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Cosmic Narratives: Media's Role in Cultivating Space Interest among Youth in Pakistan

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ABSTRACT

Aim of the Study: This study examines Pakistani youths' current level of space awareness and the need for focused educational programs to close existing gaps with the aid of the media. Despite progressions in space exploration around the world, many Pakistani youth are still unaware of and severed from this field. The study intends to create a comprehensive and long-lasting media framework for involving Pakistani youth in space education and exploration, ultimately advancing the nation's economic, scientific, and technological advancement.

Methodology: The study gauges level of awareness, comprehension, and enthusiasm for space science education through inclusive surveys and interviews of youth aged 13 to 35. The sample of the study consisted on (n=200) respondents selected using stratified random sampling technique.

Findings: This study pinpoints important factors that affect young people's interest and involvement in space field, for instance the lack of educational programs and resources. It also outlines how other countries have successfully motivated and encouraged their youth to take interest in space science and technology careers.

Conclusion: Pakistan can foster and nurture a new generation of space-aware citizens and future contributors to scientific progress by learning from examples from around the world and putting in place media frameworks that include everyone. There is a perilous need for media-driven strategies to enhance space education awareness and interest among youth of Pakistan.

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1. INTRODUCTION

In an era defined by globalization and rapid technological advancements, space technology has emerged as a pivotal domain shaping not only scientific frontiers but also the socio-economic landscapes of nations. As the world becomes increasingly interconnected, the need to cultivate public understanding and enthusiasm for space sector has grown significantly as it has tangible impact on all industries, amenities and society in general. (Anna Konerta, 2022) Enhancing awareness about space technology—particularly among youth—is critical to empowering individuals to contribute meaningfully to scientific innovation, fostering interdisciplinary collaboration, and ultimately advancing society as a whole (Kostenko, 2022).

Space exploration has long captivated global imagination, with agencies like NASA, Roscosmos and the China National Space Administration (CNSA), industry titans including SpaceX, Blue Origin, and Virgin Galactic pioneering ambitious missions that push the boundaries of human capability (Androniki Kavoura). While traditionally dominated by developed nations, the space race is witnessing a shift, as emerging economies like Pakistan begin to carve out their presence in the cosmic arena. Although Pakistan's involvement has primarily focused on satellite development and remote sensing, the country's potential in broader space exploration remains largely untapped.

1.1. Global Power Dynamics in Space Exploration

All around the world in the race of space exploration, various countries have demonstrated remarkable progress, at the national level. (YOLUSEVER, 2025) Recently, two private space companies based in the USA, SpaceX and Blue Origin, redefining space exploration. Both of these companies are instigated by visionary billionaires, these private companies have given a new direction to space explorations. While SpaceX strives for inter-planetary settlement, Blue Origin envisages millions of people living off Earth. In the meantime, a Japanese private company is preparing for its own lunar landing attempt in May 2025.

The United Arab Emirates currently operates its *Hope* orbiter around Mars, while India has achieved notable milestones with the Chandrayaan program—first detecting water ice on the Moon with Chandrayaan-1 and later executing a successful soft landing through Chandrayaan-3. Countries like South Korea and Turkiye have also unveiled ambitious plans for lunar missions in the near future. Simultaneously, Japan's space agency (JAXA) and the European Space Agency (ESA) continue to make steady advancements. Adding to the global momentum, the African Space Agency—structured similarly to ESA—is set to be officially launched next month in Cairo.

Meanwhile, China's space program is rapidly gaining momentum. After retrieving samples from the Moon's near side, China became the first nation to land a rover on the Moon's far side and return samples from it. It also became the second country, after the US, to land a spacecraft on Mars. Notably, China's Zhurong rover has uncovered evidence of an ancient ocean and shoreline on the Martian surface. Looking ahead, China has outlined an ambitious 25-year roadmap to establish global leadership in space by 2050. The plan includes initiatives such as the search for habitable exoplanets, the deployment of advanced space telescopes, sample return missions from Mars, lunar habitats, and even atmospheric sampling from Venus. (Luisa Corrado, 2023)

1.2. Pakistan's Effort in space exploration

Recognizing the importance of space sciences in national development, initiatives are being undertaken to integrate STEM (Science, Technology, Engineering, and Mathematics) education with space-related content (Yu Chen, 2024). Institutions like the Institute of Space Technology (IST), the Space and Upper Atmosphere Research Commission (SUPARCO), and NASTP which aims to bridge the gap between the industry, academia, and government in space and other domains, and to make Pakistan technologically independent and self-reliant, are spearheading this movement in Pakistan, with programs aimed at strengthening the country's capacity in space technology. SUPARCO's "Vision 2040" underscores aspirations to position Pakistan as a space-faring nation, focusing on the indigenous development and launch of satellites. (Hameed, 2025) Furthermore, the launch of ICUBE-Q, a student-developed lunar CubeSat onboard China's Chang'e 6 mission, marked a historic milestone in Pakistan's space journey. (Hongjin Kuang, 2023)

Recently, the contributions of private organizations to space exploration have become inevitable due to their cost-effective and rapid production capabilities. (Sharma, 2021)In Pakistan, beyond institutional efforts, individuals like Yumna Majeed and her organization, Exploration, play a critical role in democratizing access to space education. Through innovative outreach programs, public-private collaborations, and partnerships with global space agencies, these initiatives aim to bridge the knowledge

gap and nurture a new generation of space enthusiasts across diverse socio-economic backgrounds. (Fernandez, 2019)

Despite commendable progress, Pakistan continues to face challenges in fully engaging its youth in space sciences. Factors such as limited access to quality STEM education, resource constraints, and prevailing societal perceptions pose barriers to broader participation. However, the presence of active societies such as the Karachi Astronomers Society, the Rocket & Satellite Company, and other grassroots organizations reflects a growing appetite for space-related knowledge among the public.

1.3 Research Objectives

- Evaluate the current awareness and enthusiasm levels regarding space exploration among youth in Pakistan
- Determine the role of Media in formation of perspective in space-related endeavors, including the availability of educational programs and resources in Pakistan.

1.4 Research Questions

- What educational programs and resources are currently available to young people in Pakistan to learn about space exploration?
- How frequently and in what context does Pakistani media cover space science and technology-related topics?

1.5 *Problem Statement*

This research aims to explore the current landscape of space awareness in Pakistan, the effectiveness of national outreach initiatives, and the potential role of media and education in promoting sustained interest in space technology. This study determines to pinpoint strategic avenues for nurturing a culture of curiosity and innovation affiliated with global space education and exploration trends with a proper evaluation of both institutional and grassroots efforts.

2. LITERATURE REVIEW

As the global space race has progressed from exploration to the exploitation of resources in outer space, Nations are vying for control of this new frontier, Peripheral nations like Pakistan were encouraged to pursue space exploration by the space race in Asia, which was first started by the Soviet Union. Pakistan had the chance to play a big part because it was the third Asian nation to create its own space agency. However, due to a lack of research and development (R&D) in the field, its influence gradually diminished (Atif, 2020)

Pakistan's early engagement in the global space race was marked by pioneering efforts under the leadership of Dr. Abdus Salam. The establishment of the Space and Upper Atmosphere Research Commission (SUPARCO) in 1961 placed Pakistan among the first ten countries to initiate a space program. Collaborations with NASA and successful sounding rocket launches, such as Rehbar-I, positioned the country as a space-faring hopeful (Miqdad Mehdi, 2019). However, economic instability, sanctions, and inconsistent policy directions contributed to a significant decline in progress (Ahsan & khan, 2019). As (Atif, 2020) highlights, outer space is a relatively abstract concept in Pakistan, receiving limited attention despite its potential benefits for national growth.

In stark contrast, neighboring country India leveraged media, institutional coherence, and a strong STEM pipeline to bolster the Indian Space Research Organization (ISRO) and successfully launched landmark missions like Mangalyaan and Chandrayaan-3. (Pandey, 2023) Media in India played a critical role by broadcasting these events and cultivating national pride, which translated into greater public support and policy reinforcement. (Rajeswari Pillai Rajagopalan, 2024)

US Space exploration ventures have received extensive media attention recently, and research suggests that media consumption is related to audience members' support for space exploration in broad terms. (James Bingaman E. O., 2024)A range of media including science fiction television programs and films, news outlets, and social media platforms present messages about space exploration by the US government (NASA) and private companies (such as SpaceX). (James Bingaman W. D., 2022) As organizations with an interest in space tourism need to use scientific knowledge and scientists, documentary broadcasts, and serious news media for broadening their appeal, as more tangible scientific messages derive the higher response and impact. (Asli D. A. Tasci, 2020)

Pakistan, however, suffers from an underutilized media strategy that limits public engagement with space sciences. Limited proactive media coverage has resulted in weak visibility of space efforts, diminishing policy momentum and discouraging youth participation. (Atif, 2020) Echoes these concerns, pointing out that the lack of inspiring narratives around SUPARCO's activities contributes to a thin educational pipeline and minimal societal support for space exploration.

Events like the UN's World Space Week exemplify how media and public events can shape public understanding and support. Globally, space awareness campaigns successfully leverage media platforms to build enthusiasm and engagement, a strategy Pakistan must adopt more systematically. The lack of such visibility not only impedes technological innovation but also risks further strategic imbalance in a region where space capabilities are increasingly tied to national security. (Hassan, 2023)

A report, NASA's 2024, "Economic Impact of Space Exploration," examines the benefits of space programs like the Artemis Program on its economy. This report highlights not only the space ventures, which aim to return humans to the Moon but also how these endeavors fuels innovation and foster thousands of high-skilled jobs. Furthermore, this report states the progressive influence on STEM education, as space exploration investments lead to increased funding for schools and resources, inspiring future generations. It also outlines the multiplier effect of these investments, showcasing how each dollar spent stimulates broader economic activities, benefiting local and national economies. (YOLUSEVER, 2025)

Social intelligence is actively becoming part of popular social media networks. Illustrious social media networks today, including YouTube, Facebook, Instagram, Tik-Tok, inhabit a distinctive place in New Media. These channels are not only a means of exchanging information, but also a place to predict and shape the future. There are areas where the visual narrative is most used (Figure 1).

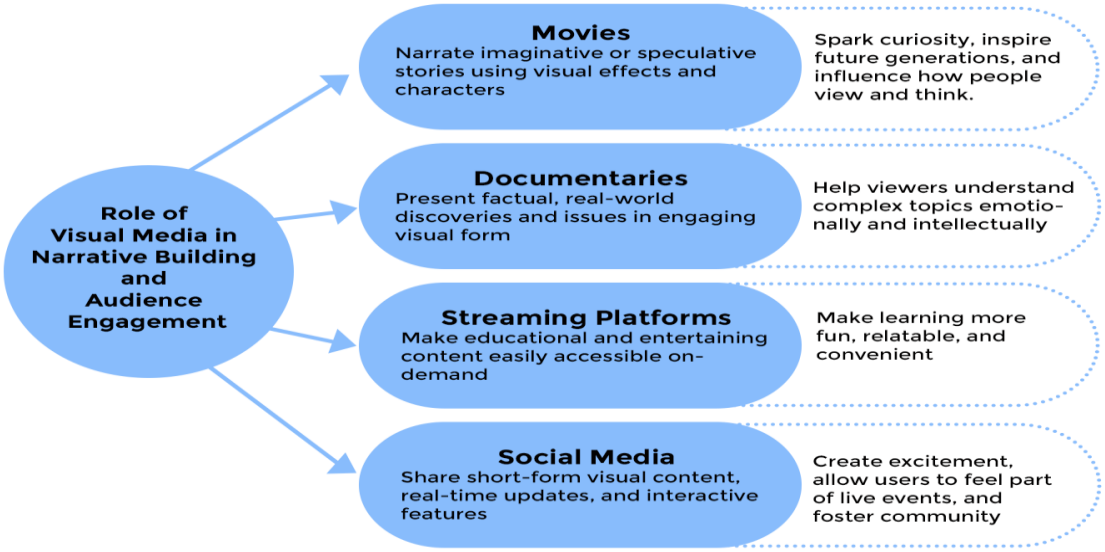

Figure 1: Role of Visual Media in Narrative Building and Audience Engagement

These mediums convey information through visuals—using videos, graphics, Infographics, and audio-visual materials—with the aim of capturing viewers' attention and creating an emotional impact. As space becomes more accessible, media provides comprehensive channels for navigating and understanding its complexities and for identifying new opportunities. By integrating perspectives from academic research and industry practices, modern media is increasingly positioned as a pivotal driver in raising awareness about space innovations and exploration. This evolution will not only transform humanity's engagement with outer space but also reshape the future dynamics of the global economy.

Recent analyses underscore the urgent need for a strategic overhaul of Pakistan's space program, focusing on enhancing its scientific and technological base to establish a self-sustaining space industry (Ahsan & khan, 2019). This, in turn, would align with Pakistan's broader goal of using space exploration for national development. A crucial aspect of this strategic overhaul is the need for broader public engagement, especially through media. Media plays an essential role in generating public interest and informing citizens about the potential benefits of space exploration. As such, media initiatives could be instrumental in revitalizing Pakistan's space program by fostering greater awareness, inspiring the next generation of scientists, and encouraging public-private partnerships to enhance Pakistan's space capabilities. (Hassan, 2023)

While Pakistan's space history is marked with early achievements, a revival depends heavily on widespread awareness and youth involvement. Media can play a transformative role by spotlighting national achievements, creating science communicators, and fostering a culture that values STEM education and exploration. To ensure sustained interest and participation, there must be a national effort to harness both institutional and media resources to inspire the next generation of Pakistani space scientists. (Jamy, 2025) Opportunities are not limited to traditional spacefaring nations but it now includes emerging economies, small ventures, and global interest, thereby democratizing access to space. (YOLUSEVER, 2025)

3. THEORETICAL FRAMEWORK

3.1 Cultivation Theory

Cultivation Theory, introduced by George Gerbner, postulates that consistent exposure to media content gradually cultivates a collective perception of reality among viewers. (Shrum, 2017) This theory helps explain how repeated and strategic media representation of space science achievements can foster a culture of curiosity, awareness, and long-term support for technological advancement.

In neighboring countries like India, the Indian Space Research Organization (ISRO) has benefitted immensely from media narratives that consistently celebrate its milestones, such as the Mangalyaan and Chandrayaan missions. These representations have contributed to cultivating a strong public interest in space science and reinforced national identity centered on scientific progress. When it comes to Pakistan's space agency, SUPARCO, it has to date, writhed to maintain decent media visibility, which in turn has led to an absence of public involvement, limited youth engagement in STEM education, and weak policy initiative. The very notion of outer space remains abstract and unfledged in the national consciousness due to the lack of consistent narratives around space exploration and education in Pakistani media—a situation that can be illuminated by Cultivation Theory.

3.2 Framing Theory

Besides cultivation theory, Framing Theory gives an additional support to our research by investigating how media presents narratives across nation about space exploration nd education field. As per media framing theory, media presents the event by framing what part of it should be stressed, modulated or omitted. This considerably affect the perception of audience how they interpret and respond to the narratives. Indian media has fostered encouragement and economic support and citizen investment by successfully framing space endeavors as a national achievement and symbol of progress, Meanwhile,

Pakistani media's inadequate and often dull framing of SUPARCO's space activities has botched to generate comparable public enthusiasm or support.

Applying these media frameworks enables us for a deeper understanding in what way strategic media communication can help as a catalyst for scientific development and national investment in space exploration.Combined these theories provide a comprehensive perspective through which the analysis of disparity in youth's responsiveness, engagement and interest with space programs in Pakistan can be evaluated and directed towards a better future. While cultivation theory suggests the long term impact of media exposure on people's perception by altering the societal values and aspirations. Framing theory implies the significance of narrative building in and mobilizing public interest, support and involvement. Application of both of these media theories can enable and help to create a deeper understanding regarding the strategic media and communication. Which can help as a catalyst for advancement if STEM education and space exploration endeavors.

4. METHODOLOGY

Methodology is process of collecting, analyzing and interpreting data to understand and approach a meaningful conclusive result. For this study, a quantitative survey research method is devised to examine the level of awareness and interest in Pakistani space initiatives among Pakistani youth and the role of media in cultivating a narrative for space education and interest.

4.1 Population

The target audience was selected to serve as a main unit of analysis for this research, including both male and female, Residents of twin cities of Islamabad and Rawalpindi are the primary audience of this study. The researcher applied a stratified sampling technique to ensure the proper representation among various age groups, educational backgrounds and genders.

4.2 Sample Size

To participate in the study, this sample includes both male and female participants from diverse educational and socioeconomic backgrounds, a total of 200 respondents were selected to reflect a balanced perspective.

4.3 Sampling Technique

For this study a stratified random sampling was used. This approach ensured that all key demographic categories were proportionately represented. All the Participants were divided into relevant strata (e.g., age groups, gender, education level), and random samples were drawn from each group.

4.4 Data Collection Tool

The study utilized a structured questionnaire as the primary data collection tool to gather specific and quantifiable data, which consisted mostly of close-ended questions to expedite uniformity in responses and help with their analysis. The questionnaire covered areas such as awareness of space programs, interest levels, media influence, and preferred sources of information.

4.5 Ethical Considerations

To ensure that the ethical protocols are strictly followed throughout the research, Participants were informed about the purpose of the study, and their informed consent was obtained before data collection. Confidentiality and anonymity of responses was well kept, and participation was voluntary, with the option to withdraw at any time without any consequences.

4.6 Data Analysis Technique

Descriptive statistical methods for data collection. Frequencies and percentages were calculated to interpret the responses. The results were organized into tables to illustrate trends in awareness levels,

media preferences, and interest in space exploration among Pakistani youth. Microsoft Excel and SPSS were used for data entry and analysis.

5. RESULTS

The findings revealed a significant gap in space awareness and interest among Pakistani youth, particularly those from non-scientific academic backgrounds. Survey results showed that while 68% of respondents expressed curiosity about space, only 29% could identify basic national or global milestones in space exploration. Moreover, over 70% reported minimal to no exposure to space science content in their formal education. Interviews highlighted a general lack of accessible platforms or media programming dedicated to space topics, which further limits youth engagement. Interestingly, respondents who had access to documentaries, YouTube channels, or space-related online communities demonstrated notably higher enthusiasm and awareness. These results endorse the need of targeted media (Mainstream and social) strategies and revised curriculum with enhancements for educational purposes, is the need of hour to stimulate interest and build understanding around the space education, exploration, science and technologies among Pakistani youth.

Table 1: *Awareness Level of Youth Regarding Space Exploration*

Awareness Level	Frequency	Percentage (%)
Fully Aware	20	10.0
Somewhat Aware	120	60.0
Not Aware at All	60	30.0

These responses indicates that only 10% claim to be fully aware while a majority (60%) of respondents are somewhat aware of space exploration topics.

Table 2: *Sources of Information about Space Exploration*

Source	Frequency	Percentage (%)
Social Media	90	45.0
Television	30	15.0
Educational Institutions	40	20.0
Friends/Family	20	10.0
Others	20	10.0

Social media is the leading source of space-related information for youth, followed by educational institutions and television.

Table 3: *Interest in Learning More about Space Exploration*

Response	Frequency	Percentage (%)
Yes	160	80.0
No	40	20.0

A significant majority (80%) expressed interest in deepening their knowledge about space, indicating a high potential for engagement.

Table 4: *Perceived Importance of Space Exploration for Pakistan*

Perception Level	Frequency	Percentage (%)
Extremely Important	100	50.0
Somewhat Important	70	35.0
Not Important	30	15.0

Half of the respondents believe space exploration is extremely important for Pakistan’s growth and technological progress.

Table 5: *Preferred Media for Learning about Space*

Media Type	Frequency	Percentage (%)
Documentaries/TV Shows	60	30.0
Social Media Videos	80	40.0
Books/Articles	20	10.0
Educational Apps/Websites	40	20.0

Social media videos are the most preferred learning medium, indicating that visual and interactive content is more appealing to the youth.

6. DISCUSSION

Space exploration stands as a remarkable frontier that unites nations, advances scientific knowledge, and motivates future innovators. However, findings from this study reveal that while global momentum around space science is accelerating, Pakistani youth exhibit only moderate awareness and limited engagement. According to the data collected, Social media has emerged as the primary information source for the majority of youth, who are somewhat aware of the space program. Which puts a lot of responsibility and opportunity on media to play a transformative role in bridging this awareness gap with proper strategies.

In Pakistan, Media is not just as a communication tool but as a catalyst for curiosity, learning, and national pride. As there are only a few avenues available for space education and awareness, and it remains an underdeveloped field, Strategic media can play a crucial role. It can provide coverage to amplify efforts like SUPARCO's Vision 2040 and IST's CubeSat launch, tactically presenting them in youth-friendly formats across social, broadcast, and digital channels. Media can help dismantle stereotypes by sharing relatable stories and visuals of Pakistani contributions to space science and nurture an inclusive narrative where every young person feels they can contribute. And the notion that associate science with exclusivity diminishes.

Furthermore, the study demonstrates a strong desire among youth to learn more about space exploration, with 80% of participants expressing interest in further engagement. This interest, if harnessed through targeted communication and storytelling, can translate into higher enrollment in STEM fields, greater innovation, and a more technologically literate population.

It is also evident that the medium of delivery significantly affects engagement. Social media and short videos were preferred over traditional sources, suggesting that future awareness campaigns should focus on visual storytelling, interactive platforms, and culturally relevant messaging to be effective.

7. CONCLUSION

In Pakistan, media can play a crucial role in cultivating awareness and interest in the field of Space, which in turn can help unleash untapped potential among its youth, increasing their engagement and involvement with national and global space missions. As Space exploration is far more than a scientific endeavor, it is a collective testament to human imagination, unity, and aspiration.

The findings from this study highlight an urgent need to restructure media narratives and enhance the visibility of space-related content. Failure to act may lead to missed opportunities and stagnation in science education, which in turn could result in broader socio-political and economic consequences.

To ensure Pakistan is not left behind in the new space age, it is essential to embed space science into public discourse, utilize digital media effectively, and make space education accessible, engaging, and inspiring. By doing so, we can foster a generation that not only dreams of the stars but also works towards reaching them together.

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Conflict of Interest

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