

Impact of the SENA Rural Entrepreneurship Training Program on the Development of Productive Units during the Covid 19 Pandemic in Colombia

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Abstract

Rural productive units represent an alternative for improving the quality of life in rural communities, but they require relevant training for their implementation and sustainability. During the COVID-19 pandemic, the business training processes offered by the National Learning Service (SENA) underwent significant transformations, which in many cases were not effective in consolidating these productive units. The objective of this study is to analyze the effectiveness of SENA training programs during the social confinement in Colombia and their impact on the development of rural productive units in municipalities of Cundinamarca. A qualitative approach with descriptive scope and an action research design was used, employing interviews and focus groups with 22 participants of the SENA Emprise Rural program. The findings indicate that the insufficient accompaniment by tutors and the lack of adequate training hindered the consolidation of the productive units, which led to the closure of seven of them by the beneficiaries. Therefore, it is concluded that it is necessary to offer training programs adjusted to the needs of the rural context, in addition to providing continuous support and financing to ensure the sustainability of the productive units.

Keywords: Rural business training, COVID-19 pandemic, SENA, productive units.

1. Introduction

Rural productive units have been consolidated as fundamental strategies for the socioeconomic development of rural communities by offering viable alternatives to improve their quality of life (Clavijo et al., 2021). However, for these initiatives to be successful, it is necessary to have relevant entrepreneurial training that responds to the specific needs and challenges of the rural environment (Parra and Ramírez 2020). Rural entrepreneurship training, especially in times of crisis such as the COVID-19 pandemic, becomes critically relevant. During this period, teaching

and learning processes had to adapt quickly to new modalities, such as remote training, which posed significant challenges for the consolidation of rural enterprises (Hurtado et al., 2022).

The National Learning Service (SENA) has played a central role in the training of rural entrepreneurs in Colombia, especially through its SENA *Emprende Rural* program, which seeks to foster the creation and sustainability of productive units by strengthening entrepreneurial skills (Sánchez, 2020). However, the restrictions imposed by confinement during the pandemic forced SENA training programs to transform, adopting a predominantly virtual approach. This adaptation, although necessary, generated doubts about the effectiveness of the training provided and its ability to meet the needs of rural entrepreneurs (Álvarez, 2021).

Recent studies suggest that the entrepreneurial training strategies implemented during the pandemic were not always adequate to respond to the demands of the rural context. The lack of access to technological resources, low connectivity, and the poor preparation of some tutors to handle digital tools limited the effectiveness of these programs (Rodríguez and Pérez, 2022). In turn, rural entrepreneurs faced multiple difficulties in consolidating their productive units in an environment of economic and social uncertainty (Torres, 2021).

In this context, this study sought to analyze the effectiveness of SENA's business training programs during social confinement in Colombia and their impact on the development of rural productive units in municipalities of Cundinamarca. For this purpose, a qualitative approach with a descriptive scope and an action-research design was used, using interviews and focus groups with 22 participants of the SENA *Emprende Rural* program. This analysis will make it possible to identify the strengths and weaknesses of the training processes in times of crisis and to propose recommendations to improve their effectiveness in the rural context (Hernández and Polanía, 2023). The need to adjust these programs to the conditions of the rural environment becomes fundamental to guarantee their sustainability and, thus, contribute to the integral development of these communities.

2. Literature Review

The following paragraphs review the body of research and theoretical approaches that contextualize and substantiate the impact of business training programs in rural contexts, with special emphasis on the emerging dynamics during the COVID-19 pandemic. To this end, we first analyze the characteristics and relevance of rural business training and its role in the development of productive units, as well as the specific challenges it faces in these environments. Next, we explore the adaptations and changes that these training processes, particularly the SENA *Emprende Rural* program, have undergone due to the pandemic and how these transformations have affected the consolidation of rural productive units. Subsequently, the concept of rural productive units and the factors that determine their sustainability are addressed, delving into the role that entrepreneurial training plays in their development. Finally, the challenges and opportunities of virtual business training in rural areas are discussed, highlighting the implications of accelerated digitalization in these contexts and its potential to contribute to a more accessible and flexible education in the future.

Entrepreneurial Training in Rural Contexts

Entrepreneurial training in rural contexts is defined as the educational and training process that seeks to improve the entrepreneurial competencies of the inhabitants of rural areas, with the objective of promoting the creation, development and sustainability of productive units in these regions (Méndez et al., 2020). This type of training includes different activities aimed at strengthening skills in management, finance, marketing, strategic planning, and other aspects relevant to rural business administration. The main characteristics of rural business training include its practical and contextualized approach, adapted to the specific needs of the rural environment, as well as its orientation to the development of technical and administrative competencies that contribute to improving the efficiency, productivity and competitiveness of local productive units (Pérez and Ramírez, 2019). In this sense, business training in rural areas is not only limited to the transmission of theoretical knowledge, but also focuses on the practical application of this knowledge to face the challenges specific to the rural environment (Rodríguez and Sánchez, 2018).

Entrepreneurial training is crucial for the economic development of rural communities, as it facilitates the generation of new business opportunities, improves the management of local resources, and promotes the sustainability of rural productive units (González and Rojas, 2019). This training allows rural entrepreneurs to acquire skills necessary to face market difficulties, access new financing opportunities, and improve their ability to negotiate and establish strategic alliances. According to Valencia and Bustos (2022), appropriate entrepreneurial training can significantly contribute to strengthening local capacities, fostering economic inclusion and empowerment of rural communities, which is fundamental for their long-term sustainable development. However, despite the potential benefits, there are numerous challenges that hinder the effective implementation of entrepreneurship training programs in rural areas.

Among the main challenges of business training in rural contexts are the lack of adequate infrastructure, limited access to educational resources and cultural barriers that hinder the adoption of new business practices (Ramírez and Gómez, 2023). The lack of Internet connectivity and appropriate technologies represents a significant obstacle to virtual training, especially in the context of the COVID-19 pandemic, which has forced a transition to non-face-to-face educational modalities (Martínez and Pérez, 2022). In addition, resistance to change on the part of some rural communities, together with the scarcity of trained trainers in rural areas, complicates the effectiveness of training programs. According to López et al. (2021), overcoming these challenges requires a comprehensive approach that combines investment in infrastructure, the development of educational materials adapted to local needs, and the promotion of an inclusive and innovation-oriented entrepreneurial culture.

Rural Productive Units: Concept and Sustainable Development

Rural productive units are defined as those economic entities located in rural areas whose purpose is the production of goods or services, with a focus on the use of local resources and the generation of employment in the communities in which they operate (Rodríguez and Sánchez, 2019). These units can be classified into various typologies, such as agricultural, artisanal, tourism or service units, depending on the main economic activity they develop. The main

characteristics of rural productive units include their dependence on local natural resources, predominantly family or community labor, and a generally informal and small-scale organizational structure (García and Martínez, 2020). In turn, these units are influenced by contextual factors specific to the rural environment, such as limited access to advanced technologies, restricted markets, and variable climatic and geographic conditions that affect their functioning (Rodríguez and Sánchez, 2019).

The sustainability of rural productive units depends on several critical factors that determine their long-term success and viability. These factors include access to markets, the availability of financing, and the provision of adequate training and technical support (Paredes et al., 2021). Access to markets is essential for rural productive units to be able to sell their products or services at competitive prices and obtain income that allows them to reinvest in their operations. On the other hand, the availability of financing allows these units to make necessary investments in infrastructure, technology and human capital, essential elements to improve their productivity and sustainability (Gómez and Ramírez, 2018). In addition, business training and technical accompaniment play a key role in strengthening management capacities and in the adoption of sustainable practices that allow productive units to adapt to changes in the economic and social environment (Paredes et al., 2021).

The impact of business training on the sustainability of rural productive units is manifested in the improvement of management skills of owners and workers, the optimization of production processes, and the implementation of innovative strategies that favor resilience in the face of external challenges (López et al., 2021). According to López et al. (2021), business training contributes to the development of critical skills for strategic planning, financial management, marketing and negotiation, resulting in an increased ability to identify business opportunities, manage risks and optimize resources. Ongoing support through training and accompaniment programs enables rural entrepreneurs to adapt to changes in market conditions, incorporate sustainable practices in their operations, and improve their competitiveness in the medium and long term (López et al., 2021; García and Martínez, 2020).

Challenges and Opportunities in Virtual Business Training in Rural Areas

The implementation of virtual business training in rural areas faces several challenges that limit its effectiveness and reach. One of the main obstacles is the digital divide, characterized by limited technological infrastructure and lack of access to adequate devices and high quality connectivity in these regions (Rojas and León, 2022). This lack of technological resources affects both program participants and trainers, who, in addition, often lack the necessary training to effectively use digital tools in the teaching process (Méndez et al., 2021). There are also significant cultural barriers that manifest themselves in resistance to technological change on the part of rural communities, who often prefer traditional learning methods and show distrust towards digital training platforms (Pérez and Martínez, 2020).

Despite these challenges, virtual training in rural areas also offers important opportunities, especially in the post-pandemic context. One of the most outstanding advantages is the flexibility provided by virtual education, allowing participants to access educational content and resources at times and locations that better suit their needs and local contexts (Valencia and Bustos, 2022).

This educational modality also allows expanded access to a wider variety of training resources, including multimedia materials, discussion forums and online tutorials, which enrich the learning experience and enhance the acquisition of entrepreneurial competencies (Ramírez and Gómez, 2023). In addition, virtual education can significantly expand the reach of training programs, reaching communities that would otherwise be excluded due to geographic and transportation limitations (Valencia and Bustos, 2022).

The COVID-19 pandemic has accelerated the adoption of virtual training modalities, and with it, has fostered greater acceptance and adaptation of these methodologies in rural contexts. According to Fernández and López (2021), virtual education has proven to be a valuable tool for the continuity of learning in times of crisis, and its post-pandemic consolidation can contribute to overcoming traditional barriers to access to education in rural areas. The opportunities offered by this modality, such as the personalization of learning and the possibility of connecting students and trainers from different regions, suggest a promising future for entrepreneurial training in these areas, provided that the specific needs of infrastructure, training and cultural adaptation are addressed (Rojas and León, 2022).

3. Materials and Methods

This section details the methodology employed in the research, including the methods integrated in the research process, the study categories and the selected participants. It also describes the data collection techniques and instruments and other pertinent elements of the research process.

Type of research

The present study is part of the qualitative paradigm which, according to Creswell and Poth (2018), is oriented to the construction of knowledge about social reality through the analysis of the experiences and perspectives of the subjects who live it. This approach implies an interpretive and dialogic stance towards the realities perceived by the participants, recognizing their centrality to understand the impact of the SENA rural entrepreneurial training program in the pandemic context.

Merriam and Tisdell (2022) point out that qualitative research seeks to interpret the phenomena experienced by subjects in their daily context, considering their particularities. Under this perspective, this study aims to interpret the perceptions and experiences of the participants with respect to the development of rural productive units during the Covid-19 pandemic, exploring the influence of the SENA program on their capacity to adapt and grow under adverse circumstances.

Likewise, the research also adopts a descriptive approach which, according to Yin (2018), allows detailing phenomena, contexts and events associated with the object of study, specifying their manifestations and characteristics. This approach is fundamental to detail the characteristics and results of the productive units developed during the pandemic, as well as to identify the factors that facilitated or limited their success, from the perspective of rural entrepreneurs.

The methodology also follows an action research design that, as indicated by McNiff and Whitehead (2023), encourages systematic and critical reflection by participants on their experiences and practices. This approach not only seeks to identify and analyze the impact of the SENA program, but also to generate recommendations to strengthen future interventions in the area of rural business training, especially in crisis situations such as the one experienced during the pandemic.

Unit of Study

The unit of study of this research is composed of apprentices of the SENA Emprende Rural program, who participated in the training course during the Covid-19 pandemic in Colombia. This course integrates technical training with the development of skills for entrepreneurship, with the objective that the apprentices become creators and managers of their own businesses, generating income for their livelihood and that of their families.

A total of 22 apprentices from different municipalities in the western part of the department of Cundinamarca, such as Mosquera, Funza, Bojacá, Zipacón, Facatativá, Subachoque and Cota, were considered. From these, a purposive sample of 15 apprentices was selected by means of convenience sampling. This type of sampling was applied considering factors such as availability, the interest shown by the apprentices, their active participation in the program during the pandemic, and especially the continuity in the management of the productive units they created during the course.

The main criterion for selection was the capacity demonstrated by these 15 apprentices to keep their productive units in operation despite the difficulties presented by the health crisis. This continuity is considered essential to evaluate the real impact of the program on the development of effective entrepreneurial skills. The specific criteria used for selection are detailed in Table 1.

Table 1 Criteria established for the selection of the study unit

Unit of study	Selection criteria
15 apprentices of the SENA Emprende Rural program from the municipalities of Mosquera, Funza, Bojacá, Zipacón, Facatativá, Subachoque and Cota, Cundinamarca.	- Be an apprentice of the SENA Emprende Rural program during the Covid-19 pandemic.
	- Show interest and availability to participate in the research.
	- Active participation in the course during the confinement period.
	- To have kept the productive unit created during the course operational.
	- Represent the geographic diversity of the municipalities of western Cundinamarca.

The choice of this unit of study is based on the objective of analyzing the impact of SENA's rural business training program on the development and sustainability of productive units during the Covid-19 pandemic. The selected trainees provide valuable insight into how the program has influenced their abilities to create, manage and maintain enterprises in a crisis context, allowing for an evaluation of their effectiveness and areas for improvement.

Study Categories

The objective of this study is to analyze the impact of the SENA rural business training program on the development and sustainability of the productive units created by the beneficiaries during

the Covid-19 pandemic in Colombia. To achieve this objective, a qualitative approach has been used to explore in depth the perceptions, experiences and results obtained by the participants of the program, who have faced significant challenges due to the context of confinement and social restrictions.

In this context, the study categories have been identified and refined through an inductive process, based on the collection and analysis of qualitative data from questionnaires applied to program beneficiaries, as well as semi-structured interviews and focus groups. This approach has made it possible to capture the complexities of the program's impact on the productive units from the perspective of the participants themselves, thus ensuring greater validity and depth in the findings.

The process of configuring the study categories was developed in the following stages:

- **Qualitative Data Collection:** Questionnaires were administered to 15 beneficiaries of the SENA Empeño Rural program who participated in the training during the pandemic. Subsequently, semi-structured interviews and focus groups were conducted with 8 and 7 of the beneficiaries who managed to keep their productive units active, which allowed for an in-depth exploration of their perceptions of the training process, the results achieved and the difficulties faced.
- **Open Coding:** The data collected were transcribed and analyzed through open coding, according to the approach of Strauss and Corbin (2002). This initial phase consisted of a thorough reading of the texts to identify patterns, recurrent themes, concepts or key ideas related to the impact of SENA training in the productive units. Through this process, initial codes were assigned to text fragments representing emerging themes such as acquired knowledge, digital skills, and business consolidation.
- **Axial coding:** From the initial codes, axial coding was carried out to reorganize and group the codes around broader thematic axes or preliminary categories. This process made it possible to identify relationships between the codes, structuring them into categories that represent significant dimensions of the impact of training on the development of productive units (Saldaña, 2015).
- **Category Refinement:** The emerging categories were reviewed and refined through an iterative process of constant comparison (Glaser and Strauss, 1967). During this stage, the preliminary categories were contrasted with the original data and adjusted to ensure their coherence, relevance and explanatory capacity. This process ensured that the emerging categories were aligned with the objectives of the study and the research context.
- **Final Definition of Categories:** Once refined, the final study categories were precisely defined and validated through data triangulation (Denzin, 1978), combining information from different data sources (questionnaires, interviews and focus groups). This process made it possible to consolidate a set of categories that reflect the key elements that influence the impact of the SENA training program on the productive units. The categories emerging from the analysis of the data collected are presented below.

The final study categories were defined to understand the impact of SENA's rural entrepreneurship training program during the COVID-19 pandemic on the development of productive units in Colombia. The first category, "Perception of the Implementation of the SENA Emprende Rural Training," focused on the evaluation of how the entrepreneurial training provided by SENA contributed to improving the knowledge of the trainees. This category analyzed, firstly, entrepreneurship, reflecting how participants acquired fundamental skills to start and manage their ventures effectively, facing the challenges of the pandemic context. Secondly, it considered resilience through learning, highlighting the ability of trainees to adapt to change and continue to develop their skills despite the adversities generated by the pandemic, such as the need to adjust their business models and learning strategies.

The second category, "Strengthening Digital Skills," explored how the training enabled trainees to develop competencies in the use of digital technologies, which were crucial for the continuity of their businesses during periods of confinement. This category was broken down into two specific dimensions: access to new technologies and use to publicize ventures. In the first dimension, the degree to which participants had access to and used technological tools to keep their productive units active, adapting to the limitations of confinement, was measured. In the second dimension, we analyzed how the trainees used the digital skills acquired to promote and expand their businesses through digital media, thus overcoming the barriers imposed by the lack of physical contact and reaching new markets.

The last category, "Consolidation of the Productive Unit", evaluated the impact of the program on the capacity of the trainees to establish and maintain their businesses over time, despite the restrictions imposed by the pandemic. Within this category, first, teamwork was considered, which analyzed how collaborative work among the entrepreneurs was a decisive factor in the consolidation of the productive units, facilitating resilience in the face of difficulties and promoting a sense of community and mutual support. Secondly, the future projection examined the entrepreneurs' expectations, plans and strategies for the long-term sustainability and growth of their businesses, considering the post-pandemic context. Here we analyzed the entrepreneurs' efforts to adapt to the new reality, implement strategic changes and take advantage of emerging opportunities in the market to ensure the viability of their initiatives.

Stages of the Research Process

In the section corresponding to the phases of the research process, three fundamental stages were developed to achieve the objectives of the study and to obtain a detailed understanding of the impact of the SENA Emprende Rural training program during the COVID-19 pandemic on the development of productive units in Colombia. Each phase was designed with a specific purpose, interrelated to ensure a systematic and coherent approach throughout the research.

The first phase, called the characterization phase, aimed to identify and understand the impact of the training provided by the SENA program on the apprentices, according to the established study categories. During this phase, information related to aspects such as entrepreneurial capacity, resilience to learning, strengthening of digital skills and consolidation of productive units was collected and analyzed in order to identify the achievements and challenges faced by the apprentices in the pandemic context. This phase allowed to outline a clear picture of the

perceptions and experiences of the participants, establishing the basis for the formulation of proposals for improvement in subsequent stages.

The second phase was oriented towards the formulation of an action plan, specifically designed to address and overcome the problems and challenges identified in the characterization phase. This stage involved a process of analysis of the deficiencies and emerging needs, from which strategies and practical recommendations were constructed to optimize the impact of the training offered by SENA. Interventions at both the curricular and methodological levels were considered, as well as the integration of additional resources to facilitate the adaptability and effectiveness of the program in situations of crisis or limitations, such as those imposed by the pandemic. The formulation of the action plan was based on a participatory approach, incorporating the opinions and suggestions of experts, trainers and the program beneficiaries themselves.

Finally, the third phase of the research focused on the presentation of the action plan to SENA managers, with the purpose of validating its relevance and feasibility or making necessary adjustments prior to its implementation. This stage involved a review and feedback process, in which meetings and workshops were held with institutional leaders to analyze the proposals formulated and consider their alignment with SENA's strategic objectives. In addition, possible obstacles or limitations to the execution of the plan were evaluated and modifications were proposed to ensure that the recommended actions were adaptable, effective and sustainable in the context of rural training. This phase culminated in the preparation of a final report that integrated the accepted recommendations and agreed adjustments, providing a clear roadmap for the continuous improvement of the SENA Emprise Rural program.

4. Results

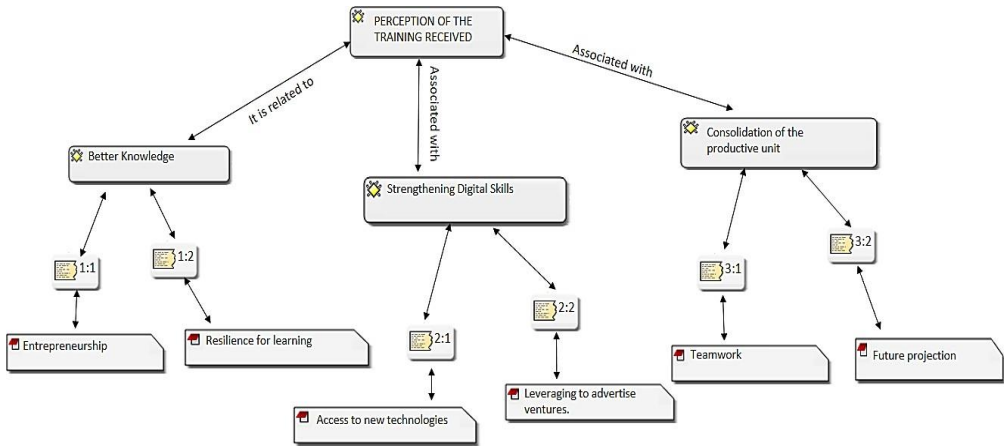
The results of this research are in line with the proposed objectives, evidencing the fulfillment of the methodological stages formulated. Throughout the process, various dimensions of the impact of the SENA rural business training program during the COVID-19 pandemic were analyzed, focusing on the development of productive units. Each of the phases of the research made it possible to observe how the training provided contributed to the strengthening of entrepreneurial competencies in rural contexts, adapting to the exceptional conditions imposed by the global health crisis.

- Results of the characterization phase

The purpose of the characterization phase was to identify the impact of the SENA program on the apprentices, based on the emerging study categories. Through the administration of interviews with 15 key informants linked to the study, information was obtained that allowed the analysis of aspects such as entrepreneurial capacity, resilience to learning, strengthening of digital skills and consolidation of productive units in the context of the pandemic. The data were processed and analyzed using Atlas.ti software, which facilitated the creation of a semantic network (see Figure 1), integrating the emerging categories derived from the analysis, making it

possible to visualize the connections between the different impact factors on the development of the apprentices.

Figure 1. Semantic network derived from the analysis of the interviews administered to the informants involved in the study.



Note: The illustration details the study categories emerging from the analysis of the interviews administered to the informants.

- Category Perception in the execution of the SENA Emprende Rural Training

In the category Perception on the execution of the SENA Emprende Rural training, the results obtained through interviews administered to 15 informants show that the implementation of remote classes during the COVID-19 pandemic had a positive impact. The transition to digital tools such as WhatsApp, Google Meet and Zoom allowed students not only to acquire theoretical knowledge, but also to strengthen key skills such as entrepreneurship and resilience to new learning methodologies. Despite initial difficulties with e-learning, students highlighted that these tools facilitated their adaptation to changes and contributed to the development of their productive projects.

The informants also emphasized that remote training made it possible to consolidate learning on topics relevant to their productive units. In their opinion, the appropriation of knowledge was effective, partly due to the flexibility offered by the digital platforms. However, some pointed out that learning would have been more complete with more face-to-face interaction, since distance training limited the development of practical skills essential for the implementation of their projects.

On the other hand, the interviewees emphasized the strengthening of their digital competencies. The need to use technological platforms to continue the training process during the confinement gave them the opportunity to improve their technological skills, which has been useful for the management of their productive units. However, this process was not without difficulties, as

several students mentioned that the low quality of connectivity in rural areas was a recurring obstacle that limited their continued participation in classes.

In terms of challenges, the lack of face-to-face interaction with instructors was one of the main aspects that students felt needed improvement. The physical presence of the instructors would have allowed for better development of specific techniques and closer monitoring of the progress of the productive projects. The majority of respondents expressed that, although the remote training provided a good theoretical basis, face-to-face mentoring is essential for practical learning in rural contexts.

Overall, the results in this category reflect the effectiveness of the remote training implemented by the SENA Emprande Rural program during the pandemic, but also highlight areas for improvement related to face-to-face interaction and connectivity in rural areas. These findings underscore the importance of combining digital strategies with direct accompaniment to maximize the impact of training in rural contexts.

- Category Consolidation of productive units from the SENA Emprande Rural training program

The category Consolidation of productive units from SENA Emprande Rural training reveals important findings on the impact of the program on the creation and sustainability of these initiatives. In general, the beneficiaries of the program were able to implement productive units that, in many cases, improved their socioeconomic wellbeing. However, the analysis of two subcategories shows both progress and significant challenges to ensure the continuity of these units.

The first subcategory, Teamwork, highlights that, although beneficiaries developed communication and collaboration skills, the lack of adequate training in social skills was an obstacle in several cases. This was reflected in the dissolution of some productive units due to coordination and cohesion problems among team members. Testimonies such as that of informant 12 underline that the lack of communication skills negatively affected the success of the initiatives, making evident the need to integrate social development and leadership modules in the training.

On the other hand, the subcategory Projection of productive units over time reveals that only 15 of the 22 consolidated productive units remain active. Although this result shows acceptable sustainability, several factors, such as insufficient income and lack of continuous support, led to the closure of seven units. Beneficiaries indicated that the pandemic exacerbated these problems, affecting the capacity of the productive units to generate sufficient income, which reduced their long-term economic viability.

In addition, several testimonies indicated that distance and lack of face-to-face interaction weakened associativity among entrepreneurs, a key aspect in the consolidation of productive units. The lack of cohesion and teamwork, together with the absence of clear leadership, hindered the continuity of the initiatives in several cases. This factor highlights the importance of fostering collaborative work within the program.

In itself, the analysis of this category underscores that, although the SENA Empeñe Rural program has made significant progress in consolidating productive units, there are key areas that require improvement. The strengthening of social skills, associativity and more constant accompaniment by SENA are essential to guarantee the sustainability of these initiatives in the long term.

- Category: Digital Skills Strengthening

The category Strengthening of Digital Skills in the framework of the SENA Empeñe Rural program during the COVID-19 confinement shows an important impact on the acquisition of technological skills by rural apprentices. The use of platforms such as Google Meet, Zoom and WhatsApp, tools that were unknown to many, allowed beneficiaries to continue their training despite physical limitations. However, connectivity and access to devices represented significant barriers, especially in rural areas, which affected the pace of learning for some students.

In the subcategory Access to new technologies, the testimonies show that the trainees managed to adapt to the digital environment thanks to the accompaniment of the instructors. Although access to digital platforms was mostly achieved, technical and infrastructure challenges, such as the low quality of the internet connection, hindered the learning experience for several of the participants, who had to overcome these barriers to continue with their training.

On the other hand, the subcategory Use to publicize enterprises reveals that, although the trainees acquired basic skills in the use of technologies, they still have difficulties in the application of these tools to promote their productive units. This highlights a need for additional training in digital marketing, especially in terms of customer acquisition and promotion in social networks, key areas for the growth of the enterprises.

The testimonies collected in this category highlight a gap in advanced skills that limit the ability of rural entrepreneurs to maximize the opportunities of the digital environment. Although the basic use of digital platforms was mastered, the trainees stated that they did not feel prepared to take full advantage of these tools for the dissemination and sustainability of their projects.

In essence, the results evidence the importance of continuing to strengthen digital skills in rural apprentices in the SENA program, but with a specific focus on the strategic use of these tools. It is necessary for the program to include training in digital marketing to enable beneficiaries to achieve sustainable growth of their enterprises in a rural context with greater technological limitations.

In summary, the analysis of the study categories reveals a balance between the achievements and challenges of the SENA Empeñe Rural program during the confinement. Although the apprentices acquired theoretical knowledge and strengthened their digital skills, the limitations in connectivity and the lack of face-to-face interaction underscored the need to adopt a hybrid approach that integrates the remote with practical teaching. The productive units, although functional in their creation, present difficulties in generating sufficient income, highlighting the urgency of structured and continuous support, both in terms of economic resources and in the creation of marketing networks that allow access to wider markets.

Likewise, the strengthening of digital skills, although significant, has not been sufficient to close the digital divide in rural areas. More specialized training in digital marketing and e-commerce is required so that entrepreneurs can apply technological tools effectively in their businesses. In this context, it is crucial that support goes beyond technical training, encompassing aspects of accounting and motivational advice and access to resources that promote the long-term sustainability of productive units, thus ensuring a lasting impact on the rural communities benefited.

- Results of the action plan formulation phase

The action plan is formulated based on the detailed analysis of the categories studied, which include the perception of the execution of training in the SENA *Emprende Rural* program, the consolidation of productive units and the strengthening of digital skills. Each of these categories has made it possible to identify key areas for the improvement and sustainability of the training and productive initiatives of rural entrepreneurs. Based on these results, several strategic actions are proposed that seek to address the limitations found and enhance the achievements obtained.

Regarding the improvement of hybrid educational training, the analysis has shown that, although remote training during confinement allowed continuing with the educational process, connectivity difficulties and the lack of face-to-face interaction were significant limitations. Therefore, it is proposed to implement a hybrid approach that combines the advantages of virtual and face-to-face training. This model should guarantee access to adequate technological resources in rural areas and train instructors in methodologies that effectively integrate both modalities, thus ensuring a more complete and accessible training.

To strengthen the sustainability of the productive units, it is necessary to implement a continuous support system that goes beyond initial training. The results show that many of the productive units created have faced economic and marketing difficulties, so it is vital to establish mechanisms that facilitate access to broader markets. In addition, the creation of collaboration networks between entrepreneurs and commercial entities should be promoted, and advice on financial management and diversification of activities should be offered. Structured accompaniment, including periodic follow-up, is essential to ensure the growth and long-term viability of these initiatives.

In relation to strengthening digital skills, although significant progress has been made, the results highlight the need to expand competencies in areas such as digital marketing and e-commerce. These skills are crucial for rural entrepreneurs to expand their markets and increase the visibility of their products. Therefore, a training program in advanced digital skills is proposed, focused on the strategic use of digital platforms for marketing, which will enable rural entrepreneurs to compete in an increasingly digitized environment.

Finally, a comprehensive post-training accompaniment is proposed, including not only technical support, but also accounting, motivational and financial advice. This support should be tailored to the specific needs of each entrepreneur and ensure that they have the necessary tools to face the challenges of the market and improve their economic stability. Only with comprehensive and continuous support will productive units be able to consolidate and have a lasting positive impact on the economic and social development of rural communities.

This action plan responds to the needs identified in the analysis of the categories and seeks to strengthen the achievements, ensuring that the beneficiaries of the SENA *Emprende Rural* program can develop their projects in a sustainable and successful manner.

- Results of the action plan validation

The third phase of the research focused on the validation and adjustment of the action plan with SENA managers, which resulted in a participative and collaborative process. During this phase, focus groups and feedback workshops were held with the participation of institutional leaders who analyzed each of the proposals formulated in the plan. These meetings made it possible to evaluate the relevance of the recommended actions, ensuring their alignment with SENA's strategic objectives and the specific context of rural training. The participatory approach facilitated a constructive exchange of ideas to ensure that the plan was feasible and that the available resources could be optimally used.

SENA managers approved the action plan in its general structure, recognizing its relevance in addressing the difficulties identified during the previous phases of the research. However, important suggestions for strengthening the plan emerged, such as the need to prioritize the focus on post-training accompaniment, not only from a technical, but also from a psychosocial perspective. The managers emphasized that many rural entrepreneurs face emotional and motivational challenges, which can influence the sustainability of their initiatives. Consequently, they proposed integrating a psychological and motivational support component into follow-up strategies.

Another critical aspect discussed was the financial viability of the plan, especially with regard to the creation of marketing networks and access to markets. Although the importance of these actions was recognized, it was felt that their implementation should be gradual and supported by strategic alliances with private and governmental actors. It was suggested that, in order to maximize the plan's impact, pilot projects should be developed in a few specific regions, which would make it possible to evaluate the effectiveness of the marketing networks before expanding them nationwide.

Regarding the strengthening of digital skills, the directors emphasized the need to adjust training content to the technological realities of rural areas. They recommended adapting digital training not only to the use of common technological tools, but also to platforms accessible to entrepreneurs with connectivity limitations. In addition, it was proposed to include specialized modules in digital marketing and e-commerce, which would be easily applicable and low cost, to ensure that productive units could benefit from this knowledge without facing additional technological barriers.

Finally, the phase concluded with the preparation of a final report that integrated the observations and adjustments proposed by SENA managers. This document will serve as a roadmap for the implementation of the action plan and provides a solid foundation to ensure the continuous improvement of the SENA *Emprende Rural* program. The report also included a revised timeline and strategies for periodic evaluation of progress, ensuring that the plan is not only effectively implemented, but also adaptable to the changing conditions of the rural environment.

5. Discussion

The present research reveals significant challenges in the SENA *Emprende Rural* program, underscoring the critical importance of rural entrepreneurship as a strategy to improve the economic sustainability of families in rural Colombian contexts. The findings indicate that, despite the potential of entrepreneurship as a tool for sustainability, there are notable obstacles in the quality of education and the availability of resources for students.

These limitations in training and access to adequate resources negatively affect students' ability to apply theoretical knowledge in practical situations, which impacts their ability to start and maintain sustainable productive units in their communities. As Pérez-Pérez et al. (2021) point out, the gap between theoretical training and the practical needs of rural entrepreneurship is a persistent challenge in many rural development programs in Latin America.

The quality of education emerges as a crucial factor for the success of rural entrepreneurship. This conclusion finds support in recent literature, as demonstrated by Ramírez-Arias et al. (2023), who emphasize that comprehensive, adaptive and contextualized training is essential to face the specific challenges of the Colombian rural environment. However, our findings contrast with the research of Gómez and Vega (2020), who report greater effectiveness in similar programs in other regions of Colombia. This discrepancy could be explained by differences in implementation, available resources, and the sociocultural particularities of each region.

A decisive aspect that emerges from this research is the importance of productive units as a form of entrepreneurship in rural communities. Castillo and Echeverri (2022) emphasize that family and community productive units are fundamental for economic and social sustainability in rural contexts. The findings of the study support this perspective, pointing out the need for training programs, such as SENA *Emprende Rural*, to focus more on the development and strengthening of these productive units as the backbone of rural entrepreneurship.

The study provides a critical perspective on the limitations of current programs, highlighting the need to adjust the educational approach to improve the results of rural entrepreneurship. This contribution broadens the field of study by highlighting the importance of adapting training strategies to the specific realities of rural contexts in Colombia. The evidence suggests that a reform in the design and delivery of training programs is necessary to ensure that they are aligned with the real needs of rural entrepreneurs.

Moreno and Sanchez (2021) argue that the integration of digital technologies and innovative learning methodologies can significantly improve the effectiveness of rural entrepreneurship programs. The study findings support this idea, suggesting that the incorporation of digital tools and modern pedagogical approaches could help overcome some of the barriers identified in the SENA *Emprende Rural* program.

However, the limitations of this study must be considered, such as the limited sample size and the possible lack of representativeness of the results in broader rural contexts. In addition, the focus on a single specific program may not capture the diversity of experiences in other similar contexts. For future research, studies with larger and more diversified samples are recommended to obtain a more complete picture of the effectiveness of rural entrepreneurship programs. It

would also be valuable to investigate the implementation of innovative strategies and the incorporation of educational technologies as complementary tools in the training of rural entrepreneurs.

Additionally, as suggested by Vargas and Castañeda (2022), it is essential to examine the role of support networks and entrepreneurship ecosystems in the success of rural initiatives. Future studies could explore how to strengthen these networks and ecosystems to enhance the impact of programs such as SENA Emprende Rural.

Overall, this research highlights the need to improve the quality of education and resources available in rural entrepreneurship programs to achieve greater sustainability and success in Colombia's rural communities. The results underline the importance of reforming the training offered by SENA Emprende Rural, with a particular emphasis on strengthening productive units and adapting them to local realities. This reform is essential to overcome current barriers and enhance the positive impact of entrepreneurship on rural families, thus contributing to the sustainable development of rural communities in Colombia.

6. Conclusions

Research on the impact of the SENA *emprende rural* training program during the COVID-19 pandemic has yielded significant findings that reveal both the effectiveness and the challenges faced in this adverse context. The study demonstrates that, despite the limitations imposed by the pandemic, the program contributed substantially to the creation and consolidation of productive units in rural areas. Participants exhibited a remarkable capacity for adaptation, using the knowledge acquired to adjust their business ideas to the new market realities, overcoming obstacles and taking advantage of emerging opportunities in a volatile economic environment.

However, the research also revealed several areas in need of improvement. The quality of training and access to adequate resources emerged as crucial factors in the success of entrepreneurial initiatives. The pandemic exacerbated pre-existing difficulties related to the lack of infrastructure and local support in rural areas, underscoring the urgent need to strengthen these aspects to enhance the results of training programs. Despite SENA's efforts, many entrepreneurs were limited in their ability to implement ventures due to limited resources and restricted access to digital tools and training materials, underscoring the importance of addressing these technological and resource gaps in future iterations of the program.

The study highlights the critical importance of adapting training programs to the specific conditions of the rural context and to crisis situations such as those caused by the pandemic. The results suggest that greater flexibility in program design, coupled with more robust support during emergent situations, could significantly improve the ability of entrepreneurs to face unforeseen challenges and develop their productive units successfully. This adaptability is not only desirable but necessary to ensure program relevance and effectiveness in changing and adverse contexts.

In conclusion, SENA's rural business training program has proven to be a valuable tool for fostering entrepreneurship in rural areas during the COVID-19 pandemic, despite the difficulties

encountered. However, the findings underscore the need for a review and adjustment of the program's implementation to more effectively address the needs of entrepreneurs in times of crisis. Adapting educational resources, strengthening support for entrepreneurs, and developing strategies to overcome infrastructure and technological access limitations are critical to maximizing the positive impact of the program. These improvements will not only enhance the development of rural productive units, but will also contribute to increasing the economic resilience of rural communities in the face of future crises. The future success of the program will depend on its ability to evolve and respond nimbly to the changing needs of the rural and business environment, thus ensuring its continued effectiveness and relevance in fostering rural economic development.

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