Science fiction as a didactic tool to bring science to Architecture students

Ciencia ficción como herramienta didáctica para acercar la ciencia a estudiantes de Arquitectura

Luis Adolfo Apolín Montes
lapolinm@ucvvirtual.edu.pe
https://orcid.org/0009-0003-5854-8116
Universidad César Vallejo, Huaraz, Perú

Isaura Ruth Lirión Rodríguez
ilirion@ucv.edu.pe
https://orcid.org/0009-0000-2462-7746
Universidad César Vallejo, Huaraz, Perú

Rodolfo Sánchez Coello
rsanchez1@ucvvirtual.edu.pe
https://orcid.org/0000-0003-3657-0227
Universidad César Vallejo, Huaraz, Perú

Luis Elmer Angulo Cabanillas
languloc@ucvvirtual.edu.pe
https://orcid.org/0000-0002-9054-6933
Universidad César Vallejo, Huaraz, Perú

Abstract

This study investigates the integration of science fiction as a didactic tool in the teaching of Architecture to facilitate the learning of scientific concepts. An educational strategy is recommended that includes the reading of science fiction stories and participation in lectures. The research, with quantitative sequential explanatory design, used surveys before and after implementation. Data were analyzed with descriptive statistics and significance tests. The results show a positive receptivity, with the majority of participants valuing its usefulness for understanding new content and encouraging group participation. The need to adapt the strategy to the different needs and expectations of the students is emphasized. This study highlights the importance of flexible and personalized educational approaches to enhance engagement and understanding, promoting a dynamic and responsive academic community in Architecture. Ethical aspects were considered and informed consent was obtained from the participants.

Keywords: Science Fiction; Science; Teaching; Architecture; Strategy

Resumen

Este estudio investiga la integración de la ciencia ficción como herramienta didáctica en la enseñanza de la Arquitectura para facilitar el aprendizaje de conceptos científicos. Se propone una estrategia educativa que incluye la lectura de cuentos de ciencia ficción y participación en ponencias. La investigación, con diseño cuantitativo secuencial explicativo, utilizó encuestas antes y después de la implementación. Se analizaron los datos con estadísticas descriptivas y pruebas de significancia. Los resultados muestran una receptividad positiva, con la mayoría de los participantes valorando su utilidad para comprender nuevos contenidos y fomentar la participación grupal. Se subraya la necesidad de adaptar la estrategia a las distintas necesidades y expectativas de los estudiantes. Este estudio destaca la importancia de enfoques educativos flexibles y personalizados para mejorar el compromiso y la comprensión, promoviendo una comunidad académica dinámica y receptiva en Arquitectura. Se consideraron aspectos éticos y se obtuvo el consentimiento informado de los participantes.

Palabras clave: Ciencia ficción; Ciencia; Enseñanza; Arquitectura; Estrategia

INTRODUCTION

Science fiction as a training tool presents a valuable opportunity for education, especially in bringing students closer to science, which often seems abstract or distant. This approach provides a bridge between imagination and scientific knowledge, facilitating the exploration of complex concepts in an accessible and stimulating way.

For example, the study by Vesga Vinchira (2015) concludes that science fiction as a pedagogical tool represents a significant methodological change, fostering pedagogical diversity. This approach allows students to engage with a less commonly explored but effective literary genre to promote reading and develop a critical and reflective attitude through narrative writing.

Rubio Albizu (2016), states that his research aimed to motivate students and inspire their interest in science through creativity and reflection. By using science fiction as a tool to connect popular and academic culture, reading and critical skills are encouraged. Preliminary results showed a positive reaction, identifying areas for improvement in written and oral expression.

Petit Pérez and Solbes Matarredona (2015) found that science fiction films are valuable educational resources. Scenes with scientific errors are useful for debates and correction activities in the classroom. Students find these activities fun and effective, while teachers view them as motivating and helpful, though with some limitations in conceptual learning. The authors suggest analyzing the representation of science and scientists in popular films and identifying scientific errors to suggest educational activities based on these observations, enriching the teaching and learning process.

Sierra Cuartas (2006) also highlights the importance of science fiction as a pedagogical resource in science education, useful for fostering critical and ethical thinking among students. Despite institutional mistreatment, "hard" science fiction holds great didactic value. The author cites the works of Jules Verne, which have a clear educational and ethical intent. He concludes that integrating science fiction into the classroom promotes an interdisciplinary and democratic environment, suggesting pedagogical activities such as analyzing scientific coherence, discussing bioethical issues, and composing essays, reinforcing its educational value.

It is important to highlight the changes in perception regarding the use of elements traditionally considered distractions in teaching. Cueva (2020) concludes that cinema and audiovisual media, thanks to the massification of streaming, are now accessible both for free and in paid formats and they are seen as educational elements from a critical perspective. The study shows that it is possible to understand students' perceptions of various realities and offers guidelines for educational intervention. Audiovisual narratives educate and induce the construction of social imaginaries, emphasizing the importance of their analysis to achieve educational and scientific transformations.

In architecture education, it is crucial for students to understand and apply scientific concepts to design sustainable and innovative structures. Innovating in teaching methods is essential to make science education more accessible in this field. Callejas (2019) emphasizes that young people's perceptions of science are influenced by its representation in literature, film, and television. These representations can misrepresent the real understanding of science, highlighting the need for teaching approaches that accurately present scientific ideas.

Barceló García (2015) defines science fiction as a narrative genre that offers bold speculations about the world, society, and the effects of science and technology, considering it "literature of ideas" due to its reflective quality. Science fiction is helpful to reflecting on the impact of science and technology on life and society.

Chapela (2014) considers that science fiction has increased its presence in university classrooms, especially among students not specializing in sciences. Since 1970, Arizona State University and other institutions have incorporated science fiction into their courses, including its use in teaching engineering and science in California and the United Kingdom. These examples have encouraged educational programs that adapt science fiction for classroom use, facilitating the search for examples and sources of narrative inspiration.

For Fernández Rovira (2008), science fiction has influenced society by imagining hypothetical

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

54

futures that seek to modify the present, giving it relevance beyond entertainment. Similar to art, which explores possibilities; science fiction goes beyond scientific knowledge, even if it is fictional. Thus, if we accept that art can change society and science fiction is a form of art that incorporates technique, then science fiction also has the potential to influence society.

Now, in Latin America, science fiction has historically been underestimated and confused with other literary genres. Although it has a growing presence in film, comics, and music, critical bibliography is scarce. Critics often trace its roots to Anglo-Saxon production, limiting its appreciation as an autonomous genre. However, Latin American science fiction focuses on sociological, political, philosophical, and psychological themes, aligning with the "soft" trend of the genre. It is worth noting that there has recently been an increase in academic interest and production of science fiction in the region (Kurlat Ares, 2012).

Science fiction in architecture is evidenced in works such as those by Bonifacino and Brum Stewart (2013), who explore the relationships between architecture and film, especially in dystopian movies. In these films, architecture acts as a protagonist that connects the fictional with the real, using familiar elements in fictional contexts that evoke Freud's uncanny. The research divided the history of cinema into two stages of the twentieth century, identifying recurring elements in dystopia: topology-society, nature-climate, and architectural collage, forming an archetype that reinforces the relationship between architecture and futuristic cinema.

Another example of this interrelationship can be found in the study by Tovar Camacho (2016), where students improved their understanding and retention of physical reality by using media, teamwork, experimentation, and idea contrast. This allowed students to actively participate in their learning process, adapting it to their interests.

Zamorano et al. (2011) also demonstrated a favorable and receptive attitude among students towards the scheduled activities. The narrative in the classroom, through conceptual metaphors, significantly improved comprehension. The teacher's didactic strategies positively influenced learning. Fictional narratives not only increase interest but also help understand scientific models and acquire general knowledge. The use of science fiction as an educational resource is encouraged to stimulate cognitive processes, value scientific thinking, differentiate it from pseudoscience, and promote its appreciation as a cultural activity.

Perales Palacios et al. (2004) conclude that analyses of television content reveal a tendency toward catastrophic events, limiting its use for scientific literacy without expert supervision. Cartoons have proven effective in identifying Physics errors and generating problematic situations for learning, promoting interaction and extrapolation to everyday contexts. Computer simulation programs enhance conceptual and procedural knowledge in Physics. They recommend that future research expand the analysis of television content and further explore the use of cartoons and simulations in various educational contexts.

Reading comprehension strengthens analytical skills and transforms information into lasting knowledge, which is crucial in school life. Aimed at practical objectives, it improves students' mathematical and scientific competence. Akbaşli et al. (2016) indicate that a deep understanding of a text correlates with high scores in PISA and outstanding performance in science and mathematics, which is fundamental for academic success in OECD countries. This development is not limited to formal learning; collaboration between schools and families in reading comprehension significantly influences performance.

Reading is essential in school development and every learning experience, and it is vital to enhance its role to bring knowledge closer in science and mathematics. Fries (2016, cited by Thevenon, 2018), defines science as systematized knowledge, co-created theoretically and experimentally, and disseminated for social understanding. Popular science allows science fiction writers to select and adapt this knowledge, creating narratives that capture the public's imagination. Thus, science fiction drives technological advancements by presenting innovative ideas and fostering scientific creativity, as well as facilitating a critical analysis of the social impact of technology, positioning itself as an effective teaching tool to stimulate interest in science.

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

55

Charalambos et al. (2015) underscore the importance of certain narrative aspects, such as cause and effect, intentionality, and temporal sequence, which are often overlooked in traditional expository texts in science education. Thus, these narratives not only seek to understand the human world but also the natural one.

In literature, Grün (1971) highlights the significant role of science fiction in technological advancements, driving disciplines such as physics, chemistry, and biology. These narratives, initially considered fantasy, have inspired real inventions and methodologies, encouraging scientific inventiveness and criticizing the impact of technologies on society.

One such proposal comes from Petit and Solbes (2012), who question the didactic character of science fiction to develop "scientific attitudes and attitudes towards science" (p. 56) in students, considering the narrative capability of this genre as a promoter of imagination and observation, which are essential drivers of inquiry processes, constituting the starting point for research and scientific competence (Gonzales-Weil et al., 2012).

The lack of academic interest in sciences can be linked to students' demotivation due to the perception of their abstract complexity. Approaching science from a literary perspective can eliminate this apathy by engaging students in deducing scientific ideas. Vrasidas et al. (s.f.) highlight that science fiction motivates students, generating a sense of agency and maintaining their interest through stories with characters. Science fiction portrays scientific knowledge plausibly in imaginative contexts, strengthening competencies and skills essential for human development.

Palacios et al. (2018) emphasize the importance of education and scientific and technological advancements to improve quality of life and adapt to future changes. It is necessary to cultivate creativity and critical thinking to face future challenges, exploring the intersection of science, art, and ethics. Scientific literacy is crucial to address everyday problems and understand the interactions between science and society, highlighting science as an integral part of contemporary culture (Furió and Vilches, cited by Hernández y Zacconi, 1997).

Promoting this literacy requires a long-term educational approach, focused on asking questions rather than seeking definitive answers (Maienschein, 1998). Although students may have less knowledge, they possess adaptable skills for a constantly changing world. Cortés (2022) describes scientific literacy as derived from impartial research and general applicability, with variable interpretations.

Martín et al. (2005) highlight that scientific literacy requires both knowledge and skills, debating whether one precedes the other. Preparing teachers for a long-term learning-focused educational approach is crucial. In a changing world, this literacy fosters skills to adapt to future challenges, promoting creative and critical scientific thinkers. The teaching of sciences should address the gap between scientific and everyday meanings, proposing a communicative approach to promote precise and applied understanding of concepts.

The formation of attitudes towards science among young people is strongly influenced by their peers, rather than by parents and teachers, especially in adolescents, according to Koballa & Crawley (1985). Social leaders in educational settings also have a significant impact. Social psychology studies show that even a consistent minority can influence the majority. It is essential to consider these social dynamics to foster positive attitudes towards science. Furthermore, quality science fiction, written by authors with a scientific background, is growing and combines literary writing with a reasonable extrapolation of current scientific advances (Fraknoi, 2003).

Grilli (2016) highlights the crucial role of cable television, movie rentals, and streaming in popularizing cinema as an educational complement to traditional science teaching. These media offer a visually appealing and accessible way to approach scientific and technological topics, influence on interest and foster understanding in a broad audience. Science fiction films, in particular, can make scientific concepts more exciting and understandable, becoming a valuable educational tool that enriches learning and allows us to explore the repercussions of science on our existence. Thus, cinema broadens scientific dissemination and generates discussions about advances and their impact on society.

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

56

Barnett & Kafka (2007) highlight a course designed to strengthen the ability of future primary school teachers to critically examine the representation of science in the media. The course seeks to improve scientific literacy by teaching how to analyze and question scientific images and arguments in films and television programs. This study details the educational strategies used to help students distinguish between factual and fictional information.

The educational work in the use of science fiction elements is emphasized in the course Science and Science Fiction by Brake & Thornton (2003), which addresses the relationship of science fiction with philosophy, history and politics. This course allows us to examine the impact of science in all spheres of life, analyzing key moments in scientific history and its connection with science fiction. The social and scientific revolutions caused by the Copernican and Darwinian changes are explored, as well as the implications of the 20th century paradigm shift driven by relativity and quantum theory.

Science fiction influences society in a multifaceted way, offering a critical view of scientific advances and their cultural impact. Studying scientific milestones in science fiction reveals contemporary progress and influences. Zegarra (2020) emphasizes research in written sources to develop critical skills in students, strengthening their academic progress. Balakireva and Mogilevich (2021) promote integrating entertainment, such as deconstruction of fantastic images, to increase interest in higher education, advocating for games that facilitate research skills. Dinuta (2013) considers teaching strategies essential to achieve educational goals in specific contexts, improving participation and engagement.

However, despite the potential of science fiction as an educational tool, there has been insufficient research into how its inclusion can improve the understanding of scientific concepts among architecture students. This gap in the literature permits further exploration of this topic. Therefore, the present research proposes that science fiction can be an innovative and effective teaching strategy to teach scientific concepts to architecture students, thus filling a significant gap in the educational literature and offering a novel approach to teaching in this field.

The main objective of this study is to recommend a teaching strategy that uses science fiction to bring science closer to students in the professional school of Architecture. Specific objectives include analyzing the impact of using science fiction on architecture students' learning and understanding of scientific concepts, identifying factors that influence the effectiveness of science fiction as a teaching tool, and analyzing the effectiveness of the science fiction-based teaching approach in improving students' understanding of specific scientific concepts related to architecture.

This research addresses the lack of effective teaching methods that integrate science into architecture education in an accessible and engaging way, by exploring how science fiction can serve as a teaching tool to bring scientific concepts closer to architecture students. Research questions include:

What is the impact of using science fiction on the retention and application of specific scientific concepts among architecture students?

What are the key factors that influence the effectiveness of science fiction as a teaching tool in architecture?

To what extent does the science fiction-based teaching strategy improve the understanding of specific scientific concepts linked to architecture?

Solving this problem is essential to improve the training of future architects, making them more competent in applying scientific principles in their designs, inspiring their education and fostering innovation and sustainability in architectural practice.

METHOD

The research is classified as a sequential explanatory quantitative design, using quantitative data to explore patterns and trends, thus achieving a more complete view of the research. The research was carried out in two phases:

First, the collection of initial quantitative data, which consisted of the design and administration of a questionnaire with, closed questions to Architecture students to assess their prior knowledge and interest in scientific concepts and science fiction. The data were analyzed using descriptive statistics to establish a model. In this phase, a Likert scale pretest was managed to 45 students to assess their level of prior knowledge in

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

57

relation to science fiction and its link to science teaching.

Then, the selection and delivery of science fiction stories relevant to the students was developed, allowing exploring them during a given period. Subsequently, a second survey was directed with closed questions to assess the perceptions, experiences and changes in the knowledge and interest of the students. Pre- and post-intervention data were compared using statistical tests to determine the significance of the observed changes.

Regarding ethical considerations, it is worth remembering that informed consent was obtained from all participants and the confidentiality of their data was guaranteed.

Procedures

The research sought to address the need to bring science closer to students of the professional school of Architecture so that they can understand the importance of science in their professional development and to have them feel motivated to learn it. To do so, the first step was to review the bibliography on the subject, seeking to pinpoint the information that links the teaching of science with science fiction, as well as what is related to effective teaching strategies to instruct about science. For the selection of the stories, the provisions of the Copyright Law were taken into account, which is stated in Title IV, Chapter I, Article 41, paragraph c, amended by the Sole Article of Law No. 30276, published on December 3, 2014, which text states that verified educational works used in the activities of an educational institution by its staff and students, not seeking profit, with an audience linked to the institution, may be shared, but limited to that community. Thus, the following texts were considered: Sentinel by Fredric Brown, The Observer by Julio de Miguel, A Gift from the Earth by Frederic Brown, Ladies of the Sun and the Firmament by Rocío Qespi Agnoli, review of Ringworld by Larry Niven, review of The City and the Stars by Arthur C. Clarke, An Angel to Hold Your Fall by Sarko Medina Hinojosa. As it can be seen, the selection took into account the idea of architecture and futuristic constructions linked to the students' specialty. Stories that could well serve as an approach to science were also considered, such as: the arrival of extraterrestrial beings, fabulous machines or the possible harmful consequences of technological progress.

Subsequently, three interventions were carried out, which consisted of assigned readings and specific presentations designed to bring students closer to scientific concepts through science fiction literature, all of the above trying to link science fiction with aspects of Architecture as mentioned in the typical ones chosen for each story delivered. Finally, a posttest with a Likert scale was applied to measure the changes in knowledge after the interventions. The entire sequence of activities was carried out throughout the academic semester 2023-2024.

Sample

The sample consisted of 46 students from the first semester of the Professional School of Architecture 2023-2024. Students enrolled in the Professional School of Architecture, who were enrolled in the corresponding academic semester, attended regularly, and signed the informed consent were included. Those who were not enrolled in the Professional School of Architecture, attended irregularly, or did not sign the informed consent were excluded.

Data collection techniques and instruments

For this research, closed quantitative surveys were used, which allowed the researchers to collect and analyze the data more efficiently. The surveys were applied to a representative group of students enrolled in the School of Architecture, and the data collected were subjected to an analysis that combined statistical techniques and quantitative evaluation methods. The findings obtained were used to obtain valuable information on the use of science fiction as a tool to increase the understanding and interest of architecture students in scientific concepts.

RESULTS

The demographic results show significant diversity among the participants in the study. 40% were under 18 years of age, suggesting the inclusion of younger students and early exploration of scientific concepts through science fiction in Architecture. The 18-21 age group accounted for 44.4%, reflecting the typical presence of students in Architecture programs. Those over 22 years of age completed the remainder, indicating diversity in educational and professional path. In terms of gender, the sample showed a balance with 53.3%

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

58

male and 46.5% female, crucial for the validity of the study.

These results focus on the importance of age diversity in exploring how different stages of development and academic experience influence the effectiveness of science fiction-based teaching strategies. The gender balance gives emphasis to the importance of inclusive educational approaches. The findings suggest that science fiction-based strategies can be effective for a wide range of Architecture students and their adaptability in different educational contexts can maximize their effectiveness.

71.1% prefer to consume science fiction through movies and 15.6% opt for television series, underlining the preference for the cinematic media. 35.6% are primarily interested in the design of futuristic worlds and 28.9% show interest in advanced technologies and their application in architecture, evidencing the connection between technological speculation and its practical impact. These results ensure the educational potential of science fiction, especially in the design of futuristic worlds and advanced technologies, for Architecture students, fostering innovative perspectives in their academic training.

A remarkable 46.7% have never participated in science fiction-related conferences or presentations, indicating an opportunity to introduce educational events that merge both fields. 28.9% attend occasionally, and 20% do so sporadically, indicating some degree of exposure to these events. Developing strategies to increase participation in these events could strengthen the connection between the Architecture student community and the integration of science fiction as an educational tool.

The research shows a widespread exposure to the science fiction genre. 71.1% report having had previous experience reading books or watching science fiction films and series on some occasion, indicating a potential interest in integrating these elements into the academic field. However, 17.8% indicate that they have never had such experience, emphasizing a segment that could benefit from greater exposure to enrich their educational perspective in the context of Architecture.

77.7% have chosen to read or watch science fiction on some occasion, demonstrating a widespread interest and conscious choice towards this genre. 22.2% do so frequently, revealing a significant group with a recurring preference. These results support the idea that most students show an active disposition towards exploring science fiction, indicating that its integration into teaching strategies could be well received by the Architecture student community.

Regarding the perception of the usefulness of science fiction, 40% consider that it occasionally contributes to their personal or professional development, 42.2% maintain that it frequently contributes, and 11.1% believe that it always contributes. This permits to state that there is a consistent recognition of the benefits of this genre. The results underline the willingness of Architecture students to recognize the usefulness of science fiction in their training, supporting its integration into teaching strategies.

Regarding the need for prior knowledge of scientific concepts related to science fiction, 48.9% agree, suggesting a significant recognition of the intersection between science fiction and scientific foundations. 26.7% are neutral, 11.1% strongly agree, and another 11.1% rarely consider this knowledge necessary. These results underline the diversity of opinions within the Architecture student community, demonstrating the importance of adapting teaching approaches considering the different perspectives on the relationship between science fiction and scientific knowledge.

64.4% agree with the idea that understanding scientific concepts through science fiction could be useful in their daily lives or in their field of study, supporting the probability of integrating this genre into academic contexts.

Regarding the ability to find depth in science fiction narratives, a substantial 66.6% agree, suggesting a widespread appreciation of the thematic and reflective richness of this genre. This support defends the idea that science fiction could be an effective tool to foster critical reflection in the academic and personal sphere. Only 6.7% disagree, indicating a minority less motivated to consider significant aspects in these narratives.

Regarding engagement with events and activities related to science and science fiction, a significant 42% show active engagement, reflecting a participatory interest in these initiatives. However,

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

59

22.2% say they do not feel engaged, underlining the diversity of attitudes within the student community. This panorama suggests opportunities for strategies that encourage greater participation and interest in these topics.

Attendance at science and science fiction-related events and conferences shows significant variability. While 44.4% indicate that they never attend, 13.3% attend frequently, showing levels of active engagement. These results underline the diversity of participation levels and point to opportunities to foster greater involvement, creating an educational environment for learning and exploration.

Overall, the pretest results suggest that science fiction has a potentially valuable role in the academic and personal development of Architecture students. Despite some less favorable perspectives and varying levels of participation, the majority show an active willingness to integrate science fiction elements into their educational experience, supporting the exploration of teaching strategies based on this genre.

After the pretest, the teaching strategy was applied, which consisted of reading science fiction stories over a period of two months, the stories selected were mostly related to their professional career. This initiative sought to encourage the exploration of futuristic and speculative narratives that, in addition to providing entertainment, offered an inspirational perspective of their academic field.

The reading phase was complemented by a series of thematic presentations. Over four sessions, each lasting one chronological hour, the themes addressed in the stories were explored, as well as broader aspects of science fiction related to the students' careers. From the construction of futuristic cities to the creation of architectural wonders. The aim was to establish meaningful connections between fiction and practical applicability in the professional field.

In the post-test, 77.8% supported the usefulness of the teaching strategy to understand new science fiction content, with 13.3% occasionally benefiting from it and 6.7% disagreeing. The majority showed a positive perception of the strategy's effectiveness. Regarding participation in discussions, 73.4% agree, 17.8% participate occasionally, and 8.9% rarely did it. These results demonstrate the effectiveness of the strategy in stimulating participation and the exchange of ideas. Regarding the effectiveness in approaching science through science fiction, 66.7% agree, 26.7% are neutral, and 6.6% disagree.

The teaching strategy receives majority support, with 68.8% considering it relevant for scientific learning. Although 11.1% disagree and 20% remain neutral, the majority support its usefulness, although the concerns of those who disagree could be linked to specific perspectives or concerns about educational suitability. The diversity of opinions highlights the importance of adapting the strategy to address the different needs and students expectations.

Regarding the improvement of understanding of scientific concepts through science fiction, 73.4% indicated that the strategy has been beneficial, while 15.6% adopted a neutral position and 6.7% expressed disagreement. These results show the positive perception of the strategy's effectiveness in this regard, although it is crucial to consider different perspectives and adapt the strategy according to the varied needs and perceptions of students.

Regarding the expansion of knowledge about scientific concepts through the strategy, 75.5% agree or strongly agree, 11.1% are neutral, and 12.3% express disagreement. These findings reflect a mostly positive perception of the strategy's ability to expand understanding of scientific concepts through the application of science fiction. The variety of perceptions accentuates the need to adapt the strategy to effectively address students' different needs and expectations.

Concerning proactive participation in science-related group activities, 68.8% indicate that the teaching strategy has fostered their participation in these activities. Although 11.1% express disagreement and 20% adopt a neutral position, the high percentage suggests that the strategy has effectively stimulated active participation in science-related group contexts. The diversity of perceptions highpoints the need to address potential challenges and consider individual experiences to optimize the strategy's effectiveness in promoting active participation in group activities.

About the retention of scientific concepts, 68.8% agree that the teaching strategy effectively

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

60

contributed to the retention of these concepts. Although 15.6% remain neutral and 15.6% express disagreement, the mostly positive perception suggests that the strategy has been well received. The neutral position may require further evaluation, while divergent opinions describe the importance of analyzing specific aspects of the strategy to adapt it to students' needs, optimizing its benefits.

On the topic of interest and engagement in science, 73.3% agree that the strategy has had a positive impact. Although 13.3% show neutrality and another 13.3% express disagreement, the high percentage suggests that the strategy has positively motivated students' perception towards science. Neutrality could provide valuable information to improve the connection between the strategy and interest in science, while divergent opinions underline the importance of adjusting the strategy according to individual needs. As regards the improvement of motivation to explore scientific concepts, 77.8% agree that the strategy has had a positive impact. Although 15.6% disagree and 4.4% remain neutral, the high percentage indicates that the strategy has significantly stimulated active exploration of scientific content. Divergent opinions suggest specific areas that could be adjusted to strengthen the connection between the strategy and motivation to explore science. These results highlight the relevance of considering individual perceptions when adjusting the strategy, ensuring effective alignment with the objectives of motivation for scientific exploration.

DISCUSSION

The research evaluated a teaching strategy that combines science fiction and architecture teaching to increase scientific interest and understanding. The results reveal a positive reception, with the majority expressing agreement on its usefulness in understanding science fiction and encouraging participation in group discussions and activities. This suggests that the strategy promotes active learning and exploration of scientific concepts in the context of architecture.

The above-mentioned idea agrees with what Callejas (2019) stated, who points out the influence of science fiction on young people's perception of science and scientists through entertainment media. In addition, the strategy of integrating science fiction into the academic field of Architecture reflects how this narrative can be used as an effective tool to foster interest and understanding of scientific concepts among students, as suggested by Chapela (2014).

Likewise, the research demonstrates the importance of considering the different perspectives and individual experiences of students, which coincides with the idea put forward by Maienschein (1998) and Cortés (2022) on the need to adapt educational approaches to meet the individual needs of students and promote effective scientific literacy. On the other hand, the widespread and positive receptivity towards the strategy suggests that this can be a valuable tool to promote active learning and exploration of scientific concepts in the context of Architecture, in line with what was proposed by Petit and Solbes (2012) on the didactic potential of science fiction to develop positive scientific attitudes among students.

It is important to point out the diversity of opinions among participants. Although the majority supported the strategy, there was a neutral segment or disagreement on certain aspects. This underlines the need to consider different perspectives and experiences when evaluating the effectiveness of the strategy. The results corroborate the importance of adapting the strategy to address diverse needs and expectations of students, which could involve incorporating alternative approaches or modifying certain aspects to better meet individual needs.

CONCLUSIONS

The outcomes reveal a widespread and positive receptivity towards the strategy by participants. The majority expressed a high degree of agreement with the usefulness of this strategy to understand new science fiction content and stimulate participation in science-related activities. This suggests that the integration of science fiction into the field of Architecture can be perceived as a valuable tool to promote active learning and exploration of scientific concepts among students.

This favorable perception towards the strategy aligns with the idea that science fiction can influence young people's perception of science and be effectively used to foster interest in the understanding of scientific concepts.

However, it is important to highlight the diversity of opinions and experiences among the participants. Although the majority showed their

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

61

support for the strategy, there was a segment that adopted a neutral position or even showed disagreement on certain aspects. This underlines the need to consider different individual perspectives and experiences when evaluating the effectiveness of the strategy.

Furthermore, the results are important for adapting the strategy to address the different needs and students expectations. This involves incorporating alternative approaches or modifying certain aspects of the strategy to better meet the individual needs of students.

This study not only offers a promising perspective on how science fiction can enrich teaching and learning in Architecture, but also stresses the importance of adaptability and customization in implementing innovative educational approaches. This approach can not only enhance students' understanding and engagement with scientific concepts, but can also contribute to cultivating a more dynamic and responsive learning community in the academic realm of Architecture.

REFERENCES

Akbaşlı, A.; Şahin, M. & Yaykiran, Z. (2016). The Effect of Reading Comprehension on the Performance in Science and Mathematics. Journal of Education and Practice, 7(16), p. 108-121. https://files.eric.ed.gov/fulltext/EJ1108657.pdf

Balakireva, T. A. & Mogilevich, M. N. (2021) On the Educational Potential of Humor, Science Fiction, and Game. Galactica Media: Journal of Media Studies. 3(3), 46-60. https://galacticamedia.com/index.php/gmd/article/view/190

Barceló García, M. (2005). Ciencia y ciencia ficción. Revista Digital Universitaria, 6(7). 2-10. https://www.ru.tic.unam.mx/bitstream/handle/123456789/931/jul_art69.pdf?sequence=1&isAllowed=y

Barnett, M. & Kafka, A. (2007). Using Science Fiction Movie Scenes to Support Critical Analysis of Science. Journal College Science Teaching. 36(4). https://www.researchgate.net/profile/Alan-Kafka/publication/270283465_Using_Scien ce_Fiction_Movie_Scenes_to_Support_Critical_Analysis_of_Science/links/54a6b8ea0cf 256bf8bb69388/Using-Science-Fiction-Movie-Scenes-to-Support-Critical-Analysis-of-Science.pdf

Bonifacino, I. & Brum Stewart, C. (2013). La metrópolis oscura. Influencias arquitectónicas en la creación de las ciudades del cine de ciencia ficción. Anales de Investigación en Arquitectura, 3, 27-40. https://revistas.ort.edu.uy/anales-de-investigacion-en-arquitectura/article/view/2659/3251

Brake, M. & Thornton, R. (2003) Science fiction in the classroom. Physics education. 38(1), 31-34. https://iopscience.iop.org/article/10.1088/0031-9120/38/1/305/pdf

Callejas Arévalo, R. E. (2019). Ciencia Ficción: Una imagen de Ciencia y Científico ¿Favorable para la Enseñanza de la Física? Revista Científica.357-369. file:///C:/Users/Personal/Downloads/Dialnet-CienciaFiccion-7021340.pdf

Chapela A. (2014, enero) Entre ficción y ciencia: El uso de la narrativa en la enseñanza de la ciencia. Educación química. 25(1), 2-6. https://doi.org/10.1016/S0187-893X(14)70516-6

Charalambos Vrasidas, C., Avraamidou, L., Theodoridou, K., Themistokleous, S., & Panaou, P. (s.f.) Science Fiction in Education: Case studies from classroom implementations. State University. https://www.researchgate.net/profile/Vrasidas-Charalambos-2/publication/282350899_Science_Fiction_in_Education_case_studies_from_classroom_implementations/links/5627449008aed3d3f1396b2b/Science-Fiction-in-Education-case-studies-from-classroom-implementations.pdf

Cortés Vera, J. J. (2022). Acceso y aprovechamiento de la información científica en México. Reflexiones, retos e interrogantes en el contexto de una pandemia. En Morán Guzmán, A. G. y López Ruelas, S. (Comp.). Desafíos de la comunicación científica: el papel de las bibliotecas y los bibliotecarios,

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

62

p. 42. Universidad de Guadalajara.

Cuevas, J. (2020). Imaginarios sociales sobre uso de tecnología y relaciones interpersonales en jóvenes universitarios a través del cine de ficción como recurso didáctico. Sophia, colección de Filosofía de la Educación, 28(1), pp. 165-183. http://scielo.senescyt.gob.ec/scielo.php?pid=S1390-86262020000100165&script=sci_arttext

Dinuta, N. (2013). Didactic Strategies Used in Teaching - Learninig of Premathematical Operations in Preschool Education. Procedia - Social and Behavioral Sciences, 76, 297-301. https://core.ac.uk/download/pdf/82526402.pdf

Fernández Rovira, C. (2008). Interpretación histórica de la ciencia ficción. [Tesis de maestría]. https://upcommons.upc.edu/bitstream/handle/2099.1/7636/Fern%C3%A1ndez_Rovira_Carlos.pdf

Fraknoi, A. (2003, january). Teaching Astronomy with Science Fiction: A Resource Guide. The Astronomy Education Review, 1, 112-119. https://www.researchgate.net/profile/Andrew-Fraknoi/publication/250277919_Teaching_Astronomy_with_Science_Fiction_A_Resource_Guide/links/0c960534e285d5d14d000000/Teaching-Astronomy-with-Science-Fiction-A-Resource-Guide.pdf

González-Weil, C.; Cortéz, M.; Bravo, P.; Ibaceta, Y; Cuevas, K.; Quiñones, P.; Maturana, J. & Abarca, A. (2012). La indagación científica como enfoque pedagógico: estudio sobre las prácticas innovadoras de docentes de ciencia en EM - Región de Valparaíso. Estudios Pedagógicos, 38(2), p 85-102. https://scielo.conicyt.cl/pdf/estped/v38n2/art06.pdf

Grilli Silva, J. (2016). Cine de ciencia ficción y enseñanza de las ciencias. Dos escuelas paralelas que deben encontrarse en las aulas. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias. 13 (1), 137-148. http://repositorio.cfe.edu.uy/handle/123456789/366

Grün, E. (1971). Literatura de anticipación y derecho. Universidad de Buenos Aires. Facultad de Derecho. 231-235. http://www.derecho.uba.ar/publicaciones/lye/revistas/43-45/literatura-de-anticipacion-y-derecho.pdf

Gushiken Ibáñez. M. E. (2020). Luchas utópicas en una Lima apocalíptica: Mañana, las ratas de José B. Adolph. [Tesis de maestría, Pontificia Universidad Católica del Perú]. http://hdl.handle.net/20.500.12404/17900

Hernández, S. A. & Zacconi, F. C. M. (1997). Alfabetización científica. Química al alcance de todos. Congreso Iberoamericano de Educación. https://www.adeepra.org.ar/congresos/Congreso%20IBEROAMERICANO/COMPETENCIASBASICAS/RLE3304_Hernandez.pdf

Martín Díaz, M. J., Guitiérrez Julián, M.S., & Gómez Crespo, M.A. (2005). Alfabetización científica ¿Para qué y para quienes? ¿Cómo lograrla? Enseñanza de las ciencias. https://core.ac.uk/download/pdf/13300988.pdf

Maienschein, J. (1998, 14 August). Scientific Literacy. Science. 5379 (281). 10.1126/science.281.5379.91

Koballa, T. R. & Crawley, F. E. (1985, March). The Influence of Attitude on Science Teaching and Learning. School Science and Mathematics, 85(3), 222-232. file:///C:/Users/Personal/Downloads/The_Influence_of_Attitude_on_Science_Tea.pdf

Kurlat Ares, S. (2012). La ciencia-ficción en América Latina: entre la mitología experimental y lo que vendrá. Revista Iberoamericana, 78(238-239), 15-22. https://Www.Liverpooluniversitypress.Co.Uk/Doi/Pdf/10.5195/Reviberoamer.2012.6884

Palacios, J. J., Palacio, H. E. & González, R. (2018, julio-diciembre). Educación versus tecnología y su convergencia hacia la IA. Revista Vínculos: Ciencia, Tecnología y Sociedad. 15(2), 186-194. https://doi.org/10.14483/2322939X.14114

Perales Palacios, F. J.; Vilchez, J. M. & Sierra, J. (2004). Imagen y educación científica. Cultura y Educación, 16(3), 289-304. https://journals.sagepub.com/doi/epdf/10.1174/1135640042360960

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

63

Petit, F. & Solbes, J. (2012). La ciencia ficción y la enseñanza de las ciencias. Enseñanza de las Ciencias. 30(2), 55-72. https://ensciencias.uab.cat/article/view/v30-n2-petit-solbes/494-pdf-es

Petit Pérez, M. F. & Solbes Matarredona, J. (2015). El cine de ciencia ficción en las clases de ciencias de enseñanza secundaria (I). propuesta didáctica. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 12(2), 311-327. https://rodin.uca.es/handle/10498/17254

Rubio Albizu, M. (2016). Ciencia, Ficción y Futuro: Una propuesta didáctica para fomentar la motivación en Ciencias Naturales en la Enseñanza Secundaria a través de la Ciencia Ficción. [Tesis de Maestría, Universidad Complutense de Madrid]. https://digital.csic.es/handle/10261/190851

Sierra Cuartas, C. E. J. (2006). Fortalezas epistemológicas y axiológicas de la ciencia ficción: un potosí pedagógico mal aprovechado en la enseñanza y divulgación de las ciencias. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias. https://rodin.uca.es/bitstream/handle/10498/16128/Sierra_2006.pdf?sequence=1&isAllowed=y

Thévenon, M. (2018). Using Science Fiction as a Teaching Tool in ESP Classes for Science Students, ILCEA, 31, 1-18. http://journals.openedition.org/ilcea/4688

Tovar Camacho, J. M. (2016). Enseñanza del concepto de energía a estudiantes de grado sexto del Instituto Tomas de Iriarte haciendo uso de fragmentos de películas de ciencia ficción. [Tesis de titulación, Universidad Pedagógica Nacional]. http://upnblib.pedagogica.edu.co/bitstream/handle/20.500.12209/2045/TE-19248.pdf?sequence=1&isAllowed=y

Vesga Vinchira, A. (2015, febrero). La ciencia ficción como herramienta pedagógica en un curso de Estudios en Ciencia, Tecnología y Sociedad: descripción de una experiencia docente. Revista Eureka sobre Enseñanza y Divulgación de las Ciencias, 12(3), 520-528. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2939068

Wellington, J. & Ireson, G. (2018). Science Learning, Science Teaching (4th ed.). Routledge.

Zamorano, R. O.; Moro, L. E. & Gibbs, H. M. (2011). Aproximación didáctica a la termodinámica con modelos y literatura de ciencia ficción. Ciência & Educação (Bauru), 17 (2). https://www.scielo.br/j/ciedu/a/NbWkYk43gBTMz6mvHdnH58G/?format=html&lang=es

Zegarra Torres, R. E. (2020). La relación entre la alfabetización informacional y la comprensión lectora inferencial en estudiantes del primer ciclo de la Facultad de Ingeniería y Arquitectura de una universidad privada de Lima. [Tesis de Maestría, Universidad Peruana Cayetano Heredia]. https://repositorio.upch.edu.pe/bitstream/handle/20.500.12866/7766/Relacion_ZegarraTorres_Rocio.pdf?sequence=1

661330/educacion_echeita_TEJUELO_2011.pdf?sequence=1

Torres Hernández, A. Y., & Galeano Guíza, J. A. (2022). Repositorio Universidad Javeriana. Recuperado el 12 de Abril de 2024, de Sitio web oficial de la Universidad Javeriana: https://repository.javeriana.edu.co/handle/10554/62013

Valero Pacheco, P. P. (2015). Documentos de la Universidad Nacional Autónoma de México. Recuperado el 20 de Febrero de 2024, de Sitio web oficial de la Universidad Nacional Autónoma de México:

https://cienciashumanasyeconomicas.medellin.unal.edu.co/images/revista-quiron-pdf/edicion-2/3.ArtPerlaPatriciaValero.pdf

REBE. Revista Boliviana de Educación / Volume 7 / Issue 12/ January-june 2025
ISSN: 2710 - 0537 / ISSN-L: 2710 - 0537 / www.revistarebe.org

64