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The Role of Academic Social Media in Talent Attraction and Gender Equity in Medical Physics at UFG

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Abstract

This study investigates the association between digital science communication and talent attraction, career literacy, and gender equity within the Medical Physics program at the Institute of Physics of the Federal University of Goiás (IF/UFG). Adopting a descriptive-analytical quantitative approach, an institutional population census (N = 134 active students in the program / N = 525 in IF/UFG) was combined with a directed field survey (N = 72 active students) and analytics from Meta Business Suite regarding the Academic League of Medical Physics (LAFISMED) Instagram account (annual reach of 45.7k unique accounts and 387.8k views). To eliminate Instagram self-selection bias, survey recruitment was conducted exclusively through SIGAA and WhatsApp. Statistical analysis included exact binomial tests for cohort enrollment proportions and Mann–Whitney U tests for ordinal gender comparisons. Results demonstrate that Medical Physics functions as the primary diversity hub at IF/UFG, achieving gender parity (52.24% female students, n = 70/134) and increasing overall female representation at the Institute of Physics from 28.13% to 34.29%. Recent cohorts exhibit a statistically significant influx of female entrants (53.6% in 2025, $p = 0.0055$; 73.3% in 2026, $p < 0.001$). Digital educational authority was validated by 95.8% of surveyed students (69/72). A statistically significant gender disparity emerged in reported digital influence: 51.3% of female respondents affirmed that social media content influenced their enrollment decision, compared with 28.1% of male respondents ($p < 0.05$). In conclusion, peer-mediated digital communication serves as a complementary vector for career visibility, reducing occupational uncertainty, and supporting virtual onboarding, effectively lowering symbolic entry barriers in Medical Physics. As an observational single-institution case study, digital outreach acts alongside high school guidance (34.0%) and family orientation (10.0%). Sustainable gender equity requires pairing entry-level attraction with institutional retention strategies to address the 'leaky pipeline' into senior clinical and academic leadership roles.

Keywords: Medical Physics; Social Media; Science Communication; Career Choice; Gender Equity.

1. Introduction

Medical Physics is a well-established interdisciplinary field that applies physical principles, theoretical models, and experimental methods to the prevention, diagnosis, and treatment of disease. This specialty represents a structural component of contemporary medicine, providing the physical foundation, development, optimization, and quality assurance for complex clinical technologies such as radiotherapy, nuclear medicine, and advanced medical imaging modalities. On a global scale, the field exhibits a robust economic growth trajectory, with projections indicating that the medical physics market will reach US$ 8.06 billion by 2031, driven by the expanding demand for oncological treatments and technological innovations (1). In Brazil, the profession was formally organized in 1969 with the founding of the Brazilian Association of Medical Physics (ABFM) (2). Despite this, there is a lack of medical physicists in Brazil, and national estimates indicate that the country requires at least 1,800 medical physicists (3) to adequately meet clinical demand, highlighting a significant professional shortage (3). International organizations such as the International Atomic Energy Agency (IAEA) recommend a ratio of one medical physicist per 180,000 to 200,000 inhabitants (4).

Despite market expansion, the consolidated professional profile in clinical practice and academic leadership still reflects historical gender disparities in Medical Physics. The most recent ABFM professional survey indicates that the Brazilian clinical market is predominantly male (62.9%), with a notable concentration of professionals aged between 30 and 40 years (2). This scenario of female underrepresentation in clinical leadership roles, program directorships, and scientific awards is similarly documented on an international scale by the International Organization for Medical Physics (IOMP) and the American Association of Physicists in Medicine (AAPM) – where overall female representation ranges between 23% and 29.8% (5-8) – characterizing the "leaky pipeline" phenomenon in senior positions (5-8). Conversely, while bachelor physics degree programs maintain a historically low proportion of female students – as observed at Federal University of Rio de Janeiro (UFRJ), where men represent 74.5% of the student body (9) – Medical Physics has stood out as a hub for attracting female talent in higher education. In Brazilian institutions such as UFRJ, women represent 52.4% of undergraduate students in the Medical Physics Bachelor program (9), a balanced pattern corroborated by census data from the Institute of

Physics at the Federal University of Goiás (IF/UFG), where 52.24% of the 134 active students in the Medical Physics undergraduate program are female (10).

This pattern in incoming-student profiles is associated with reconfigurations in information flow driven by digital communication and social media. The transition from secondary to higher education is a critical period of vocational development, during which young "digital natives" seek information and validation online to reduce occupational uncertainty (uncertainty reduction) (11). Studies on career guidance and digital communication emphasize that social media platforms and virtual tools expand the reach of science communication, deconstructing traditional gender stereotypes, and presenting role models that encourage female audiences to enter exact and technological sciences (2,12). In the national Medical Physics context, ABFM data reveal that the Internet and social media account for 25% of initial career interest among new professionals, rivaling the historical influence of teachers (30.5%) (2). By translating hospital routines, the technology involved, and the financial attractiveness of the profession – with average salaries ranging between R$ 11,000 and R$ 20,000 (2) – digital channels serve as showcases capable of demystifying the field for new demographic strata.

In the academic sphere, social media profiles and student academic leagues – such as the Academic League of Medical Physics at UFG (LAFISMED) on Instagram – function as strategic channels for scientific literacy and student onboarding (11). However, vocational development literature recognizes that professional career choice is a multifactorial process shaped by a combination of school-level influences – including high school teacher guidance, peer interactions among classmates, and institutional outreach events – alongside family support, socioeconomic background, and digital channels (2,12). Within this framework, this institutional case study conducted at IF/UFG aims to investigate the association – without assuming direct causal relationships – between digital science communication outreach on social media, student career perceptions, and gender-differentiated decision-making when choosing and enrolling in the UFG Medical Physics undergraduate program (10). By analyzing the dynamics of this specific context, this article seeks to provide insights into how digital visibility relates to lowering symbolic entry barriers in science and promoting gender equity in higher education (2,5-8,12), mainly in the IF/UFG Medical Physics undergraduate program.

2. Materials and Methods

This study uses a descriptive-analytical quantitative approach structured around three complementary axes of investigation: digital dissemination metrics analysis (Section 2.1), an academic population census (Section 2.2), and a targeted field survey (Section 2.3).

2.1 Digital Dissemination Metrics Analysis

To evaluate the public visibility, educational scope, interaction patterns, and demographic composition of the audience interested in Medical Physics science communication – encompassing both the discipline in general and the specific undergraduate program at UFG – quantitative data were extracted from the Insights analytics dashboard provided by Meta Business Suite, linked to the official Instagram account of the LAFISMED (@lafismed). This platform serves as the primary digital outreach channel managed directly by undergraduate students in the program.

Methodologically, digital metrics were categorized into two primary indicators: reach (defined as the total number of unique user accounts exposed to LAFISMED content at least once) and views or impressions (defined as the cumulative volume of content exposure, serving as a proxy for recurring engagement and high-frequency interaction). Crucially, this second indicator set encompasses both interaction patterns (e.g., content saves, shares, format preferences, and profile visits) and the demographic composition of the audience (e.g., gender distribution and age stratification automatically aggregated by Meta Insights). It is important to emphasize that these metrics measure digital communication reach and public informational dissemination rather than direct academic recruitment rates.

To capture both short-term engagement dynamics surrounding specific academic events and macro-level audience trends over a full academic cycle, data extraction was structured across two distinct temporal windows (a 3-month quarterly window and a 12-month annual baseline):

2.1.1 Quarterly Period:

The quarterly analysis window was established to evaluate short-term engagement dynamics, immediate content shareability, and audience responsiveness surrounding specific academic and institutional events (e.g., celebratory posts on national quality scores, live coverage of scientific congresses like CONPEEX (Annual Research, Teach and University Extension Conference of UFG), and educational platform launches such as the launch of student-led digital educational platforms.

2.1.2 Annual Period (April 2025 to April 2026):

The annual analysis window comprised a continuous 12-month period (April 1, 2025, to April 15, 2026) to assess long-term outreach sustainability, cumulative account reach, total view volume, and demographic stability over a complete academic cycle.

Across both complementary temporal windows – the short-term quarterly focus (3 months) and the long-term macro trend (12 months) – the primary observed variables included follower gender distribution, age brackets (specifically segmenting the 18–24 transition cohort and the 25–34 professional cohort), total reach, profile visits, and content

interaction profiles. These metrics were analyzed to evaluate whether student-led visual communication serves as an inclusive, accessible vector for career visibility and scientific literacy for female audiences in Medical Physics.

2.2 Academic Population Census

Based on the population census conducted for this study, the academic population characteristics of the Medical Physics program at the IF/UFG were determined. A total of 134 active students regularly enrolled in the program in 2026 were identified, according to data obtained on April 18, 2026, through the Integrated System for the Management of Academic Activities (SIGAA/UFG).

For the description of student profiles, the following variables were analyzed:

- Gender and Identification: distribution of students by gender.
- Year of Admission: identified based on the first four digits of the student enrollment number.
- Academic progression: distribution of active students across admission cohorts, considering the nominal five-year period established for program completion.

For the academic progression analysis, a cohort analysis model was adopted, comparing the number of active students in each admission cohort with the reference value of 25 positions offered annually by the program. In some cohorts, the number of active students exceeds this reference value due to additional admissions through program transfers and other entry pathways. Therefore, values above 25 reflect the inclusion of transfer students and other forms of entry into the respective cohorts.

To contextualize the representativeness of the program, the Medical Physics data were compared with the population of 525 active undergraduate students enrolled at the IF/UFG, based on data requested from the Program Coordination on April 18, 2026. This population comprised the four programs offered by the Institute: Physics Teaching, Physics, Medical Physics, and Engineering Physics, allowing for a comparison of gender distribution and female participation across the different programs.

2.3 Directed Field Survey

With the aim of assessing the perceived association between social media use and career choice, a structured questionnaire was administered through the Google Forms platform, entitled "Social Media, Digital Content, and Career Choice in Medical Physics." The questionnaire assessed students' informational journey, investigating the influence of digital content on their decision to enroll in the program and the role of social media in shaping their perceptions of a career in Medical Physics. This online questionnaire approach is consistent with the methodology adopted by the ABFM (2023) (2) in national surveys of the professional profile of medical physicists.

2.3.1 Recruitment and Data Collection

Data collection was conducted during two periods: April 14–18, 2026, and August 16–30, 2026. The questionnaire was distributed through WhatsApp, both in student groups and individually, and through SIGAA/UFG, with the support of the Program Coordination. The questionnaire was not distributed through Instagram, LAFISMED's social media accounts, or any other social media channels associated with the league.

2.3.2 Participant Characteristics

Participation was voluntary and anonymous. The inclusion criterion was regular enrollment as an active student in the Medical Physics program during the data collection period. No exclusion criteria were applied, and all responses obtained were included in the analysis.

The questionnaire was administered to active students enrolled in the Medical Physics program at the IF/UFG. Among the 72 respondents, 39 (54.2%) identified as women, 32 (44.4%) as men, and 1 (1.4%) as non-binary. Participants belonged to different admission cohorts, covering 2019 to 2026, with the highest proportions in the 2025 (22.2%), 2026 (20.8%), and 2023 (16.7%) cohorts.

2.3.3 Anonymity and Data Handling

During the first data collection period, 44 responses were obtained from the population of 134 active Medical Physics students identified in April 2026, corresponding to a response rate of 32.8%. During the second data collection period, conducted in August 2026, 28 additional responses were obtained. These new responses were incorporated into the initial dataset, resulting in a cumulative total of 72 valid responses used in the questionnaire analysis.

Between the two data collection periods, the number of active students decreased from 134 in April to 119 in August, due to students completing the program and students being withdrawn from the program. Therefore, the 72 responses constitute a cumulative sample collected across the two periods and should not be interpreted as 72 responses obtained exclusively from the population of 119 active students recorded in August. The institutional population of 134 active students refers to the April 2026 census used as the initial reference population, whereas the questionnaire analysis considers cumulative responses from both collection periods.

2.3.4 Ethical Considerations

Regarding informed consent, we clarify that no formal Informed Consent Form (ICF) was used, nor was a specific consent question included in the questionnaire.

Concerning ethical review, considering the nature of the study as an opinion survey addressing students' perceptions of social media and careers in Medical Physics, as well as the impossibility of individually identifying participants from the analyzed dataset, the study was classified as public opinion research involving non-identifiable participants, in accordance

with Article 1, sole paragraph, item I, of National Health Council (CNS) Resolution No. 510/2016 (13). Survey research within this category is not required to be registered with or submitted for review by a Research Ethics Committee (CEP) or the National Research Ethics Commission (CONEP) within the CEP/CONEP system. We emphasize, however, that ethical review requirements and informed consent are distinct aspects; therefore, the exemption from CEP/CONEP review is not presented as a justification for the absence of a formal Informed Consent Form (ICF).

2.4 Statistical Processing

Population data from the SIGAA/UFG were processed to obtain absolute and relative frequencies. Dropout and retention rates were calculated based on the difference between the baseline number of admission slots and the number of students remaining in each cohort.

To assess whether the observed increase in female representation in the 2025 and 2026 cohorts could be attributed to random fluctuations, an exact binomial test for a single proportion was applied separately to each cohort. For the 2025 cohort, the observed proportion of female students was compared with the historical reference proportion calculated from the 2016–2024 cohorts (28.4%). For the 2026 cohort, the observed proportion was compared with the historical reference proportion calculated from the 2016–2025 cohorts (40.4%). The cohort under analysis was excluded from calculating the corresponding historical reference proportion. A significance level of $\alpha = 0.05$ was adopted, with $p < 0.05$ considered statistically significant.

For the questionnaire data, absolute and relative frequencies were calculated for categorical variables. To investigate the association between gender and the reported level of influence of LAFISMED's social media on students' decision to enroll in Medical Physics at UFG, the responses "No influence," "Yes, a little," and "Yes, a lot" were treated as an ordinal variable. The distributions between female and male participants were compared using the Mann–Whitney U test. The rank-biserial correlation (r_{rb}) was calculated as a measure of effect size to quantify the magnitude of the difference in reported social media influence between female and male students. In addition, the difference in the proportion of women and men reporting any degree of influence ("Yes, a little" or "Yes, a lot") was calculated, together with its 95% confidence interval (95% CI).

The non-binary response was retained in the descriptive analysis but was not included in the inferential comparison by gender because only one participant identified as non-binary.

3. Results

3.1 Demographic Profile and Institutional Representativeness at UFG

The Medical Physics program has become the second-largest undergraduate program at the IF/UFG. According to official population census data from SIGAA/UFG, extracted on April 18, 2026, the program comprises 134 active students, representing 25.52% of the institute's total undergraduate population (525 active students), surpassed only by the Physics Teaching Degree. The complete distribution of active students across the four undergraduate degree tracks offered by the Institute of Physics is presented in Figure 1.

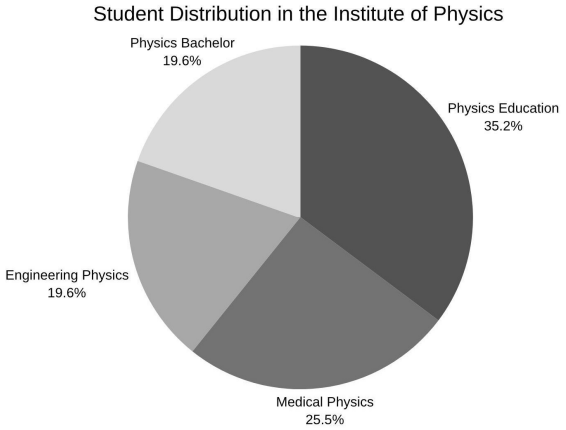


Figure 1. Course Distribution in the IF/UFG in the period 04/18/2026. The author.

Evaluating the overall gender distribution across the entire undergraduate population of the IF/UFG reveals a persistent male predominance, with 345 men (65.71%) and 180 women (34.29%). The overall gender distribution across the Institute of Physics is detailed in Figure 2.

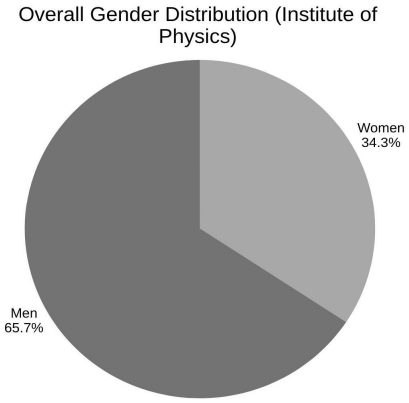


Figure 2. Overall Gender Distribution in the IF/UFG in the period of 04/18/2026. The author.

As illustrated in Figure 2, the aggregate demographic profile of the unit reflects the structural gender asymmetry historically documented both in physical science programs (5-8) and in institutional records at UFG (10). However, disaggregating students' demographics by specific degree track demonstrates that gender distribution across the IF/UFG is highly heterogeneous, as shown in Figure 3.

In contrast to traditional degree tracks – which exhibit pronounced male predominance ranging from 65.05% in Engineering Physics (67 men, 36 women) to 70.87% in the Physics Bachelor (73 men, 30 women) and 76.22% in Physics Teaching (141 men, 44 women) – Medical Physics displays a balanced

demographic composition with a slight female majority, comprising 52.24% female students (70 women) and 47.76% male students (64 men). Of the 180 female students enrolled across the entire IF/UFG, 70 belong to the Medical Physics program. It indicates that 38.89% of the unit's entire female student contingent is concentrated within a single academic degree track.

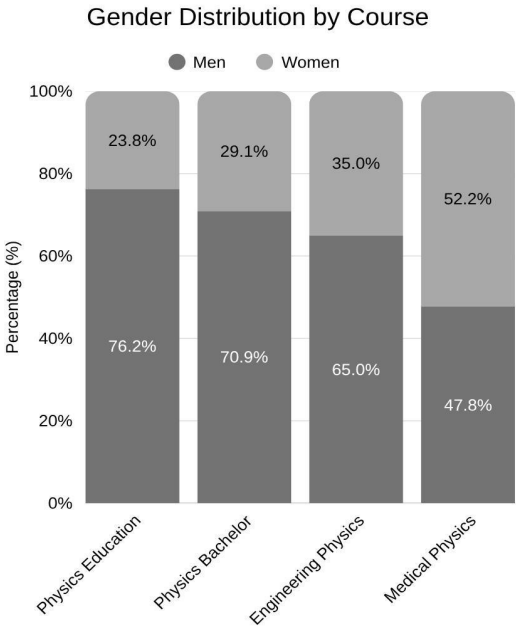


Figure 3. Gender Distribution by Course at IF/UFG in the period of 04/18/2026. The author.

From an institutional perspective, Medical Physics operates as a primary hub for attracting female students and enhancing student gender diversity within the IF/UFG. To quantify this structural impact, cross-referencing student gender distribution across the IF/UFG with and without Medical Physics demonstrates a marked shift: excluding Medical Physics reduces the institute's female representation from 34.29% to 28.13% (110 women out of 391 students). The comparative impact of Medical Physics on overall student gender distribution is illustrated in Figure 4, which shows that the presence of the Medical Physics undergraduate program increases female representation across IF/UFG degree tracks by 6.16 percentage points.

However, within the scope of this institutional case study, this gender distribution pattern must be interpreted with analytical nuance. While the concentration of female talent in Medical Physics significantly alters unit-level diversity metrics, it reflects an applied attraction mechanism – potentially associated with greater career visibility, the interdisciplinary healthcare interface, and clear professional practice options – rather than a generalized resolution of gender disparities across pure and theoretical physics tracks. Nevertheless, within IF/UFG, Medical Physics has become a key structural pole for gender inclusion and student diversification.

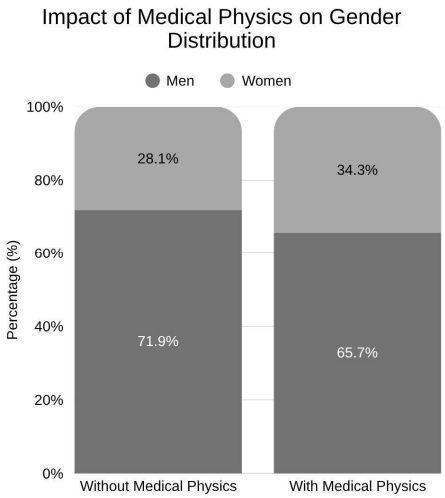


Figure 4. Impact of Medical Physics on Gender Distribution at undergraduate programs at IF/UFG in the period of 04/18/2026. The author.

3.2 Cohort Analysis and Academic Progression

The cohort analysis, using the 25 positions offered annually by the program as a reference value, provides a descriptive overview of the distribution of active students across admission cohorts. As shown in Table 1, the number of active students varies substantially across cohorts. The most recent cohorts include 30 active students in 2026 and 28 in 2025, exceeding the reference value of 25 positions. This difference reflects that the number of active students in a cohort may exceed the number of positions offered annually, particularly because the cohort includes students admitted through program transfers.

The April 2026 census showed that the most recent cohorts had a comparatively high proportion of women. In the 2026 cohort, women accounted for 22 of the 30 active students (73.3%), while in the 2025 cohort they represented 15 of 28 students (53.6%). In contrast, several older cohorts, particularly those admitted between 2016 and 2019, showed predominantly male compositions.

Table 1. Cohort Analysis of Students Active in April 2026, by Year of Admission

Year of Admission (Cohort)	Active Students (n)	Men	Women
2026	30	8	22
2025	28	13	15
2024	15	6	9
2023	18	13	5
2022	9	8	1
2021	15	6	9
2020	8	3	5
2019	3	3	0
2018	4	2	2
2017	2	2	0
2016	2	0	2

Source: Information extracted from the Integrated System for Academic Activities Management (SIGAA)/UFG (2026).

To examine changes in the number of active students during the same academic year, the cohort distribution was also assessed using the August 2026 census, as presented in Table 2. The comparison between the April and August 2026 censuses showed that the number of active students may change even within the same academic year.

Table 2. Cohort Analysis of Students Active in August 2026, by Year of Admission

Year of Admission (Cohort)	Active Students (n)	Men	Women
2026	28	8	20
2025	27	12	15
2024	14	6	8
2023	15	10	5
2022	9	8	1
2021	13	5	8
2020	7	3	4
2019	2	2	0
2018	2	1	1
2017	2	2	0

Source: Information extracted from the Integrated System for Academic Activities Management (SIGAA)/UFG (2026).

Between April and August 2026, the number of active students decreased in several cohorts. For example, the 2026 cohort decreased from 30 to 28 active students, while the 2025 cohort decreased from 28 to 27. Similar reductions were observed in the 2024 to 2018 cohorts. These changes indicate that active-student counts should be interpreted as snapshots of academic status at specific points in time rather than as direct measures of student retention or dropout.

The differences observed in the 2025 and 2026 cohorts were statistically significant when compared with their respective historical reference proportions. For the 2025 cohort, the exact binomial test indicated a significant difference from the 28.4% historical reference proportion ($p = 0.0055$). Similarly, the 2026 cohort showed a significant difference from the 40.4% historical reference proportion ($p < 0.001$). Specifically, the exact binomial test confirmed this divergence (k = 22/30, 73.3%, $p = 0.00028$, Clopper–Pearson 95% CI [54.1%, 87.7%], Cohen's h = 0.68). These findings indicate that the female representation observed in both recent cohorts was significantly higher than that observed in their respective historical reference populations.

The cohort distribution also showed substantial variation in the number of active students among admission cohorts. The 2022 cohort, for example, comprised only 9 students classified as active in August 2026. Compared with the reference value of 25 positions offered annually, this represents a 64% reduction in the number of students currently classified as active relative to the reference value. However, this reduction should not be interpreted as a dropout rate, as the available aggregate data do not allow students who were no longer classified as active to be distinguished according to their academic status, such as graduation, transfer, suspension, re-enrollment, change of program, or withdrawal.

The analysis of graduates provides an additional perspective on gender representation in the Medical Physics program. Table 3 presents the number of graduates and their gender distribution from 2018 to the first semester of 2026. The data were obtained from the Communication Office (SECOM/UFG) (14) and provide an overview of the gender composition of graduates throughout the period analyzed.

Table 3. Analysis of Medical Physics Graduates from UFG in the period of 2018 to 2026.

Year	Total Graduates	Men	Women	% Women	% Men
2018	4	2	2	50.0%	50.0%
2019	3	2	1	33.3%	66.7%
2020	0	0	0	-	-
2021	9	6	3	33.3%	66.7%
2022	2	0	2	100.0%	0.0%
2023	9	5	4	44.4%	55.6%
2024	13	7	6	46.2%	53.8%
2025	9	4	5	55.6%	44.4%
2026.1	7	2	5	71.4%	28.6%
TOTAL	**56**	**28**	**28**	**50.0%**	**50.0%**

Source: Information obtained from the UFG Communication Office (SECOM), 2026.

In 2018 and 2019, the program recorded 4 and 3 graduates, respectively. Female representation accounted for 50.0% of graduates in 2018 and 33.3% in 2019. In 2020, no graduates were recorded. Although this period coincides with the COVID-19 pandemic, the available data do not allow the absence of graduates to be attributed to a specific factor. In 2021, the number of graduates increased to 9, with women representing 33.3% of the graduates.

In 2022, both graduates were women, resulting in 100.0% female representation. However, this proportion should be interpreted with caution because it is based on only 2 graduates and, therefore, should not be considered, by itself, evidence of a change in the demographic profile of graduates. In the following years, female representation remained substantial, accounting for 44.4% of graduates in 2023, 46.2% in 2024, and 55.6% in 2025. Although the absolute number of women graduates varied across these years, the proportion of women increased from 44.4% in 2023 to 55.6% in 2025.

In 2025, women accounted for 55.6% of graduates, with 5 women compared with 4 men. This was the first year in the period analyzed, since 2018, in which the number of women graduates exceeded the number of men graduates. In the first semester of 2026, female representation increased further, reaching 71.4%, with 5 women and 2 men among the 7 graduates recorded.

Taken together, the graduate data indicate that the higher female representation observed in recent admission cohorts is also reflected among recent graduates. This pattern shows that female representation has increased among students completing the program in the most recent years of

the period analyzed. However, the graduate data alone do not establish the mechanisms underlying this pattern or demonstrate differences in retention between women and men. Rather, they show that the increase in female representation is observable not only among currently enrolled students but also among students completing the program.

The higher female representation among recent graduates is consistent with the pattern observed in the most recent admission cohorts. In 2025 and the first semester of 2026, women represented the majority of graduates, indicating that the greater female representation observed among recent entrants is also present among students completing the program. This pattern is consistent with the demographic changes identified in the cohort analysis, although the available data do not allow a direct relationship between admission patterns and graduation outcomes to be established.

Overall, the graduate data demonstrate a more balanced gender composition in the later years of the period analyzed, with female representation becoming more prominent among recent graduates. When considered alongside the cohort analysis, these findings indicate that the increased presence of women observed among recent entrants is also reflected at the completion stage of the program. However, this descriptive pattern should not be interpreted as evidence of a causal relationship between gender composition at admission and graduation outcomes. Further longitudinal analyses would be necessary to determine whether differences in academic progression, retention, or completion contribute to the observed changes in gender representation over time.

3.3 Analysis of Digital Dissemination Metrics

The social media platforms of the LAFISMED function as a strategic instrument for science communication, contributing to a digital ecosystem that enhances career visibility and professional awareness. The continuous production of educational content – including conceptual explanations, clinical routines, technological applications, and academic guidance – fosters engagement between the field of Medical Physics and both secondary students and the general public. Notably, all digital content is produced by active undergraduate students, which enhances public identification with the profile and reinforces the authenticity of peer-to-peer communication.

Since the creation of LAFISMED's Instagram profile in May 2021, a total of 342 publications and 1,242 followers have been recorded. Analysis of Meta Business Suite metrics from April 1, 2025, to April 15, 2026, shows a reach of 45.7k unique accounts (Figure 5) and 387.8k total views (Figure 6). In digital communication analysis, **reach** measures the capillarity of informational diffusion (the number of distinct individuals exposed to content), whereas **views** reflect total exposure volume, serving as a proxy for recurring engagement. Overall, key account interaction indicators are summarized in Table 4. These figures represent communication and dissemination reach rather than direct academic recruitment metrics.

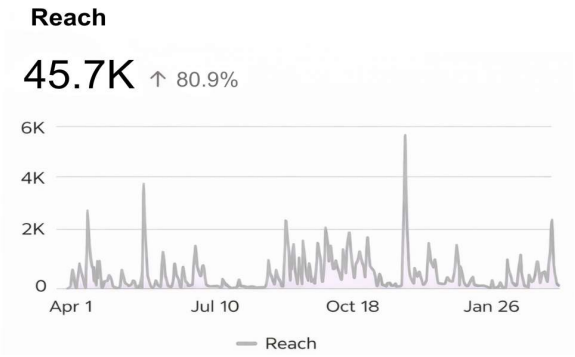


Figure 5. LAFISMED Social Media Reach (April 1, 2025 – April 15, 2026). Source: Meta Business Suite.

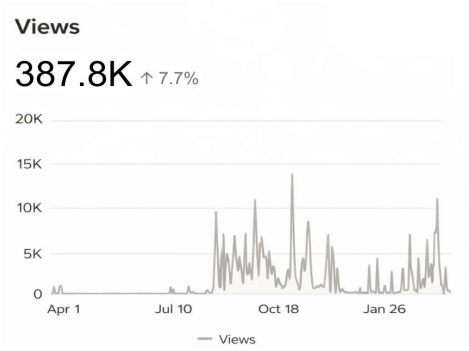


Figure 6. LAFISMED Social Media Views (April 1, 2025 – April 15, 2026).

Table 4. Social Media Metrics Information: Instagram

Types of Metrics	Values
Followers	1.24k
Profile Visitors	8.2k
Interactions	6.5k
Accounts Reached	7.5k

Source: Information extracted from the LAFISMED Instagram profile. Accessed on April 15, 2026.

Figure 6 allows analysis of the daily engagement timeline. It reveals that specific institutional events and high-shareability content drove major visibility surges throughout the period. On April 15, 2025, a commemorative post regarding the Medical Physics program's maximum score (Grade 5) assigned by the Ministry of Education (MEC) expanded by 2,925 views, followed by Physicist's Day on May 19 (+3,867 views). A sustained rise in engagement began on August 21, 2025 (+7,271 views), driven by the launch of a student-led digital educational platform on radiation protection and short-form video coverage (Reels) of a technical visit to a diagnostic imaging and nuclear medicine clinic in Goiânia. Further engagement occurred on October 3, 2025 (+9,120 views) during live coverage of the XVIII Brazilian Congress of Medical Physics. The series recorded its highest single-day peak on November 7, 2025, reaching 12,157 views and 5,554 unique accounts, coinciding simultaneously with International Medical

Physics Day and LAFISMED's interactive information booth at CONPEEX.

The demographic characterization of the audience (Figure 7) reveals a female majority of 54.9% (compared to 45.1% male), with a strong concentration in the age groups of 25–34 years (≈30%) and 18–24 years (≈20%). The 18–24 age bracket corresponds to the transition from secondary to higher education and university entrance, when prospective students seek career information to reduce occupational uncertainty. The 25–34 age bracket reflects graduates, healthcare professionals, and postgraduate candidates seeking continuing education and insights into the medical physics job.

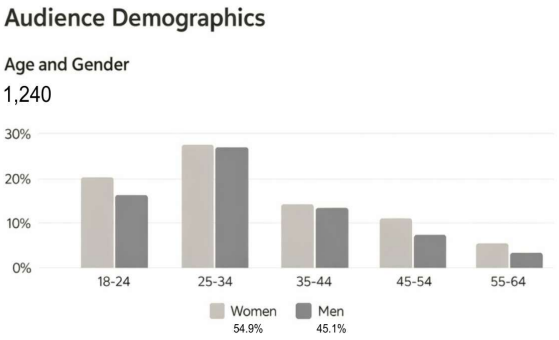


Figure 7. Public Demographic Profile Analysis on Instagram: Meta Business Suite

From a gender equity perspective, the female predominance among the reached audience is a relevant finding in a field historically characterized by female underrepresentation in medical physics. This pattern suggests that LAFISMED's visual and educational communication strategy functions as an inclusive vector, lowering symbolic entry barriers by highlighting female role models and accessible career pathways.

3.4 Analysis of the Impact of LAFISMED Social Media

The field survey, with a cumulative sample of N = 72 active Medical Physics students (39 women [54.2%], 32 men [44.4%], and 1 non-binary participant [1.4%]), allowed quantification of the association between digital communication strategies and student career selection[10]. As described in the methodology, recruitment was conducted via WhatsApp class groups and SIGAA/UFG institutional communication channels rather than LAFISMED's Instagram page, thereby eliminating potential self-selection bias toward highly engaged social media followers and ensuring a representative cross-section of the active student body.

The questionnaire results demonstrate the multifactorial nature of vocational decision-making: primary sources of initial career awareness were distributed between Social Media and Websites (38.0%, n = 30), School/College Environment (34.0%, n = 27), Friends and Relatives (14.0%, n = 10), Family (10.0%, n = 9), and Clinical/Other Work (4.0%, n = 2). The comparable weight between digital channels (38.0%) and traditional school guidance (34.0%) indicates that social media functions as a complementary vector of career validation and visibility rather than an isolated sole driver of university selection. This empirical finding aligns with national demographic data from the ABFM[2], where internet sources and high school educators represent parallel, reinforcing channels of initial professional orientation. The complete quantitative distribution of primary career discovery channels is presented in Figure 8.

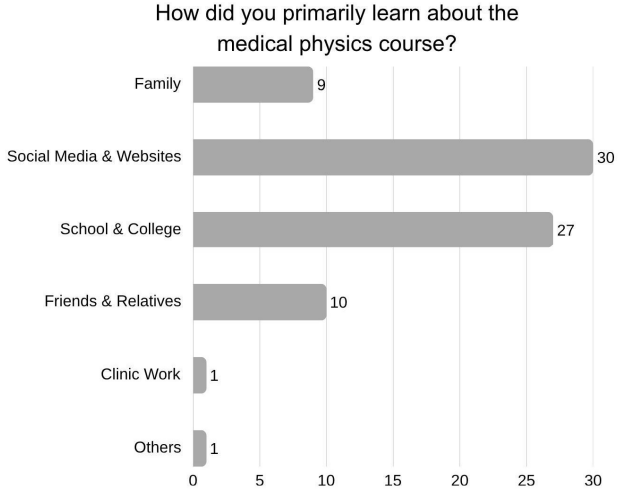


Figure 8. Impact of digital communication on professional awareness and career understanding among Medical Physics students at UFG.

Segmenting student responses by admission cohort demonstrates a clear generational shift in informational flow aligned with the academic league's digital consolidation across four distinct historical phases:

- Historical Cohorts (2019–2020): Among respondents who entered in 2019 and 2020 (n = 7), 57.1% (n = 4) retrospectively indicated social media influence. As noted in the methodology, since LAFISMED was officially founded in May 2021, these positive responses in a 2026 survey reflect retrospective recall bias or post-enrollment engagement with league activities during their upper-level academic trajectory.
- Senior Cohorts (2021–2022): 100% of respondents (n = 13) reported that social media had no influence on their initial enrollment decision, noting in qualitative feedback that at the time of their admission the academic league "was newly created" or "did not exist yet." Their academic choices were driven primarily by high school teachers, family recommendations, or in-person university outreach events.
- Intermediate Cohorts (2023-2024): 38.1% of respondents (n = 21) reported that digital content influenced their choice ("Yes, a little" or "Yes, a lot"), reflecting the initial expansion of LAFISMED's online outreach and structured digital dissemination.

- Recent Cohorts (2025–2026): 58.1% of respondents (18 out of 31 students) reported being influenced by digital content. Specifically, among female entrants in the 2025–2026 cohorts, 70.6% (12 out of 17) affirmed that social media content influenced their decision to enroll and validated their career path. The temporal evolution of reported social media influence across admission years is detailed in Figure 9.

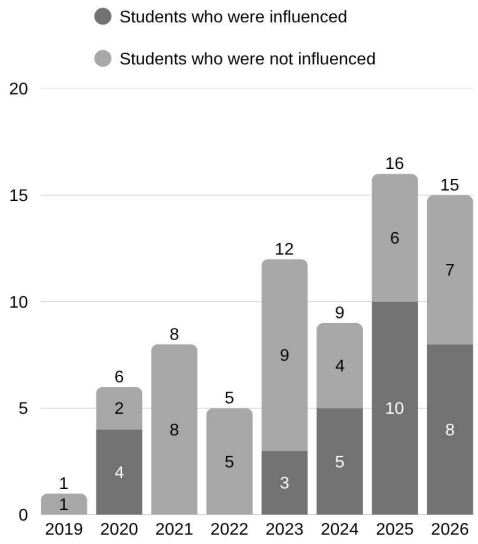


Figure 9. Evolution of Social Media Influence on Enrollment Decision by Year

A central objective of this research was to investigate whether digital science communication exerted a differential impact by gender, addressing key reviewer critiques regarding the mechanism behind increased female enrollment. When responses are stratified by gender, a marked disparity emerges: 51.3% of female respondents (20 out of 39) reported that LAFISMED's social media content influenced their decision to enroll ('Yes, a little' or 'Yes, a lot'), compared to only 28.1% of male respondents (9 out of 32). A Mann–Whitney U test comparing the ordinal response distributions between genders confirmed a statistically significant difference ($p < 0.05$), demonstrating that female students were significantly more receptive to digital outreach and peer guidance. The full quantitative breakdown of reported social media influence by gender is presented in Table 5.

3.4.1 Educational Validation and Career Awareness

Beyond initial course discovery, survey data confirm that digital scientific communication is strongly associated with career literacy, academic onboarding, and professional understanding among undergraduate students. When assessing the educational authority of the content produced by LAFISMED, an overwhelming majority of 95.8% of surveyed students (69 out of 72 respondents) validated LAFISMED's social media platforms as an essential source of explanatory content regarding clinical routines, radiation protection, and professional opportunities. The full breakdown of student responses regarding the educational validation of LAFISMED as an explanatory professional source is presented in Figure 10.

Table 5. Reported Influence of LAFISMED Social Media on Enrollment Decision by Gender (N = 72)

Reported Influence	Women (n = 39)	Men (n = 32)	Non-Binary (n = 1)	Total (N = 72)
No Influence	19 (48.7%)	23 (71.9%)	0 (0.0%)	42 (58.3%)
Yes, a Little	12 (30.8%)	7 (21.9%)	1 (100.0%)	20 (27.8%)
Yes, a Lot	8 (20.5%)	2 (6.3%)	0 (0.0%)	10 (13.9%)
Total Influenced (A Little + A Lot)	20 (51.3%)	9 (28.1%)	1 (100.0%)	30 (41.7%)

Source: Survey data collected via SIGAA and WhatsApp (April–August 2026).

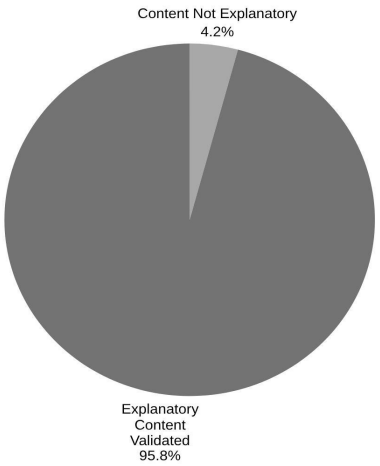


Figure 10. Validation of LAFISMED as an Educational and Explanatory Professional Source.

As illustrated in Figure 10, only a minor fraction of respondents (4.2%, n = 3) indicated that the digital content did not serve an explanatory purpose for their academic trajectory. This structural consensus demonstrates that regardless of whether exposure to social media served as the primary trigger for initial university registration, the digital ecosystem established by active undergraduate students operates as a primary channel of scientific literacy for the program.

From a theoretical perspective, this empirical finding aligns directly with the Uncertainty Reduction model proposed by Papakonstantinidis (11) in studies of digital native youth transitions. Prospective students navigating the critical transition from secondary education to specialized higher education experience substantial vocational anxiety and informational asymmetry regarding complex, multi-specialty disciplines like Medical Physics. By providing accessible visual demonstrations of hospital equipment (e.g., linear accelerators, CT scanners, radiopharmacy routines) and simplifying regulatory

frameworks of radiation safety, LAFISMED's digital outreach systematically mitigates occupational uncertainty prior to and during the initial university semesters.

This educational validation is further corroborated by qualitative thematic analysis of open-ended responses from students who retrospectively reported no direct social media influence on their initial university enrollment choice. Rather than reflecting an absence of digital impact, their open-ended accounts highlighted a profound process of post-admission career awareness and identity construction. As several participants noted in their qualitative feedback, engaging with LAFISMED's social media provided a clear, comprehensive understanding of the program structure, clinical workflows, and future professional options as a medical physicist. Thus, social media engagement transitions from a passive promotional showcase into an active pedagogical tool that reinforces academic commitment and clarifies long-term vocational prospects (12).

Furthermore, when evaluating decision-making mechanisms across admission cohorts, a marked qualitative shift emerges in recent entrant profiles. Among the 2025 and 2026 cohorts – characterized by a statistically significant influx of female students (53.6% and 73.3%, respectively) – the survey item "Support and orientation from other students" (Peer Support) was selected with the highest frequency alongside career opportunity posts. The comparative impact of digital scientific communication and peer support on academic enrollment across cohorts is detailed in Figure 11.

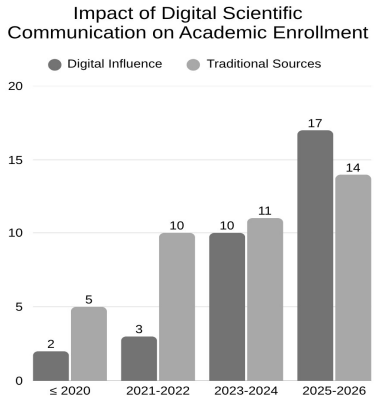


Figure 11. Influence of Peer Support and Academic Guidance on Student Enrollment.

As depicted in Figure 11, recent cohorts (2025–2026; Digital Influence = 17, Traditional Sources = 14) demonstrate a strong interplay between digital information consumption and peer-mediated guidance compared to senior cohorts (≤ 2022; Digital Influence = 2-3, Traditional Sources = 5-10). In traditional, historically male-dominated exact science tracks, female students frequently report feelings of symbolic isolation, stereotype threat, and lack of visible role models (5-8). The digital presence of LAFISMED – being entirely managed by active undergraduate peers – helps lower these entry barriers by presenting relatable, diverse female role models actively engaged in laboratory research, clinical visits, and academic outreach. As conceptualized by Unay-Gailhard and Brennen (15), peer-to-peer digital communication creates an inclusive virtual welcoming environment that fosters self-efficacy and provides social validation, directly encouraging young women to visualize themselves as future medical physicists and reducing perceived isolation in Medical Physics.

3.4.2 Preferences of Consumption and Engagement

Student preferences regarding digital interaction were evaluated across media formats and content topics among survey participants (N = 72) to identify the structural mechanisms underlying effective science communication. Regarding media formats, static posts (73.6%, n = 53) and short-form videos/Reels (55.6%, n = 40) generated the highest level of engagement, followed by Stories (38.9%, n = 28) and long-form videos exceeding three minutes (19.4%, n = 14). The complete distribution of student preferences across digital content formats is presented in Figure 12.

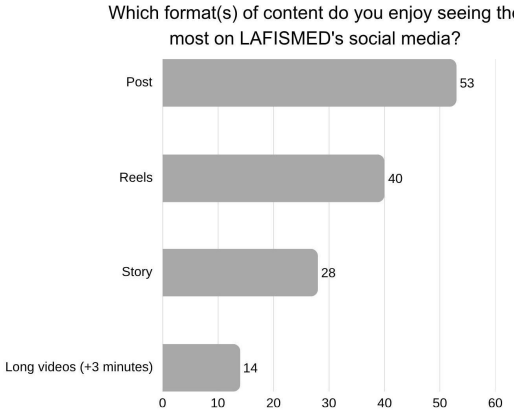


Figure 12. Preferred content formats on LAFISMED's social media.

The strong preference for static posts (73.6%) and short-form Reels (55.6%) over long-form audiovisual material reflects the cognitive consumption habits of digital native students navigating demanding undergraduate curricula. Static posts, formatted as multi-slide carousels or infographics, serve as high-density "reference cards" that synthesize technical information (e.g., radiation protection regulations, clinical residency pathways, and course syllabus structures) into easily saveable and shareable reference units. Concurrently, short-form Reels leverage platform recommendation algorithms to deliver dynamic, high-impact visual tours of hospital facilities, radiotherapy linear accelerators, and student laboratory routines, capturing viewer attention within the first few seconds. Conversely, long-form videos (19.4%) encounter substantial consumption friction due to time constraints and higher cognitive barriers among STEM undergraduates.

In terms of content topics, educational posts and general information (59.7%, n = 43) emerged as the most selected category, closely followed by

extension/research projects (55.6%, n = 40), on-campus events and activities (55.6%, n = 40), and scientific outreach (55.6%, n = 40). Posts specifically addressing career opportunities and professional market pathways were selected by 50.0% of respondents (n = 36), while interactive Q&A sessions accounted for 23.6% (n = 17). The quantitative breakdown of student interest across specific content topics is presented in Figure 13.

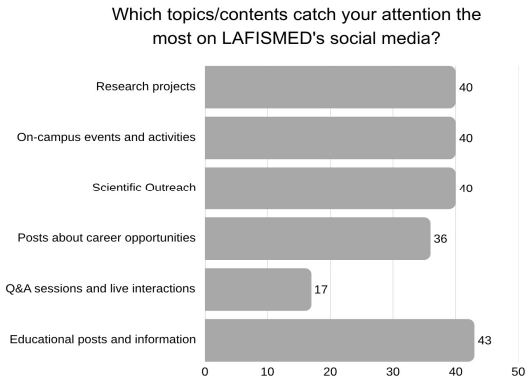


Figure 13. Most engaging content types on LAFISMED's social media platforms.

The prominent ranking of educational posts (59.7%) and career opportunities (50.0%) underscores a pragmatic, outcome-oriented motivation among prospective and current students. Rather than consuming social media purely for leisure, students utilize academic league platforms to bridge the information gap surrounding professional practice in Medical Physics. As established in vocational guidance literature by Driesel-Lange et al. (12), early exposure to clear career trajectories and workplace realities enhances professional self-efficacy and mitigates post-admission disillusionment.

Furthermore, the equal, high endorsement of extension projects (55.6%), campus events (55.6%), and scientific outreach (55.6%) demonstrates a strong student demand for authentic academic immersion. Visualizing active peers participating in clinical internships, scientific congresses, and laboratory experiments demystifies the academic environment and creates a sense of belonging. As conceptualized by Unay-Gailhard and Brennen (15), showing real-world peer involvement in specialized science tracks fosters institutional trust and social validation, converting abstract scientific interest into concrete academic commitment.

Analyzing Figures 12 and 13 together reveals an optimal communication model for academic outreach in Medical Physics: concise, visually accessible formats (static infographics and short Reels) paired with high-value, pragmatic content (career literacy and authentic student activities). While interactive Q&A sessions (23.6%) represented a smaller overall volume, qualitative feedback indicates they fulfill a vital role as high-touch channels for direct peer mentoring, addressing specific student anxieties regarding course requirements, entrance examinations, and academic transition.

4. Discussion

4.1 Institutional Case Study at UFG and Student Gender Parity vs. Global Clinical Disparity

The results reveal that the Bachelor's degree program in Medical Physics at the Institute of Physics of the Federal University of Goiás (IF/UFG) serves as the primary hub for diversity and female talent attraction within the unit (10). With 134 active students, the program accounts for 25.52% of the institute's total student body and exhibits a balanced gender distribution, with 52.24% female students (70 students). This pattern contrasts markedly with the other degree programs at IF/UFG (Bachelor's in Physics, Licentiate/Physics Education, and Physical Engineering), in which male predominance ranges from 65.05% to 76.22%. Of the total contingent of 180 female students enrolled at the institute, 38.9% are concentrated in Medical Physics, whose presence raises the overall female representation of the unit from 28.13% to 34.29%. In terms of more recent demographic trends, a further accentuation of this profile is observed in incoming cohorts, reaching 53.6% female students in the 2025 cohort and 73.3% in the 2026 cohort, proportions statistically higher than historical institutional benchmarks (10).

In interpreting the specificity of this case study at UFG, local student data contrast significantly with the consolidated professional market scenario and international indicators in the field. In Brazil, the professional survey by the Brazilian Association of Medical Physics (ABFM) indicates that clinical practice remains predominantly male (62.9%) (2). On a global scale, surveys by the International Organization for Medical Physics (IOMP) and the American Association of Physicists in Medicine (AAPM) demonstrate that the female workforce in medical physics ranges between 28% and 29.8% (5-8). Furthermore, international literature documents the persistence of the "leaky pipeline" phenomenon, in which female representation declines sharply in senior positions: in the United States, women hold only 12.0% of clinical leadership positions, 7.5% of directorships in CAMPEP-accredited graduate programs, and 2.4% of council presidencies in the AAPM (5). Similar patterns of asymmetry in scientific awards, editorial boards, and senior academic positions are widely reported by Covington et al. (5), Pollard-Larkin et al. (6), Marcu et al. (7), and Paradis et al. (8). Thus, the findings of this case study reinforce that although the undergraduate student base at IF/UFG displays distinct female attraction and gender parity – aligning with institutional data such as those from UFRJ (52.4% female students) (9) – the transfer of this equity into the senior professional market continues to face structural barriers at both national and international levels.

4.2 Digital Communication, Vocational Uncertainty Reduction, and Role Models

Analysis of metrics from the Instagram profile of the LAFISMED (45.7 thousand accounts reached and 387.8 thousand views) demonstrates the reach of

digital science communication initiatives led by students in training (10). The demographic characterization of the reached audience reveals a female majority (54.9%) and a strong concentration in the age groups of 18–24 and 25–34 years, corresponding to the period of academic transition and career choice definition. In the field survey conducted with students, 95.4% of respondents validated the league's social media as an essential source of explanatory content regarding professional routine and applications (10).

The theoretical foundation of these findings is supported by literature on vocational development and digital communication. As discussed by Papakonstantinidis (11), social media usage by "digital natives" actively contributes to reducing occupational uncertainty (uncertainty reduction), allowing young individuals to seek detailed information and clarification to mitigate anxiety during the transition from secondary to higher education. Additionally, Unay-Gailhard and Brennen[14] demonstrate that social media communication strategies serve to deconstruct stereotyped views regarding technical and historically male-dominated fields, providing role models that strengthen self-efficacy and inspire female audiences to envision scientific careers. This perspective is corroborated by Driesel-Lange et al. (12), who emphasize the value of digital tools and virtual networks as triggers for reflection and expanders of vocational horizons among youth. In the context of IF/UFG, visual communication of the clinical and academic routine of Medical Physics functions as a channel for scientific literacy and student onboarding (11).

4.3 Multifactorial Mechanisms of Career Choice and Causality Moderation

As highlighted in editorial evaluations, the observational and retrospective nature of this study precludes establishing direct causal relationships between exposure to digital content and increased female enrollment in the program. The data indicate a relevant temporal association: while senior cohorts from 2021 and 2022 report limited social media influence (5%), incoming students in the 2025 and 2026 cohorts report a substantial level of digital influence in consolidating interest and validating career choice (70% to 73%) (10). However, this association must be interpreted cautiously and integrated with other factors constituting career decisions.

Survey results demonstrate the multifactorial nature of vocational choice: school and educational environment influence (34.0%) showed representation equivalent to that of social media and websites (38.0%), combined with family support (10.0%) and recommendations from friends and relatives (14.0%) (10). Thus, LAFISMED's digital environment should not be understood as the sole isolated determinant of student decision-making, but rather as a complementary vector of career visibility and validation that interacts with traditional school, academic, and socioeconomic influences (11,12). Peer support observed in the responses of female students in 2025 and 2026 indicates that the digital channel reduces perceived isolation and facilitates initial identification with the field (10).

4.4 Cohort Analysis, Academic Flow, and Student Retention Challenges

Analysis of student flow by incoming cohorts requires methodological caution to avoid simplistic interpretations regarding dropout or retention rates based on aggregate data. For instance, finding 9 active students in the 2022 cohort in the August 2026 census represents a 64% reduction relative to the benchmark of 25 annual seats offered by the program (10). However, this variation should not be directly labeled as a "dropout rate", given that aggregate population records involve diverse academic situations, such as early graduations, leave of absence/enrollment holds, institutional transfers, re-enrollments, and temporary suspensions. Similarly, in recent cohorts such as 2026 (30 active students) and 2025 (28 active students), totals exceed the 25 intake seats due to the continuous incorporation of students admitted through transfer processes (10).

Under the same principle of statistical moderation, recording 100% female graduates in the year 2022 stems from the small number of graduates in that specific year (only 2 graduates, n=2) and should not be used in isolation to generalize a profile shift in the program. A more robust longitudinal analysis of graduate history (2018 to 2026.1) reveals a consolidated total of 56 graduates, with exact gender parity of 50.0% (28 women and 28 men) (14). The consistent increase in the proportion of female graduates consolidates from 2023 onward (44.4%), reaching 55.6% in 2025 and 71.4% in the first semester of 2026 (14), demonstrating that the parity profile observed in the incoming student base is progressively reflected in graduation completion.

5. Conclusion

The Medical Physics program at the Federal University of Goiás (IF/UFG) constitutes a key institutional hub for student diversity, achieving gender parity (52.24% female students, n = 70 out of 134) within a physics institute historically characterized by male predominance (above 65% in traditional physics tracks). Cohort analysis demonstrates a statistically significant increase in female enrollment among recent entrants – reaching 53.6% in 2025 (exact binomial test, $p = 0.0055$) and 73.3% in 2026 ($p < 0.001$) – which is further reflected in historical graduation records exhibiting complete gender balance across the 2018–2026.1 period (50.0% female, n = 28 out of 56 graduates). These findings confirm that Medical Physics serves as a major structural vector of gender inclusion within Medical Physics at UFG.

In evaluating the underlying mechanisms of student engagement, digital scientific communication – exemplified by student-led outreach via the LAFISMED – operates as an essential channel of career literacy, academic onboarding, and

occupational uncertainty reduction. This educational authority was validated by 95.8% of surveyed students (69 out of 72 respondents). Crucially, field survey data reveal a statistically significant gender disparity in digital receptivity: 51.3% of female respondents reported that social media content influenced their decision to enroll, compared to only 28.1% of male respondents (Mann–Whitney U test, $p < 0.05$. Qualitative feedback indicates that peer-mediated digital communication creates an inclusive virtual welcoming environment, where relatable female role models engaged in clinical routines and laboratory research effectively lower symbolic entry barriers, foster professional self-efficacy, and reduce perceived isolation among young women entering STEM disciplines.

However, in accordance with observational research principles and reviewer guidelines, these findings must be interpreted within the specific scope of a single-institution case study. Digital science communication functions as a complementary vector of career visibility and validation acting alongside traditional school guidance (34.0%), family orientation (10.0%), and peer networks (14.0%), rather than an isolated causal driver of university admission. Furthermore, digital metrics – such as LAFISMED's annual reach of 45.7k unique accounts and 387.8k views – reflect public communication capacity and scientific dissemination rather than direct university recruitment rates.

Finally, cohort flow dynamics highlight that successful students attraction at entry must be coupled with robust institutional retention strategies during intermediate undergraduate years. While digital visibility successfully demystifies Medical Physics and attracts female talent to higher education, bridging the long-term 'leaky pipeline' into senior clinical leadership, residency programs, and academic positions – where women remain historically underrepresented nationally (37.1% in clinical practice) and internationally (~28%) – requires sustained structural interventions. These include formal mentorship networks, equity-focused workplace policies, and continuous student support. Multi-institutional longitudinal studies across Brazilian universities are recommended to evaluate the broader generalizability of student-led digital communication strategies in fostering gender equity across STEM fields.

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