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Management of entrepreneurial projects in students with technical training and academic sufficiency
(Gestión de proyectos de emprendimientos en estudiantes con formación técnica y suficiencia académica)

Jose Ivan Llatas Lozano [1] *: https://orcid.org/0000-0002-5918-8533
Juan Pedro Soplapuco-Montalvo [1] : https://orcid.org/0000-0003-4631-8877

[1] Cesar Vallejo University, Peru.

Corresponding author* jillatasl@ucvvirtual.edu.pe

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Abstract. Introduction : The research analyzes the management received by technical training students, who due to the challenge of said training, wanted to investigate the link with academic sufficiency. **Objective** : To determine the relationship between entrepreneurship project management and academic sufficiency in technical students. **Methodology** : A quantitative approach, correlational scope, non-experimental design was used for a sample of 90 technical education students, during the year 2022. **Result** : There is a Spearman's Rho correlation of 0.841. between entrepreneurship project management and academic proficiency in technical students. **Conclusion** : There was a high and significant correlation between entrepreneurship project management and academic proficiency in technical students; indicating the close and reliable relationship. **Contribution** : It is important to deepen studies to identify specific strategies such as AI to facilitate entrepreneurship project management in students, impacting on academic proficiency. **Keywords:** Project management, entrepreneurship, technical training, academic proficiency.

Gestión de proyectos de emprendimientos en estudiantes con formación técnica y suficiencia académica

Resumen. Introducción: La investigación analiza la gestión recepcionada por estudiantes de formación técnica, que debido al reto de dicha formación, se deseaba investigar la vinculación con la suficiencia académica. **Objetivo**: Determinar la relación entre la gestión de proyectos de emprendimiento y la suficiencia académica en estudiantes técnicos. **Metodología**: Se utilizó enfoque cuantitativo, alcance correlacional, diseño no experimental, para una muestra de 90 estudiantes de educación técnica, durante el año 2022 **Resultado**: Existe 0,841 de correlación de Rho de Spearman entre la gestión de proyectos de emprendimiento y la suficiencia académica en estudiantes técnicos. **Conclusión**: Existió alta correlación y significativa entre la gestión de proyectos de emprendimiento y la suficiencia académica en estudiantes técnicos; indicando la estrecha y confiable relación. **Aporte**:Importa profundizar estudios para identificar estrategias específicas tal como las IA para facilitar la Gestión de proyectos de emprendimientos en estudiantes repercutiendo en la suficiencia académica. **Palabras clave:** Gestión de proyectos, emprendimientos, formación técnica, suficiencia académica.

Gestão de Projetos de Empreendimentos em Estudantes com Formação Técnica e Suficiência Acadêmica
Resumo. **Introdução**: A pesquisa analisa a gestão recebida por estudantes de formação técnica, que, devido ao desafio dessa formação, procuraram investigar a ligação com a suficiência acadêmica **Objetivo**: Determinar a relação entre a gestão de projetos de empreendedorismo e a suficiência acadêmica em estudantes técnicos. **Metodologia**: Foi utilizado um enfoque quantitativo, de alcance correlacional e desenho não experimental, com uma amostra de 90 estudantes de educação técnica, durante o ano de 2022. **Resultado**: Foi encontrada uma correlação de 0,841 no Rho de Spearman entre a gestão de projetos de empreendedorismo e a suficiência acadêmica em estudantes técnicos. **Conclusão**: Houve uma correlação alta e significativa entre a gestão de projetos de empreendedorismo e a suficiência acadêmica em estudantes técnicos, indicando uma relação estreita e confiável. **Contribuição:** É importante aprofundar os estudos para identificar estratégias específicas, como a IA, para facilitar a gestão de projetos de empreendedorismo em estudantes, impactando a suficiência acadêmica **Palavras-chave**: Gestão de projetos, empreendedorismo, formação técnica, suficiência acadêmica.

1. Introduction

In the current context of technical education and entrepreneurship, we are faced with a reality in which many students with technical training fail to achieve the desired levels of academic proficiency or fully develop their entrepreneurial capacity. Despite having advanced technical skills, their ability to manage entrepreneurial projects is not always reflected in the success of their initiatives. In many cases, this is due to a lack of effective integration between theoretical and practical training, which reduces the possibilities of applying what they have learned in real contexts.

1.1. Entrepreneurship Project Management

Technical training has established itself as a key pillar for entrepreneurship, allowing students to apply practical and specific skills in the creation of innovative companies. A relevant article by Martínez et al. (2022) highlights the importance of integrating agile methodologies into educational programs to train more competent entrepreneurs. Agile tools allow entrepreneurs to manage their projects efficiently and flexibly, adapting to the rapid changes that characterize the current business environment. This type of training, specifically designed for students with a technical background, provides a competitive advantage in globalized markets.

Project management in the educational context is not only limited to the acquisition of technical tools, but also to the creation of support networks that foster collaboration and knowledge sharing. According to López and García (2022), support networks are essential for the success of young entrepreneurs, as they provide access to mentoring, financial resources, and strategic collaborations. Universities play a crucial role in the creation of these networks, by connecting students with companies, institutions, and experts who can offer advice and resources, contributing to the development of more solid and viable projects.

Disruptive entrepreneurship is another key area that benefits students with a technical background. González et al. (2022) state that the ability to identify disruptive innovation opportunities is essential to compete in the global market. Technical students, being familiar with advanced processes and technologies, have a significant advantage in developing products and services that transform traditional sectors. Combining technical knowledge with creativity allows these entrepreneurs to create unique solutions and solve complex problems, increasing the chances of success in international markets.

Digitalization also plays a crucial role in entrepreneurial education. Sánchez and Pérez (2022) point out that digital tools facilitate the learning of project management and provide entrepreneurs with access to online collaboration and management platforms. Digitalization enables the creation of more agile and scalable business models, which is especially important for students who want to launch startups in technological sectors. Indeed, educational programs that incorporate digital technology into their curriculum prepare students to face the challenges and take advantage of the opportunities offered by the digital economy.

Social entrepreneurship is also gaining relevance in the educational field, especially among students with a technical background. García et al. (2022) argue that social entrepreneurs have a significant impact on the community, as they combine technical innovation with social commitment. Students with a technical background can leverage their knowledge to create solutions that are not only profitable, but also address social and environmental problems. This type of entrepreneurship has the potential to transform communities, and universities play a crucial role in fostering this culture of entrepreneurship with social impact.

Intrinsic motivation is also an essential factor in the success of student entrepreneurship. Rodríguez and López (2022) highlight that entrepreneurs with strong internal motivation are more likely to persist in their projects, even in the face of challenges and failures. This type of motivation is associated with personal satisfaction derived from creating and solving problems. Technical students, having a solid background in practical areas, often feel a greater connection with the tangible impact of their projects, which increases their motivation and commitment to long-term success.

Access to capital and financial management are essential aspects for the sustainability of entrepreneurial projects. According to a study by Martínez et al. (2022), entrepreneurs must have financial knowledge to effectively manage their company's resources. This is especially true for students with technical backgrounds, who often lack formal business training. Technical education should include components on financial management, budgeting, and finding investors, which increases the likelihood of success of their projects.

Global competitiveness is also a major challenge for entrepreneurial students. González et al. (2022) point out that globalization requires constant adaptation and the adoption of new technologies to compete in international markets. Technical training equips students with skills to apply innovative technological solutions to real problems, which increases their competitiveness. The ability to adapt quickly to changes in the global market is crucial, and universities must prepare students with tools and resources to face these challenges.

The problem is that, in the field of technical education, training in entrepreneurial project management is still incipient and often isolated from the practical skills that these students develop. This gap between theory and practice limits the potential of students to implement projects that are not only technically sound, but can also remain sustainable in the market. Hence the need to investigate how entrepreneurial project management in students with technical training can influence their academic proficiency, and vice versa, to generate a virtuous cycle of learning and professional development.

2. Methodology

A quantitative approach was used, a non-experimental cross-sectional design. The sample was intentional and non-probabilistic, selecting the students according to the expert teacher's criteria, identifying the students who could answer adequately and impartially; it was made up of 90 students from the last two years of technical secondary education from a regular basic education institution, surveyed during the last two months of 2022. The present research had a descriptive correlational scope.

The data collection instruments corresponding to the variables Management of entrepreneurial projects in students with technical training and academic sufficiency, were obtained and adapted from Bañuelos et al. (2021) , which were validated both at the expert level reaching an average of 97.5% approval; then with a Cronbach's Alpha reliability of 0.82 and 0.89 respectively, which makes it replicable in other research and can be used in other similar situations.

Null hypothesis: There was no significant relationship between Entrepreneurship Project Management in students with technical training and academic sufficiency in technical students during the last two months of 2022

Alternative hypothesis: There was a significant relationship between Entrepreneurship Project Management in students with technical training and academic sufficiency in technical students during the last two months of 2022

Hypothesis testing was done using Spearman's Rho statistic.

3. Results

The inferential results are presented through the hypothesis test, shown in the following Table 1.

Table 1. Presentation of correlation between Entrepreneurship Project Management in students with technical training and academic sufficiency in the last two months of the year 2022

		academic sufficiency
Entrepreneurship project management	Spearman's Rho correlation	0.841 **
	Next (bilateral)	0.005
	N	90

**. The correlation is significant at the 0.01 level (two-tailed).

A Spearman's Rho correlation coefficient of 0.841 was obtained with a bilateral significance (Sig) p=0.005<0.01 (highly significant); consequently, the null hypothesis is rejected and the general hypothesis is accepted; it is concluded that: there was a significant relationship between Entrepreneurship Project Management in students with technical training and academic sufficiency during the year 2022.

That is to say, by increasing the value of Entrepreneurial Project Management in students with technical training, the values of academic sufficiency also increase with almost the same relevance; or by decreasing the values of Entrepreneurial Project Management in students with technical training, then the values of academic sufficiency in students with technical training also decrease with almost the same intensity.

4. Discussion

The importance of this study lies in the interconnection between two key variables: entrepreneurial project management and academic proficiency . It is considered that better management of entrepreneurial projects can have a direct impact on the academic development of students, by promoting a more integrated and contextualized learning, where theory and practice complement each other fluidly. In addition, technical training, being strongly linked to the ability to solve specific problems in the practical field, generates in students a greater intrinsic motivation to continue improving their skills, which can enhance their academic proficiency.

On the other hand, access to technology and artificial intelligence (AI) tools is playing a growing role in higher education. Students can improve their academic training by using educational platforms, project simulators, and digital tools that allow both the optimization of their learning and the faster execution of their projects, contributing to the improvement of the efficiency of their projects. In this context, **AI** can be key in improving access to information and academic training. Thus, the connection between project management and academic proficiency depends not only on a pedagogical effort, but also on the proper use of technology.

In comparison to the present research, entrepreneurial project management is a fundamental discipline for the success of business projects led by students with technical training and academic sufficiency. This discipline provides the tools and skills necessary to plan, organize, execute and control their projects effectively, increasing the possibilities of achieving their objectives.

Ortiz's (2023) article evaluates the implementation of distance education at a university, highlighting the importance of adapting pedagogical methodologies to the requirements of the digital environment. This perspective is relevant in the management of entrepreneurial projects, as it suggests that technical training and distance education can be complementary when managing entrepreneurial projects. Continuous evaluation of the dimensions of online education can improve educational quality and strengthen students' academic proficiency.

Ramos-Moreno and Torres Paredes (2021) explore strategic planning and process management for the organization of sports activities, which is relevant for students with a technical background. The integration of structured processes in the management of entrepreneurial projects fosters a systematic approach that maximizes resources and improves results. This methodology can also be applied in the educational field to support students in the planning and execution of technical and entrepreneurial projects, promoting their academic sufficiency.

Furthermore, the study by Aliaga et al. (2020) focuses on how university incubators influence the birth of startups in the Peruvian context. This analysis is essential to understand how the management of entrepreneurial projects in students with technical training can benefit from a structured academic environment, helping entrepreneurs to materialize their ideas into viable companies. Incubators provide key resources and support for students with academic sufficiency, improving their chances of entrepreneurial success. Aranibar et al. (2022) address creativity as an essential driver in business development. The research highlights the importance of creativity in students with technical training for the management of entrepreneurial projects, as it allows innovation in the business process. This theoretical approach demonstrates that creativity is not only a necessary skill for problem solving, but also for the identification of opportunities in competitive environments, supporting students to carry out their projects successfully.

Also, Bigliardi and Filippelli (2022) examine the factors that affect the growth of academic spin-offs, especially those oriented towards research and innovation. This study is relevant for students with a technical background, as it shows how academic skills combined with effective project management can lead to successful companies. The factors analyzed, such as technology transfer and collaboration with academic institutions, are essential for the development of sustainable ventures with growth potential.
Bravo et al. (2021) highlight how entrepreneurship education influences students' intention to become entrepreneurs. The research underlines the direct relationship between a solid technical background and students' intention to become entrepreneurs, highlighting that academic proficiency not only contributes to their technical capacity, but also to their willingness to take risks and manage entrepreneurial projects. This is key for students looking to start their own businesses after completing their technical training.

Muñoz and Felices (2020) focus on the key elements for the growth of biotechnology startups in the Peruvian agricultural sector. Their study is relevant for the management of entrepreneurial projects, especially for those students with technical training in scientific or industrial areas. The research emphasizes the importance of having a good support infrastructure, technical knowledge and strategic alliances to foster the success of entrepreneurial projects, especially in innovative and high-demand sectors such as agricultural biotechnology.

The article by Moreno Muro et al. (2021) highlights the fundamental role of artificial intelligence (AI) in the management of university curricula. The application of AI in the management of entrepreneurial projects allows learning to be personalized and content to be adapted to the needs of technical students. This approach can optimize the development of entrepreneurial skills and improve academic proficiency, making it easier for students to manage projects more efficiently and in line with market demands.

Gonzales Ttito et al. (2023) carry out an analysis of investments in educational infrastructures, suggesting that multifunctional designs are key in preparing students to face health emergencies. In the management of entrepreneurial projects, the use of innovative and adaptive infrastructures is essential. Technical students can benefit from this approach, developing projects that are not only sustainable, but also resilient to crises, which increases their ability to apply what they have learned in real situations and improves their academic proficiency.

Rosales Urbano et al. (2021) explore the impact of communications from educational institutions and local governments on the well-being of the population. This approach is relevant to entrepreneurship project management, as it highlights the importance of effective communication in project management. Technical students can benefit from these practices, improving their ability to collaborate and communicate their entrepreneurial projects, which positively impacts their academic performance and the sustainability of their initiatives.

4.1. Entrepreneurship Projects in Students with Technical Training

Technical training has gained great relevance today, due to the growing interest in digital entrepreneurship and the need for innovation to face global challenges. The incorporation of Artificial Intelligence (AI) in the training of technical students is an effective strategy to enhance both the management of entrepreneurial projects and academic sufficiency . Through practice combined with theory , students not only acquire the necessary technical skills, but also the competencies to create profitable and sustainable ventures , applying new technologies in their projects. This integration of theory and practice generates accelerated development that favors the creation of innovative products and viable solutions .

This article contributes to the academic and practical debate on how entrepreneurial project management in technically trained students is not only an effective tool for the application of knowledge, but also a means to strengthen academic proficiency . The integration of theory and practice in technical training creates a synergy that allows students not only to apply what they have learned in real situations, but also to enrich their theoretical training as they solve specific problems in the business world. Through a practical approach, students can develop management, leadership, and decision-making skills that not only improve their entrepreneurial projects, but also their academic performance. The article suggests that the development of entrepreneurial projects generates a positive feedback loop, where practice not only reinforces previous knowledge, but also contributes to the generation of new knowledge, which increases academic proficiency. As students face real challenges, they learn to manage resources, make informed decisions, and adapt to unexpected changes, which reinforces the cognitive skills that are assessed in the academic field.

Furthermore, the study highlights that technology and artificial intelligence can play a crucial role in this process, enabling continuous improvement in project management and more efficient access to educational resources . AI-based platforms can provide students with access to up-to-

date knowledge, personalized advice and project simulations, contributing to both improving their technical training and maximizing their academic results.

5. Conclusions

Entrepreneurial project management emerges as a key tool not only for developing entrepreneurial skills, but also for increasing the academic proficiency of technical students. The use of advanced technologies, such as AI, offers fertile ground for continuing to improve this process, generating a virtuous circle that reinforces both theory and practice.

In summary, entrepreneurial project management emerges as a key tool not only for developing entrepreneurial skills, but also for increasing the academic proficiency of technical students. The use of advanced technologies, such as AI, offers fertile ground for continuing to improve this process, generating a virtuous circle that reinforces both theory and practice.

This article, therefore, calls on educational institutions to continue strengthening the link between technical training and project management, incorporating innovative methodologies and emerging technologies that optimize the teaching-learning process and, ultimately, the academic and professional success of students.

Recommendations:

Implement training programs in entrepreneurship project management specifically for students with technical training. Encourage the participation of students with technical training in entrepreneurship competitions and events.

Contributions: This article contributes to the academic and practical debate on how entrepreneurial project management in students with technical training is not only an effective tool for the application of knowledge, but also a means to strengthen academic proficiency . The integration of theory and practice in technical training creates a synergy that allows students not only to apply what they have learned in real situations, but also to enrich their theoretical training as they solve specific problems in the business world.

Through a practical approach, students can develop management, leadership, and decision-making skills that not only improve their entrepreneurial projects, but also their academic performance. The article suggests that **the** development of entrepreneurial projects generates a positive feedback loop, where practice not only strengthens previous knowledge, but also contributes to the generation of new knowledge, which increases academic proficiency. As students face real challenges, they learn to manage resources, make informed decisions, and adapt to unexpected changes, which reinforces the cognitive skills that are assessed in the academic field.

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