English

Unifesp Digital Health Center: Healthcare and Management Innovations for the digital transformation of SUS

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Abstract

Objective: To report the experience of structuring the Digital Health Center at the Federal University of São Paulo. Methods: This Center was structured based on developing and approving the Care and Management Innovations from a Digital Health Perspective project by the Information and Digital Health Secretary of the Ministry of Health. The areas of activity were defined based on the articulation of groups that were already developing Digital Health actions at the University, guided by the premises of primary care, intersectoral networks, digital technologies, continuing education, and comprehensive care in the Brazilian Unified Health System (SUS), with equity. Municipal diagnoses in the State of São Paulo, carried out in the context of the SUS Digital Program, were considered for service definition and action planning. Results: The Center was structured along the following axes: Professional qualification of Digital Health competencies; Strengthening of the Alyne Network; the Psychosocial Care Network; Mental Health Care and Confronting Violence; Provision of Assistive Technology Devices such as Orthoses and Prostheses Using 3D Printing Technology, and Care for the LGBTQIAPN+ Population. Conclusion: The Unifesp Digital Health Center establishes itself as a relevant actor in SUS to respond to care gaps, promoting access and qualification of care from a Digital Health perspective.

Key-words: Digital Health, Telehealth, Maternal and Child Health, Mental Health, Violence; Sexual, Gender Minorities, Drug Users, Health of Indigenous Polulations, Health of the Rural Population, Assistive Technology.

Resumen

Centro de Salud Digital de la Unifesp: Innovaciones en Asistenciales y Gestión de la Salud para la transformación digital del SUS.

Objetivo: Relatar la experiencia de estructuración del Centro de Salud Digital de la Universidad Federal de São Paulo. Métodos: El Centro fue estructurado a partir de la construcción y aprobación del proyecto Innovaciones Asistenciales y de Gestión en la Perspectiva de la Salud Digital por la Secretaría de Información y Salud Digital del Ministerio da Salud. Las áreas de actuación fueron definidas según la experiencia de grupos que ya desarrollaban acciones de Salud Digital en la Universidad, que desarrollaron la propuesta orientados por las premisas de la equidad, de la atención básica, de las redes intersectoriales, de las tecnologías digitales, de la educación permanente y de la integralidad del cuidado en el Sistema Único de Salud (SUS). Los diagnósticos de los municipios de São Paulo, realizados en el contexto del Programa SUS Digital, fueron considerados para la definición de los servicios y planeamiento de las acciones. Resultados: El Centro actúa en las siguientes áreas: Calificación profesional de competencias en Salud Digital; Fortalecimiento de la Red Alyne; Ampliación del Acceso a la Atención Psicosocial; Oferta de dispositivos de Tecnología de Asistencia como órtesis y prótesis mediante tecnología de impresión 3D, Cuidado de la Población LGBTQIAPN+, además de las áreas en desarrollo. Conclusión: El Centro Salud Digital Unifesp se establece como un actor relevante en el SUS para responder a vacíos asistenciales, promoviendo acceso y calificación del cuidado en la perspectiva de la Salud Digital.

Palabras clave: Salud Digital, Telesalud, Salud Materno-Infantil, Atención Psicosocial, Violencias; Minorías Sexuales y de Género, Usuarios de Drogas, Salud Indígena, Salud en el campo, Tecnología de Asistencia.

Resumo

Núcleo de Saúde Digital da Unifesp: Inovações Assistenciais e de Gestão para a transformação digital do SUS

Objetivo: Relatar a experiência de estruturação do Núcleo de Saúde Digital da Universidade Federal de São Paulo. Métodos: O Núcleo foi estruturado a partir da construção e aprovação do projeto Inovações Assistenciais e de Gestão na Perspectiva da Saúde Digital pela Secretaria de Informação e Saúde Digital do Ministério da Saúde. As áreas de atuação foram definidas segundo a experiência de grupos que já desenvolviam ações de Saúde Digital na Universidade, que desenvolveram a proposta orientados pelas premissas da equidade, da atenção básica, das redes intersetoriais, das tecnologias digitais, da educação permanente e da integralidade do cuidado no Sistema Único de Saúde (SUS). Os diagnósticos dos municípios paulistas, realizados no contexto do Programa SUS Digital, foram considerados para a definição dos serviços e planejamento das ações. Resultados: O Núcleo atua nos seguintes eixos: Qualificação profissional de competências em Saúde Digital; Fortalecimento da Rede Alyne; Ampliação do Acesso à Atenção Psicossocial; Oferta de dispositivos de Tecnologia Assistiva como órteses e próteses usando a tecnologia de impressão 3D, Cuidado da População LGBTQIAPN+, além das áreas em desenvolvimento. Conclusão: O Núcleo Saúde Digital Unifesp se estabelece como um ator relevante no SUS para responder a vazios assistenciais, promovendo acesso e qualificação do cuidado na perspectiva da Saúde Digital.

Palavras-chave: Saúde Digital, Telessaúde, Saúde Materno-Infantil, Atenção Psicossocial, Violências; Minorias Sexuais e de Gênero, Usuários de Drogas, Saúde Indígena, Saúde no campo, Tecnologia Assistiva.

INTRODUCTION

The digital transformation of the Brazilian Unified Health System (SUS) has been established as a strategy to enhance the quality of care, expand access, and address health inequalities within the healthcare system. In Brazil, the Digital Health Strategy for Brazil 2020–2028 (ESD28) and the SUS Digital Program promote the integration of technological solutions—such as telehealth, artificial intelligence, wearable devices, system interoperability, and advanced manufacturing applied to healthcare—into care, training, and management practices.[1,2]

In this context, this article presents the experience of structuring the Digital Health Center of the Federal University of São Paulo (Unifesp Digital Health Center-*Núcleo de Saúde Digital Unifesp*), which aims to implement technological solutions that can contribute to the digital transformation of healthcare and management practices geared towards the needs of SUS.

Unifesp is a multi-campus university, with academic units in Baixada Santista, Diadema, Guarulhos, Osasco, São José dos Campos, and São Paulo, totaling seven campuses. Four are directly involved in the organization of the Center, coordinating resources in the field of health and technology: Baixada Santista, Diadema, São José dos Campos, and São Paulo. Unifesp has a recognized contribution to SUS through the integration of teaching, service, and community in various areas. All campuses involved in the Center have been committed, over decades, to improving actions in the areas of training/continuing education, assistance, and management, and also addressing topics of social interest.[3-5] To these efforts, the incorporation of technologies to improve solutions in the era of digital health is added.

The Unifesp Digital Health Center focuses on implementing digital solutions for areas of SUS that require complex coordination and efforts to improve processes and outcomes. The Center prioritizes areas with gaps in healthcare access and reducing barriers to access for historically vulnerable populations, such as people with mental health issues, indigenous peoples, rural populations, LGBTQIAPN+ individuals, people experiencing homelessness, drug users, and those affected by violence, as well as those requiring support to reverse unfavorable outcomes, such as pregnant and postpartum women in their family and social context. Professional development of partners to develop competencies in Digital Health has also been defined as essential and urgent, considering the need to prepare professionals to incorporate technological innovations into their practice, ensuring technical quality and adherence to legislation and ethics.

This article shows the development trajectory, areas of activity, technological resources employed, and expected results of the Unifesp Digital Health Center, contributing to the scientific debate on the paths of digital transformation in SUS and its potential to promote inclusion, innovation, and improved quality of healthcare, with equity.

METHOD

This account outlines an institutional, interdisciplinary, and inter-campus initiative in digital health innovation, developed by Unifesp in collaboration with managers, healthcare professionals, and users of the Unified Health System (SUS). The center was established in alignment with the SUS Digital Program and the Digital Health Strategy for Brazil (2020-2028). Its first three-year plan is set to run until October 2027 and has been made possible through a partnership with the Secretariat of Information and Digital Health (SEIDIGI/MS)[1-2].

The initial areas of focus for the Center were defined according to the following criteria: identification of populations with the greatest barriers to access; experiences of university groups that were already developing telehealth actions or providing support to municipalities and SUS health services; and digital health diagnoses

formulated by municipalities in the state of São Paulo within the context of the SUS Digital Program, which support the development of Municipal Action Plans for Digital Health Transformation. A large number of municipalities in the state of São Paulo listed mental health, the Alyne network, and orthopedics/rehabilitation as priority areas for digital transformation, among other areas.[6] The Center also considered areas not listed in the diagnoses, which are precisely those that remain as gaps in care, compromising access, comprehensiveness, and equity in the health system. In this sense, the digital innovation proposals present in the center's action plan mobilized resources previously organized institutionally to improve the quality of care in specific areas.

To address the structural challenges of SUS, the proposal integrates solutions such as teleconsultations, teleinterconsultations, teleconsulting, tele-education, and telemonitoring, combined with advanced manufacturing, including 3D printing of personalized assistive devices, as a strategy to expand coverage, improve the quality of care, and reduce inequalities in access to healthcare.

The proposal adopts a territorial and participatory approach, involving multiple university campuses and community-based care and support networks from different regions of the State of São Paulo. The actions are structured in the following main dimensions (Figure 1): (1) Strengthening Primary Health Care (PHC); (2) Equity; (3) Intersectorality with strengthening of intersectoral networks; (4) Digital Technologies applied to Care; (5) Support and Continuing Education; and (6) Monitoring and Evaluation in Digital Health.

Figure 1. Guiding dimensions of the actions of the Unifesp Digital Health Center in different regions of the State of São Paulo. Source: the author. São Paulo, 2025.

The technologies used comply with the interoperability and security standards defined by DATASUS and the Ministry of Health. All processes follow the principles of the General Data Protection Law (LGPD-*Lei Geral de Proteção de Dados*), ensuring confidentiality, informed consent, and respect for user privacy[7].

The monitoring of the actions is carried out by an interdisciplinary team, composed of health professionals, technology specialists, and administrative staff, as well as researchers. The evaluation is conducted through process and outcome indicators, records in integrated systems, qualitative interviews, and continuous feedback from the teams.

RESULTS

The Unifesp Digital Health Center was established in November 2024. Since then, it has been working on developing actions aimed at implementing technological solutions integrated with the needs of SUS. Based on five priority areas of action, the Center aims to reach municipalities in the state of São Paulo and other states, involving healthcare professionals in training and technical support activities, and thousands of users in care actions mediated by digital technologies. In all areas, the potential of digital tools is observed to expand the reach of health actions, improve the quality of care, and reduce inequalities in access to services, especially for vulnerable populations and/or in areas with limited access to healthcare.

Key actions from this perspective include developing competencies in areas such as Digital Health, Maternal and Child Health, Mental Health, care for the LGBTQIAPN+ population, and assistive technology devices like orthotics and prosthetics utilizing 3D printing technology. In addition to these initial focus areas, the center aims to identify and address the needs and priorities of the health system, particularly at the regional level. This involves coordinating institutional resources to implement new initiatives effectively (see Figure 2).

Figure 2. Thematic areas of the Unifesp Digital Health Center. Source: the author. São Paulo, 2025.

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Strengthening the Alyne Network

The project focused on strengthening the Alyne Network, an initiative by the Ministry of Health that restructures the former Stork Network to reduce maternal mortality by 25% by 2027[8,9]. Through digital strategies, it aims to enhance comprehensive care for pregnant women, women in labor, and postpartum women, especially in areas with high rates of maternal and infant morbidity and mortality. The actions include tele-education, telemonitoring of high-risk pregnant women, teleconsultation, tele-interconsultations, and teleconsulting with specialists in obstetrics and neonatology. Additionally, this component involves distance learning courses and training for primary care professionals to improve prenatal care, childbirth management, and postpartum care.

These digital interventions promote greater adherence to prenatal care, increase the early detection of hypertensive syndromes, infections, and other preventable conditions, and develop health education initiatives for both pregnant women and healthcare professionals. The experience also strengthens the role of pregnant women in making decisions about their care, in line with the literature on woman-centered care, and fosters health education actions focused on autonomy and female empowerment.[10,11]

Expanding access to psychosocial care.

Structured based on the guidelines of the National Mental Health, Alcohol and Other Drugs Policies[12], Indigenous Health, Comprehensive Health of rural, forest and riverside populations, Health of People in Street Situations, and the WHO Comprehensive Mental Health Action Plan 2013-2030[13], this axis includes situational diagnosis, planning, management, training, assistance, monitoring and evaluation actions, proposing the expansion of services and support for care from: a) Street Clinic Teams, Family Health Teams, Multiprofessional Teams and Violence Prevention Centers, in Primary Health Care; b) Psychosocial Care Centers (CAPS), Emergency Care Units (UPA) and Mobile Emergency Service (SAMU); c) Indigenous Health Teams.

The actions focus on reducing barriers to accessing mental health care, stemming from the need for long journeys to receive care, stigma related to cultural, territorial, and experiential peculiarities and/or situations of risk, targeting people with problems related to the intense and radical use of drugs, communities settled in rural areas, homeless populations, indigenous peoples, and victims of domestic, ethnic-racial, gender-based, and police violence.

The initiative focuses on creating digital content and support tools, while also providing specialists and supervisors. It aims to involve local supporters to enhance the integration of community needs with mental health responses that are emancipatory, territorial, and community-based. The plan includes developing both individual and group care strategies, offered in synchronous and asynchronous formats. Additionally, it involves creating digital maps to identify accessible services, programs, and activities, as well as implementing notification systems via messaging. The initiative will also feature workshops, virtual discussion groups, and mutual support groups, as well as support for managing crises and drug-related issues. Peer support and the implementation of protocols will be essential components of this effort.

The implementation of these strategies is accompanied by the development of scientific research, collaboration with public administrators and organized social movements, and is inspired by national experiences of harm reduction agents working with Indigenous people and those experiencing homelessness[14,15] the Mental Health Network of the Landless Rural Workers' Movement (*Rede de Saúde Mental do Movimento dos Trabalhadores Rurais sem Terra)*[16] and the Friendship Bench developed and implemented in Zimbabwe.[17,18]

Assistive technology (orthotics and prosthetics) for physical rehabilitation.

The expansion of care for historically neglected populations, such as people with physical disabilities and women who have undergone mastectomies, is being carried out through the incorporation of digital technologies, such as 3D scanning and 3D printing, for the production of personalized orthoses and prostheses, integrated into rehabilitation care lines within SUS[19]. This strategy has been coordinated with partner municipalities and specialized centers, strengthening the provision of personalized and accessible solutions. Among the devices developed, external breast prostheses for transgender women and prostheses and orthoses for children with specific motor needs stand out. The application of these technologies occurs with remote support and systematic monitoring of users, promoting functional rehabilitation, autonomy, and social inclusion.

Support for healthcare teams in providing care focused on the LGBTQIAPN+ population.

The lack of knowledge among healthcare professionals about the needs and specificities of this population hinders care and contributes to the perpetuation of inequalities within SUS. Discussing topics such as mental health, hormone therapy,

sexual and reproductive health rights, as well as vocal training and knowledge of the legal rights of this population, among other topics, ensures better quality in managing fundamental aspects of this population's health by specialized professionals. The actions include teleconsultations, teleconsulting, and tele-education, with the development of educational materials to develop digital competence that can contribute to the humanization of care and the overcoming of institutional barriers affecting the LGBTQIAPN+[20] population.

Technical and technological training for Digital Health

The Unifesp Digital Health Center acknowledges that the digital transformation of SUS necessitates trained professionals who can effectively integrate and utilize digital technologies in an ethical, safe, responsible, and efficient manner. In this regard, training programs have been developed at different levels, ranging from awareness-raising to advanced technical training. In collaboration with the UNA-SUS System, the training strategies include self-paced courses, hybrid workshops and mentoring, training processes based on active methodologies, and learning based on real problems in healthcare territories and services. The content covers topics such as Digital Health, ethics and data security, data and system integration and interoperability, applied telehealth, artificial intelligence in healthcare, and user experience.

The training in digital skills for Primary Health Care professionals is highlighted to strengthen the critical use of technologies in longitudinal monitoring and care coordination. Training was also structured to improve decision-making based on Health Data Science and the implementation of digital transformation projects in local communities. Available throughout the country, this training contributes to the democratization of knowledge in Digital Health.

DISCUSSION AND FUTURE PERSPECTIVES

The reported experience indicates the transformative potential of Digital Health as a structuring axis for requalifying healthcare within the Unified Health System (SUS). By integrating technological innovations, training strategies, and intersectoral practices, the Unifesp Digital Health Center contributes concretely to expanding access, personalizing care, and strengthening care networks—especially for vulnerable populations and in areas with limited access to healthcare[10,21,22].

The proposed technological solutions align directly with the guidelines of the Digital Health Strategy for Brazil 2020–2028[1] and the SUS Digital Program[2]. These policies propose the integration of digital technologies into health information governance, professional training, and clinical care, with a focus on system interoperability and the ethical use of data[7].

In the field of maternal and child health, digital interventions converge with the global goals of reducing maternal mortality outlined in the Sustainable Development Goals, especially target 3.1 of the 2030 Agenda[23]. The literature indicates that approximately 90% of maternal deaths could be prevented with quality prenatal care, coordinated networks, and effective clinical surveillance[24,25]. The incorporation of tools such as telemonitoring, teleconsultation, and virtual discussion groups strengthens these dimensions, bringing pregnant women closer to timely and safe care.

In the area of mental health, the project follows the guidelines of the World Health Organization (WHO) for strengthening community-based and non-medicalized care, as proposed in the Comprehensive Mental Health Action Plan 2013–2030[13] and the report Transforming Mental Health for All[27]. The creation of remote support strategies, tele-guidance, and the use of digital territorial maps favors overcoming the exclusively biomedical and psychiatric logic, promoting a more comprehensive and person-centered approach[28].

The use of personalized assistive technology devices created through 3D printing aligns with the user-centered rehabilitation concept promoted by the WHO and various technological innovation initiatives in healthcare. The experience gained by the Unifesp group demonstrates that it is possible to integrate advanced technologies into the Brazilian public health system (SUS) in an accessible and scalable manner. This approach has a significant positive impact on functionality, autonomy, and social inclusion, particularly for children and adolescents with disabilities[19,29,30].

The projects developed at Unifesp demonstrate high potential for promoting equity in care for the LGBTQIAPN+ population, by enabling access to personalized assistive devices — such as external breast prostheses for transgender women — produced with advanced manufacturing technologies. This provides an alternative to the challenge of geographical distance from services qualified to offer hormone therapy, as well as supporting primary care teams in improving work processes, aligning technological innovation, humanization, and inclusion within SUS[20].

Despite the positive results, the consolidation of Digital Health as a structuring policy of SUS still has challenges. These include regional inequalities in technological infrastructure,

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the scarcity of connectivity in vulnerable territories, and the fragmentation of information systems.[6] The interoperability of data, envisioned in the pillars of SUS Digital, still requires technical, financial, and regulatory efforts, including strict compliance with the General Data Protection Law (LGPD).[7]

It is essential to invest in training professionals with digital skills in healthcare. The literature has emphasized the need to incorporate the development of digital health competencies and skills into undergraduate health curricula and continuing education programs, focusing on critical skills, ethics, security, and techniques for the use of digital technologies[21].

The collaboration between universities and health services has been strategically important for integrating science, management, and healthcare practice. This partnership enhances localized and participatory innovation, aligning with the principles of the Brazilian Unified Health System (SUS) as well as promoting equity and social participation in health[4].

Therefore, it is recommended that the initiatives described here be continued and expanded, focusing on impact assessment, evidence production, and strengthening digital governance in healthcare. The advancement of digital transformation in the Brazilian Unified Health System (SUS) requires sustainable policies, adequate funding, and an ethical commitment to the individuals and territories involved.

Inducement policies such as the Education through Work Program (PET)-Health: Digital Health are examples of initiatives that allow the expansion and strengthening of telehealth and Digital Health centers and influence the planning of new actions at the Unifesp Digital Health Center. In dialogue with the "*mais acesso a especialistas*" Program of the Ministry of Health, the Center developed an expansion plan that includes actions in the area of Ophthalmology and support for the originally established areas.

CONCLUSION

Digital Health can be a strategic tool to improve the quality of care, expand access, and promote equity within SUS. Through collaboration between universities, managers, and healthcare professionals, it has been possible to develop and implement innovative solutions that address the concrete needs of vulnerable populations and historically neglected territories.

Challenges include the need for investment in technological infrastructure, system interoperability, and continuous training for healthcare teams, as well as the consolidation of public policies that ensure the sustainability and expansion of Digital Health strategies in the country.

Finally, the role of universities as leading institutions in promoting health innovation is reinforced, acting as bridges between science, service, and society. The continuation and improvement of experiences like this are fundamental for building a more inclusive, efficient, and connected SUS that is responsive to contemporary technological and social transformations.

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