

Exploring the Effects of Mentorship on Technological Innovation Among Women in Andean Textile Communities

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Abstract

This research examines the impact of mentoring on technological skills among women working in the textile industry in the high Andean areas of Cusco, Puno, Tacna, Moquegua, and Arequipa in southern Peru. To evaluate this impact, surveys were administered both before and after the virtual mentoring sessions, focusing on acquiring basic tech skills such as using Google search, Canva, and social media management. The findings reveal that the mentoring sessions helped improve participants' technology skills. Initially, the surveys showed a widespread lack of these skills, with limited familiarity with tools like search engines and graphic design platforms. However, subsequent surveys demonstrated notable advancements in these areas. Overall, the study emphasizes the significance of mentoring in developing basic technological competencies and empowering women in the high Andean textile sector, suggesting that such initiatives can play a vital role in bridging digital gaps and boosting active participation in the digital economy and society.

Keywords: Mentoring, technologies tools, High Andean Regions.

1 Introduction

Peru is among the countries with the highest concentration of domestic camelids, such as alpacas, llamas, and vicuñas, primarily found in the high Andean regions (3,800 to 4,700 meters above sea level). In these areas, fiber production and its related textile activities play a crucial role. According to ComexPerú, Peru is the leading producer of camelid fiber textile products across large, medium, small, and micro enterprises, many of which are organized into associations led by women of various ages. Data from the National Institute of Statistics and Informatics [1] indicate that in the first quarter of 2020, women led a total of 20,697 companies (53.7%). Within this, 22.5% were women entrepreneurs in micro and small enterprises, surpassing the 21.9% reported for men. Additionally, Fintech companies, which focus on financial services driven by new technologies, report that women lead 44% of these startups.

Entrepreneurship has traditionally been associated with men on a global scale [2]; however, the participation of women has significantly increased, particularly in Latin America, where both genders exhibit high entrepreneurship

rates [3]. This trend is largely attributed to the limited access women have to job opportunities compared to men. In several Latin American countries, entrepreneurship emerges more out of necessity than opportunity due to restricted employment options for women in the formal labor market [4].

In Peru, 63% of women entrepreneurs have completed technical studies, 44% are willing to take risks, 68% learn from their mistakes, 65% have other stable sources of income, and 82% are open to acquiring new knowledge. Additionally, 50% believe that age is a key factor in entrepreneurship, with younger women finding it easier to start a business [5].

The COVID-19 pandemic created a challenging economic scenario, severely impacting various industries, particularly tourism and the textile sector. Large companies faced export restrictions, while small and micro-enterprises struggled due to limitations in the tourism industry. Before the pandemic, 45% of businesses were led by women; this figure rose to 68% afterward. Necessity-driven entrepreneurship now surpasses opportunity-driven entrepreneurship. For 38% of women entrepreneurs, their business serves as their primary income source, while 22% view it as a temporary source, and 33% consider it an important supplement to their earnings [6].

The health, economic, and social crisis brought on by the pandemic underscored the need to strengthen women's entrepreneurship, particularly in rural areas of the country. These regions possess significant potential, especially among young women eager to start textile businesses. In this context, the present study aims to evaluate the impact of mentoring in high Andean regions that have been severely affected by the COVID-19 pandemic. The research will focus on the regions of Puno, Moquegua, Tacna, Cusco, and Arequipa, with a primary focus on benefiting both young women and adult women engaged in textile-related activities.

2 Materials and methods

2.1 Population and Study area

The study area was established in southern Peru, covering the regions of Arequipa, Cusco, Puno, Moquegua, and Tacna. These regions were chosen due to the presence of textile associations with a traditional focus on women, as well as the fact that this activity is primarily conducted in high Andean areas [7]. In Arequipa, the selected association is situated in the district of Tisco, within the province of Caylloma, where 24 women from the association were evaluated. However, given the remote locations where these textile associations operate, most of these 24 women also belong to other associations, forming a vast network of individuals within the high Andean textile sector.

In the Puno region, the identified textile association is situated in Chucuito, 19.4 km from the city, at an altitude of 3,875 meters above sea level. This association consists of 13 women and shares characteristics with the one in Tisco, further highlighting the extensive network of artisanal textile production in these study areas.

Additionally, in Cusco, a region renowned for its rich cultural heritage, the study focused on an association located in the district of Chincheros, positioned at an altitude of 3,754 meters above sea level. This association consists of 20 women and exhibits similar traits to those found in the previously mentioned regions.

On the other hand, the regions of Moquegua and Tacna showed a different trend, as their artisan textile associations were largely fragmented, with some being inactive and others having completely disappeared. Consequently, no evaluations were conducted in these areas; however, valuable insights were gathered regarding the critical state of textile associations in these regions. Despite some connectivity limitations, these populations generally had access to the internet and mobile devices, making them suitable candidates for mentoring programs in technological tools. Their exposure to both physical and digital tools indicated a potential for learning and utilizing technological resources, although their prior knowledge in this area was quite limited.

The remote locations and challenging geography of the Peruvian altiplano restricted telephone and internet access for many associations [8]. As a result, information on the use of practical digital tools remains scarce in studies of this nature.

The age range of the participants was set between 18 and 40 years. The cultures of the Peruvian highlands have traditionally been engaged in various activities, including textile production [9]. Recognizing the significance of this craftsmanship, in 2022, Law No. 29073 was enacted, along with the Regulation of the National Registry of Artisans and the National Council for the Promotion of Artisan Activity [10]. These regulations were established to acknowledge and promote artisanship as an essential part of the country's cultural identity and traditions. The Ministry of Tourism is responsible for proposing, coordinating, regulating, and evaluating policies related to artisans, including textile artisans.

Such policies contribute to the recognition and revitalization of this sector, encouraging investment and fostering economic and innovative growth [11]. When selecting study groups, a key consideration was that the textile artisans produce culturally significant textiles, as this type of craftsmanship requires greater visibility.

2.2 Theoretical background of technological tools in high Andean areas

The COVID-19 pandemic triggered a global crisis that significantly impacted multiple sectors, with tourism being among the hardest hit [12]. This impact is particularly significant since tourism is a key driver of the national economy, directly influencing the textile sector, especially in high Andean regions. In these areas, many livelihoods depend on tourists who purchase artisanal and textile products unique to each high-altitude zone. The decline in tourism during the pandemic exacerbated economic difficulties for artisans and small textile entrepreneurs.

Additionally, the sector's reliance on the informal economy and limited access to financial resources further weakened its resilience. In response to the crisis, the Peruvian government and other organizations have launched initiatives to revitalize the textile industry, incorporating digital tools such as social media to market and promote their products. Within this framework, the need for training and skill development through both in-person and virtual mentoring has become increasingly evident. These mentorship programs serve as a crucial strategy to help the sector adapt to new technological trends and drive its economic recovery.

Several authors have conducted studies on the application of mentoring in various contexts. For instance, Oyarzún-Cristi [13] implemented a mentoring program for indigenous beneficiaries in 2020 as part of the UN Women's Indigenous Women Program. Their study found that 36 women benefited from the initiative, with 33% successfully securing non-reimbursable funding to launch their projects and businesses.

Similarly, Buendía-Martínez [14] analyzed the relationships between female empowerment, entrepreneurial activity, and rural development in Latin America using a Structural Equation Model with the Partial Least Squares technique. Their findings confirmed a direct correlation between female empowerment and rural development, facilitated through entrepreneurship and business growth.

Additionally, Castillo [15] conducted a systematic literature review on female empowerment in rural entrepreneurship. Their study employed a bibliographic reference search methodology, focusing on topics such as female empowerment, entrepreneurship, gender, participation, and leadership. The review highlighted various studies examining rural and indigenous female entrepreneurship, gender-focused public policies, women's empowerment within organizations, and the role of rural development in communities. The evidence underscores the need to reflect on gender policies and the rights of rural women, advocating for measures to reduce societal and state-driven discrimination.

Headlam-Wells [16] emphasize the significance and transformative potential of e-mentoring for professional women, as demonstrated by the Empathy-Edge program in the United Kingdom. The study, which involved 122 participants paired through psychological profiling, highlighted both the benefits and challenges of e-mentoring, advocating for its role as a crucial tool in career development and breaking the "glass ceiling." Additionally, the research underscored the strategic importance of psychological profiling in mentor-mentee matching. This innovative approach, which integrates mentoring, gender management, and computer-mediated communication, introduced originality to the field and reinforced the need to examine e-mentoring from a European perspective.

Similarly, Crawford [17] conducted a study on the role of mentoring in African American women's decision to pursue higher education careers and their subsequent professional development. Their research provided recommendations on how African American women administrators in higher education can further advance their careers. Mentoring was identified as a key factor contributing to career progression, academic success, and personal growth.

More recently, Tinoco-Giraldo [18] designed a mobile application called e-mentoring to enhance communication and matching within university mentoring programs. Their study assessed existing applications, identified key design requirements, and proposed a model that considers social, graphical, technological, and legal factors. The application aims to serve as a central platform for students and mentors, strengthening academic connections. Built upon previous models, its design highlights its effectiveness in streamlining educational processes and fostering a sense of community. This initiative holds great potential to enhance the quality and efficiency of educational services.

Based on the aforementioned points, various methodologies have been identified for implementing mentoring, demonstrating a significant impact on the sector under study. This underscores the importance of carrying out mentoring sessions, whether in-person or virtual, as their effectiveness relies on adaptability, effective communication, and a personalized approach to achieving specific objectives. This approach is vital for the target group, fostering leadership, personal development, and the ability to overcome challenges, thereby promoting equity and prosperity in the Andean communities under study.

Additionally, mentoring women in high Andean regions strengthens female entrepreneurship by adopting a methodological model that enhances the effectiveness of their efforts to achieve improvements. In this context, mentoring has proven to be an effective model for promoting entrepreneurship [19].

2.3 Measuring instrument

For this study, two data collection tools were utilized: surveys and personal interviews. The surveys consisted of two parts-pre and post-mentoring evaluations-designed to assess the study population's familiarity with technological tools. This method was applied in regions where associations had a significant number of members.

Conversely, in regions where associations were fragmented or disjointed, personal interviews were conducted to identify the underlying causes of this phenomenon. Based on the collected data, a series of virtual workshops was implemented, utilizing platforms such as Google Forms, Canva, Google Search, and social media. These digital tools were selected for their fundamental role in developing essential skills for the textile business sector and their accessibility to associations in southern Peru.

Additionally, the cross-cutting competencies survey was reviewed by a panel of experts and underwent statistical analysis to ensure reliability and validity [20].

2.4 Mentoring development

The mentoring program in technological tools, known as "PROMETEC MUJER," begins with the development of a free-access website designed to facilitate both in-person and virtual mentoring. This initiative aims for long-term engagement with textile associations, providing access to educational materials, shared experiences, and a database containing information collected in previous research phases. The program focuses on high Andean regions of southern Peru, including Cusco, Puno, Arequipa, Moquegua, and Tacna, with the goal of strengthening essential skills in the commercial textile sector.

The vision of PROMETEC MUJER is to contribute to the economic and social empowerment of participants, enabling them to develop leadership roles within their communities. To achieve this, the study employed Flanagan's Critical Incident Technique [20] [21], which involves collecting data, defining objectives based on expected outcomes, and interpreting the gathered information[23].

2.5 Statistical análisis

Descriptive statistical analyses, including mean, standard deviation, coefficient of variation, and normality tests, were conducted. Additionally, inferential analyses were performed using a paired samples t-test to assess the impact of the mentoring program. An ANOVA was also applied to evaluate differences between the Pre-test and Post-test results. All analyses were conducted at a 95% confidence level using OriginLab Pro statistical software.

3 Results and discussion

3.1 Mentoring development

The workshops focused on technological tools were conducted with the associations across different regions. Before the workshops began, a pre-test was administered in person to assess which competencies the participants had and which ones they lacked. As shown in Table 1, competencies such as internet search were initially challenging for the study population, while workshops on Google Forms and social media were easier for them to grasp. One key factor that affected the workshops was the duration, as participants' attention significantly decreased over time[24].

The technological tools were applied in a logical sequence to ensure optimal learning of the fundamentals in each session. The internet search module helped participants understand the importance of keywords and the need for high-quality content for effective searches. Reliable web sources were also provided. The next module focused on enhancing logical thinking, coherence, and questionnaire management, which was also used to create the post-test template and streamline data processing during the post-test evaluation.

The subsequent tool aimed to boost creativity and critical thinking, particularly in the context of textile products, given that the focus was on textile craftswomen. Finally, the last session covered social media, focusing on how to expand contacts effectively and introducing the basics of business accounts to promote their ventures.

Table 1: Mentoring Development Summary

1st mentoring 14/8/2023 Internet search	2nd mentoring 11/9/2023 Google forms	3rd mentoring 18/9/2023 Canva	4th mentoring 11/10/2023 Social networks
The workshop lasted for 2 hours, during which the main	The workshop lasted 2 hours, and the main topics	The workshop lasted 3 hours, and the main topics covered	This workshop lasted 2 hours, the main aspects

1st mentoring 14/8/2023 Internet search	2nd mentoring 11/9/2023 Google forms	3rd mentoring 18/9/2023 Canva	4th mentoring 11/10/2023 Social networks
topics covered included the use of keywords in Google, how to search for information from reliable sources, and the process of setting up accounts and/or creating email addresses.	covered included accessing the web platform, creating forms, editing questions, sorting questions, saving forms, and submitting the forms via a link.	included accessing the web platform, registering on the platform, creating new documents, using templates to create documents, text editing, utilizing the "insert" function, image editing, adding graphic elements, and applying the "insert" function.	exposed were the basics of using Instagram, Facebook and WhatsApp business accounts.

3.1 Statistical analysis

In the context of social research conducted in the high Andean regions of Cusco, Arequipa, and Puno, a statistical analysis was performed, focusing on normality tests and descriptive analysis of pre-test and post-test data. The results of the normality test, presented as p-values, suggest that the data from the study population follow a normal distribution.

For the descriptive analysis, key metrics such as the coefficient of variation, standard deviation, and standard error were evaluated. The coefficient of variation, which remained below 30% across all regions, indicates a level of consistency in the data's variability, suggesting stable measurements. The standard deviation, ranging from 3 to 8 across regions, shows how the data spread around the mean. The observed variability is attributed to the inherent diversity within the samples, highlighting the need to address this diversity in future studies.

The standard error, ranging from 0 to 2 for all regions, demonstrates the precision and reliability of the sample estimates, with minimal error. This provides confidence in the accuracy of the measurements, despite some deviations from normality. These results emphasize the importance of caution and consideration of sample heterogeneity in both the design and analysis of studies.

Table 2: Normality test

City	Test	Statistician	p-value	Decision at 5%.
TISCO	Pre test	0.95853	0.40967	Does not reject normality
	Post test	0.9473	0.2366	Does not reject normality
CHUCHUITO	Pre test	0.9534	0.65065	Does not reject normality
	Post test	0.88348	0.07951	Does not reject normality
CHINCHEROS	Pre test	0.9169	0.08636	Does not reject normality
	Post test	0.90471	0.05059	Does not reject normality

Table 3: Normality test

	Mean	Desv Std	SE of var	Variance	Coef of var	Min	Avg	Max
TISCO	Pre test	11.91667	8.0645	1.64616	65.03623	0.27674	0	12
	Post test	22.54167	6.72425	1.37258	45.21558	0.2983	10	20
CHUCHUITO	Pre test	17.69231	7.59808	2.10733	57.73077	0.22946	0	18
	Post test	27	3.85141	1.06819	14.83333	0.14264	18	27
CHINCHEROS	Pre test	18.3	4.46153	0.99763	19.90526	0.2438	11	16
	Post test	29.4	3.69067	0.82526	13.62105	0.12553	19	29

When analyzing the data presented in Tables 2 and 3, several relevant aspects can be identified. First, the p-values obtained in the normality tests for the pre-test and post-test are all greater than 0.05. This implies that the null hypothesis of normality is not rejected, allowing us to consider that the data follow a normal distribution in all the tests conducted in the three evaluated regions: Tisco, Chucuito, and Chincheros. This finding is fundamental, as it enables the parametric comparison of the results obtained before and after the intervention.

Additionally, a significant increase in the average scores is observed in all the evaluated regions. In the post-test, the average values increased compared to those obtained in the pre-test, suggesting an improvement in skill acquisition after the mentoring process. The specific increases in each region were as follows:

Tisco: from 12 to 20 points.

Chucuito: from 18 to 27 points.

Chincheros: from 16 to 29 points.

Another relevant aspect is the reduction in data variability, evidenced by the decrease in standard deviation and variance in the post-test compared to the pre-test. This indicates that responses became more homogeneous after the mentoring process. In particular, in the regions of Chucuito and Chincheros, a notable reduction in data dispersion was observed, suggesting that the intervention had a significant impact on the uniformity of participants' performance. In the case of Tisco, although the standard deviation slightly decreased, the variance remains relatively high, indicating that heterogeneity in results persists in this region.

The coefficient of variation, which measures dispersion relative to the mean, also showed a reduction in all regions in the post-test. This reinforces the conclusion that, after the intervention, variability in results decreased and more participants achieved similar levels of performance, demonstrating greater stability in acquired learning.

In summary, the results indicate that mentoring had a positive impact on the development of the evaluated skills. The increase in average scores suggests substantial improvements in acquired knowledge, while the reduction in variability reflects greater uniformity in learning among participants. Overall, mentoring was effective in improving the evaluated skills in the three regions, with Chucuito and Chincheros showing the most significant impact, as the dispersion of data decreased considerably, indicating that a greater number of individuals improved their performance uniformly.

Figure 1 illustrates a comparative analysis of Pre-test and Post-test results obtained from women's associations in the Alto Andean textile area. This comparison provides key information about the effectiveness of mentoring and its influence on the development of technological competencies. The contrast between both stages reveals clear benefits, with notable improvements observed after the mentoring process. The pre-test serves to measure the participants' initial knowledge and familiarity with digital tools, offering a reference point to understand their starting level. This initial evaluation helps detect gaps and specific needs for training. Subsequently, the post-test is applied following the mentoring sessions, acting as a tool to assess the outcomes and skill improvements achieved through the program.

The differences detected between the initial and final evaluations reflect the learning progress fostered by the mentoring. An increase in scores highlights the acquisition of new technological abilities and enhanced confidence in using these tools. The analysis shows that participants experienced meaningful improvements in handling platforms such as Google, internet browsers, Canva, Google Forms, as well as in managing social networks like Instagram and WhatsApp. These positive changes suggest that the mentoring intervention contributed effectively to strengthening the digital competencies of women in the textile sector.

This result is particularly promising, as it confirms the relevance of mentoring initiatives within community-based women's organizations in rural textile contexts. Moreover, the findings support the idea that guided learning processes can help close digital divides and equip women with useful technological skills for their work. The success of this experience may also serve as a model for similar initiatives in other regions, further promoting the development of digital skills and empowering women in contexts with similar characteristics.

As we mentioned next figure highlights the effectiveness of mentoring in improving technological skills among women's associations in the Alto Andean textile region. The pre-test established a baseline of participants' initial knowledge, while the post-test measured progress after the mentoring sessions. The significant improvements in technological tool usage, including Google, internet searches, Canva, Google Forms, and social media integration, indicate the program's success in enhancing digital skills.

These findings demonstrate that mentoring effectively bridges the technology skills gap, empowering women in the textile sector. The success of this initiative suggests that similar programs could be implemented in other communities, further promoting digital literacy and women's empowerment in comparable contexts.

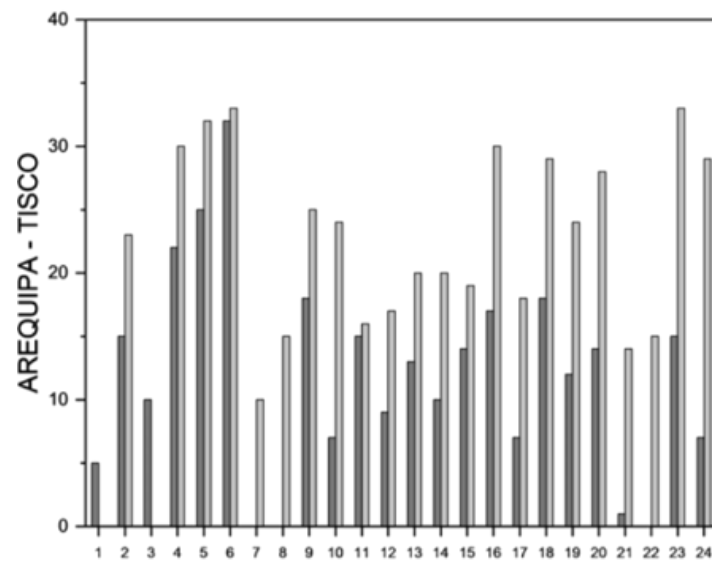


Figure 1: Comparison between the results of the Pre-test (left bar) and Post-test (right bar) carried out in Region of Arequipa - Tisco

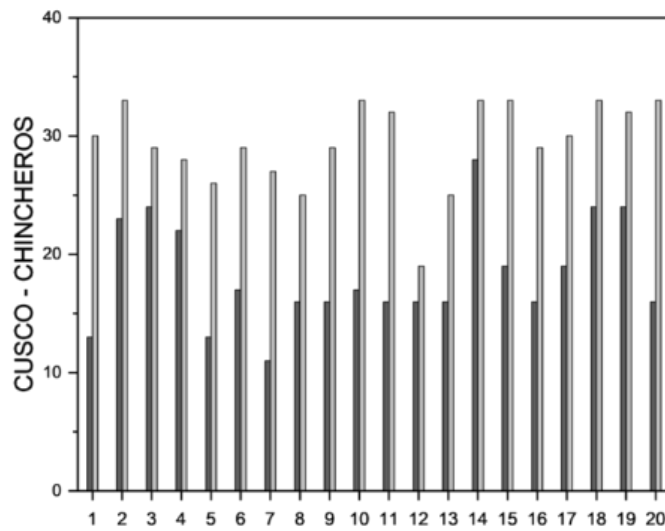


Figure 2: Comparison between the results of the Pre-test (left bar) and Post-test (right bar) carried out in Region of Puno - Chucuito

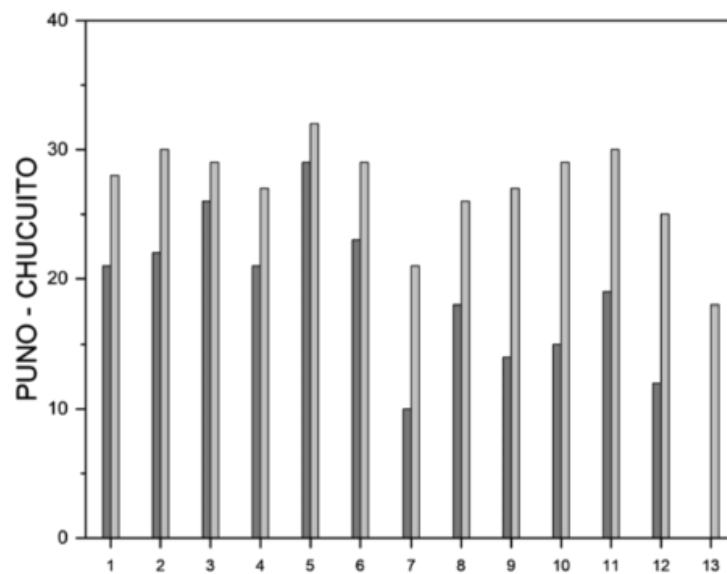


Figure 3: Comparison between the results of the Pre-test (left bar) and Post-test (right bar) carried out in Region of Cusco - Chincheros.

The results reveal noticeable progress in the use of digital platforms such as Google, online searches, Canva, Google Forms, as well as social networks like Instagram and WhatsApp. This growth in digital capabilities suggests that the mentoring process played a key role in strengthening the technological skills of women from the high Andean textile communities. This is a particularly encouraging finding, as it reinforces the value of mentoring initiatives within this context.

In Figure 2, a dendrogram generated through Jaccard's similarity analysis compares the groups from Arequipa, Puno, and Cusco. This visual diagram helps illustrate the degree of similarity between these regions. Jaccard's coefficient measures how much the sets overlap, making it useful for comparing binary data such as the presence or absence of certain characteristics across populations.

Notably, the analysis indicates that Puno and Cusco show the strongest similarity. This result could be relevant when considering aspects related to women's textile associations and their initial knowledge of technological tools. The resemblance between these regions may stem from shared socioeconomic, cultural, or environmental factors, all of which could influence how women's associations are formed and sustained.

This observed similarity also opens the door to potential knowledge sharing between the two regions. Strategies that have been successful in one area could be adapted and applied in the other, fostering collaborative learning. In terms of digital tool adoption, the comparable profiles of Puno and Cusco suggest that women artisans in both areas likely face similar challenges and opportunities when it comes to technology use. This provides valuable input for designing future programs aimed at enhancing digital literacy, allowing planners to build on proven strategies rather than starting from scratch.

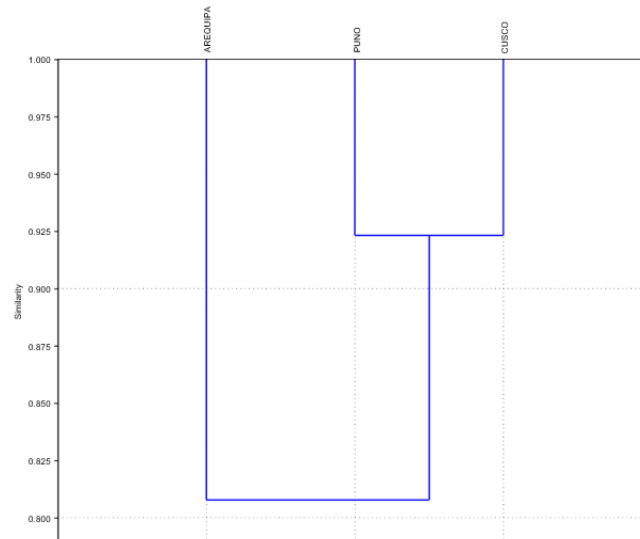


Figure 4: Jaccard similarity analysis applied to the pre-test scores assessed across the different regions.

On the other hand, a thorough investigation into the presence of women-led textile associations in the Moquegua region exposed a clear lack of structured organization within these groups. This absence of cohesion appears to stem from various factors, one of the most significant being the region's mild coastal climate, which remains relatively constant throughout the year. Typical temperatures vary between 14°C in August and 25°C in February. Moreover, the areas near the Andean foothills experience dry, desert-like conditions, which extend into the higher elevations. As a consequence, non-textile crafts are generally more prominent in Moquegua, while textile goods are more sought after in colder locations like Cusco, Puno, and Arequipa.

In this context, an interview with the leader of the primary association in the area shed light on some critical barriers. The president emphasized that Moquegua struggles with limited promotional efforts to attract visitors, partly due to the absence of a specialized marketplace where artisans can showcase and sell their work. Additionally, the lack of a regional Center for Productive Innovation and Technology Transfer (CITE TEXTIL) was highlighted as a major obstacle to advancing the textile industry locally. In response to these challenges, the Economic and Social Development Office is preparing initiatives to secure financial support for the sector, with a focus not only on enhancing non-textile crafts but also on strengthening textile production. The aim is to prevent the gradual disappearance of existing associations, while encouraging a more dynamic and coordinated revival that complements broader tourism development efforts.

Similarly, the textile sector in Tacna struggles with a range of challenges that slow down its development. One of the primary obstacles is the weak participation and backing from regional authorities, even though the Artisans Law was specifically designed to support artisans. This law aims to stimulate the growth of artisan activities, connect artisans to the broader economy, improve their chances of obtaining private financing, and strengthen their productivity, competitiveness, and market reach.

Moreover, the role of the Regional Directorates of Foreign Trade and Tourism [8] is worth noting, as they are responsible for formulating and overseeing programs related to trade, tourism, and handicrafts. Their work should, in theory, foster both national and international tourism in the region (TACNA: Economic Activity Synthesis, 2022). However, Tacna faces a particularly serious shortage of designated locations where artisans can regularly display and sell their textile creations. This shortage stems largely from the Regional Government's persistent unwillingness to set aside permanent spaces for this purpose.

In an interview with a member of a local association, it was stressed that despite being officially certified as artisans, they still struggle to gain the visibility and acknowledgment necessary to thrive. This ongoing lack of institutional support directly weakens the associations' ability to grow and flourish, leaving the entire textile handicraft sector in a vulnerable and largely overlooked position.

Tourism represents a potential growth area for the textile sector in Tacna, especially given the high demand from visitors from neighboring Chile, who show considerable interest in products with strong cultural symbolism. Furthermore, regional design preferences tend to shift when moving away from areas influenced by colder climates. In places such as Tisco, Chincheros, and Chucuito, traditional crafts reflecting Peruvian cultural heritage are widely produced. On the other hand, in Moquegua and Tacna, textile offerings lean toward contemporary garments, often made from camelid fibers, but without the distinctive cultural aesthetics seen in other regions. This distinction is

likely linked to differences in the primary customer base: while areas like Cusco, Puno, and Arequipa attract more culturally curious tourists, Tacna and Moquegua receive fewer visitors, which influences product design choices. The textile industry in Tacna also faces obstacles that limit its progress, largely due to insufficient support from regional authorities, despite the existence of the Artisans Law a legal framework intended to promote artisan work by facilitating economic inclusion and improving market access. The Regional Directorates of Foreign Trade and Tourism [8], tasked with boosting the visibility of artisan goods, have yet to secure adequate permanent spaces where textile products can be showcased and sold. The ongoing reluctance of the Regional Government to allocate such venues further restricts artisans' opportunities for exposure and growth, putting the future of many associations at risk.

That said, tourism could become an important driver for strengthening the sector, particularly given the interest shown by Chilean consumers in products with authentic cultural roots. However, the absence of a clear cultural identity in Tacna's textiles places them at a disadvantage compared to those produced in more popular tourist destinations. To increase competitiveness and secure the future of local artisans, it will be essential to adapt product designs to attract diverse consumer segments and develop strategies that broaden market access.

4 Conclusions

This study aimed to assess the impact of mentoring on technological tools among women in the textile sector in the high Andean regions of southern Peru. Surveys were conducted before and after virtual mentorship sessions, focusing on fundamental technology skills such as Google searches, Canva usage, and social media management. The initial results revealed a widespread lack of these skills. However, follow-up surveys showed significant improvement, demonstrating the positive effect of mentorship on technology skills development.

The analysis of the data indicates that the p-values in the normality tests are greater than 0.05, which allows us to assume a normal distribution in all the regions evaluated (Tisco, Chucuito and Chincheros) and to make parametric comparisons. There was a significant increase in the average scores after mentoring: Tisco went from 12 to 20, Chucuito from 18 to 27 and Chincheros from 16 to 29.

In addition, there is evidence of a reduction in variability, with less dispersion in the responses in Chucuito and Chincheros, while in Tisco the variability remains relatively high. The coefficient of variation also decreased in all regions, indicating greater uniformity in the performance of the participants.

The findings emphasize the importance of mentoring in addressing specific technology gaps in the high Andean regions. The observed progress in essential skills, such as using search engines and design platforms, highlights the critical role of mentorship in equipping and empowering women in the textile industry. By focusing on core digital competencies, this initiative underscores the necessity of adapting to the modern digital landscape.

Beyond technological advancements, these results have economic and social implications. Enhancing digital skills can foster greater inclusion and active participation in the digital economy, ultimately promoting diversity in society. In conclusion, this study reaffirms the effectiveness of mentoring in reducing technology gaps, empowering women in the textile sector, and encouraging more active engagement in both the digital economy and broader society.

In conclusion, mentoring had a positive impact on skill development, improving average scores and reducing dispersion in the results, especially in Chucuito and Chincheros, where more participants reached similar levels of performance.

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