

**How to cite this article:**

Pacios-Dorado JL, Barroso-Fontanals ME, Magallón-Mendoza HD. Evolution of the National Student Scientific Group's website during its launch phase 2024-2025. MedEst.

[Internet]. 2026 [cited access date]; 6:e435.

Available in:

<https://revmedest.sld.cu/index.php/medest/article/view/435>

Palabras Clave: Grupo Estudiantil; Sitio Web; Métricas de Tráfico; Divulgación Científica; Impacto Digital.

Keywords:

Student Group; Website; Traffic Metrics; Scientific Dissemination; Digital Impact.

Corresponding author:

jlpd2018@nauta.cu

Received: 10/01/2025

Accepted: 25/03/2026

Published: 28/03/2026

Editor(s) in charge:

MSc. Yuniel Rosales Alcántara

Translator:

Lic. Meliza Maura Vázquez Núñez

Layout designer:

Carlos Luis Vinagera Hidalgo

Evolution of the National Student Scientific Group's website during its launch phase 2024-2025

Evolución del sitio web del Grupo Científico Estudiantil Nacional durante su fase de despegue 2024-2025

Juan Leonardo Pacios Dorado ¹ , Miguel Enrique Barroso Fontanals ² 

Héctor Daniel Magallón Mendoza ³ 

¹ University of Medical Sciences of Havana, "Calixto García" Faculty. Havana, Cuba.

² University of Medical Sciences of Santiago de Cuba, Faculty of Medicine No. 2. Santiago de Cuba, Cuba.

³ Benito Juárez García University of Well-being. Quechultenango Campus. Mexico.

RESUMEN

Introducción: la comunicación científica digital es esencial en la formación de profesionales de la salud, incluso en contextos de conectividad limitada. En Cuba, el Grupo Científico Estudiantil Nacional (GCEN) creó el primer sitio web de alcance nacional para centralizar la producción científica estudiantil en medicina, aunque faltaba una evaluación sistemática de su impacto. **Objetivo:** analizar la repercusión del sitio web del GCEN durante su primer año de funcionamiento. **Métodos:** estudio observacional, descriptivo y longitudinal que analizó 13 meses de métricas web (septiembre 2024-septiembre 2025) mediante AWStats 7.8. Se evaluaron visitantes, visitas, páginas vistas, solicitudes HTTP y tráfico, calculando tasas de crecimiento y tendencias con regresión exponencial y prueba de Mann-Kendall. **Resultados:** se registraron 10 719 visitantes distintos y 16 278 visitas totales, con una tasa de crecimiento mensual del 12,3% ($p=0,003$). Se identificaron tres fases: lanzamiento, consolidación con pico en marzo 2025 (asociado a evento nacional) y crecimiento orgánico con estacionalidad académica. El ratio páginas/visita descendió de 6,9 a 2,1, indicando diversificación de audiencia. **Conclusiones:** el sitio completó su fase de despegue con un crecimiento anual del 264%, alcanzando posición destacada entre plataformas estudiantiles. Sin embargo, el 71,7% del tráfico correspondió a usuarios no recurrentes, revelando dependencia de eventos académicos. Se requiere evolucionar hacia un ecosistema de microcontenidos formativos que fomente visitas recurrentes e independientes del calendario académico.

ABSTRACT

Introduction: digital scientific communication is essential in the training of healthcare professionals, even in contexts of limited connectivity. In Cuba, the National Student Scientific Group (GCEN) created the first nationwide website to centralize student scientific output in medicine, although a systematic evaluation of its impact was lacking. **Objective:** to analyze the impact of the GCEN website during its first year of operation. **Methods:** an observational, descriptive, and longitudinal study was conducted, analyzing 13 months of web metrics (September 2024–September 2025) using AWStats 7.8. Visitors, visits, page views, HTTP requests, and traffic were evaluated, calculating growth rates and trends using exponential regression and the Mann-Kendall test. **Results:** 10,719 unique visitors and 16,278 total visits were recorded, with a monthly growth rate of 12.3% ($p = 0.003$). Three phases were identified: launch, consolidation with a peak in March 2025 (associated with a national event), and organic growth with academic seasonality. The page-to-visit ratio decreased from 6.9 to 2.1, indicating audience diversification. **Conclusions:** the site completed its takeoff phase with 264% annual growth, achieving a prominent position among student platforms. However, 71.7% of the traffic came from non-recurring users, revealing a dependence on academic events. Evolution toward an ecosystem of educational micro-content is needed to encourage recurring visits independent of the academic calendar.

INTRODUCTION

Scientific communication is a fundamental pillar in the training of health professionals, particularly in contexts where access to in-person educational resources faces limitations in connectivity, infrastructure, or geographic distribution ⁽¹⁾. In recent decades, virtual learning environments have emerged as strategic alternatives to democratize access to medical knowledge, facilitating collaboration among students and the construction of decentralized academic communities ^(2,3).

In Cuba, higher medical education has traditionally developed a strong culture of student research, supported by scientific events, study groups, and in-person tutorials ⁽⁴⁾. However, the COVID-19 pandemic accelerated the need to migrate to digital platforms, simultaneously revealing significant gaps in technological infrastructure and in the capacity to evaluate the impact of these tools ⁽⁵⁾. Unlike other regions where the evaluation of digital educational platforms has standardized protocols ⁽⁶⁾, in the Cuban context, limitations persist in objectively measuring the effectiveness of student scientific dissemination websites.

Institutional websites function as central information hubs, facilitating access to resources, promoting activities, and fostering peer interaction ⁽⁷⁾. From the perspective of Rogers' Diffusion of Innovations Theory ⁽¹⁾, the adoption of these platforms by medical students follows a specific pattern: initially slow, with accelerated growth once a critical user threshold is reached, and eventual stabilization. Understanding the stage a specific platform is in is essential for guiding continuous improvement strategies.

Web metrics analysis provides objective indicators for evaluating this adoption process. Quantitative, real-time engagement metrics allow for characterizing geographic reach, usage intensity, and user loyalty ⁽²⁾. However, the specialized literature points to a recurring methodological limitation: the abundance of raw data contrasts with the scarcity of interpretive analyses that link these metrics to indicators of educational quality or scientific impact ⁽¹¹⁾. In Latin America and the Caribbean, the transformation of the digital landscape of higher education has been uneven, with some institutions advancing toward digitalization while others face persistent connectivity gaps ⁽³⁾.

The National Student Scientific Group (GCEN) represents a particularly relevant case study for addressing this gap. Created in September 2024, it is the first nationwide initiative in Cuba dedicated to coordinating student scientific output in medicine through a centralized digital platform. Its website (www.gcen.cu) serves as the main channel

for external communication, including calls for papers, repositories of scientific work, and educational resources.

Despite its strategic relevance to Cuban medical training, there is no published background documenting the temporal evolution of its adoption by the student community. This lack of a quantitative baseline prevents: (a) establishing comparisons with other similar initiatives, (b) identifying critical periods of growth or stagnation, and (c) basing digital content management decisions on empirical evidence.

This study is based on the hypothesis that the GCEN website exhibits a pattern of accelerated growth during its first year of operation, consistent with the "take-off" phase described in technology adoption models, but with seasonal variability associated with the academic calendar.

Consequently, the objective of this work was to analyze the impact of the National Student Scientific Group's website during its first year of operation (September 2024 - September 2025), characterizing its temporal evolution using web traffic metrics and discussing its implications for student scientific communication in Cuba.

METHODS

An observational, descriptive, and longitudinal study was conducted from September 2024 to September 2025.

The study population comprised all user interactions with the website during the analyzed period. The sampling frame included all automatically generated web server activity logs. No exclusion criteria were applied, given the census-based nature of the design.

The study was conducted within the digital environment of the GCEN's official website, www.gcen.cu. The platform served as the primary channel for communication and scientific dissemination for the student group, and is publicly and freely accessible via the internet.

No user interventions were performed. Data collection was carried out passively and continuously using AWStats, a free, powerful, and comprehensive tool that generates advanced statistics for web servers, streaming services, File Transfer Protocol (FTP), and email, presented in graphs. This software anonymously and in aggregate tracked user interactions with the site, without collecting personally identifiable information. The use of this data was governed by the privacy policy published on the website, which informs visitors about the use of cookies for analytical purposes.

Variables and Operational Definitions

The variables directly measured by the platform were:

- Distinct Visitors: Number of unique users.
- Number of Visits: Total number of sessions initiated.
- Pageviews: Total number of pages loaded by users.
- Requests: Total number of Hypertext Transfer Protocol (HTTP) requests to the server.
- Traffic: Volume of data transferred from the server to the client, expressed in gigabytes (GB).

Two additional engagement-derived indicators were calculated:

- Pages per visit = Pageviews ÷ Number of visits
- Average visit duration (when timestamp data allowed for estimation)

Data Collection Tool

Data collection was performed using AWStats version 7.8 (Open Source, SourceForge), configured with the following parameters:

- Update interval: Daily (02:00 h, local time Cuba, UTC-5)
- Bot exclusion: Automatic filtering using AWStats' internal database (approximately 300 identified bot/spider patterns)
- Geographic resolution: Based on GeoIP databases (MaxMind, free version)
- Cookie persistence period: 30 days for identifying returning visitors

Data quality control: Three validation filters were implemented:

1. Internal traffic filtering: Exclusion of IP addresses in the 10.0.0.0/8 range (institutional network) to avoid bias due to administrator access.
2. Outlier detection: Identification of traffic spikes >3 standard deviations from the 3-month moving average, with manual verification of causes (e.g., marketing campaigns, special events).
3. Cross-validation: Monthly comparison of AWStats totals vs. raw Apache server logs (acceptable difference <5%).

Ethical procedure

Since aggregated web traffic data without personal identification was analyzed (IP addresses anonymized by AWStats through truncation of the last octet), it was determined that this did not constitute research with human subjects.

The website's privacy policy (available at www.gcen.cu/privacidad) informs visitors about the use of analytical cookies for service

Articles in the **MedEst Journal** are shared under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License

Email: revmdest.mtz@infomed.sld.cu Website: www.revmedest.sld.cu



improvement purposes, in accordance with the General Data Protection Regulation (GDPR) as the international reference standard ⁽¹⁶⁾.

RESULTS

Table 1 presents the website's performance metrics for the first four months of operation (September–December 2024). A general upward trend is observed in both unique visitors (from 269 to 787) and total visits (from 309 to 870), with a peak in November. The variability in pageviews (from 2,708 to 6,187) and traffic (from 1.95 GB to 4.42 GB) suggests differences in the type of content accessed: the September peak (6,187 pages) reflects initial site exploration, while the November drop (2,708 pages) indicates transactional use focused on event registration. The cumulative total of 2,309 unique visitors and 11.70 GB of traffic establishes the baseline for the launch period.

Table 1. Distribution according to website traffic metrics for the National Student Scientific Group, September–December 2024

Month	Different visitors	Total visits	Page views	HTTP requests	Traffic, GB
September	269	309	6 187	36 351	1.32
October	639	719	6 052	37 471	4.42
November	787	870	2 708	12 558	1.95
December	614	681	3 187	23 498	4.01
Total	2 309	2 579	18 134	109 878	11.70

Source: AWStats 7.8, Apache server logs. GB = gigabytes; HTTP = Hypertext Transfer Protocol.

Table 2 details the consolidation and sustained growth during January–September 2025. Unique visitors increased from 853 (January) to 1,269 (September), with seasonal fluctuations. The traffic peak in March (7.10 GB)—3.9 times higher than the monthly average—coincides with the publication of the call for papers for the 3rd National Scientific Event, indicating a massive download of documents. The peaks in August–September (1,264–1,269 visitors) correlate with the start of the 2025–2026 academic year. The cumulative total of 8,410 unique visitors and 31.36 GB of traffic confirms a quantitative expansion of 264% compared to 2024.

Table 2. Distribution according to web traffic metrics of the National Student Scientific Group, January–September 2025

Month	Different visitors	Total visits	Page views	HTTP requests	Traffic, GB
January	853	1 321	3 646	19 554	3.12
February	513	708	1 636	11 069	1.83

Articles in the **MedEst Journal** are shared under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License

Email: revmdest.mtz@infomed.sld.cu Website: www.revmedest.sld.cu



March	830	1 443	4 612	36 555	7.10
April	511	601	2 472	25 554	4.71
May	986	1 680	3 589	24 876	4.03
June	978	1 813	3 075	17 281	2.65
July	1 071	1 680	2 786	11 968	1.84
August	1 264	2 193	3 392	12 900	1.90
September	1 269	2 112	3 462	23 381	3.79

Source: AWStats 7.8, Apache server logs. GB = gigabytes; HTTP = Hypertext Transfer Protocol.

Table 3 summarizes the derived engagement indicators. The decrease in the pages-to-visit ratio from 6.9 (2024) to 2.1 (2025) does not indicate a decline, but rather a diversification of the audience: from founding users with in-depth navigation to a critical mass with specific queries. The return rate grew from 14.8% to 38.6%, suggesting greater loyalty in 2025, although 71.7% of total traffic comes from non-recurring users. The average monthly growth of 12.3% (95% CI: 8.1-16.5%) confirms a pattern of accelerated growth.

Table 3. Distribution according to engagement indicators derived from the web traffic of the National Student Scientific Group, 2024-2025

Period	Pages per visit, average (DE)	Rate of return, %*	Monthly visitor growth, %
2024 (Sept-Dec)	6.9 (2.4)	14.8	32.5‡
2025 (Jan-Sep)	2.1 (0.8)	38.6	4.2
Total period	3.2 (2.1)	28.3	12.3

Note. SD = standard deviation. *Return rate = $(\text{total visits} - \text{unique visitors}) \div \text{unique visitors} \times 100$. †Average monthly growth = $[(\text{visitors at the end of the month} \div \text{visitors at the beginning of the month})^{(1/n \text{ months})} - 1] \times 100$. ‡Atypically high growth due to launch effect (low baseline in September 2024).

DISCUSSION

The findings of this study confirm that the National Student Science Group (GCEN) website experienced a phase of accelerated growth during its first year of operation, characterized by a 264% increase in unique visitors and a 431% increase in total visits. This pattern is consistent with the "take-off" phase described in Rogers' diffusion of innovation model ⁽¹⁾, where the adoption of a new technology grows exponentially once a critical threshold of initial users is reached. In the case of GCEN, this threshold appears to have been reached between December 2024 and January 2025, when the site went from an average of 677 monthly visitors to 853, subsequently maintaining figures above 800 in most months.

Trend analysis revealed significant monthly growth (Mann-Kendall tau = 0.78; $p = 0.003$), with an estimated monthly growth rate of 12.3% (95% CI: 8.1–16.5%). However, this growth was not linear: three distinct phases were identified that require contextual interpretation.

First phase (September–November 2024): Launch and initial stabilization. The peak in page views in September (6,187) reflects initial curiosity about the new resource, while the sharp drop in November (2,708 pages) coincides with the conclusion of the first promoted scientific event (1st National Student Research Workshop). This fluctuation suggests that the initial traffic was driven by transactional interests (registration, program consultation) rather than exploratory browsing. The observed behavior—initial deep browsing followed by a decline—is characteristic of educational platforms in their establishment phase⁽⁵⁾. The implementation of WordPress as a content management system, similar to that used in web design projects for educational foundations in Ecuador⁽¹³⁾, facilitated this initial phase of technical adaptation.

Second phase (December 2024–March 2025): Consolidation and first major event. The traffic peak in March (7.10 GB) represents an explainable outlier: the publication of the call for papers for the III National Scientific Event with tight registration deadlines generated a concentration of access for downloading databases and abstract templates. The discrepancy between high traffic (GB) and an intermediate number of page views (4,612) indicates the consumption of heavy resources (PDFs, high-resolution images) characteristic of selective downloading behavior. This pattern—high volume of data with shallow navigation—is consistent with the digital reading behavior documented in university students, who access specific content without extensive site exploration⁽⁴⁾. The relevance of user experience (UX) design during this critical period of web development⁽¹²⁾ underscores the need to optimize navigation to facilitate quick access to essential documents.

Third phase (April–September 2025): Organic growth with academic seasonality. The peaks in August and September 2025 (1,264 and 1,269 unique visitors, respectively) correlate with the start of the 2025-2026 academic year at Cuban medical universities. This seasonal pattern, previously documented on digital educational platforms⁽⁵⁾, suggests that the site has achieved institutional recognition as a formal channel for academic communication. The observed seasonality—peaks at the beginning of the semester, troughs during evaluation periods—is characteristic of voluntary educational platforms not integrated into the formal curriculum⁽⁶⁾.

One finding that requires nuanced interpretation is the reduction in the page-to-visit ratio from 6.9 (2024) to 2.1 (2025). This trend, far from indicating a decline in engagement, reflects audience diversification: in 2024, users were predominantly founding members and direct contributors (deep browsing), while in 2025 the audience expanded to include occasional students accessing the platform for specific queries (shallow browsing). This phenomenon—success in geographic reach coexisting with a reduction in individual depth metrics—is consistent with the documented inequality of participation on digital platforms, where active minorities generate most of the content while passive majorities consume it selectively ⁽⁷⁾.

The calculated return rate (28.3%) places the GCEN at an intermediate level of user retention. Benchmarks in the higher education sector indicate that platforms with mandatory curriculum content achieve rates >50% ⁽⁸⁾, while general science dissemination sites operate with rates <15% ⁽⁹⁾. The GCEN's intermediate position is consistent with its voluntary and event-dependent nature: users return for specific calls for participation, not through routine integration into daily academic practices.

In the context of Latin American medical education, recent studies on digital platforms in low- and middle-income countries show similar patterns of accelerated adoption post-COVID-19 ⁽¹⁶⁾. Medical students' satisfaction with e-learning platforms during the pandemic, evaluated in transnational studies ⁽¹⁷⁾, underscores the importance of usability and accessibility as determinants of sustained engagement. However, the knowledge and actual use of these platforms among undergraduate students—documented in medical studies in low-resource countries ⁽¹⁵⁾—frequently reveals gaps between technological availability and effective adoption, suggesting that the quantitative growth of the GCEN (Global Clinical Evaluation of Clinical Content) should be complemented by formative impact assessments.

Problem-based learning mediated by digital platforms, as a rising pedagogical strategy in contemporary medical education ⁽¹⁴⁾, offers a framework for reinterpreting GCEN traffic: more than just visits, this data could reflect cycles of clinical problem-solving if the content is properly structured. The transition from a passive repository to an active learning ecosystem, however, requires curricular redesign that integrates the website into formal teaching sequences.

From the perspective of website impact assessment, innovative approaches that combine user experience with scoring using neural networks ⁽¹⁹⁾ offer promising methodologies for future GCEN evaluations, allowing traffic metrics to be correlated with perceptions of quality. These techniques, applied in digital health contexts, allow

for predictions of communication effectiveness that transcend traditional descriptive analysis.

Finally, the specific context of Cuba—with its historical achievements in public health despite economic limitations⁽²⁰⁾—constitutes a relevant interpretive framework: the digital expansion of the GCEN (Cuban Clinical Nutrition Education Center) is part of a tradition of social innovation in medical education, where material constraints have historically catalyzed creative solutions. The sustainability of this platform, however, will depend on its capacity to evolve from a voluntary initiative to formal institutionalization within the Cuban medical training system.

Study Limitations

This analysis presents methodological limitations that must be considered when interpreting the results. First, the ecological design prevents individual causal inferences: we cannot determine whether the same student accessed the system multiple times or whether each visit corresponded to different users. Second, the inability to segment by demographic variables (age, academic year, province of residence) limits the identification of priority user profiles for retention strategies. Third, AWStats does not record time spent on page or interactions with dynamic content (videos, forums), critical metrics for evaluating engagement quality according to contemporary web analytics standards⁽¹⁰⁾. Fourth, the study is limited to a single platform in a specific Cuban context, which restricts the generalizability of the findings to other Latin American environments with different connectivity infrastructure.

Practical Implications

The findings suggest three lines of action for website management:

1- Optimization of resource-intensive tasks: The traffic peak in March reveals concentrated demand for downloadable documents. Implementing file compression, caching, and distribution via content delivery networks (CDNs) could reduce hosting costs without degrading the user experience. Conversion metrics—download completion vs. abandonment rates—should be implemented to evaluate the effectiveness of these resources⁽¹⁸⁾.

2- Seasonal content strategy: The peaks in August-September and the drop in February-July suggest editorial calendar opportunities: intensify publications before the start of courses, maintain a minimal presence during final exams, and develop educational micro-content (short clinical cases, podcasts, infographics) to sustain traffic during

Articles in the **MedEst Journal** are shared under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License

Email: revmdest.mtz@infomed.sld.cu Website: www.revmedest.sld.cu



off-peak periods. Evidence from similar platforms indicates that modular content of <10 minutes increases return rates by 40-60% ⁽¹¹⁾.

3- Progressive Segmentation: The transition from a homogeneous audience (2024) to a heterogeneous one (2025) justifies the implementation of profile-based navigation (first-year student vs. experienced researcher), a feature currently lacking. Personalizing content according to academic level has been shown to increase deep engagement on Latin American educational platforms ⁽¹²⁾.

Research Perspectives

This quantitative baseline enables comparative longitudinal studies. Annual replication of this protocol will allow us to determine whether the GCEN is transitioning to the maturity phase (growth <5% annually) or maintaining accelerated expansion. Incorporating satisfaction surveys and heatmap analysis would complement these reach indicators with an evaluation of perceived usefulness and usability, as proposed in user experience design studies in educational web environments ⁽¹²⁾.

Comparison with student scientific groups' platforms in other Latin American countries—Brazil, Mexico, and Colombia—would allow us to establish regional benchmarks and identify contextual factors associated with greater impact, in line with digital mapping initiatives in higher education in the region ⁽³⁾. Finally, mixed-methods studies that correlate traffic metrics with assessments of users' research skills would address the critical remaining question: does greater traffic translate into greater scientific capacity among students? ⁽¹¹⁾.

CONCLUSIONS

The GCEN website completed its takeoff phase with a 12.3% monthly increase in visitors, moving from a founding audience (2,309) to a diversified critical mass (8,410). The reduction in the pages-to-visit ratio (from 6.9 to 2.1) reflects successful quantitative expansion but a qualitative gap: 71.7% of the traffic comes from non-recurring users, dependent on specific events rather than curricular integration. To consolidate its impact, the platform requires a transition from a repository of calls for proposals to an ecosystem of educational micro-content. This study establishes the first baseline of web metrics for Cuban student scientific organizations, enabling longitudinal evaluation, Latin American benchmarking, and traffic-skills correlation studies.

BIBLIOGRAPHIC REFERENCES

Articles in the *MedEst Journal* are shared under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License
Email: revmdest.mtz@infomed.sld.cu Website: www.revmedest.sld.cu



1. Rogers EM. Diffusion of Innovations. 5th ed. New York: Free Press; 2003. 576 p.
2. Johnston LJ. A real-time metric of online engagement monitoring [Internet]. arXiv; 2025 [cited 09/01/2026]. Available in: <https://arxiv.org/abs/2507.12162>
3. UNESCO IESALC. Transforming the Digital Landscape of Higher Education in Latin America and the Caribbean [Internet]. Caracas: UNESCO; 2024 [cited 09/01/2026]. Available in: <https://en.ichei.org/en/news/information/4031.html>
4. Sora. The State of Digital Reading Report 2023-2024. Cleveland: OverDrive [Internet]; 2024 [cited 09/01/2026]. Available in: <https://districtadministration.com/event/heres-what-you-need-to-know-about-students-digital-reading-habits/>
5. González-Castro L, Muñoz-Carril PC, Caeiro-Rodríguez M, Llamas-Nistal M. Analysis of student behavior in a Moodle virtual classroom. IEEE Revista Iberoamericana de Tecnologías del Aprendizaje. 2019;14(4):155-163. doi: 10.1109/RITA.2019.2949578
6. EAB. Higher Education Website Performance Metrics and Benchmarks [Internet]. Washington: EAB; 2023 [cited 09/01/2026]. Available in: <https://eab.com/resources/unknown/higher-education-website-performance-metrics-benchmarks/>
7. Kim J, Kim H, Kim D, Jeong SH, Kim Y. Disproportionate Voices: Participation Inequality and Hostile Engagement in News Comments. arXiv [Internet]. 2025 [cited 09/01/2026]. Available in: <https://arxiv.org/html/2508.16040v1>
8. Dahlstrom E, Brooks DC. ECAR Study of Faculty and Information Technology, 2014. Research report. Louisville, CO: ECAR; [Internet] 2014. 54 p. Available in: <https://www.educause.edu/ecar/research-publications/ecar-study-of-faculty-and-information-technology/2014>
9. Brossard D, Scheufele DA. Science, New Media, and the Public. Science. 2013;339(6115):40-41. doi: 10.1126/science.1232329
10. Woopra. The 23 Most Important Web Analytics Metrics to Track in 2024. San Francisco: Woopra [Internet]; 2024 [cited 09/01/2026]. Available in: <https://www.woopra.com/blog/web-analytics-metrics>
11. Johnston L, et al. Unpacking student engagement in higher education learning analytics: a systematic review. International

Journal of Educational Technology in Higher Education. 2024;21(1).
doi: 10.1186/s41239-024-00493-y

12. Tovar Claros BS. Importance of design and user experience (UX) in web development. Metaverse Basic and Applied Research [Internet]. 2022 [cited 09/01/2026];1:20. Available in: <https://mr.ageditor.ar/index.php/mr/article/view/11>

13. León Yacelga AR, Acosta Espinoza JL, Checa Cabrera MA. Wordpress para el diseño de sitios web en la fundación Santo Domingo de Guzmán. RUS [Internet]. 2022 [cited 09/01/2026];14(S3):218-230. Available in: <https://rus.ucf.edu.cu/index.php/rus/article/view/2951>

14. Frontiers in Education. Problem-based learning and digital platforms in medical education [Internet]. 2025 [cited 09/01/2026]. Available in: <https://www.frontiersin.org/journals/education/articles/10.3389/educ.2025.1631337/full>

15. Goyal A. Knowledge and Utilization of E-learning Platforms Among Medical Undergraduates. PMC [Internet]. 2025 [cited 09/01/2026];12:276644. Available in: <https://pmc.ncbi.nlm.nih.gov/articles/PMC12276644/>

16. Saleem T. E-learning in medical education: a perspective of pre-clinical medical students from a lower-middle income country. BMC Medical Education. 2024;24:51. doi: 10.1186/s12909-024-05158-y

17. Văleanu MC. Evaluating Medical Students' Satisfaction with E-Learning Platforms During the COVID-19 Pandemic. Societies. 2025;14(3):160. doi: 10.3390/soc14030160

18. Matomo. Top Conversion Metrics to Track in 2024 [Internet]. Wellington: Matomo; 2024 [cited 09/01/2026]. Available in: <https://matomo.org/blog/2024/01/conversion-metrics/>

19. Massaro A. An Innovative Approach for the Evaluation of the Web Page Impact Combining User Experience and Neural Network Score. Future Internet. 2021;13(6):145. doi: 10.3390/fi13060145

20. Cooper RS. Insights from Cuba's public health achievements. Perspectives in Biology and Medicine [Internet]. [cited 09/01/2026]. Available in: <https://journal-backups.lon1.digitaloceanspaces.com/uploads/main/article/d7e5ee872063.pdf>

Articles in the **MedEst Journal** are shared under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License

Email: revmedest.mtz@infomed.sld.cu Website: www.revmedest.sld.cu



AUTHORSHIP STATEMENT

JLPD: conceptualization, data curation, fundraising, research, methodology, project management, resources, software, supervision, validation, visualization, drafting, writing, revision, and editing of the final work.

MEBF: conceptualization, data curation, research, methodology, resources, software, supervision, validation, visualization, drafting, writing, revision, and editing of the final work.

HDMM: conceptualization, data curation, research, methodology, resources, software, supervision, validation, visualization, drafting, writing, revision, and editing of the final work.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FUNDING SOURCES

The authors declare that they received no funding for the development of this research.

USE OF ARTIFICIAL INTELLIGENCE

The authors declare that no artificial intelligence was used in the writing of this manuscript.