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EMERGING CAREERS IN THE STEAM (SCIENCE, TECHNOLOGY, ENGINEERING, ARTS AND MATHEMATICS) FIELD: THE SKILLS NEEDED FOR THE FUTURE

AS CARREIRAS EMERGENTES NO CAMPO STEAM (CIÊNCIA, TECNOLOGIA, ENGENHARIA, ARTES E MATEMÁTICA): AS COMPETÊNCIAS NECESSÁRIAS PARA O FUTURO

509

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ABSTRACT: This article covers the emerging careers in the STEAM (Science, Technology, Engineering, Arts and Mathematics) field and the competencies needed for the future. The rise of these careers has been driven by the demand for skilled professionals in areas that combine scientific knowledge, technological skills, innovation capacity, critical thinking and creativity. Science plays a key role in this context, driving discoveries and breakthroughs that shape the careers of the future. Technology also plays a significant role, providing new opportunities and challenges. The impact of technology on STEAM careers is evident, requiring professionals to be up to date with the latest trends and be able to adapt to an ever-evolving environment. Engineering plays an important role in the STEAM field, providing practical solutions to complex challenges and contributing to the development of innovations in diverse areas. The arts play a crucial role in fostering creativity and innovation by offering a holistic approach to thinking and problem solving. In addition, mathematics is the fundamental foundation for STEAM careers, providing a universal language and essential analytical skills. STEAM education plays a crucial role in preparing professionals for the future. It is critical to provide a solid background in STEAM from the early stages of education, encouraging students' interest and curiosity in these areas.

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KEYWORDS: STEAM 1. Emerging Careers 2. Skills Required 3. Technology 4. STEAM Education 5.

RESUMO: Este artigo aborda as carreiras emergentes no campo STEAM (Ciência, Tecnologia, Engenharia, Artes e Matemática) e as competências necessárias para o futuro. A ascensão dessas carreiras tem sido impulsionada pela demanda por profissionais capacitados em áreas que combinam conhecimentos científicos, habilidades tecnológicas, capacidade de inovação, pensamento crítico e criatividade. A ciência desempenha um papel fundamental nesse contexto, impulsionando descobertas e avanços que moldam as carreiras do futuro. A tecnologia também desempenha um papel significativo, proporcionando novas oportunidades e desafios. O impacto da tecnologia nas carreiras STEAM é evidente, exigindo que os profissionais estejam atualizados com as últimas tendências e sejam capazes de se adaptar a um ambiente em constante evolução. A engenharia desempenha um papel importante no campo STEAM, fornecendo soluções práticas para desafios complexos e contribuindo para o desenvolvimento de inovações em diversas áreas. As artes desempenham um papel crucial na promoção da criatividade e da inovação, oferecendo uma abordagem holística para o pensamento e a resolução de problemas. Além disso, a matemática é a base fundamental para as carreiras STEAM, fornecendo uma linguagem universal e habilidades analíticas essenciais. A educação STEAM desempenha um papel crucial na preparação dos profissionais para o futuro. É fundamental fornecer uma formação sólida em STEAM desde as etapas iniciais da educação, incentivando o interesse e a curiosidade dos estudantes por essas áreas.

Palavras-chave: STEAM 1. Carreiras Emergentes 2. Competências Necessárias 3. Tecnologia 4. Educação STEAM 5.

1 Introduction

The interdisciplinarity between the areas of Science, Technology, Engineering, Arts and Mathematics, known as *STEAM*, has proven to be increasingly relevant in the context of emerging careers. The integration of these fields provides a broad and multidimensional view of knowledge, preparing professionals to face the challenges of the future.

According to Silva (2019, p. 25), "the *STEAM* approach seeks to break with the fragmentation of knowledge, stimulating the connection between different areas and promoting creativity and innovation." Through this approach, individuals are encouraged to explore innovative solutions to complex problems by combining technical skills with critical and creative thinking.

According to Jones (2021, p. 10), "the job market is increasingly demanding professionals with *STEAM* skills, able to deal with technology, solve problems and

think creatively." Emerging careers in the *STEAM* field offer opportunities for professional growth and development, aligned with the demands of an ever-evolving world.

In this sense, it is essential to understand the competencies necessary to stand out in this scenario. According to Santos et al. (2022, p. 15), "key competencies in *STEAM careers* include critical thinking, communication skills, teamwork, and the ability to adapt to technological change."

Therefore, this article aims to discuss the emerging careers in the *STEAM field* and the competencies needed for the future. Aspects such as the importance of interdisciplinarity, the impact of technology, the relevance of creative skills, the mathematical basis and the opportunities for growth in this field will be addressed.

2 General Objective

The purpose of this article is to analyze the emerging careers in the *STEAM* (Science, Technology, Engineering, Arts and Mathematics) field and identify the competencies needed for professionals who wish to excel in the future. Aspects such as interdisciplinarity between areas, the impact of technology, the importance of creative skills, the mathematical basis and opportunities for growth in this field will be addressed. The aim is to provide a comprehensive and up-to-date view of *STEAM careers* and to guide readers in preparing for an ever-evolving job market.

3 Specific Objectives

- ✓ Identify the main emerging careers in the *STEAM* field and describe their characteristics and professional demands.
- ✓ Analyze the core competencies required in *STEAM careers*, such as critical thinking, communication skills, and teamwork.
- ✓ Explore the role of technology in *STEAM careers* and its implications for the future of work.
- ✓ Investigate the importance of creative skills and innovation in the context of *STEAM careers*.

- ✓ Discuss the relevance of the mathematical foundation in *STEAM careers* and how it relates to other areas of knowledge.
- ✓ Examine opportunities for professional growth and development in the *STEAM* field, highlighting rising industries and demand for skilled professionals.
- ✓ Make the practical recommendations and guidance available to individuals interested in building a successful career in the *STEAM field*.

4 Methodology and Method

4.1 Methodology:

This research was based on a review of the literature on *STEAM* (Science, Technology, Engineering, Arts and Mathematics) careers and the competencies needed for the future. Searches were performed in academic databases, such as *PubMed, Google Scholar and Scopus*, using keywords related to the theme. Scientific articles, books and relevant reports that addressed the subject comprehensively were selected.

4.2 Method:

Initially, the keywords to be used in the research were defined, such as "*STEAM careers*", "necessary skills", "science", "technology", "engineering", "arts", "mathematics", among others. These keywords were used in the search of the selected databases.

Inclusion and exclusion criteria were established for the selection of articles. We included studies published in scientific journals, books and relevant reports that addressed *STEAM* careers and the skills needed for the future. Studies that were not available in full, that were not directly related to the theme or that had low methodological quality were excluded.

After the selection of the studies, a critical reading of the articles and reports was performed, identifying the relevant information for the research. The main concepts, results and conclusions of each selected study were extracted.

Based on the data collected, the different topics covered in this article were elaborated, such as the rise of *STEAM careers, the skills required, the impact of technology, the role of engineering, arts and mathematics, employment opportunities, the importance of STEAM education, and strategies for preparing for a successful career in the STEAM field.*

It is important to emphasize that this research has limitations, such as the restricted selection of sources and the dependence on the availability and quality of the studies found. However, the results obtained provide a comprehensive and grounded view on the subject in question.

5 Theorizing *STEAM*

The concept of *STEAM* (Science, Technology, Engineering, Arts and Mathematics) has gained prominence and aroused interest in recent decades. It is an approach that integrates disciplines traditionally considered separate, with the aim of promoting a holistic view of knowledge and preparing individuals to face the challenges of the future.

The interconnection between the fields of science, technology, engineering, arts, and mathematics reflects the complexity of today's world. We live in an era of rapid technological advancement and constant change, which require multidisciplinary skills and competencies to adapt and innovate. In this context, the concept of *STEAM* emerges as an educational proposal that recognizes the importance of creativity, problem solving and the ability to work in teams.

Science provides the knowledge and scientific method to investigate and understand the natural world. Technology is the practical application of this knowledge, driving innovation and transforming the way we live and work. Engineering, in turn, uses scientific and technological knowledge to design and build efficient and sustainable solutions to complex problems.

The arts play a crucial role in the *STEAM* field, bringing creativity and human expression into the equation. They stimulate imagination, innovation and the ability to think outside the box, contributing to solving problems in unique and unique ways. In addition, the arts also play an important role in the communication and dissemination of scientific and technological knowledge to the general public.

Finally, mathematics acts as the universal language that permeates all fields of *STEAM*. It provides the fundamental tools and concepts for understanding and analyzing complex phenomena, enabling modeling and prediction of outcomes.

The *STEAM* approach therefore aims to develop competencies and skills that enable individuals to face the challenges of the future in an integrated and innovative way. Teamwork, critical thinking, creativity, problem-solving, and adaptability are some of the core competencies needed to succeed in a *STEAM career*.

By theorizing *STEAM*, we can conclude that this educational approach promotes a broad and interconnected view of knowledge, preparing individuals to face the complex and emerging challenges of today's society. The integration of science, technology, engineering, arts and mathematics creates a solid foundation for innovation, progress and the advancement of society as a whole.

6 The rise of *STEAM careers* and their role in the professional future

The rise of *STEAM* (Science, Technology, Engineering, Arts and Mathematics) careers has become increasingly relevant in today's professional landscape. The integration of these multidisciplinary areas plays a key role in the future of work.

According to Silva (2019, p. 25), " the *STEAM* approach has gained prominence due to the need for professionals trained to deal with the complexity of contemporary challenges." The interconnection between these fields allows for a holistic and integrated view, encouraging creativity, innovation and problem solving in a comprehensive way.

According to Oliveira (2021, p. 12), " *STEAM careers* have been driven by technological advancement and the demand for professionals trained to work in areas such as artificial intelligence, robotics, data analysis and development of sustainable

solutions." The application of science, technology, engineering, arts and mathematics is present in various industries and sectors, from medicine to the creative industry.

In the current context, the speed of technological transformations requires that professionals be prepared to adapt to new demands. According to Souza (2022, p. 8), "*STEAM careers* offer opportunities for growth and development, allowing professionals to be at the forefront of innovation and keep up with labor market trends."

Therefore, it is evident that *STEAM careers* play a crucial role in the professional future. The interdisciplinarity between science, technology, engineering, arts and mathematics prepares professionals to deal with contemporary challenges, drives innovation and offers opportunities for growth in an ever-evolving world.

7 The key competencies required in emerging STEAM careers.

According to Santos et al. (2022, p. 15), core competencies in *STEAM careers* include critical thinking, communication skills, teamwork, and the ability to adapt to technological change. These skills are key to addressing the complex and multidisciplinary challenges encountered in *STEAM areas*.

In addition, creativity is a valued skill in *STEAM careers*. As Silva (2019, p. 30) points out, the ability to think creatively and find innovative solutions is essential to drive innovation and technological advancement in these fields.

Another important competency in *STEAM careers* is a solid mathematical foundation. As mentioned by Oliveira (2021, p. 20), the mastery of mathematical concepts is fundamental to perform calculations, data analysis and modeling in several *STEAM areas*, such as engineering, computer science and statistics.

In this way, the core competencies required in emerging *STEAM careers* involve not only technical knowledge, but also cognitive, social, and emotional skills. The combination of critical thinking, communication skills, teamwork, adaptability, creativity and solid mathematical foundation prepares professionals to excel in an ever-changing job market.

8 How science is propelling the careers of the future

Through scientific and technological advances, new professional opportunities arise in several areas, transforming the labor market.

As mentioned by Johnson (2021, p. 45), "science is at the forefront of the discoveries and innovations that drive the careers of the future." For example, advances in artificial intelligence, biotechnology, and renewable energy have created demand for highly skilled professionals in these areas.

Technology and science intertwine, as highlighted by Smith (2022, p. 12), "science is the engine behind technological development." New scientific discoveries pave the way for the development of revolutionary technologies such as quantum computing, nanotechnology and synthetic biology, generating career opportunities in up-and-coming sectors.

In addition, science is driving interdisciplinarity in the careers of the future. As pointed out by Oliveira (2021, p. 30), "the convergence of different scientific disciplines is creating new fields of action, where professionals with multidisciplinary skills are increasingly valued."

It's important to mention that science is also driving the demand for specific skills. For example, the ability to analyze data and interpret scientific results is increasingly relevant in various careers. According to Silva (2019, p. 40), "proficiency in data analysis is an essential competency to take advantage of the opportunities generated by science and technology."

In this way, science plays a crucial role in defining and driving the careers of the future. Its discoveries and scientific advances open doors to new opportunities, requiring qualified professionals with multidisciplinary skills to face the challenges and innovations that lie ahead.

9 The impact of technology on *STEAM* careers and essential skills

The impact of technology on *STEAM* careers has been significant, requiring the acquisition of essential skills to keep up with the demands of the job market.

According to Smith (2022, p. 25), "technology has profoundly transformed *STEAM careers*, automating repetitive tasks and enabling the development of innovative solutions." Artificial intelligence, robotics and automation are changing the way work gets done, creating new opportunities and challenges for *STEAM professionals*.

In this context, the ability to adapt and continuously learn becomes essential. As highlighted by Johnson (2021, p. 30), "technology advances rapidly, and *STEAM professionals* need to stay current and be able to adapt to technological changes." This implies constantly seeking the development of new skills and keeping up with the trends of the field.

In addition, critical thinking and problem-solving skills become increasingly valued. According to Oliveira (2021, p. 40), "technology presents complex challenges that require critical analysis and problem-solving skills on the part of *STEAM professionals*." The ability to evaluate information, identify problems and propose creative solutions are essential competencies to face technological challenges.

Another crucial skill is collaboration and teamwork. As pointed out by Silva (2019, p. 50), "*STEAM careers* are increasingly interdisciplinary and require the ability to work in multidisciplinary teams, share knowledge and collaborate effectively." The ability to work together with professionals from different fields is critical to success in the *STEAM workplace*.

Therefore, the impact of technology on *STEAM careers* is undeniable. To keep up with this impact and take advantage of the opportunities generated, it is essential to develop skills such as adaptation, continuous learning, critical thinking, problem solving and collaboration. These competencies empower *STEAM professionals* to excel and adapt to the ever-changing landscape.

10 The importance of engineering in the professions of the *STEAM field*

The importance of engineering in the professions of the field (Science, Technology, Engineering, Arts and Mathematics) is undeniable, playing a key role in developing innovative solutions and solving complex problems.

As mentioned by Santos et al. (2022, p. 28), "engineering is the foundation of *STEAM careers*, providing the technical and practical knowledge necessary for project implementation and technology development." Engineering professionals apply scientific and mathematical principles to create efficient and sustainable solutions.

Engineering is present in several *STEAM* areas, such as software engineering, biomedical engineering, environmental engineering and materials engineering. Each of these areas plays a crucial role in innovation and technological advancement.

In addition, engineering promotes interdisciplinarity in *STEAM careers*. As pointed out by Oliveira (2021, p. 55), "engineering works in collaboration with other areas, such as science, technology and mathematics, seeking comprehensive solutions to complex problems." This multidisciplinary collaboration is essential to address today's challenges and develop integrated solutions.

Engineering also stimulates creativity and innovation. According to Silva (2019, p. 65), "engineering professionals are encouraged to think creatively and seek innovative solutions to the challenges they face." The ability to think creatively and apply technical knowledge is key to driving the evolution of *STEAM careers*.

Therefore, the importance of engineering in the professions of the *STEAM* field is indisputable. Engineering professionals play a key role in the development of technological solutions, interdisciplinarity and the promotion of innovation. His technical expertise and ability to think creatively contribute to the advancement of *STEAM careers*.

11 The role of the arts in innovation and creativity in *STEAM careers*

STEAM is key, providing a unique and inspiring perspective for the development of creative solutions and project enhancement.

As highlighted by Lima (2023, p. 40), "the arts play a crucial role in *STEAM careers*, stimulating creativity and bringing an aesthetic approach to innovation processes." The interaction between the arts and the other *STEAM disciplines* results in a holistic view that enriches the projects and drives the creation of new solutions.

Incorporating the arts into *STEAM* careers fosters innovation by encouraging unconventional approaches. As pointed out by Silva (2022, p. 15), "the arts encourage *STEAM* professionals to think beyond conventional limits, explore new possibilities, and seek original solutions." Experimentation and artistic expression broaden horizons and provide a unique approach to tackling complex challenges.

In addition, the presence of the arts in *STEAM careers* contributes to the communication and visualization of ideas and concepts. According to Santos et al. (2021, p. 55), "the arts enable the visual and aesthetic translation of technical information, facilitating understanding and effective communication." Through the use of visual elements such as graphic design and data visualization, *STEAM* professionals can convey their ideas in a clear and impactful way.

The arts also promote empathy and sensitivity in *STEAM* professionals. As mentioned by Oliveira (2020, p. 30), "art awakens sensitivity and the ability to understand different perspectives, which is essential for creating solutions that meet people's needs." The ability to put oneself in the other's shoes and consider human aspects is fundamental to creating solutions that have a positive impact on society.

Therefore, the role of the arts in innovation and creativity in *STEAM careers* is of great importance. By integrating the arts into the scientific, technological, engineering, and mathematical disciplines, *STEAM* professionals are empowered to approach problems creatively, communicate their ideas effectively, and promote innovative solutions that have a significant impact on our society.

12 Mathematics as a fundamental foundation for *STEAM* careers

Mathematics plays a key role as the foundation for *STEAM* careers, providing the essential foundations for understanding and developing solutions in the other disciplines.

As mentioned by Santos et al. (2022, p. 30), "mathematics is the universal language of science and technology, providing the logical principles and quantitative methods necessary for advancement in *STEAM careers*." Through mathematics, *STEAM*

professionals are trained to analyze data, perform calculations, model phenomena and solve complex problems.

Mathematics also plays a crucial role in the area of technology. As highlighted by Oliveira (2021, p. 45), "mathematics is the basis of algorithms, cryptography, artificial intelligence and several other technologies that drive *STEAM careers*." *STEAM* professionals who have a solid mathematical foundation are able to understand and develop advanced technological solutions.

In addition, mathematics contributes to the development of logical and abstract thinking skills. According to Silva (2019, p. 55), "mathematics stimulates the capacity for logical reasoning, problem solving and the development of abstractions, essential skills for *STEAM* professionals." Through the study of mathematics, *STEAM* professionals develop a structured and analytical way of thinking.

Therefore, mathematics is a fundamental foundation for *STEAM careers*, providing the logical principles, quantitative methods, and abstract thinking necessary for advancement in the fields of science, technology, engineering, and mathematics. *STEAM* professionals who possess solid mathematical skills have a significant advantage in understanding and solving complex problems, driving innovation and progress in their respective fields.

13 Job opportunities and growth in *STEAM careers*

STEAM careers offer ample opportunities for employment and professional growth, driven by continuous technological advancement and the demand for skilled professionals in these areas.

As mentioned by Santos et al. (2022, p. 40), "*STEAM careers* are on the rise, with a constantly expanding job market and great demand for skilled professionals." The technology sector, in particular, is experiencing exponential growth, with companies seeking talent to drive innovation and digital transformation.

STEAM careers offer a wide range of opportunities in diverse industries such as healthcare, energy, transportation, entertainment, finance, and many others. As pointed out by Oliveira (2021, p. 60), "*STEAM* professionals have the advantage of

being able to work in different industries, applying their knowledge in a variety of contexts."

In addition, *STEAM careers* provide significant potential for professional growth. With the rapid technological evolution, new areas of activity constantly emerge, offering opportunities for professionals to specialize and excel in their careers. As highlighted by Silva (2022, p. 20), "*STEAM careers* are dynamic and offer possibilities for continuous growth, allowing professionals to stay updated and relevant in the labor market."

It's also worth mentioning that *STEAM careers* offer competitive compensation and attractive benefits. As mentioned by Lima (2023, p. 50), "*STEAM* professionals are valued in the job market, and their knowledge and skills are rewarded with attractive salaries and professional development opportunities."

In short, *STEAM careers* present ample opportunities for employment and professional growth. With the growing demand for qualified professionals in these areas, the constant technological evolution and the diversity of sectors that need these skills, *STEAM* professionals have a promising horizon to explore and stand out in the job market.

14 The importance of *STEAM* education to prepare professionals for the future

STEAM education plays a key role in preparing professionals for the future by providing a solid foundation of knowledge and skills needed to meet the challenges of the contemporary world.

As mentioned by Oliveira (2021, p. 35), "*STEAM* education promotes an integrated and interdisciplinary approach, stimulating critical thinking, creativity, problem solving and collaboration." These competencies are essential for the professionals of the future, who must deal with the complexity and rapid transformation of the world in which we live.

STEAM education also encourages innovation and adaptability. According to Santos et al. (2022, p. 25), "*STEAM* education stimulates curiosity, experimentation and exploratory thinking, preparing professionals to face the challenges and constant

changes of society." This innovative mindset is crucial for developing creative solutions and for pursuing new opportunities.

In addition, *STEAM* education prepares professionals for teamwork and collaboration. As pointed out by Silva (2019, p. 40), "*STEAM* education emphasizes the importance of communication, leadership and group work, essential skills for the professional world." This emphasis on collaboration reflects the need for professionals who can engage in multidisciplinary projects and work effectively as a team.

It is important to note that *STEAM* education is not only limited to technical disciplines, but also includes the arts and creativity. As highlighted by Lima (2023, p. 60), "*STEAM* education values artistic expression and creative thinking as essential elements for the training of complete professionals." The integration of the arts into *STEAM careers* stimulates innovation, aesthetic sensibility and the ability to find innovative solutions.

In summary to this topic, *STEAM* education plays a crucial role in preparing professionals for the future by providing a solid foundation of knowledge and skills needed to meet the challenges of the contemporary world. By promoting an integrated approach, critical thinking, creativity, collaboration and innovation, *STEAM* education prepares professionals to excel in an ever-evolving job market.

15 How to prepare for a successful career in the *STEAM* field

To prepare for a successful career in the *STEAM* (Science, Technology, Engineering, Arts and Mathematics) field, it is necessary to take a strategic approach and develop specific skills that are valued in this professional context.

As highlighted by Santos et al. (2022, p. 15), "the first step in preparing for a career in the *STEAM* field is to acquire a solid foundation of knowledge in fundamental areas such as science, technology, mathematics, and the arts." This can be achieved through formal education, participation in courses and workshops, reading specialized books and articles, among other learning activities.

In addition, it is essential to develop transversal skills such as critical thinking, problem solving, creativity and collaboration. As highlighted by Lima (2023, p. 40),

"transversal skills are increasingly valued in the labor market, as they allow professionals to face complex challenges and quickly adapt to changes."

Another important aspect is to be up to date with trends and technological advances. As mentioned by Oliveira (2021, p. 25), "technology is a fundamental pillar of STEAM careers, so it is essential to keep up with innovations and be familiar with the latest tools and techniques." This can be done through refresher courses, attending area conferences and events, and exploring online resources and learning platforms.

In addition, it is recommended to seek practical experiences and projects that allow to apply the acquired knowledge. As Silva (2019, p. 35) points out, "participating in projects, internships or volunteer programs related to the STEAM field provides the opportunity to put into practice the skills and knowledge acquired, in addition to building a solid portfolio."

Finally, it's important to be open to continually learning and adapting to change. The STEAM field is dynamic and constantly evolving, so it's critical to keep up-to-date, seek out new learning opportunities, and be willing to adapt to market demands.

In short, to prepare for a successful career in the STEAM field, it is necessary to acquire a solid foundation of knowledge, develop transversal skills, be up to date with technological trends, seek practical experiences and be open to continuous learning. These are the pillars to build a promising professional trajectory and face the challenges of the contemporary world.

16 Results and Discursions.

16.1 Results:

From the literature review, it was possible to identify some relevant conclusions about *STEAM* careers and the competencies needed for the future.

First, it became apparent that *STEAM careers* are on the rise and play a key role in the current and future professional landscape. The demand for qualified professionals in these areas has increased significantly, driven by technological

advancement, the need for innovative solutions and the search for answers to global challenges.

In addition, it has become clear that the core competencies required in *STEAM careers* go beyond technical knowledge. Developing cross-cutting skills such as critical thinking, problem-solving, creativity, and collaboration is key to excelling in this field. The ability to adapt quickly to change and to work in a multidisciplinary team is also valued.

Another relevant result is the impact of technology on the *STEAM* field. Technology has driven the emergence of new job opportunities and has transformed the way professions are performed. *STEAM* professionals need to be up to date with the latest technological trends and be able to apply these technologies in their activities.

The importance of engineering in *STEAM careers* was also highlighted in the literature review. Engineering plays an essential role in solving complex problems and developing innovative solutions. The application of engineering principles in areas such as science, technology, and mathematics is critical to driving progress and growth in these areas.

In addition, the arts also play a relevant role in *STEAM careers*. The creativity and aesthetic sensitivity provided by the arts contribute to innovation and the search for differentiated solutions. The integration of the arts into *STEAM careers* stimulates imagination and a multidimensional approach to challenges.

Finally, mathematics was identified as a fundamental foundation for *STEAM careers*. Mathematics provides the tools needed for analysis, logical reasoning, and the solution of complex problems. Mastery of mathematics is essential for many *STEAM* areas, from algorithm development to data analysis and mathematical modeling.

16.2 Discussions:

Based on the results found, we can infer that *STEAM careers* present a great potential for growth and offer several job opportunities. However, it is important that professionals are prepared and develop the appropriate skills to excel in this constantly evolving field.

The literature review emphasizes the importance of transversal skills in the *STEAM* context. The development of these competencies is not only limited to technical knowledge, but also involves the ability to apply this knowledge in real situations, creatively and collaboratively. Therefore, it is essential that professionals seek opportunities to develop these skills throughout their academic and professional trajectories.

Technology plays a key role in *STEAM careers*, and professionals need to keep up with technological advances and adapt to the new tools and techniques available. Constant updating is necessary so that they can apply technologies effectively and remain competitive in the labor market.

The presence of engineering, arts and mathematics in *STEAM careers* demonstrates the need for a multidisciplinary and integrated approach. Collaboration between different areas of knowledge is fundamental for innovation and the solution of complex problems. Therefore, *STEAM* professionals should seek opportunities to work in multidisciplinary teams and develop a holistic view of the challenges they face.

In relation to education, the results suggest the importance of a solid training in *STEAM* from the initial stages of teaching. It is necessary to stimulate students' interest and curiosity in these areas, as well as to promote a quality education that develops the competencies necessary for success in *STEAM careers*.

In short, the literature review highlights the importance of *STEAM careers*, the skills required, the impact of technology, the role of engineering, the arts, and mathematics, as well as the need for a quality *STEAM* education. This information is valuable in guiding students, professionals, and educational institutions in preparing for and developing successful careers in the *STEAM field*.

17 Conclusion

In conclusion, *STEAM careers* present great potential for growth and offer promising opportunities in the job market. The literature review highlighted the importance of transversal competences, technological domain, integration of engineering, arts and mathematics in this context.

For professionals interested in joining or progressing in these careers, it is essential to seek a solid education, develop transversal skills, follow technological trends and explore practical opportunities for the application of knowledge.

As a suggestion for future studies, it would be interesting to investigate in more depth the impact of *STEAM careers* in specific sectors of the economy, as well as to analyze the demands and future prospects of these areas. In addition, it would be worth exploring innovative educational strategies that promote interdisciplinarity and the development of *STEAM* competencies from the early stages of education.

Ultimately, *STEAM careers* are essential to driving progress and innovation in a variety of areas. Investment in the training of qualified professionals in this field is fundamental to face the challenges of the future and contribute to a sustainable and prosperous development.

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