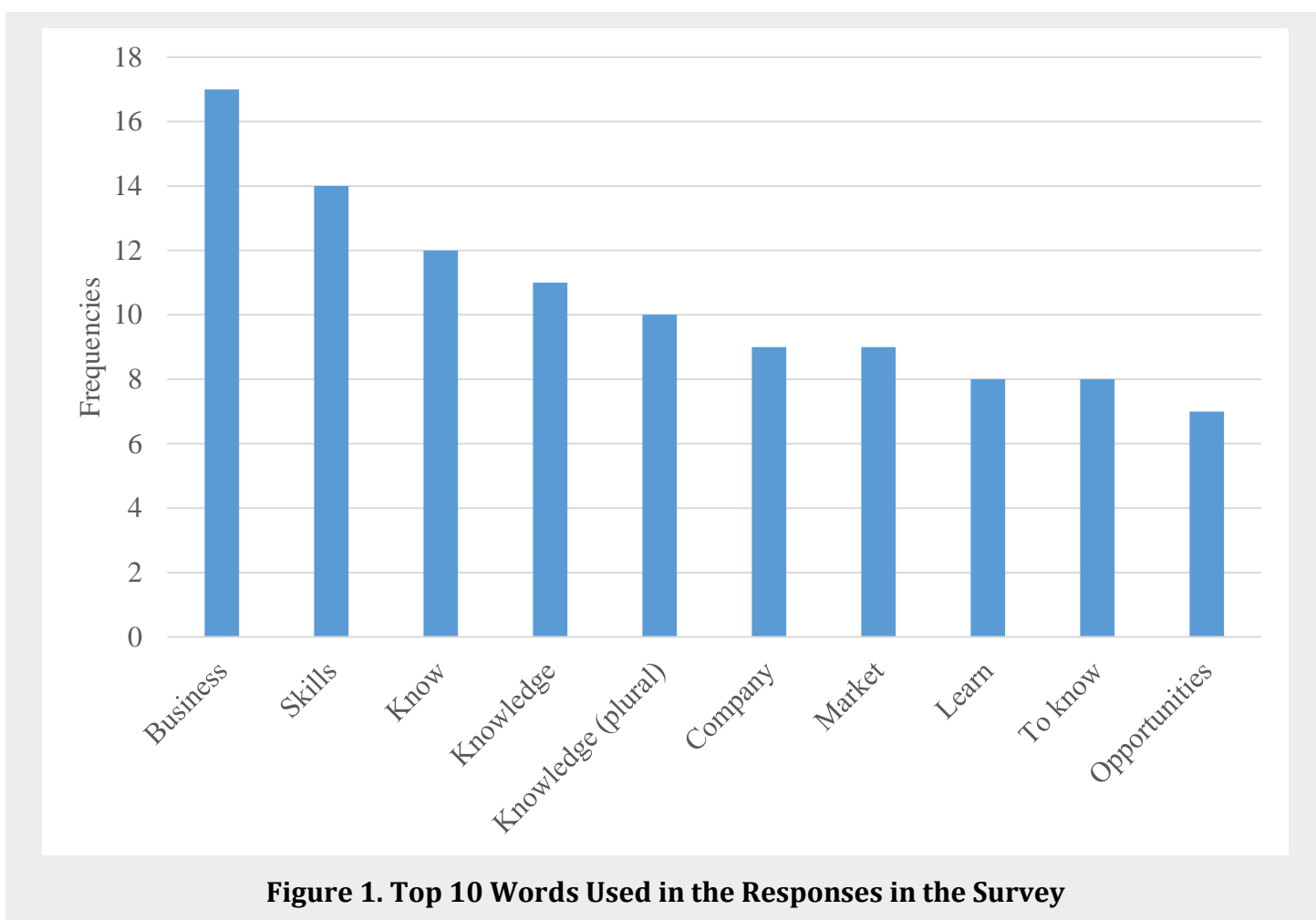
Not all entrepreneurs may start their business based on an innovation that may change the world. However, academic entrepreneurship programs are responsible for providing students with the tools to be successful, regardless of the type of entrepreneurial activity or business of their choosing. In any case, it is vital to identify the most valuable skills and knowledge to be a successful entrepreneur. In developing regions, such as Latin America, teaching students to be entrepreneurs is of utmost importance. The job market has become saturated, and wages are low compared to those in more developed regions.

Zamorano University in Honduras is one of the academic institutions seeking to strengthen their entrepreneurship curriculum and resources. In the process of doing so, among other things, we as university faculty decided to ask our alumni the following question: "What knowledge and skills are required to be a successful entrepreneur?" A survey was sent out with that question, allowing alumni to answer in essay format. This teaching commentary aims to present the identified thematic areas that arose from the survey and should be taught at universities or as part of curriculums, according to entrepreneurs and specialists in Latin America.

The survey was sent through Zamorano University's alumni network and was open from April 15 to May 3, 2021. The survey received 80 responses. We asked for the participation of entrepreneurs and researchers among alumni familiar with the topic. Due to the unstructured nature of the data set, it was analyzed using "R" statistical software via text-mining techniques. The "R" packages used include tm, qdap, and ggplot, among others. The steps taken for the analysis included: (1) data set cleaning and preparation, (2) frequency analysis of terms, (3) estimation of associations with select terms, (4) development and assessment of dendrograms, and (5) identification and definition of thematic areas. Because of the relatively small size of the data set, text-mining techniques were not required, but were employed.

In the first step, data set cleaning and preparation for analysis, punctuation, capital letters, and stop words such as "as," "the," and "is," but in Spanish, were removed, and a term document matrix was created.

In the second step, the frequencies, or the number of occurrences of each word, were estimated. The most important finding of this step was that, as expected, respondents used several variations of the same word. The top ten words are shown in Figure 1.

Figure 1. Top 10 Words Used in the Responses in the Survey

The objective of the third step, estimation of associations with selected terms, was to find the most important word associations (correlations) with the words "skills," "knowledge," and "learn" along with their variations. Emphasis was given to these words because survey participants were literally asked to elaborate on what are the skills and knowledge required to be a successful entrepreneur. Hence, words correlated with these three and their variations would help identify such skills and knowledge. Only

moderate to strong correlations, ≥ 0.4, were considered. In Table 1, the relevant associations with each word are shown. It is important to consider that there were more words with moderate to high correlations, but these were not necessarily relevant for the analysis.

Table 1. Word Associations

Base Words	Word Associations
Skills	Soft, listen, technological, be related, organize, languages, talk, learn, structure, communication, analytical.
Knowledge	Technological, be related, promotion, productivity, production, languages, communicate, communication, commercialization, analytical, alternative, agreement, deep, market, business, needed, wide, administration, technical, innovation, financing, service, product, projection, marketing, self-confidence, sales.
Learn	Production, crops, harvest, neuroscience.

A dendrogram is a type of tree visualization that shows how similar or associated objects are, in this case, words. One important feature of the dendrogram is that it allows visualizing relationships between words. For example, a group of words clustered together may be associated with a word in a superior hierarchical level. For example, the word "innovate" was consistently used with a cluster of words related to processes, costs, and marketing. While the dendrogram is not shown because it is in Spanish, key findings included: (1) the words "to know" and "skills" were used similarly, (2) the words "knowledge" and "market" were used similarly or together, and (3) as expected, "to know" and "skills" were consistently used with a cluster containing all other words.

Finally, in step five, frequencies, associations, and the dendrogram were examined together to conclude the thematic areas that should be taught to provide undergraduate students with the required skills and knowledge to be successful agricultural entrepreneurs. The identified thematic areas, in no classification order, are:
1. Business administration
    a. Sales analysis
    b. Finance
    c. Risk management
2. Continuous learning (learn to learn)
3. Analysis of market opportunities
4. Innovation
5. Resilience
6. Soft skills
    a. Learn to deal with failure
    b. Communication
7. Analytical skills (data literacy)
8. Discipline-related technological knowledge
9. Discipline-specific knowledge

2 Discussion

Some of the thematic areas were expected, such as business administration, analysis of market opportunities, and soft skills (communication), as they are required to legally establish a business and prepare the entrepreneur to make a sales pitch of the business to investors or new clients. The other thematic areas provide interesting food for thought when considered in the light of the comments from survey participants along with the personal experiences of those associated with Zamorano University's Entrepreneurship Center (CIEZ).

2.1 Continuous Learning

Overall, respondents acknowledged that no university degree could provide students with all the skills and knowledge required to be successful agricultural entrepreneurs. Therefore, entrepreneurs must be ready to continue learning after college, primarily through non-degree continuous education courses. This is particularly challenging, as students may not have the discipline and motivation to start and finish online self-paced courses. Hence, they should *learn to learn.*

2.2 Innovation

Innovation is a trending topic in higher education but is usually misinterpreted as invention. Two trends were identified in the analysis: (1) internal innovation and (2) product innovation, mostly new product and services research and development. Established businesses must incorporate innovation to make their administrative processes efficient, reduce costs, and manage innovation processes within the business to deliver new products and services to customers through some form of Research, Development, and Innovation (R&D+i), regardless of the type of business. Regarding new product and services research and development, respondents indicated the need to teach innovation to undergraduates so they can take their inventions all the way to market, especially for technical majors. Students in technical fields usually develop new products and services with little knowledge of market demand. Usually, they lack the required knowledge to push their ideas beyond the development phase, resulting in the efforts not generating any potential value after all.

2.3 Resilience and Learning to Deal with Failure

According to Duke University's Fuqua School of Business (n.d.), there are five phases in the entrepreneurial process: (1) idea generation, (2) opportunity evaluation, (3) planning, (4) company formation/launch, and (5) growth. In our experience at the CIEZ, students enjoy the hype of the idea generation phase but abandon the process either at the opportunity or planning phase, especially if majoring in a technical field. According to our respondents, students must be resilient and not become unmotivated if their original idea is initially not feasible. Instead, they must take all new knowledge acquired through the process and evaluate all possible alternatives that derive from their original idea. One respondent said: "Entrepreneurship can be very romantic, especially if you had the idea when you were young, but you should not marry that idea and instead seek what is best for business." Students must acquire the emotional intelligence to deal with failure, as almost no enterprise gets it right and is successful in the first attempt.

2.4 Analytical Skills and Discipline-Related Technological Knowledge

With the advent of the Internet of Things (IoT), which are cloud-connected or smart devices, and Agriculture 4.0, which includes better and cheaper hardware for data collection and higher data analytical capacity, students must be data literate. Otherwise, they will not be able to take advantage of the abundant information that is being generated at all levels in the value chain. It must be kept in mind that students do not need to be data scientists with the skill to perform complex analyses. However, they

need to understand the structure of data they have available to them, as well as be able to obtain and correctly interpret descriptive statistics and visualizations.

Additionally, entrepreneurs must continuously monitor and learn new technology advances that relate to their business. A respondent said, "Because I am technologically savvy, my business had an online presence, and we had good communication with our clients through social media. When the pandemic came, we already had a channel of communication with our clients, and we were able to deliver products using delivery apps quickly."

2.5 Discipline-Specific Knowledge

Frequently, students have ideas for which they do not have the knowledge to develop. For example, a student may have an idea for a plant-based meat substitute and be an agriculture economics major. In this case, the student may soon abandon their entrepreneurship goal simply because they do not have the technical skills to produce a prototype. Our respondents emphasized that entrepreneurs must have deep discipline knowledge in the field they want to start a business, as well as business administration knowledge. Students must either have access to deep knowledge on their own or learn to team up (effectively) with peers who contribute such knowledge to the enterprise.

Frequently, teamwork is promoted during classroom exercises and fairs. If the professor does not randomly or strategically create the teams, students do it themselves by friendship or prior connection, which may finally lead to social loafing (Boren and Morales 2018). The problem with social loafing, when students put less than their fair share of the team effort, is that it may hinder the development of a promising idea or give credit and even financial rewards to students who do not deserve it. In short, the professor must ensure students learn to conform effective and productive teams.

3 Conclusion

According to 80 entrepreneurs and experts in Latin America, nine thematic areas should be taught at universities and in college curriculums to be able to educate successful entrepreneurs. Some of the identified thematic areas were expected and constitute the basis of entrepreneurship, such as business administration, market analysis, communication, and discipline-specific knowledge. Others, like innovation, analytical skills, continuous learning, and discipline-related technological knowledge, reflect trends in the agricultural sector, such as big data and precision and digital agriculture. Therefore, knowledge and skills in agriculture 4.0 will be fundamental to thrive in an increasingly digitalized agricultural sector. Finally, resilience and learning to deal with failure, which is not knowledge or skills, but abilities related to emotional intelligence, should be developed mainly during the early stages of entrepreneurship programs.

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