Blendend learning: report of experience in disciplines of the Faculty of Medicine of the Federal University of Mato Grosso do Sul, Campo Grande - MS, Brazil

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INTRODUCTION: This study aims to present the use of hybrid teaching experience – blended learning - in two disciplines of the Medical School of Federal University of Mato Grosso do Sul (Famed- UFMS), in the state capital, Campo Grande. The blended learning corresponds to the combination of online with offline learning in models that mix times when the student studies alone, virtual manner, with others in which learning happens presentially, valuing the interaction among peers and between students and teacher. It is understood that this possibility suits the proposal contained in the National Curricular Guidelines (DCN) for Medical Courses in Brazil, edited in 2014, indicating the use of methodologies that emphasize active student participation in the construction of knowledge and integration between content, and encourage interaction between education, research and extension / assistance.

METHODS: In hybrid school, usually the face-to-face time dispenses technology. It can be organized with lessons face-to-face; conference in large group; problem solving in small groups; courses in various spaces (visits and outdoor work). There can also be conducted seminars and workshops with invited experts. At this stage, the teacher or tutor becomes responsible for proposing activities that enhance interpersonal interactions. Here, the teacher can propose works involving the whole class, or it can be broken down into smaller groups to carry out projects. In synchronous moments "on-line" virtual meetings can be conducted by chat, video conferencing and remote access; webinars with guest experts; instant messaging (like MSN, ICQ, SMS and MMS). Already in asynchronous period, the idea is to work with paper documents (guides and handouts); documents in digital format (CD-Rom and DVD); Web pages (directed and free research); Learning Management System (LMS): Contents, questionnaires, surveys, simulations, webseminars, evaluation and communication tools (internal email and chat lists); external mail (ESECWeb). In this report, we worked specifically in two disciplines of the 4th year of Medicine Course, "Health Care for Women" and "Health Care for Children and Adolescents". These disciplines are arranged in modules of 9 weeks each, with 20 hours on average. In this workload, were then distributed synchronous and asynchronous activities. In synchronous activities, there are the practical lessons which take place in the hospital of the University and the Regional Hospital, and one of the periods have internship at a Health Family Basic Unit. There was also the offer of traditional classes as well as the use of active methodologies as the team-based learning, such as problem-based learning, using complex cases provided by Open University of Unified Health System (UNA-SUS), in partnership with the Brazilian Society of Family and Community Medicine, available at its Educational Resource Collection on Health (ARES). Furthermore, in line with these classroom activities, it was organized a virtual learning environment using Moodle platform of University (Federal University of Mato Grosso do Sul - UFMS). In Moodle, manuals are available, teaching guides, recorded lectures, complementary

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library. It is also used for discussion forums for the complex case as for the experiences in the scenario of the Family Health Basic Units, for interaction with peers and teachers.

RESULTS: In 2014, we will work until the end of the year with all students of the 4th year, taking turns between these and other disciplines, and to date, the results show that students are divided between traditional education and innovations of blended learning and feel overwhelmed with tasks that it brings as its center moves from teacher to student. However, the method shown enable greater personal integration between the participants formed small groups, with consequent exchange of experiences. It was possible to develop collective activities during active methodologies, resulting in students the habit of seeking solutions in team and a mixture of different scenarios of interest to the medical education in the country. It attempted to also promote the humanization of the relationship between the institution and the students. It is worth, however, to register that among the difficulties encountered can be cited the requirement of a repositioning of teachers in the learning process as well as the increased workload on the diversity of activities, especially as they face teachers also exercised the role of distance tutor.

CONCLUSIONS: By the results till now, it is seen that such mixed methodologies allow the expansion of learning, but are not yet part of the routine of the disciplines as a whole in the course, so that it is important that the course hasten the inclusion of active methods, properly used, merged to ICT from the 1st year graduation, so that in the 4th year resistances are not found merged to lack of disponibility to deal with changes in the real world, which includes new ways of learning. ■

ISfTeH Students Working Group: e-Health Towards a New Generation of Professionals

Adolfo Sparenberg Sparenberg[1]

INTRODUCTION: The International Society for Telemedicine and eHealth (ISfTeH) is a non-governmental and non-profit international organization headquartered in Basel, Switzerland, whose mission is to facilitate the international dissemination of knowledge and experience in Telemedicine and e-Health. In order to achieve its goals, the Institution counts on the active participation of several "Working Groups". One of them - the ISfTeH Students Working Group - is in charge of internationally promoting e-Health initiatives within the context of the academic world, providing its student members access to recognized experts in the field. Students from all over the world (undergraduate and postgraduate up to MSc degree) can affiliate to the ISfTeH on a free of charge basis, including those coming from the technological as well as from the health sciences areas (medical, nursing, pharmacy and physiotherapy schools, etc.). The ISfTeH Students WG encourages the active participation of interested students in several activities and opportunities promoted by the ISfTeH, such as publishing through the newsletter, journal of the ISfTeH, accessing and posting via the ISfTeH website, attending international conferences and other ISfTeH supported meetings, also allowing students to stay in close contact with international experts.

METHODS: Since 2008, a series of web-conferencing sessions have been organized by the ISfTeH Students WG towards the affiliated members, annually held in April as part of the educational program of the Med-e-Tel Conference, in Luxembourg. Traditionally, 5 students - after a selection process - are given an opportunity to remotely present the results of their telemedicine and e-health activities through a multiseat web-conferencing platform. The objective is to allow full interactivity and dynamic academic discussions, emphasising the participation of students from all countries, including underserved regions of the globe. As part of this initiative, an Award of US$ 1500 is granted by MEDGATE/Switzerland to the best presentation made at the ISfTeH Students Web-conferencing Session. From 2012 on, thanks to the acquisition of a new web-conferencing platform license, the session allows the active and simultaneous participation of up to 200 students from all around the world, without the need (and costs) of travelling long distances to participate.

RESULTS: The celebration of an official partnership with the International Federation of Medical Students Association (IFMSA) in 2013 and with the European Medical Students Association (EMSA) in 2014, represents a very important milestone for our Institution in recent years. Through the establishment of external partnerships with IFMSA and EMSA, both institutions are opening doors to launching an important plan of joint activities in the field of e-Health, taking advantage of the labor force and the innovative spirit of a generation of future professionals from the health sector. In that sense, both IFMSA (over 1.2 million affiliated students from around 110 countries) and EMSA (300.000 student members from 27 countries) can largely contribute to the achievement of this important

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objective. Based on the very successful results of ISfTeH Students Web-conferencing Session, other similar sessions have been jointly organized with some of the ISfTeH WG such as Tele-nursing.

CONCLUSIONS: The ISfTeH is a NGO in official relation with the WHO. The active participation of students in Telemedicine and e-Health activities promoted by the ISfTeH is considered a key element for a successful and sustainable implementation of e-Health projects internationally. Requesting on-line affiliation to the Students Category of the ISfTeH is quite an easy process (free of charge for students up to MSc degree), accessible through the ISfTeH Website at: http://www.isfteh.org/members/join . ■

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Usability and Design in a Telehealth in the Home Service

Alan Taylor[1]; Colin Carati[2]

INTRODUCTION: The Flinders Telehealth in the Home trial (FTH trial) conducted in South Australia during 2013-14 introduced telehealth services in three clinical areas:

1) Community based palliative care. Patients and their carers received video-conferencing and remote monitoring services from a palliative care nurse using a tablet device (iPad), a self-assessment application to record their health status, and electronic devices and scales to monitor their physical activity and weight.

2) Home-based rehabilitation services for the elderly at home. Patients were monitored by a therapist remotely, who made video calls as required, and also had access to rehabilitation and speech therapists using a tablet device (iPad), a self-assessment application to record their health status and an exercise tracking device to monitor their physical activity.

For all groups, clinical teams emphasized the need for solutions appropriate for those aged over 65. The applications needed to be simple to use and interoperable with existing information and communications (ICT) infrastructure used by the health services. The equipment chosen was low-cost, consumer-grade, and as far as possible, based on non-proprietary standards.

This paper reports on the design decisions that were taken in order to maximize the usability of the technology solution and maintain equity and access for these patient groups.

METHODS: Research activities in the FTH trial were approved by the Southern Adelaide Clinical Human Research Ethics Committee. Assessment of the design choices and usability of telehealth in the home services was undertaken within an action research framework for the conduct of the whole trial.

An action research process used a variety of methods to examine the design choices and usability of telehealth in the home services including patient surveys, staff observations, documented meetings, emails, descriptions of the technology solutions and interviews with ICT team members.

RESULTS: The perceived need for solutions to be simple to use in order to maximize access to telehealth services drove design decisions, device selection, and choice of applications. Implicit in this perception were assumptions that due to age related, cultural, cognition, and motivation issues an elderly patient cohort might not be able or willing to receive care by telehealth. Following clinical triaging 48% of the 241 rehabilitation patients were judged to be eligible to provide care via telehealth. Sixty-two percent of those eligible consented to receive telehealth care in their own home. Of those who did not consent seven considered involvement would be too stressful or difficult and six family members declined on the patient's behalf.

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To understand the digital technology competency of patients a Technology Familiarity Scale survey was undertaken which showed that on entry into care 50% of patients (n=51) had never used the internet to look for information and 31% had never used a banking ATM-machine.

Because many patients in this aged group did not have their own devices, computer or internet connection the loan of equipment to patients was considered the best way to maximize participation. Patients were provided with a fixed or mobile data internet connection for the duration of their treatment, configured by technical staff and installed by clinical staff on the first visit to the home. During this visit clinical staff trained patients in the use of the tablets and exercise monitors. Tablet devices were the preferred, lowest cost option for a simple to use, low cost patient hardware platform.

A survey of available tablets in the retail market was undertaken to assess the following; the accessibility of on/off power buttons, easy attachment of power connectors for people with limited dexterity, availability of good quality stands for the tablet, quality of the front facing camera, and usability of the interface or screen for people with poor eyesight.

Of available devices, the Apple iPad and Samsung Galaxy TAB 3 tablets provided most of the required features. It was intended to develop applications that would work on two major tablet platforms (Android and Apple IOS), but compatibility of both platforms with the required applications was a problem. Many applications were available for one platform only. While the hardware platform deployed was the Apple iPad, work continued to identify use cross-platform applications.

Selection of applications for use on tablets focused around compatibility with the Apple iPad, performance, functionality and ease of use. A detailed assessment undertaken of two video conferencing applications showed that they were would both be suitable for use. The assessment of usability for applications used a Likert scale from 1 to 5. Each aspect of the application was given an initial score of 5, with a demerit point applied for each issue found. Assessment included the number of steps to initiate call, simplicity of application, clarity of use, ease of navigation via the user interface, logical usability and ability to share applications.

Patient monitoring devices were assessed for ease of physical use and battery life. Some patients found the electronic scales difficult to use due to the raised feet and slippery glass surface. There was one occasion where a small child had stepped on to the edge of the scales which toppled over cracking the glass face. An activity monitoring device also failed to reliably monitor patients that moved slowly.

Following the completion of treatment patients were asked to respond to a System Usability Scale in which 72% (n=61) agreed that the system was easy to use. A survey of clinicians that conducted video conferencing sessions with patients found that clinicians considered that in 80.8% (n= 687) of sessions patients felt comfortable although some comments were received about patient still learning how to use the technology for instance "couldn't turn machine on, then volume had been switched off", and other usability issues.

Simplifying application and device usability for patients increased the configuration and support workload for ICT staff. Deployment tools such as the Apple Configurator utility have limitations in their ability to customize some applications and user groups. For instance users of activity monitors were logged out after a server upgrade to protect

against a security coding defect and each participant had to be contacted and visited to log them back into the monitoring application.

CONCLUSIONS: The take-up of a telehealth in the home service depended on a complex interaction between the design and configuration of the technology, the support available, maintenance of the technology and the pre-existing competences of users. Other studies have pointed to the role of carers, relatives and support persons in enabling use of technology. The design and configuration of "easy to use" solutions appears to have been successful if measured in terms of acceptability to the user, albeit at the cost of additional complexity to the telehealth service provider. The importance of building holistic solutions based on good design, configuration management and support should not be underestimated. However further research is required to understand how the threshold for "ease of use" varies between groups of users. This changes over time and is influenced by the scaffolding of support structures around users, and the degree to which users adapt the technologies to their own needs. ■

Tele-education in the universalization of public policies in oral health in Brazil

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INTRODUCTION: The search for the reduction of caries incidence, despite having experienced a decline in recent decades, is still a goal to be achieved in our country. The Atraumatic Restorative Treatment (ART) proposed by the World Health Organization (WHO) in 1994, is an excellent alternative to control and reduce the incidence of caries. Although contemplated in Primary Care notebooks in Brazilian public health system and indicated by the Secretariats and Coordination of Oral Health for wide use in public health, it is not described in the scientific literature that oral health professionals that works in public health services value their sedimentation. One of the main reasons pointed out is the lack of knowledge of protocol, since there is weak approach in undergraduate curricula. From ignorance, dental professionals do not believe it is a definitive procedure indicated for treatment of caries but a palliative and temporary treatment. Another issue is the lack of training and technical training limiting the expected results, leading to technical failures.

Objective:Promote, through Telehealth Brazil, training in ART, in different regions, to dental professionals working in public and private in order to demystify and bring the light of the science for effectiveness in caries control.

METHODS: A training course in Atraumatic Restorative Treatment (ART) protocol recommended by the World Health Organization (WHO) with attested effectiveness in reducing and controlling dental caries, was offered the whole country through Rio de Janeiro UERJ Telehealth Center - Brazil. The 10 modules that make up the course totaling 15 hours class in Distance Education (EAD). The modules comprised lectures, didactic videos and background material for further reading. The modules of the contents were based on scientific evidence and references covering the systematic reviews and meta-analyzes as much as possible. Evaluations are carried out by relevant issues to the modules and sent students how measurement method apprehended content. Modules emphasize from the epidemiological, social and demographic context of caries to the description and discussion of the protocol, its applicability, indications and limitations in clinical situations. Based content are addressed in the updated results of the international scientific literature.

RESULTS: Distributed in distinct regions among Brazil, so far 450 dentists took the Atraumatic restorative Treatment (ART) training course. There was no dropout among students. All of them completed the ten modules proposed in the training course. There were no reports of difficulty in attending the course, as well as in understanding the functioning of telehealth platform. Their evaluations were positive for eHealth strategies, being certified by the College of UERJ Dentistry in relation to training (15 hours tuition) in question. For future research, a questionnaire measuring demographic issues, perceptions and attitudes toward ART are being conducted by the author at this moment.

CONCLUSIONS: The telemedicine and telehealth tool contributes favorably to training professionals and sedimenta-

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tion of public health policies leading to a universal health coverage in public health. The impact in dentistry, especially in public health, can be perceived in motivating professionals to act in such health policy, since they know the protocol fund and start to use it. For communities treated with ART, the impact is the democratization of access to health and sustainability, since ART is aimed at reducing and halting the advance of caries disease. Training in Atraumatic Restorative Treatment (ART) allows this public policy for oral health to be implemented in the Health Units and the Family Health Strategy that its beneficial effects are achieved to the population, approaching us from the goals proposed by the World Health Organization health regarding the reduction of dental caries, particularly in developing countries. From this experience, the authors hope to develop the necessary expertise to provide training to all dental professionals who work in public health using the Tele-education in the democratization of access to science throughout the country, even in places of difficult access in certain regions of Brazil. ■

Tele-education in the training of technical professionals of oral health teams in public health: a pilot study

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INTRODUCTION: The preventive approach and health promotion aimed at comprehensive care and equity in public health has been a major goal. However, the training of professionals and technicians need updates to adapt to the new model and acting against the dynamism of assistance from the scientific development, vis a vis the inclusion of Oral Health Team in the Family Health Strategy. The travel professionals for technical improvement in classroom courses becomes costly and impacts the routine of health services. For the professional, it is difficult to membership due to displacement and to the manager of the service suspension of difficulty and routine health unit in order to release the professional to conduct refresher courses. Distance education is in a teaching methodology that allows for continuing education and viable tool, especially for application in public health services.

Objectives: The experience gained in Rio de Janeiro Telehealth Center / UERJ describes a pilot project for use in health departments for the training of Technical Professional Oral Health (TSB) to serve a broad and resolute way in public health, both in Primary Care Strategy Health as Family Health Units in the Unified Health System (SUS).

METHODS: This work originated from a pilot project at the Faculty of UERJ Dentistry in partnership with the Oral Health Unit of the Municipal Health and Civil Defense of Rio de Janeiro (SMSDC / RJ), where 10 Auxiliaries in Oral Health participated in a training course to become an Oral Health Technician with 600 horas class, contained in 10 acclimatised modules in Telehealth UERJ platform. The course was structured with classes, scientific discussion forum and further reading on eHealth distributed in 10 modules. The end of each module students participated in an evaluation. The course was offered for technical professionals in dentistry that operate in the Unified Health System (SUS). We selected 10 tutors, dentists who worked in the same Health Unit that the students. Tutors received guidance on mentoring co bodily functions and the form of guidance. Assessments carried out by tutors were standardized through mentoring records, which contemplated daily activities carried out by assistants. In addition to the evaluations, the tutors helped the students on questions and performing the tasks.

RESULTS: At the end of the course, students received technical certification to act as an Oral Health Technician and were automatically promoted within the health unit, resulting in new salary range and titles recognized by the UERJ and the Federal Council of Dentistry. As a result, professionals proved to be motivated and committed to the service. It was noticeable appreciation of the work and increased self-esteem in these technical professionals. In mentoring, it was greater interaction between dentists professionals, reducing the gap between professionals and assistants. In addition to the professional recognize the competence of the technical professional and not under-utilizes it, it was noticed better labor relations team after the lived experience. The Auxiliaries in Oral Health had excellent performance evaluated through scientific discussion forums on the platform and tests applied in person meetings. This can be

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attributed to the dedication of the same due to motivation and engagement, coupled with the fact the partnership tutors. There was no withdrawal. Tutors (dentists) reported excellent participation of auxiliary professionals in their evaluation sheets.

CONCLUSIONS: On the reports of the students (Auxiliaries in Oral Health) and tutors (Dentists) allies to the results obtained in the evaluations, it can be inferred that the professional training pilot project in Technical Oral Health using the Distance Learning tool through Rio de Janeiro Telehealth Center / UERJ was successful. The immediate impact on public health stands out, with evidence for improvement in the network of Primary Care, Family Health Strategy and other public spheres. From experience, we can implement Tele-education as a tool for training and updating professionals working in public health in various spheres, municipal, state and federal due to the lack of physical impediment and barrier to bring knowledge to hard to reach places. For the health service manager, the advantage is noticeable while the technician does not need to move to realization of professional training course, what seems to have a negative impact because of its absence in the service routine. And for the technical professional motivation seems to be the big advantage from the appreciation of his work and change of professional category with curriculum improvement. ■

Telemedicine from the Apps: Example of an Semiology Application

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INTRODUCTION: There has been an exponential growth in the use of portable devices such as smartphones and tablets, and it's increasingly common to use applications developed for such devices, especially medical software's. One of the available operating systems on mobile devices that provide access to these applications is Android, which is free and open source, allowing easy access for users and developers. In medical graduation ambulatory practices, consulting bibliographies is often necessary, in view of the large amount of information and details relating to a medical appointment. Applications installed in portable electronic devices may enhance the medical consultation, ensuring practicality, dynamism and objectivity in obtaining quick on-time information, helping students and health professionals making decisions. We aim to describe the possibility of knowledge of students and users of the application on new technologies to support learning and the creation of a medical semiology application for mobile devices at the Federal University of Ouro Preto (UFOP) and its stages: routing contents of Medical Semiology, project design, creating an Android application, providing it in Google Play.

METHODS: The construction of the application was conducted in two stages. An extensive literature review of Medical Semiology, followed by workshops between teachers, doctors and monitors of the project for the production of the theoretical part of the tool was first made. The resulting content then was scripted and then the design was carried out to build the application, seeking easy navigation and quick access to information and use of multimedia resources. The software was built using development tools of the Android system, each of them free and open access. After creating the application, it was offered freely at Google Play online store of applications.

RESULTS: The app was used for education with facility of access to the referenced material in outpatient activities. We measured theachievement of students and doctors in Brazil through Android store metrics, with more than 6,000 downloads from all over the country in the period of December 2014 to March 2015. The users rated the application as useful, easy access and good content. The rating on Google Play reached an average score of 4.5 out of 5 for the quality of the tool.

CONCLUSIONS: The project was pioneer in UFOP School of Medicine. From the large number of downloads in a short period of availability of the software as well as the positive evaluation in the Play Store, it is noticeable that tools for tele-education through mobile devices are well received by users. Version 2.0 of the tool will be built in order to improve the content and navigability, with inclusion of the health content related to childhood, neonatology, and expansion of multimedia features. ■

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eHealth League of PucRS: An Interdisciplinary Experience in Undergraduation

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INTRODUCTION: Advances in Information and communications technology (ICT) have been enabling new and faster ways for data transmission. Together with the intrinsic need for trading information in healthcare services - about a patient, the logistics involved in the medical care, or new information about a disease - using those technologies has proving to be a promising way to overcome existing difficulties in communication and access to information in the many levels of healthcare. This application of telecommunication resources to healthcare needs is what characterizes Telehealth.

The difficulties in access - to professionals or to basic information in health - plus the recent mass popularization of ICT are turning Telehealth a promising mean to boost the development of all levels of healthcare by integrating professional, students and patients. In this context, gathering students interested both in better understand the area and to participate actively in this development process, it was created the Telehealth League of PUCRS (LITESA), a group of interest for undergraduation.

The main objectivesof this work are to prepare academically and professionally the participating students in order to improve the existing healthcare treatment models, allowing them to participate actively in this process.

METHODS: Founded in december 2007 inside the eHealth Laboratory of Microgravity Centre of PUCRS (MicroG), supported by PUCRS' School of Medicine, LITESA had as its first challenge the theoretical and practical studies in eHealth. To officially establish it, a statute was written including all the rights and duties of each member in the group, and defining the availability of the physical and virtual area inside eHealth Laboratory as its head office. Besides that, the league has received support from many other academic units of the university for knowledge spreading and development projects. LITESA has established some guidelines for its members in order to define the general operation of the group, guided by its advisor professors, covering research conduction, bimonthly meetings with students presentation, event participation, development of eHealth tools - and the training to use it -, lecture organization, Telehealth missions and webclasses with brazilian and foreigner institutions for clinical case, projects and activities discussion. All the accomplished events were approved by the participating colleges, including the School of Medicine, São Lucas Hospital and the Technologic Park of PUCRS (TECNOPUC).

About the administrative structure, Telehealth League is composed by a Direction which organize the activities, and a General Assembly, formed by all league members that resolve, in last instance, abou topics of interest of the group. Moreover LITESA can count on a guidance from a faculty formed by professors of diverse areas of expertise inside eHealth.

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Telehealth League widely uses internet resources, as SkypeTM and Adobe® ConnectTM videocall systems, the cloud storage system Google Drive™ and the presentation tool Prezi™.

RESULTS: LITESA already worked on teledermatology, teleodontology and telecardiology, in the project Missão Xingu/2008 performed by MicroG, in which was validated a software developed for these. Also, organized multipoint videoconference lectures for clinical case discussion, principles of Image Diagnostic and other themes relevant for health professionals. One of the lecture series was done in partnership with european universities: Kaunas University of Medicine (Lithuania), Plymouth University (England), Aachen University (Germany) and the Medical University of Warsaw (Poland). A recent international lecture series done with eHealth Laboratory's support was about the United Kingdom's National Health System, the Schools of Medicine of Warwick and Barts and the London and the work done in MicroG by the students of those universities.

LITESA has participated in many events, among them the international congress Med-e-Tel in Luxembourg - winning, in 2008, best student presentation prize in "ISfTeH Student's Videoconference Session"- and national events as the Brazilian Telemedicine and Telehealth Congress. The league has also participated in science and technology popularization events, as the "8th Spring of Museums" in the Science and Technology Museum of PUCRS, presenting about history and applications of telemedicine in the outer-space environment.

Most of the recent league activities are based on eHealth studies, whereby is possible to act in many ways: mHealth, designing a mobile software to find healthcare services near the user using the GPS; eLearning, by an Surgery-applied Anatomy using video and online tools, and a series of webclasses by videoconference, and lectures by local professionals involved in Telehealth solutions; eHealth Missions for remote assistance to faraway communities' health units and the validation of instruments for this purpose.

Members of LITESA also participate in research projects in Telemedicine and eHealth Studies under the Extension and Activities Management in Continuing Education of PUCRS (PEGA), among them: the development of an Online Tool for Pharmacological Interactions, and the article review about telemedicine in commercial flights. Furthermore, the group meet twice a month in seminars to discuss important topics in eHealth, from which were arranged workshops and lectures to students in the Aeronautic Sciences, Pharmacy, Medicine and other Colleges.

CONCLUSIONS: eHealth is a wide field of study, which allows to integrate different areas of expertise, apart if they're directly related to health, for instance Information Technology, Engineering, Aeronautical Sciences and Administration. The work done by LITESA until now allowed the students to develop integration skills by approaching diverse areas of knowledge. So, we believe the Telehealth League is a long-term work which has the potential to:

1) provide a better understanding of the impact of the ITC integration to improve the processes in healthcare;

2) prepare its members to operate in their future jobs;

3) give the opportunity to, in short-term, participate actively in projects which aims to improve the healthcare systems already in operation. ■

Telehealth as a tutorial tool in Medical Residency Program in Otorhinolaryngology University Hospital Onofre Lopes - UFRN

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INTRODUCTION: The Brazilian Telehealth Network Program created in 2007 is a national action which seeks to improve the quality of service and primary care in the Unified Health System (UHS), integrating teaching and service through information technology tools, which offered conditions to promote Telecare and Tele-education. Partnership between the Ministry of Health and Ministry of Science, Technology and Education. In 2011, Decree No. 2,546 redefines and expands the Brazilian telehealth program, which is now called the National Brazilian Telehealth Networks. The ordinance establishes the operating structure and rules to be adopted for telehealth actions under the UHS, provides the incorporation of institutions that will promote the teleconsulting and remote diagnostics services. The Federal University of Rio Grande do Norte (FURN) participates in the Center for Telehealth Scientific Technician, responsible for the formulation of teleconsultation, telediagnosis, tele-education and formative second opinion, composed of a team with teleconsultants and clinical staff reference experts conforming to the identified locoregional needs and in line with the priorities of national health policy. This paper aims to describe the way in which Teleconsulting and Telehealth have been used in activities and training of Otorhinolaryngology Residency at the University Hospital Onofre Lopes (UHOL) and declare no conflicts of interest.

METHODS: The UHOL/FURN medical residency of otorhinolaringology plays part of their clinical activities at UHS clinics in Universal System Verbotonal of Guberina Hearing (USVGH). Each week the resident doctors see patients of ENT diseases. Through anamnesis, physical examination and complementary exams is possible to formulate diagnostic hypotheses and schedule appropriate propedeutics for the patients. Cases requiring further enlightenment are discussed online through Telehealth with the teacher / tutor.

At the doctor's USVGH is available a computer equipped with speaker, microphone and complete video system. During the appointment, is possible to present the patient clinical history and examination to the preceptors through the Telehealth Platform by videoconference. This communication channel allows the exchange of information and experience on the case, building the propedeutics for patients. Secrecy, confidentiality and privacy of information generated by telehealth practices and medical practice were guaranteed.

RESULTS: During the intervention period, between 2013 and 2014, 30 patients were treated weekly. Videoconferencing allowed the discussion of 70 cases with distance preceptorship, 65 of them had their treatment plans established. Five patients had to be referred to the UHOL service for further investigation. The most discussed topics were ear infections (chronic otitis media, acute otitis media and external otitis), neonatal hearing screening, vertigo, tinnitus, hearing loss and differential diagnoses.

CONCLUSIONS: The telehealth and telemedicine have enabled the extension of activities in the Otorhinolaryngology residence of FURN. Preceptors and residents have the opportunity to simultaneously discuss themes and cases during the medical appointment through the Internet, safely. The patient has the possibility to have its problem solved more quickly. ■

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Mobile Application on Dentistry for Life Cycles directed to SUS professionals and Dental Students: the experience of UNA-SUS/UFMA

Ana Emília Figueiredo de Oliveira[1]; Rômulo Martins França; Fernanda Ferreira Lopes; Elza Bernardes Ferreira; Judith Rafaelle Oliveira Pinho

INTRODUCTION: E-learning is considered nowadays a promising educational modality that might improve teaching - learning relationship and also students' participation in content and educational objects construction. E-learning offers flexibility and affordability, characteristics that enable a greater number of individuals to access education. Brazilian government has been investing in this modality to provide permanent education for professionals linked to public health care network. An evidence of this investment is the Open University of Brazilian National Health System (UNA-SUS), an e-learning institution that offers free postgraduate courses, contributing for the training and development of health professionals. Especially in the oral health context it is noticed the need to employ technologies in order to help professionals to understand and reproduce, with a greater ease, information regarding basic oral care instructions and the presentation of hygiene habits. To address this demand, the institution developed applications for mobile devices to provide educational content about oral health to their students. This paper intends to present the experience of UNA-SUS/UFMA in the construction and provision of free applications for mobile devices in which the material about Dentistry for Life Cycles – childhood, adolescence, man and woman adulthood, and aging – is made available.

METHODS: The applications created by UNA-SUS/UFMA are built based on Theory of Multimedia Learning and on Responsive Web Design techniques (RWD). The institution counts on three teams to create the applications: the Instructional Design (ID), the Design and the Information Technology Center (ITC). The applications are developed in HTML5 (HyperText Markup Language 5) CSS3 (Cascading Style Sheets 3) and JavaScript. Detailed information will be provided about the construction process of the applications for mobile devices presented in this paper, including the organizational structure of teams involved in this process, the technology applied and the strategy employed to make the applications available. The advantages and weaknesses in the experience of UNA-SUS/UFMA will also be pointed, in order to permit not only the reproduction of the model used by the institution but also its improvement.

RESULTS: As the applications are free it is difficult to control who is installing and accessing it, but it is possible to notice the positive reception of the Dentistry Applications by the number of downloads, that is currently around 2000, since they were made available, from September to December 2014.

CONCLUSIONS: The applications for mobile devices presented in this paper are used as a tool in the practice of continuing health education and represent a plausible alternative for the development of educational practices this Distance Education modality, the e-learning. Through these applications, it was possible to provide content to be

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accessed in various mobile devices, whenever and wherever users prefer to do so. This is because such applications require only one internet access to be installed. After that, textual content and all multimedia resources become accessible even if mobile devices are operating without internet connection. This way, individuals with connection problems do not lose the opportunity to participate in educational programs at distance. By using the applications presented in this paper, Brazilian health professionals and Dentistry students can continue their studies, expand their knowledge in oral health and improve their practices, overcoming setbacks such as lack of time and compatibility with the devices used to access educational materials. ■

SAITE STORE: Mobile Platform for Learning Objects as a Support Tool on e-learning Courses

Ana Emília Figueiredo de Oliveira[1]; Eurides Florindo de Castro Júnior[2]; Rômulo Martins França[3]; Dilson José Lins Rabelo Júnior[4]; Francisco Gregório Almeida Silva[5]

INTRODUCTION: UNA-SUS/UFMA, located at Maranhão - Brazil, offers to health care professionals multiple post-graduate open courses, on the virtual learning environment Moodle. The content of the courses are distributed as learning objects in form of digital books. The possibility of facilitating the access of the student to the content of the courses through mobile applications attracted the UNA-SUS\UFMA.

However, to develop mobile friendly applications is not a simple task, because there is not standardization on screen size, hardware, operating system, among others characteristics. Each operating system has shown particularities on programming and publishing, what affected directly on the production time and maintenance of these applications.

In order to solve these problems, UNA-SUS/UFMA projected a mobile platform, the SAITE STORE (Learning and Information System of Technology and Education), which could gather the digital books in one place. The main requirements to this platform are: Standardize the development of theses digital books; Simplify the search of the digital books; Navigation simple and intuitive; Responsive Design to ensure accessibility; Offline access of the content.

METHODS: The multidisciplinary teams in charge of the project of SAITE STORE are composed of three groups: ID (Instructional Design), Graphic Design and ITC (Information Technology Center). The ID team develops educational planning and instructional design of content produced by Professors; the Graphic Design team produces the graphical part of the digital book, like icons, images, graphics, color palette and others; and ITC is responsible for developing the digital book in the form of applications for mobile devices, and the management of the LMS - Learning Management System.

These teams collective experience on developing digital books provided important insights on what features were adequate or not to these mobile applications, guiding the development of SAITE STORE based on these collected requirements.

To unify technology used on the development of the books, HTML5, CSS3 and JavaScript were the languages chosen as base to the new platform. The decision to use these languages is due to the fact that they are highly adopted and popular among web site developers, because of their simple structure and the compatibility with web browsers like Chrome, Firefox, Safari and Internet explorer.

The platform provides tools to help in the development and publishing of the digital books, file management of its multimedia content and also in the registration and management of metadatas for the books.

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The file management aim to prevent problems on the mobile systems by: not allowing special characters on the name of the files which could potentially impair its presentation; treating images to keep them in a consistent resolution and file size to the mobile system where it will be presented; and checking to ensure that the files have not been corrupted, both in their download as in the device memory.

The books, representing course modules, are published through a web service listing all books available for download. The book metadata also is made available through such web service to inform the students about its content, size, icon, and course. The book metadata also assists the platform SAITE STORE to download, store and manage the books in the student library.

RESULTS: The application developed allows access through several types of devices in order to minimize possible interference in the learning process caused by difficulties in accessing the content. Through the virtual store specific of operating systems *iOS* and *Android*, the applications became available to be accessed and installed on the mobile devices without need of previous register on a course.

The platform in charge of dealing with the particularities of each system significantly simplified development and maintenance of virtual books. All the applications that were published individually now can be accessed through SAITE STORE where it can be organized through module or course. The student can manage the books through the platform interface. Once a book is downloaded the student can access its content offline wherever and whenever it is needed, with the exception of videos which require internet access to be streamed.

CONCLUSIONS: The SAITE STORE is a great tool to help the students of e-learning courses to maintain a regular schedule of their studies in places where internet is limited and mobile devices are most likely to be used than computers.

The time to create and publish the books was reduced with the new platform. Therefore, the teams could focus on creating more learning objects or improve the ones that already exist.

As future work, it is planned to migrate all previous applications of the UNA-SUS/UFMA in the virtual stores to this new platform. A detailed study on the impact of those books on the courses will also be conducted with the students. A collaborative authoring tool to this platform is planned to offer a more dynamic and interactive way to create the digital books. ■

Inside your mind: action cameras on neurosurgery study

Ana Silvia Sartori Barraviera Seabra Ferreira[1]; Roberto Bezerra Vital[2]; Marco Antônio Zanini[3]; Denise de Cassia Moreira Zornoff[4]

INTRODUCTION: Videos are recognized by their power and great flexibility as teaching tools. Studies about using videos in medical education defend its association with innovation, emotional impact, entertainment, self evaluation, and skills acquisition. However, the expansion of video use at health education can be inhibited by requirements of infrastructure, cost of equipments and lack of human resources. The new generation of camcorders, called action cameras, could be alternatives to those restrictions, because could offer autonomy and simplicity to produce educational videos. Ease to use and with low cost, these cameras capture images in first person point of view (POV), allowing innovative and creative filmages. Our work presents the experience of using action cameras in a surgical center, specifically in neurosurgical procedures, allowing visualization in real time and post surgical discussions (clinical rounds) by neurosurgeons, neurosurgery residents and medical interns.

METHODS: Since January 2015 we have been using two action cameras GoPro Hero 3+ Black Edition in neurosurgical procedures, both skull and spine surgeries, in the Botucatu Medical School Clinical Hospital (FMB), UNESP.

RESULTS: Neurosurgery residents, along with the lead surgeon responsible for the procedure, make a previous analysis of the weekly procedures, choosing interesting or uncommon scheduled surgeries. The surgical procedure choice is made by consensus, involving professors and neurosurgeons of the Neurology, Psychiatry and Psychology department, accompanied by the residents and interns. After choosing the procedures, the department responsible for the maintenance of the action cameras are notified of the weekly schedule to prepare and charge the cameras. On the day before the patients are asked for the permission of footage and documentation of the procedures, signing a free and clarified consent term. During the surgical procedures one resident use one camera on a headband strap to POV recording and the other camera are positioned in a surgical light focus or a tripod, for wide room footage allowing analysis of the staff and resident positioning and later for example. One other resident or intern follow the cameras by a tablet (Apple Ipad), outside the surgical field, for proper camera positioning and battery or memory checks. The surgical procedures had lengths from 2 to 8 hours long. After the procedure the videos and pictures are edited with Apple's Final Cut Pro X (Version 10.1.3) and stored on a cloud server, like dropbox or google drive, sharing throughout all professionals involved for further analysis. All edited videos are presented on the monday Grand Rounds and discussed looking for technical nuances and possible mistakes during surgery (like aneurysm intraoperative bleedings) allowing future better surgical planning.

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CONCLUSIONS: This report presents a solution that allows autonomy to health professionals in the creation of educational materials of great importance to health education. In addition, the image capture in real time allows a greater number of students and health professionals follow the procedures performed without greater exposure of the surgical field or need to interrupt the procedure, minimizing the risks that infection or increased surgical time can bringing the patient. The ease of use of cameras for capturing and editing videos has reduced the need for specialized technical support and an infrastructure with high-cost resources. The action cameras proved to be efficient for the development of educational materials in neurosurgery, allowing documentation for complex cases and low occurrence in the hospital. This stock photos enable visualization techniques by future teams of residents and students, and can serve as an example for other educational institutions. ■

Experience of Tele-education in the tele-health center in Hospital of Federal University of Maranhão

Ariane Cristina Ferreira Bernardes[1]; Humberto Oliveira Serra[2]; Jessica Serrão Amaral[3]; Iara Beatriz Amorim de Noronha[4]

INTRODUCTION: Tele-education is a way of teaching that enables learning, with human mediation of systematically organized didactic resources, presented in different sources of information and broadcast by various media. The use of tele-education in the National Telehealth Program Brazil Network plays a key role in health care at the time that gives the professional a new concept of education and care, thus ensuring the exchange of knowledge between educational institutions and workers.In April 2014 began the deployment of telehealth points in Basic Health Units and initiated the Telecare actions in the municipalities. The Tele-health Center of the University Hospital of the Federal University of Maranhão offer tele-education, through Web Lectures, web conferencing mode which is characterized as a meeting or virtual meeting conducted by internet using applications or service presentations sharing possibility, voice, video, text and web files. The themes are in line with the demands of health teams linked to the telehealth center or the appointment of a consultant in order that are appropriate to local needs of health professionals. This study aims to report the experience of tele-education service through the Web Lectures, of Telehealth Center of the Federal University of Maranhão, São Luís (Brazil).

METHODS: This is a descriptive study, the case report type from the experience in Tele-Education of Telehealth Center of the University Hospital of the Federal University of Maranhão. The data are from the database provided by the Telehealth Program Brazil networks from February to June 2015.

RESULTS: The Tele-health Center of the University Hospital intensified activities of tele-education, through Web Lectures since February 2015. Web Lectures are held once a week and is aimed at Primary Health, Mental Health and the implementation of e-SUS/AB. By June 2015, we held 30 Web Lectures with the participation of 11 states and more than 2550 professionals connected on 594 points. Setting a fixed schedule of Web Lectures, organized by topics of interest to health professionals of Primary health care, always at the same time and on the same day of the week, allows the inclusion of this activity into the routine of the teams as a habit. In addition, recordings of Web Lectures are accessible on the site of the University Hospital Telehealth Center to be assisted at any time. The Web Lectures last on average 30 minutes and are subsidized by multimedia features, followed by chat to answer questions. For these meetings, they were invited experts in the area of direct core staff as guests, responding to questions from participants.

CONCLUSIONS: It concludes that the telehealth University Hospital Telehealth Center of the Federal University of Maranhão obtained positive results. The offered Web Lectures were well accepted by health professionals, with the effective participation and interaction collaborating on improving the quality of the primary care in the Unified Health System, integrating teaching and service through the use of information technology tools. ■

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The Proposed eHealth Policy/ Roadmap for Nigeria - The Armed Forces of Nigeria Tagged Defence eHealth Implementation Plan (DeHIP)

Ayotunde Joseph Ade-Agbo Owosho[1]; I. Ajigbon

INTRODUCTION: Owing to the niche created by the absence of an effective and adoptable policy/roadmap on eHealth in the Nigerian National Healthcare system, there are incoherent implementation and slow takeoff of Telemedicine and eHealth related programs and activities in the country. This necessitated a call for the proposed policy for eHealth and Telemedicine herein; which is hoped to be adopted by the Armed Forces of Nigeria-AFN to fill this void. The AFN being a decentralized arm of the government upon successful implementation of the policy, is expected to extend nationally to its sister federal and state medical facilities mutually allowing for the creation of a roadmap which would be central and nationalized for its SoP. Furthermore, the country's recent step in the launch of remote sensing and communication satellites has necessitated for the initiation of a pilot project to implement Telemedicine and eHealth in Nigeria. These incoherent developments in this regard have called for a need to adopt an eHealth policy for regulatory issues and monitoring purposes.

METHODS: 1- Comparative analysis of past experiences on existing programs/activities in the country on eHealth as well as other health policies. These were duly considered and subject to present experiences faced naturally with ongoing pilot projects as the case may be in relation with trend analysis. ie, old, present and post (future). 2- Provision of training of medical man power as well as the upgrade of facilities to compliment the pockets of Telemedicine and eHealth activities of the country. 3- Generate, adopt and implement an eHealth policy to aid the standardization, monitoring and evaluation of a safe and economic practice of Telehealth applicable to a developing country.

To this end, the framework will address policy concerns along eight thematic areas of the eHealth ecosystem namely:

- ICT Infrastructure – guidelines for the distribution of internet connectivity to Health facilities, computer hardware requirements and software specifications.
- Data Management and Confidentiality – policy statements guiding information storage and exchange by users to ensure confidentiality of sensitive health information.
- Services and Applications – guidelines on the various eHealth tools and services to be deployed and the minimum standards and specifications.
- Standards and Interoperability – guidelines to ensure that the military eHealth programme interoperates with other eHealth platforms within the military and beyond.
- Workforce – guidelines for the users of the programme and how to build their capacity.
- Funding and Investments – guidelines on necessary funding and mechanisms to ensure sustainability of the programme.

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• Legislation and Compliance – policies that will ensure appropriate legal provisions to preserve the programme; and

• Governance – policies defining the operations of the governance mechanism that will run the military eHealth programme.

RESULTS: A decentralized yet flexible and dynamic eHealth policy toolkit for the armed forces of Nigeria tagged Defence eHealth Implementation Plan – DeHIP. It will be an adaptable, efficient and cost effective roadmap plan for the implementation of Telemedicine & eHealth policy establishment to aid the AFN healthcare SoPs. The strategy approach would comprise of:

- eHealth Foundations

- eHealth Solutions

- Change and Adoption

- eHealth Governance

This would enable DeHIP provide universal access to quality health services by bridging existing gaps to basic health services between rural and urban areas using telemedicine and eHealth tools so as to;

i) Enhance free access to health information of public health significance and nurture an enlightened AFN populace to take charge of their health conditions;

ii) Stimulate rapid socioeconomic development within the Armed Forces by upgrading and optimizing existing ICT infrastructure with attendant impact on other sectors;

iii) Provide eLearning opportunities to build capacity for the health work-force; and

iv) Increase skills and expertise of the healthcare providers.

CONCLUSIONS: With the advent of Space Technology which has been a last mile solution for most of the world's long standing challenges especially in the communications and health sector, the health sector has taken tremendous advantage to this fit. It is apparent therefore, that the use of MTVs is not just only going to be very beneficiary to the efficient healthcare delivery of troops as an immediate response to both natural and manmade disasters in the battle theater, but would also proactively aid in intelligence gathering via its GIS capabilities. Hence, the implementation of a Telemedicine and eHealth technology system will impact immensely to the general well being of the Nigerian troop and citizenry. As such, the Medical Outfit of the Armed Forces of Nigeria especially the Nigerian Army Medical Corps-NAMC with relevant arms like the Defence Space Agency-DSA are saddled with the responsibility of fostering and implementing an effective eHealth policy to aid and guide the practice of Telemedicine & eHealth in Nigeria & its operational African Sub Region and in essence benefiting from the Telehealth for Universal Health Coverage initiative. ■

Applications in Distance Education: The Use of Technology in a Multidiscliplinar Nephrology Course

Christiana Leal Salgado[1]; Patricia Maria Abreu Machado[2]; Maiara Monteiro Marques Castelo Branco[3]; Ana Emilia Figueiredo de Oliveira[4]; Natalino Salgado Filho[5]

INTRODUCTION: Distance Education (DE) has expanded worldwide in a quick and intense way, consolidating itself as an important way to promote qualification and professional training. Considering the advantages such as flexible hours and place of study, employers worldwide have opted to train and capacitate their employees through DE. The health sector is one that requires constant professional development to ensure quality in service delivery. In order to provide the needed training and qualification to employees of the Brazilian National Health System (SUS), the Open University of Brazilian National Health System (UNA-SUS), in partnership with the Federal University of Maranhão (UFMA), offers postgraduate and specialization courses in different health areas by the means of Distance Education (DE) and its tools, such as online books, forum discussions, specialized games and applications. One of the health areas that were contemplated in the creation and delivery of applications was Nephrology. This is because the complications related to kidney's health have become increasingly common and severe. In this work, we intend to report the experience of UNA-SUS/UFMA in the creation of applications developed with the contents of the Specialization Course in Multidisciplinary Nephrology, along with the entire development process of these applications and their relevance.

METHODS: The development of the applications "Nephro: Module I" and "Nephro: Module II", that have been applied to the Specialization Course in Multidisciplinary Nephrology offered by UNA-SUS, counted on multidisciplinary teams of UNA-SUS/UFMA, composed of three groups: ID (Instructional Design), Graphic Design and ITC (Information Technology Center). The ID team was responsible for developing educational planning and instructional design content produced by the professors; the team of Graphic Design produced the graphical part of the digital book, like icons, images, color palette; and the ITC team was responsible for developing the digital book in the form of applications for mobile devices, and also for managing the course through the LMS - Learning Management System, in this case, Moodle. To unify the technology used in developing the books, the languages chosen as the basis for the new platform were HTML5, CSS3 and JavaScript. The decision to use these languages was due to the facts that they are standardized by the W3C and popular websites developers because of its simple structure and compatibility with all web browsers. The file management also received special care in order to prevent problems in mobile systems such as the use of special characters in file names, treatment of images to keep them in a coherent resolution presented by the mobile systems and verification to ensure that the files have not been corrupted, both in its download and device storage itself. The developed applications allow access via various devices in order to minimize potential interference

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with the learning process caused by difficulties in accessing the content. Applications represent the course modules and are published and made available in the online stores of each mobile platform, *Android* and *IOS*, being available to be accessed and installed on mobile devices without the need for prior registration in the course. Once installed, the student can access the contents of this offline application, wherever and whenever needed, with the exception of videos that require Internet access to be transmitted.

RESULTS: The use of the applications proved to be a solution to help students of Distance Education (DE) courses to maintain a regular schedule of their studies in places where the internet is limited and mobile devices are more likely to be used than computers. Both applications tested were well accepted by the audience, which encouraged the team to continue the research in this area. With the experience in creating this application, the process for creating new applications was revised and optimized. Hence, teams can focus on creating more learning objects in mobile application format or improve existing ones.

CONCLUSIONS: The vast territorial field of the Brazilian state of Maranhão represents a challenge to the range of the Distance Education initiatives, as UNA-SUS/UFMA, since in remote regions the internet access is limited. There are several technologies used by mobile devices in order to enable transmitting and receiving data. It is also worth noting that in Brazil data transmission on mobile networks are still very expensive and limited. By being designed lightweight and allowing offline access to contents, these applications hereby presented not excessively consume these resources. Once installed, they allow learning anywhere without the requirement of internet connection. Therefore, there was a welcoming scenario for implementation of m-Learning initiatives in Brazil, especially in the North and Northeast regions, which historically are the poorest in the educational field, thus requiring all the innovation and improvement that can be offered. Thereby, the trial of this new technology using applications for mobile devices in digital book format represented the importance, effectiveness and, above all, the positive acceptance of professionals of such regions, taking into account the difficulties they face with internet access and eagerness for new and innovative opportunities for qualification. ■

Gamification in Distance Learning of Nephrology: The Experience of UNA-SUS/UFMA

Christiana Leal Salgado[1]; Patricia Maria Abreu Machado[2]; Ana Emilia Figueiredo de Oliveira[3]; Natalino Salgado Filho[4]; Raissa Bezerra Palhano[5]

INTRODUCTION: The educational context has undergone several changes, mainly due to transformations in the contemporary lifestyle and the growing technological progress, noticed by the worldwide spread of information and communication technologies (ICT), increasingly present and influential in our lives. This whole context establishes new conceptions of education, school and learning. Within this scenario, the Distance Learning (DL) is highlighted as a kind of education that thrives on technological advances and strong integration of human-computer and information systems. A successful case is the Brazilian initiative in promoting continuing education for the Brazilian National Health System (SUS) professionals. The Open University of Brazilian National Health System (UNA-SUS), in partnership with the Federal University of Maranhão (UFMA), is responsible for offering free specialization, improvement and extension courses, aiming to capacitate and qualify health workers in strategic areas of health care service. The institution's differential is the use of innovative mechanisms and educational tools, such as educational electronic games - designed to provide realistic and interactive study experiences - that stand out by offering a more dynamic, creative and fun way of learning. This work intends to present the UNA-SUS experience in the development and delivery of an educational game in the area of Nephrology.

METHODS: The game "Mr. John and risks for Chronic Kidney Disease" was designed to facilitate the content transmission of the Specialization Course in Multidisciplinary Nephrology offered by UNA-SUS\UFMA. The team responsible for creating it consisted of two programmers, two games designers and professional experts in the subject matter, nephrology. The genre chosen for the game was storytelling, following the model of comic books. The user takes an active role in the story, interacting with plot elements as quizzes and mini games, thus obtaining a greater involvement with the subject. The game creation process was divided into two stages: planning and development. The plot and a clinical case of the main character were generated with the help and supervision of experts in nephrology. With this plot, the designers created the storyboard of the game, describing the context and setting of the history involved. All the scenes were previously planned and inserted in this storyboard. The game was implemented using Unity3D graphics engine that allows this implement in a simple and quick way to multiple platforms. The game follows a linear story that describes the situation of Mr. John that, when accompanying his brother to the hospital for a routine visit, turns out to feel sick. Then, he needs to undergo a series of tests to ascertain his condition. With this plot, it was possible to include in the game several situations health professionals routinely face in their work environment, therefore providing a much greater involvement in the game. The appearance of the game follows the structure of

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comic books, presenting a series of small frames containing situations for the development of the story. Each frame of the story consists of a combination of the following elements: characters, setting and speech balloons, animations, quizzes and mini games. Navigation between frames is unidirectional, from left to right. After each frame, the game automatically advances to the next with a smooth transition animation as if the player's eyes were going through the comic book page. The speech balloons are used both to tell the story of the game as to present the tutorial. They are always presented in the same region of the screen to optimize space and familiarize the player to the game mechanics. The story is told in a narrative in the third person. The player is responsible for moving forward with the balloons by clicking the button labeled for this.

RESULTS: The educational game hereby presented is a facilitator of the learning process by stimulating cognitive, psychomotor relations and student socialization capacity, besides awakening motivation, curiosity and interest to learn. The mini games used into "Mr. John and risks for Chronic Kidney Disease" game were responsible for promoting more interactivity to the player and provide challenges involving the application of knowledge in simulated situations. The quizzes, in turn, were intended to be an exercise to fix the content learned, which helps the learning process. The experience in the creation of the abovementioned game served to understand that games are tools that provide a constant state of insecurity, in which the student may be surprised at any time and has to learn how to deal with the new situations imposed. Hence, to continue playing, learning is required. This proves that this kind of instrument is effective in promoting learning. The use of this tool in Nephrology context represents an important option to train and prepare health professionals to deal with the complications related to Chronic Kidney Diseases, one of the major public health problems known worldwide. It is worth to notice that Nephrology is a field with a lack of specialized professionals in Brazil, which emphasizes the need for educational initiatives and tools as the one presented in this paper.

CONCLUSIONS: The use of ICT has expanded the role of Distance Learning to be a teaching model that suits contemporary society, where professionals have less time to attend a classroom. This modality is relevant since it allows the student to manage his own study schedule, regardless of the time he has or place where he is. The mediation of technologies through the use of electronic games as a tool for learning encourages students to devise new discoveries, besides serving as a pedagogical strategy. The game adds to the learning process recursion, multiple interferences, connections and trajectories, not limited to the dissemination of information and tasks entirely defined. UNA-SUS/UFMA developed the game "Mr. John and risks for CKD " to dynamically convey the content of the Specialization Course in Multidisciplinary Nephrology, facilitating students learning, exploring their curiosity, skills and interest to learn through a ludic tool. ■

Evaluation of Histotechnology Mode Distance Learning (Dl), for Graduation in Health

Erica Ripoll Hamer[1]; Andrea Monte Alto Costa[2]; Luis Cristovão de Moraes Sobrino Porto[3]

INTRODUCTION: The histotechnology applied in distance learning (DL), aims to promote understanding of histological methods used in histology laboratories of pathology and scientific research. This study aimed to evaluate the efficiency of histotechnology course for the degree in Health, the kind of education, distance learning (DL).

METHODS: Eight sequential modules were developed, each module lasting 27 minutes Module 1 - Understanding Biosafety; Module 2 - Collection and cleavage; Module 3 - Taxation and descaling; Module 4 - Histologic processing; Module 5 - Histological inclusion; Module 6 - Microtomy; Module 7 - Tissue Staining; Module 8 - Light Microscopy. At the conclusion of each module, a review exercise (quiz) the subject matter was formulated to fixation, being prerequisite to advance to the next module. To validate the course, it was presented to the vocational high school classes of FAETEC (6 students), graduate students in Medicine at UERJ (12 students), and Graduate students in Human Biology and Experimental / UERJ (6 students). Was evaluated: (i) Utilization of learning; (Ii) Clarity of concepts; (iii) Curriculum and content; (iv) EAD Dynamics and (v) Duration of the modules. To check the (i) use of the pre-test was applied before and post-test after the presentation of the course.

RESULTS: The result of the learning evaluation was useful according to the statistical test one-way ANOVA and Tukey's post-test which verified the existence of significant differences in student achievement in high school ($p < 0.01$) and graduation in medicine ($p < 0.001$) in pre and post-tests applied. The concepts obtained for (ii) clarity of concepts for High School 9.0; Graduation 10, Postgraduate 9.5; for (iii) and didactic content: 10 for all groups; (iv) dynamics of EAD: 9.0 for all groups; (V) Duration of the modules: High school 9.0; Undergraduate and graduate 10.

CONCLUSIONS: The kind of education, distance education, has been the subject in the media, as a facilitator of learning, with easy access, national and international reach, gratuity, freedom and flexibility of hours to study and may confer certification. In this study, the learning, the dynamics of education, didactics, contents and duration of the module shown conform to the object of this study, and with the approval of the students in all groups evaluated. The course could be available in Moodle platform of UERJ Telehealth Center, supporting Histology of discipline of degrees in Medicine and Dentistry, and as Histotechnology course for students of vocational course of FAETEC, issuing certification to successful students. We conclude that the distance learning method is efficient, achieving expected utilization for high school groups and graduation. ■

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The visibility and coverage of Primary Health Care videos posted by the nucleous of telehealth and telemedicine, Federal University of Rio Grande do Sul on Youtube between 2012 and 2014

Filipe Ribeiro Da Silva[1]; Diego Santos Madia[2]; Letícia Felipak dos Passos Martins[3]; Natássia S. da Cunha[4]; Roberto Nunes Umpierre[5]

INTRODUCTION: The changes occurred on the Internet, in mid 2000s, brought a new generation of sites and services online. This new generation, called Web 2.0, amplified the access of data online by users, making a greater interaction possible, as well as sharing and exchanging of contents. Different from traditional media, the Internet, inside the context of Web 2.0, allows the user to select the desired content and participate actively in the network. The participation happens, for example, through the creation of online profiles on relationships sites, blogs, flogs and vlogs, in which the user selects, shares and inserts content of interest.

Public institutions were also benefited from Web 2.0. Today, they can create their own profiles and pages on social media sites like Youtube®. The access to the target audience became easier and less expensive, as these profiles don't demand high investments. Therefore, the competition for audience from the public became greater. In Brazil, health institutions have been standing out in the use of online media to promote institutional actions and information. The use of Youtube® has also expanded into the distance education field as well as the promotion of health care campaigns, as in the case of *TelessaúdeRS*.

METHODS: The work is a quantitative research using a webometric approach, which is the science that studies the quantitative aspects on the World Wide Web based on infometric and bibliometric approaches. Historically, it focuses on hypertext links, number of pages online or registered on search mechanisms, the search of specific terms and the patterns of Web use. The research was carried out on the Youtube® site, a tool based on streaming technology that allows the visualization of videos via web, with the virtual address of www.youtube.com.br.

The extraction of data, done on the *TelessaúdeRS* ("TelehealthRS") channel on Youtube®, which aims for health education of Primary Health Care, took into account: most accessed topics, topics by professional categories and average length of each video. Firstly, all videos by *TelessaúdeRS* ("TelehealthRS") posted on Youtube® from January 2012 to December 2014 were listed on an Excel® table. Afterwards, only the videos that obeyed the following criteria were selected: a) over 300 views; b) themes related to Primary Health Care and c) length equal or superior to 4 minutes.

The research was done on 14/05/2015. To identify the target audience, the Brazilian Classification of Occupations (CBO) was used as reference, available on the link http://www.mtecbo.gov.br/cbosite/pages/home.jsf. For the selection of the themes of these videos, Descriptors in Health Sciences (DeCS) were used, from the Regional Medicine Library (BIREME), available on http://decs.bvs.br/.

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RESULTS: The search on the Youtube® channel totalized 137 videos. After the application of the criteria for selection, 45 videos remained, registering 90.278 views from 2012 to December 2014. Among these 45 videos, ten of them concentrate 56.837 views (59%). The total of views from the 35 videos remaining, correspond to 41%. The total time of exhibition of the 45 videos selected was of 244 minutes in length. The ten that reached most views summarized 64 minutes (26.22%) and the rest (73.78%). The result seems to indicate that the videos with shorter length have larger number of views.

The analysis of the number of views of the 45 videos, as well as the target audience shows that: the professionals that mostly access this material, according to CBO professions were: physicians (26.66%), nurses (20%), nursing technicians and assistants (10%), dental surgeons (10%) and community health workers (5%). Other professionals of Primary Health Care, nutritionists, physiotherapists and dental health workers, totalized 28.34% of views.

The topics with greatest number of views were: Unified Health System (SUS) (13%), Penetrating Injuries (13%), Prenatal Care (7.3%), Primary Health Care (5.6%), Community Health Workers (4.2%) and Tuberculosis (4.1%), remaining topics reached 52.8%.

The coverage of these videos were throughout most part of Brazil (98%), but there where views from others countries, such as: Portugal (0.5%), Bolivia (0.1%), USA (0.1%), Mexico (0.1%), Peru (0.1%) and Angola (0.1%), others totalized 1%.

CONCLUSIONS: The results of the research showed that Youtube®, the tool chosen by *TelessaúdeRS* ("TelehealthRS") to promote distance education, continuous education and also to propagate health campaigns, is a good channel of communication for health care. As in target audience, it was observed a good acceptance of the videos, especially by nurses and physicians. The results of this research, which can be used for the improvement of actions of the communication and tele-education teams from *TelessaúdeRS* ("TelehealthRS"), indicate that the actions of the streaming technology can be monitored by the institutions who publish them. ■

Teledermatology in the Academic Environment

Gustavo Guthmann Pesenatto[1]; Fábio Herrmann; Ana Luíza Fonseca Siqueira; Sérgio Antônio Curcio Celia; Thaís Russomano

INTRODUCTION: Telemedicine is based on health care at a distance, using information and telecommunication technologies to seek an additional opinion regarding a diagnosis. The use of telemedicine is proving to be increasingly important in Brazil in view of the continental dimensions of the country and its shortages in access to medical specialists in small towns and remote and poor areas. It allows an expert second opinion to be obtained and broadens the activities offered by local health teams, promoting improvements in the quality of services provided. Incorporating this into medical careers can be achieved through tele-education, which enables more professionals to learn about the tools offered by telemedicine and understand how they can be applied. To this end, it was sought to evaluate the integration of Tele-education into the academic formation of students of the School of Medicine at the Pontifical Catholic University of Rio Grande do Sul (PUCRS), through the provision of a dermatology service at its Family Health Unit (FHU).

Objective: This study aimed to report on the experience of the dermatology service at the FHU, in which the School of Medicine, PUCRS, conducts academic and assistance activities.

METHODS: Participation in the teleassistance service of the FHU of PUCRS was explored to raise interest in knowing more about techniques and processes related to the teaching of telemedicine. From this experience, it was possible to observe that software is used as a data collection tool when conducting teleassistance. This remains available for subsequent assessment by a professor, allowing them to evaluate the diagnostic hypothesis made and medical management of the consultation. All necessary materials are checked before commencement of the consultation: computer with installed software, network connection, camera and any resources for the physical exam. The students are then guided regarding the use of the telemedicine tool (login, user interface, software operation). Ethical issues linked to the use of telemedicine in patient care are also highlighted, which include: photographs that avoid patient identification, case privacy, secure storage and transmission of data, presence of a supervising physician on site, and patient consent for the use of these tools during the consultation. Throughout the explanation, great importance is attached to the complete collection of patient data (personal data, address, chief complaint, lesion type, medical history, habits and relevant observations) and its correct insertion into the software.

Assistance Protocol: After an initial explanation, students login to the program and call the patient. During the consultation, students explain how the consultation will be performed and collect patient data; one student is responsible for taking the patient medical history and the other for entering data onto the computer. Once the data collection

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phase is completed, the students ask the patient for permission to photograph the lesion and, if authorization is given, they take photographs of the lesion: one from a distance (for an overview and location) and one close-up (for more detail). After the conclusion of all data input into the program, the students make a diagnostic hypothesis and call the medical specialist (professor and dermatologist). The professor logs in to the software using his account details and evaluates the data entered by the students (simulating the situation of a remote medical specialist), confirming or not their diagnostic hypothesis. The professor gives guidance to the patient and, if necessary, a prescription. In addition, the professor provides feedback to students regarding the photograph quality, data collection and diagnostic hypothesis.

RESULTS: The practice of teaching teleassistance to PUCRS students has obtained positive results, giving them the opportunity to interact with telemedicine tools before entering the workplace. Undergraduate students participating in telemedicine classes acquire training in the area and, therefore, the initial skills required for the use of this technology. In a learning experience, students become familiar with the information technology resources needed for patient care assistance. Teaching is focused on the correct inclusion of patient data on the software, the appropriate manner in which to photograph and describe skin lesions, as well as having an understanding of the legal and ethical issues highlighted by the professor. In addition, the training of students in teleassistance enables patients to receive a quicker and more detailed second opinion from a medical specialist, assuming the professor has all the necessary patient data and there is no need for a further examination. It is also worth mentioning that students learn not only about the telemedicine area, but also about medicine itself, developing patient relationship and management skills, information gathering and diagnostic skills, lesion description and symptoms, and formulation of diagnostic hypotheses. This activity has now been developed for around 4 years.

CONCLUSIONS: Telemedicine can be used as a complementary solution to assist the logistical challenges faced by national health demands. The teaching of telemedicine in the academic setting equips students with better training in this area, preparing them for its use in the working environment. Telemedicine is not intended to replace the traditional consultation, but to enhance it. The medical second opinion given at distance aims to improve disease prevention and provide differential diagnosis and treatment, contributing to better health care. ■

Virtual Environment Moodle for teaching of Medical Radiology Course

Janduy Gil de Sousa[1]; Stephanie Cathren[2]; Alexandra Monteiro[3]; Miguel Barrella Neto[4]

INTRODUCTION: Moodle stands for "Modular Object-Oriented Dynamic Learning Environment", a free software, learning support, runned in a virtual environment or to support the classroom learning. Many medical schools have been adhering to the virtual learning environment as an aid tool in initial training and medical update.

The European University of Madrid, Physiology and Anatomy Department conducted a study applying the use of blended learning methodology compared to a traditional methodology of teaching. The researchers concluded that the mixed teaching methodology allowed the students to acquire more skills and competencies throughout the study period. This highlighted the importance of using a virtual learning environment as a support tool to education in the formation of new professionals in an effective way and without losing the quality of offered education.

The objective of this paper is to present the experience of using Moodle Virtual Environment in the teaching-learning process of Radiology, in School of Medical Sciences (UERJ).

METHODS: The discipline of Radiology at the University of the State of Rio de Janeiro, using tools in Moodle environment, went on to develop teaching activities in its institutional page. Students are placed in this environment, getting access to educational activities and teleconsulting. Signing up is allowed in collaborative platform for health professionals, with a restricted area to the students in the third year of Medical degree enrolled in Radiology discipline at the State University of Rio de Janeiro (UERJ).

The virtual environment Moodle has been installed and customized by the Telehealth Laboratory at UERJ, including the following features which are available to health professionals: classes, online courses with issued certificates, seminaries and teleconsulting. Besides the features described above, classes and instructional videos taught by radiology discipline teachers; bibliographic references; schedule of studies; tests and simulations; lessons, video lessons and sessions presented by instructors of radiology discipline. All content is divided into large areas of knowledge and compartmentalized into modules.

To access the content, the student signs up as a platform user, receiving login and password to an area directed to UERJ students and therefore becomes able to perform all the available activities.

RESULTS: From March 2005 to July 2015, there were 46,758 registered on the platform. Annually, using the virtual environment as a reinforcement tool to blended learning, there is an average of 90 students enrolled for the discipline of Radiology in the restricted area of Moodle.

CONCLUSIONS: The use of Moodle environment supports the development and consolidation of knowledge based on the collaborative relationship and interaction between student, teacher, content and technology. This tool came to contribute to the Curricular Reform in the academic scenario in the Medical School of this University, through the insertion of Information Technology applied to Health. However, individuals are active subjects in the construction of their own knowledge. They need to participate actively and be the main responsible for their own progress. ■

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Social Networks: Opportunities for the creation of learning communities

Juliana Macedo Reis Mercês[1]; Paulo Roberto Volpato Dias; Márcia Maria Pereira Rendeiro; Marcelo Henrique da Costa; Renata Fernanda de Morais

INTRODUCTION: Internet is an important medium. According to the United Nations (UN), about 40% of the population uses regularly, and in Brazil 48% (2014). Through quick, democratic and low-cost access, it transformed the everyday, encouraging interaction. Accordingly, E-learning has become fundamental to the dissemination of knowledge.

To that extent, the Ministry of Health created the Open University of the Unified Health System (UNA-SUS), to meet the capacitation needs of SUS professionals.

The UNA-SUS of Rio de Janeiro State University (UNA-SUS UERJ) offers specialization courses mediated by tutors and self instructional extension, in other words, absence of teachers or tutors. They optimize students' time and the realization at any time. However, require higher autonomy in the utilization and in learning.

It will be analyzed two self instructional courses: Violence Approach to Home Care and Legalization of Health in Home Care, proposing the use of Facebook, aiming interactivity of students, to enhance the E-learning aligning to the new contemporary education.

In Brazil, 47 million use Facebook daily (2013). Faced with this, it may be favorable to educational purposes due to: simplicity of use, to be in the daily lives of users, have tools for online content sharing and to promote collaborative learning.

METHODS: The methodology consists in analyzing the User Profile Assessment and Course Evaluation Questionnaire, self evaluative research from the students of the mentioned courses – applied by UNA-SUS/UERJ, in 2014, – by filling out online forms to identify: (1) social and digital profile of the students; (2) level of knowledge acquired in the subject before and after the courses; and (3) level of satisfaction in relation to the methodology. In these two questionnaires contained, respectively, demographic segmentation data, digital profile and individual evaluation of the knowledge about the topics covered in the course before it starts; and quantitative and qualitative information, of which the open questions were grouped and categorized and the other data aggregated and analyzed by percentage.

RESULTS: The quantitative analysis of the User Profile Assessment Questionnaire answered by 2,124 students, shows that most are female (85%), with ages of 21-40 years - higher concentration between 26 and 35 years (45,05% of the interviewed). It is observed also that students-professionals work in several fields such as medicine and dentistry, however the nursing course predominates (66%).

Still through this questionnaire, we identified the digital profile of students: 90% have already done online courses

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previously; 83.1% use the computer daily; 90.6% have a notebook, 49.1% have a smartphone and 28.3% have a tablet; 64.4% go online for a period of one to three hours a day; 55.5% participate in learning communities; 74.4% participate in a social network; 86.3% have a Facebook profile; 72.5% considered themselves "good to excellent" to the degree of difficulty in learning of computer technology resources.

In the qualitative analysis of Course Assessment Questionnaire, opinions were highlighted, criticisms and suggestions about the experience during the courses. It was reported higher incidence to the lack of an environment for exchange of experiences and doubts, since the courses have no mentoring, and the impossibility of acquiring the printed material. On the positive side, they were cited by many users the portable feature and the availability of access at any time. However, we find that the self evaluative results did not reach maximum degree of excellence, providing regular to great levels.

CONCLUSIONS: The two self instructional courses, Violence Approach in Home Care and Judicialization of Health in Home Care, showed satisfactory results, however, they did not reach the goal of maximum excellence in education.

Thus, the use of Facebook and its applications - groups and others mentioned resources - such as pedagogical tools, is presented as a strategy to achieve greater effectiveness and excellence, creating a trading environment according to the demand of students.

It is understood that the exploration of this most influential network and familiar interface could provide a new dynamic to the process of building knowledge in self instructional courses, by virtue of its possibility of promoting the interaction among students, since they are acclimatized to its use as shown in the surveys.

Moreover, information sharing, interaction, guidance and encouragement to the research, the development of autonomy and the promotion of cooperative learning are practices that may help the dissemination of new self instructional courses. ■

Building a Distance Learning Course on Semantic Web Technologies for Clinical and Biomedical Informatics

Luciana Tricai Cavalini[1]; Leandro França de Melo[2]; Timothy Wayne Cook[3]

INTRODUCTION: The adoption of Information Technologies (IT) in healthcare has been proposed as the path to overcome the contemporary challenges of healthcare systems at the national and local levels. It has been promised that healthcare IT would improve quality of care, increase patient safety, treatment adherence and satisfaction, organize workflows, free healthcare providers from unnecessary workload and reduce costs for final users, hospital managers and policy makers. There is little evidence that any of those outcomes have been reached by the computerized medical systems that have been implemented over the last half of the 20th century.

There is no consensus about why there is such a gap between the evident evolution of other sectors of the economy achieved by IT adoption and the reality observed in healthcare. It is suggested that biological processes have a different nature from human engineered processes, and that approach can be replicated on biomedical software applications; however, it is unlikely that the currently available healthcare IT products meet such specificities.

This paper has objective to present the fundamentals of a distance learning course aimed to exercising the currently available tools for practical implementation and development of semantically interoperable applications.

METHODS: The pedagogic methodology of this course takes into account that the current scenario of healthcare IT, in realistic terms, is composed by low system coverage, almost all of it centralized in developed countries, where distributed, independently developed applications are deployed in a convenience sample of healthcare facilities, locking fragments of the patient's health information into isolated, incommunicable silos.

In order to solve the semantic interoperability issue in healthcare IT, both for clinical practice and biomedical research, many solutions have been proposed to the problem of Healthcare Information System (HIS) semantic interoperability, which includes a vast and variable set of standards and knowledge representation models. Until this date, after more than 30 years of intense efforts, the "data silo" problem in healthcare IT persists.

Semantic Web technologies have been promoted as the most promising solution to providing semantic interoperability in healthcare IT. Several components of the Semantic Web technologies have been proposed as the best technological solution, especially eXtensible Markup Language (XML), Resource Description Framework (RDF) and the Web Ontology Language (OWL). Most of the academic research in this area, however, implement experimental solutions based on one of those component in isolation.

Given this scenario, there was a need to take into account the vast knowledge accumulated over the years by the development of the mainstream healthcare IT standards, such as HL7 and the Multilevel Model-Driven (MMD) approach, as first proposed on the openEHR specifications and the ISO 13606 family of standards, and harmonize them with

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Semantic Web technologies. This new framework is openly available for the development of Semantic Web compliant, interoperable healthcare applications for e-health, m-health, biomedical and translational research, as well as Electronic Health Records.

The contents of the course present the fundamentals of a Semantic Web technology-based implementation of the MMD principles, as well as exercise the currently available tools for practical implementation and development of semantically interoperable applications for the fields of clinical and biomedical informatics.

RESULTS: The Learning Units of this Course cover the following topics:

Learning Unit 1 – The Current Challenges in Healthcare Information Technology: An overview of the current scenario of the implementation of information technologies in healthcare, both for clinical practice and biomedical research. Focus will be given on the specifics of healthcare information regarding the spatial, temporal and ontological dimensions, which make the healthcare information ecosystem the most complex and dynamic in human society.

The three main challenges in healthcare IT will be addressed:

1. The semantic interoperability requirements, which are not being met by any system implemented in healthcare settings or used in biomedical research, regardless of the use of mainstream healthcare IT standards;

2. The difficulties to meet the requirements of multiple users, given the lack of consensus among healthcare domain experts about the "maximal data model" for any given clinical or biomedical concept;

3. The issues regarding maintenance of the systems, given the fast evolution of clinical and biomedical concepts, which increase costs and lead to higher and faster rates of software obsolescence.

Learning Unit 2 – The Mainstream Healthcare IT Standards: An in-depth critical analysis of the primary healthcare IT standards currently available:

1. The Health Level 7 standard, especially its XML-based version 3, with focus on the latest development of its open source specifications, the Fast Interoperability Healthcare Resources (FHIR);

2. The non-Semantic Web MMD approaches, comprising the Archetype Definition Language (ADL)-based openEHR specifications and the ISO 13606 family of standards.

Learning Unit 3 – Semantic Web Technologies: An overview of the most ubiquitous Semantic Web resources, especially XML, RDF and OWL. The variety of data interfaces and syntactic formats used for data exchange.

Learning Unit 4 – Semantic Web Technologies in Healthcare IT: A detailed explanation on the methodology adopted to incorporate a suite of Semantic Web technologies based on the MMD principles in the Multilevel Healthcare Information Modeling (MLHIM) specifications.

Learning Unit 5 – Tools and Implementations: A practical demonstration of the available tools for the development of Semantic Web-compliant healthcare applications according to the MLHIM specifications, including methods to handle data from legacy systems, medical devices, biomedical equipment, HL7 and archetype-based systems.

The evaluation of the Course include practical exercises and foruns for each module of the Learning Units.

CONCLUSIONS: The main educational goal of this Course is to create a culture of innovative thinking in healthcare IT towards overcoming of semantic interoperability challenges in clinical and biomedical informatics. In order to reach this goal, the tutorial aims to reach the following specific educational goals:

1. To develop a critical thinking approach by the attendees, regarding the causes and consequences of the current lack of semantic interoperability in healthcare IT;

2. To discuss the actual features of the mainstream healthcare IT standards, with impartial view on their strengths and vulnerabilities;

3. To disseminate the concepts of Semantic Web technologies in healthcare IT, which can be considered at this point, an innovation restricted to ground-breaking academic projects, despite its wide utilization in others sectors of software industry;

4. To execute practical exercises with Semantic Web based tools that can be used by clinical and biomedical domain experts and software developers worldwide to create semantically interoperable applications for any purpose in healthcare.

With those educational goals achieved, it is possible to start the formulation of a community of knowledge modelers and software developers endowed with a new perspective on the healthcare IT field, with the potential to produce solutions that will release healthcare information from the current "data silos". ■

Distance course production methodology in the Santa Catarina Telehealth Center

Luise Ludke Dolny[1]; Luana Gabriele Nilson[2]; Josimari Telino de Lacerda[3]; Maria Cristina Marino Calvo[4]

INTRODUCTION: In order to support the permanent and continuing education activities of Santa Catarina's Primary Health Care professionals, the SC Telehealth Center offers distance courses via the Tele-education service. Considers the needs and demands of this target audience in establishing teaching-learning processes with focus in the problematization methodology in order to enhance the ability to transform and qualify the primary health care work processes for a quality service to the population.

Since 2010 the SC Telehealth Center develops Distance Education projects, contributing to the production of learning objects on topics related to strengthening the primary health care work process and health care. The themes are elected from the health teams demands identified in various support services offered by the Center.

The courses production methodology has changed and its modifications were influenced by different composition of the tele-education service team and of the courses evaluations.

The objective of this paper is to present the SC Telehealth Center experience in the methodological construction of distance courses through the tele-education service.

METHODS: The distance learning courses of SC Telehealth Center are offered in self instructional mode, where the participants are responsible for their learning process, free to organize and plan their studies. This model assumes that the participant is motivated for the learning process and able to manage independently their studies.

The learning objects are produced by the SC Telehealth Center considering the assumptions of the Instructional Design.

First, for each course is created a content matrix, clearly setting up its main objective and target audience. Important contents are identified to achieve the objective, which are distributed in modules and learning units. The Matrix is validated by a designated team according to the theme.

After the validation, authors with experience in the topic to be addressed are invited. They are oriented about the language to be used (informal language) and the importance of integrating theoretical aspects and practical examples of the participant's daily work, questioning them about their reality work and promoting reflection spaces over the content writing (problematization methodology).

The authors are also instructed to preserve a logical line between a module / learning unit and another, demonstrating how they interact to the theme learning, always guided by the proposed learning objectives.

To organize the content writing process, the authors are encouraged to use markers as "Featured Text" (content that should draw participants attention), "Learn More" (indication of other information sources on the subject), "Professional Word" (tips based on the author professional experience), "to reflect "(questions to promote a dialogue with

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the student in order to approach the content to his reality), "Settings / concepts " (important concepts definitions for content better understanding) and "Pictures and figures" (to illustrate content).

The courses varies from 16 hours to 60 hours and are offered in the SC Telehealth Moodle platform located on the Santa Catarina Federal University server.

It is available to participants a 'FAQ Forum' in case of support need throughout the course and they are also encouraged to use the Teleconsulting service for questions regarding the content and its applicability in daily work.

Each course provides a final activity for the course completion and certification and it is certified in partnership with the UFSC Research and Extension Rectory.

RESULTS: Over time there were adopted three different distance learning courses production models by the SC Telehealth Center.

The first model adopted was the Interactive, which requires a strong involvement of tutors in monitoring the participants performances as well as interaction between participants in the teaching-learning process construction from tools such as discussion forums. Due to the great courses demand and because this model requires a large professional structure to supplement this demand, this model proved inadequate for the expansion course provision by SC Telehealth Center.

The second model adopted was the self instructional (model currently adopted by the Center), but the production of the contents was driven by the strategy "Study Guides" through which the author selects hypermedia already available on the Internet (articles, texts, videos, graphics, audio and others) and writes texts that direct the material reading in a sequence considered most appropriate for the participant's learning. After offering several classes in this mode, it assessed that the work reality problematization goal was not going satisfactorily.

Based on this evaluation it was adopted the current model (described in methodology) to ensure the practices problematization and indeed support the health permanent education actions.

The demand in the first years of course production was very focused on issues related to the Family Health teams work process as the Public Health System (SUS) Laws, Primary Health Care Principles and Guidelines, User Embracement, Groups in Primary Health Care, work process of Community Health Agents and Spatial Recognition.

Currently the SC Telehealth Center still offers courses on the organization of the Primary Health Care work process as User Embracement, Risk Rating and Family Health Support Centers as well as advances on the clinical-care courses production as Nursing Consultation in Primary Care and Teledermatology.

By comparing the course offering and the number of participants over the years, there has been a gradual increase in both aspects. In 2010 it was offered one course with 32 participants, in 2011 it was offered one course with 77 participants, in 2012 there were offered two courses with 206 participants, in 2013 there were offered six courses (24 classes) with 361 participants and in 2014 there were offered 6 courses (28 classes) with 719 participants.

CONCLUSIONS: The tele-education service is consolidated in the SC Telehealth Center and the adopted course production methodology is the result of a long process of trials and strategies validation by the team.

The supply and expansion of course's vacancy number demonstrates that this methodology appears to be the most appropriate to attend the great demand for Primary Care courses with the structure and human resources available in the SC Telehealth Center.

The participants evaluations confirm that the SC Telehealth Center can support the Permanent Education of Primary Care professionals, promoting reflection on problem situations of their work process and assisting in the alternatives to solve them.

The courses also stimulate and encourage the use of the teleconsulting service for doubts and specific questions of health professionals and their teams. ■

Profile of Health professionals in Dentistry UNASUS/ UERJ: expectations and experiences in information technology

Maria Cardoso de Castro Berry[1]; Maria Isabel de Castro de Souza[2]

INTRODUCTION: In Brazil, the intense workload in the primary health care is a factor that hinders the continuing education process in public institutions. Different methods of training and professional development have been described in order to encourage skill improvements to those professionals that are working in primary health care (PHC) / Family Health and consequently generate a better quality of life for all the users. Distance Education (DE) is a frequently used tool which allows: easy access to information, enabling the professional to continually update, greater communication between professionals in different parts of the world, overcoming geographical barriers and allowing time flexibility, which stimulates the professional to continue their education. Based on this concept, UNASUS / UERJ through a program with the Ministry of Health and other universities in the country offer a specialization course in Family Health for Medicine, Nursing and Dentistry, which stimulates a link-up between health areas and enables them to act like a family health team. The goal of this study was to evaluate the student profiles in this course and the impact of distance learning for those professionals.

METHODS: For that, an online questionnaire was administered to groups of graduates from 2012-2014, which contained 11 questions about their profile and experiences with information technology.

RESULTS: The results showed that the professionals that most sought after courses were women, ages 30-40 years old, with 10 or more years on the market, working in Family Health, with a workload of 40 hours. In relation to knowledge of informational tools it was observed that 101 professionals were using the internet daily, accessing e-mails 2 to 6 times a week and the internet was the most popular tool used for updates. Furthermore, in a total of 148 students, 140 felt that distance education could fulfill their needs and professional demands making an impact on their day to day work life.

CONCLUSIONS: The updating and the apprehension of contents lead to technical improvements as well as a refinement of their actions resulting in a direct impact throughout society. In addition, continuing education is a good way to optimize time, facilitate learning and exchanges with other professionals, making it a valuable tool. ■

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RUTE's activities in Hospital Escola São Francisco de Assis/UFRJ

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INTRODUCTION: This report contains information on the use of RUTE Network Tele medicine in HESFA – School Hospital São Francisco de Assis UFRJ (*Hospital Escola São Francisco de Assis* UFRJ). It aims to: present the national thematic of interest of education and health areas through the University of Tele Medicine Net who were followed in the institution in the years 2010, 2011, 2012, 2013, 2014 and 2015. And point out the impact the use of the network in teaching undergraduate, graduate, research and extension.

As a teaching institution HESFA contributes to the training of health professionals and for purposes such as: nurses, social workers, psychologists, physiotherapists, pharmacists, nutritionists, dentists, among others. Thus complies with its historical and social vanguard role in the development of health care professionals, the training and qualification of professionals with implications for improving the health of the population.

The HESFA develops other actions related to its function as a university institution in the public health care network of the City and State of Rio de Janeiro. On the network level, it promotes low complexity actions and offers medium-complexity diagnostic procedures simultaneously to school activities and Research within an interdisciplinary and integrated approach.

METHODS: As a teaching institution is aware the current proposals for streamlining and use of media resources that enable the themes of discussion regarding education, health among others, required for the development of the social body. Among the activities will be presented in summary corresponding to teaching, research, extension and administrative. At the end they will be presented the pictures with the activities in the institution in the years mentioned above.

RESULTS: In education participation in SIGS Nursing Intensive and High Complexity: for students of the Undergraduate Course in Nursing and Midwifery School of Nursing Anna Nery / UFRJ. Participation in scientific and administrative meetings of the MEC, involving residents of the Multidisciplinary Residency Program in Women's Health and Multidisciplinary Residency in Family Health and Community.

In research presented the results of Master's dissertation research entitled: "The Nurse in Haemovigilance: their training and skills", presented by master nurse Nursing Maria Angela Moreira Days in Sentinels Program promoted by ANVISA action on August 02, 2011.

In the Extension the opportunity to submit events, lectures offered through the resort, has been recognized by the partner institutions, internal and external UFRJ, Secretary of State of Rio de Janeiro, ANVISA among others. We have received scheduling request space to participate in activities at a distance. Among the aspects considered as a facilita-

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tor for the use of equipment for different activities relates to the provision of computer equipment for the transmission and the location of HESFA, which facilitates access by interested parties.

The administration allowed the health professionals to attend meetings of collective interest in the personnel shift would be hampered by economic issues. It enabled the meeting more people with interest in the presented topics.

The Videos Conferences often happen in HESFA auditorium with the support of the Computer Industry Coordinator (CITIS) Marcio Barbosa France. In 2009 the HESFA made five videoconferences. In 2010 fifteen, 2012 just one, 2013 were fourteen, 2014 were two and 2015 we already had four videoconferences.

CONCLUSIONS: Frequent changes in the areas of health and education must be accompanied by the institution whose mission is to provide quality and humane way the peculiar demands of Primary and Secondary Health in line with the guidelines of the National Health System an academic perspective.

The institution has made efforts to train professionals in residency programs in line with the public policy of training of human resources in the country using the available resources. For that constant updating of equipment will allow greater clarity, picture clarity and sound, enhancing the feature that we believe will be the most used in educational institutions in the coming years.

We understand that with the rebuilding of the institutional spaces HESFA will expand its partnerships and therefore we can organize a more intensified planning for the use of the material available in the institution.

The impact of the use of the material was considered highly relevant by the institution on their teaching, research and extension. ■

e-Learning for Malaria management: report of an experience involving all the Amazon border countries

Mônica Pena de Abreu[1]; Alaneir de Fátima dos Santos; Gustavo Cancela Penna; Rosália Morais Torres

INTRODUCTION: Malaria occurs in nearly 100 countries worldwide and imposing a heavy social and economic burden in developing countries and especially in the Pan Amazon region, where plaguing several countries. According to the 2013 World Malaria Report, there were more than 200 million malaria cases in 2012 and about 627,000 persons died. Malaria is preventable and treatable, and history shows that it can be eliminated, as demonstrated by the malaria elimination in most of Western Europe by the mid-1930s and the achieved elimination of the disease in United States in 1951.

Knowing the importance of this endemic disease the eight health ministries that participating in the Pan-Amazonian Network of Science, Technology and Innovation in Health prioritized this theme, offering a distance course to primary care professionals in order to approach them to diagnosis and clinical management of malaria.

Objectives: Show the results, the structure and the resources used in a training course on diagnosis and management of malaria offered in the distance modality for health professionals to countries bordering the Amazon region, where malaria is endemic.

METHODS: The theoretical content of the course was designed for professionals with extensive knowledge about the disease, covering notions of pathogenesis, pathophysiology, epidemiology; clinical pictures, diagnosis and treatment of malaria, with total workload of 80 hours. In the production of teaching materials, were used graphics features such as videos, images in 3D modeling and computer animation to facilitate understanding of epidemiological, pathophysiological and clinical aspects of the disease. Classes were offered in a free LMS, the Moodle platform. A mentoring and monitoring system was established for educational best results, doubts resolution and also to encourage student participation and facilitate access to the course.

Under the organizational point of view, the course had an overall coordination and two sub coordinations, 11 animation tutors which were responsible for monitoring 30 students groups (without monitor support) or 70 students (with monitor support); 3 malaria experts; nine monitors (undergraduate students in Medicine) responsible for assisting tutors. The communication between tutors and students was done by platform, messages (SMS), e-mail and discussion forums. The didactic activities consists of reading classes, participation in discussion forums and conducting assessment of knowledge. The participation of students was measured by the platform and tutors / instructors. The certifying institutions were the Federal University of Minas Gerais (UFMG), State University of Amazonas (UEA) and FIOCRUZ, supported by Pan American Health Organization (PAHO). The course was offered between May and September 2014.

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RESULTS: Were enrolled in the course 868 health professionals from eight countries in Latin America and one from African country: Brazil - 291 participants (33.5%); Bolivia - 28 (3.2%); Colombia - 104 (12.0%); Ecuador - 52 (6.0%); Guiana - 02 (0.2%); America - 01 (0.1%), Peru - 270 (31%); Venezuela -102 (11.7%) and Angola - 18 (2.0%).

Regarding the level of students academic training, it was found that 48.6% have higher education master degree, 46% have higher education without graduate and 4.1% have education in the intermediate level. Considering the graduation area, 38% of students were graduated in Medicine, 20% in nursing and 45% in other areas. More than half of the students (54%) had no previous experience in participating in distance courses. Were enrolled in the course 884 students and 774 of them began the course, the percentage of students who have never used the platform performed 10.8% and the percentage of students who have not completed all stages was 36% with an overall approval of 64%. These percentages are within the expected range for distance courses.

There were no statistically significant differences in the distribution of students by gender (57% female, 43% male) and marital status (married 42%; single 54%). The predominant age group was between 26-30 years (22%) and 31-35 years (22%) revealing a younger profile of students, correlating directly with the time since graduation, as most of them had up to 5 years graduation (42%) followed by students with 5-10 years of graduation (20%) and 11-15 years of graduation (14%).

The countries with the largest number of students enrolled were: Brazil and Peru (32% each one), Venezuela (13%), Colombia (12%), Ecuador (6%) and Bolivia (4%). The Republic of Suriname and French Guiana have had, each one, one student enrolled. It is known that three countries account for 76% of the malaria incidence in the Americas: Brazil (52%), Colombia (13%) and Venezuela (1%). Since the deaths from malaria are concentrated mainly in Brazil (59%) and Colombia (19%). It is also known that these two countries are more advanced in digital inclusion. This could explain the greater participation of professionals from these countries in the course. However many other factors can influence the number of participants: the dissemination strategy, internet access, etc.

The analysis of the responses of the students who completed the course general evaluation questionnaire (n = 481), shows that 68.4% of them rated the course as excellent and 28.8% as good.

CONCLUSIONS: Distance education reveals to be an ideal form for training and updating health professional teams of large territorial extensions and isolated regions countries. One of the most effective applications of distance education is training health professionals in the recognition and management of the more prevalent and important diseases in each region.

The experience in offer this course of malaria and the results achieved open doors to education actions at a distance modality of continuous, coordinated and collaborative manner between countries of the Amazon Region and Latin America. ■

Telemedicine in India - Journey from Experiments to National Outcomes

Murthy Remilla[1]

INTRODUCTION: Telemedicine has been in practice internationally in several forms/modes and is in different stages of implementation in different countries. While some are in advanced and operational phase, others are in technology demonstration/pilot phase. There are very few who are in a truly revenue model operating on a commercial basis. The approaches/policies adopted by different countries may differ but their philosophical goal remains same i.e., bringing advanced medical facilities to the doorsteps of the citizens.

India is a leader in space technology – building satellites, launch vehicles and application programmes heralded the Telemedicine programme in a big way and moved ahead with time and technology advancements.

Indian Telemedicine programme is reviewed from inception to growth in this paper and the plans and hopes for future.

METHODS: A structured questionnaire based survey of the systems, their deployment and practices and usage coupled with interviews and interactions are used to collect the data and used for analysis and drawing conclusions about the developments and trends.

Indian Telemedicine programme spearheaded by Indian Space Research Organisation (ISRO) has, to a major extent followed the philosophy of providing cost free connectivity and in certain cases subsidised/sponsored infrastructure as well.

This, coupled with the collaborative efforts of several medical research organisations, trust hospitals, NGOs etc., has resulted in a substantial growth of the telemedicine network in India. ISRO's satellite based Telemedicine network itself grew from a mere 5 nodes in 2001 to about 400 nodes by 2010. There are several other networks run by other agencies. This was achieved through Satellite communication (SatCom) based Technology for a decade of 2000-2010 and then the expansion through alternate technologies and connectivity options.

The New Indian government (after 2014 general elections) that is known for embracing innovation and highly adoptive to the new technology regimes is thinking big in the form of Digital India where Telemedicine/Telehealth and Tele-education are essential components. In addition to the traditional VSAT based SatCom the government is planning embrace novel technologies and innovative approached to build a multipurpose digital connectivity across the country and reach the unreached for services as well as administration.

A survey of current Telemedicine system in India shows the recent trends in utilization of and the assistance received by the patients. One of the interesting findings shows the beneficiaries need not be from far-flung rural areas but even citizens of crowded metro cities and urban locations, in time critical conditions.

RESULTS: A survey based study of the systems, their deployment and practices and usage coupled with interviews

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and interactions with the administrators reveal satisfactory results and enchanting outcomes promising for a bright future.

They also present the lacuna in the current system whereby the full capacity of the infrastructure and investments are not fully utilized on one side and also the unserved gaps in the expectations of the patients and care providers.

CONCLUSIONS: The path followed by India is very adoptive and embracing a variety of Information technologies and microelectronics along with the benefits of convergence of communication technologies. This can be emulated by many other nations and use ICT for bridging the rural-urban divide to reach many unreached and under-reached geographies and populace in an effective manner.

The models and policies followed along with the results and time and money saving outcomes will be presented and discussed in the paper. ■

Telemicrobiology: A useful and successful Telemedical Capability for Mission Support in the field of Infectious Medicine

Patrick L. Scheid[1]

INTRODUCTION: Various Telemedicine applications are increasingly being used within the medical service structure of the German Armed forces to provide optimum medical care to deployed military personnel. Infectious diseases are among the most common medical conditions identified while serving in foreign military missions or disaster relief operations. We present information on the development and the successful implementation of a proven Telemicrobiology / Teleparasitology capability to support long-distance diagnosis.

METHODS: In order to support laboratory diagnosis by means of telemedicine, a modification of the German Armed Forces telemedicine workstation was devised. A Telemicrobiology - module with special equipment, camera, and software has been designed, validated, and deployed. Overall clinical performance of this diagnostic telemicrobiological system was evaluated in several double blind experimental approaches. Subsequently the Telemicrobiology system was used in microbiological field laboratories.

RESULTS: Among the applications of telemedicine used within the theatre (Teleradiology, Telemicrobiology, Tele-Laboratory Medicine, Teledermatology and Teledentristry) the Telemicrobiology use is extensive (as a first or second opinion solution). This system serves as an example of a well validated tool that can be useful in a diagnostic system. The Telemicrobiology module, currently in use in three operational military theatres, has been entered into routine practice after its careful comparative evaluation and validation: The microbiological workstation has been evaluated (blinded comparative studies) in both garrison and deployed settings, and has been found to be fully satisfactory for use from both an operational and a clinical point of view. The currently deployed system allows the transmission and interpretation of high-quality static images of microscopic specimens, overgrown nutrient media, stool preparations, or malaria preparations in a matter of seconds.

CONCLUSIONS: Telemedicine is a useful tool to improve medical support within the missions abroad. The designed Telemicrobiology module has been proven, and was deployed in 2003 for the first time, providing a higher level of field diagnostic support than previously possible. The inclusion of distant experts in diagnostic analysis through the use of telemedicine improves diagnostic specificity by avoiding false positive results and, particularly in medical parasitology, allows a treatment-essential diagnosis without the dispatch of specimens to Germany. This system can only be used in a well-coordinated overall diagnostic system. The "Telemicrobiology" module currently in use in German military missions abroad has proven successful in practice. The expectations regarding an additional transfer of expertise to the operational locations have been met. In this way, special microbiological expertise can be made available to the clinician during a mission abroad which otherwise would not be available on-site. In this way, the maxim of telemedicine, "exportation of expertise instead of exportation of experts", has been realized. ■

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A View of Tele Health as a Learning Method: Experience Report on Offshore Nursing

Paula França Vilela[1]; Maria Yvone Chaves Mauro[2]

INTRODUCTION: This is an experience report on a significant learning process in healthcare for occupational health technicians on the basis of the "Tele Health" communication method. That learning process has complemented supervision by occupational health nurses working on the land basis of an oil company by means of immediate and mediated supervision of occupational health technicians' performance onboard oil platforms. This learning process makes use of the Tele Health method as a communication tool, which interconnects on real time basis thirteen occupational health technicians onboard with the health team on land. Every fifteen days an agenda for video conferences brings together the entire team of onboard nursing technicians and the occupation health nurses on land. In those meetings, all the nursing team receives training on a specific theme. Three cycles around fifteen days apart ensure instruction to all nursing technicians. That experience spurred the idea of questioning the "Tele Health" process as a distance learning method, as concerning learning effectiveness by the nursing technicians.This study aims at discussing the effectiveness of that learning with the occupational health technicians from the educational stand.

METHODS: This is an experience report on a significant learning process in healthcare for occupational health technicians on the basis of the "Tele Health" communication method. The application of the "Tele Health" method is accounted for on the basis of the difficulties related to the distance between work places and the learning center, as well as to those related to the learner's immediate supervision. Educational methods are material, information, linguistic, and psychological resources that the teacher uses to facilitate the effective educational communication with his/her students and the contents intake process on an educational plan. In this sense, according to operationalization, it is a deductive method rationally chained and formulated by the teacher. The distance method is characterized by the fact that the student is not present at the learning center, and takes the course by means of receiving the didactic material which must be individually used by each one of them. Therefore, the material must be well elaborated to ensure understanding by the distant student. Learning levels should develop slowly and progressively with the didactic material sent to the students in physical or e-format, with audiovisual (video conference) complementation. It is worth highlighting that as in every learning method, an evaluation of the learning expected by the student is deemed necessary, as it goes on presence learning methods. The students' activity is passive and requires control of the learning process by the teacher, who must evaluate them especially when they are distant from the learning centers.

RESULTS: The nurses' uneasiness concerning the operationalization of the learning method used as well as its effective result in relation to contents passed on video conferences caused the questioning of that educational method. Upon analysis of the learning method, supervision showed a series of non-conformance instances in the learning subjects' performance. That finding suggests the need for revaluating the methodology, whose evaluation at the moment lacks sufficient data.

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CONCLUSIONS: In that context the following hypotheses are raised: lack of previous printed or e-knowledge on the subject to be on conference; lack of information exchange on conference for elimination of questions; lack of feedback on the result of learning by students, the subjects of the process. Suggestions are made that these issues as well as others should be investigated to attain a consensus as for the effectiveness of this learning method. ■

Tele-education in Pediatric Cardiology and Congenital Heart Disease: Experience of a Tertiary Hospital in São Paulo

Rosangela Simões Gundim[1]; Nana Miura Ikari[2]; Vera Demarchi Aiello[3]; Marcelo Biscegli Jatene[4]

INTRODUCTION: A tertiary hospital in the capital of São Paulo offers diagnostic, clinical and surgical treatment in addition to heart transplantation to a large number of patients with congenital heart disease and children with acquired heart diseases. Such patients require special care throughout their lives. The expertise developed in this hospital has been shared with professionals of several specialties over time in different occasions for many years. With core deployment of telemedicine and telehealth since 2010, Clinical and Surgical groups as well as the Pathology Laboratory, have conducted monthly meetings with video conferencing multipoint transmission to various other hospitals throughout Brazil to exchange information and updates for a better understanding of the morphology of the defects and discussions regarding the possibilities of intervention.

The meetings have the following purposes:

a) promote anatomo-clinic and anatomo-surgical discussions to improve the understanding of diagnosis and therapeutic choice.

b) promote discussions on the nomenclature and the morphological aspects of heart and vascular system diseases through the study of anatomical specimens and of cardiovascular imaging tests aiming at the correlation of the methods and a better understanding of anatomy.

c) stimulate the specialization of medical and non-medical professionals involved in the treatment congenital heart diseases patients.

METHODS: The meetings, based on the format of case discussion, take place every first Tuesday of the month at audience room of the Hospital, for an average audience of 50 local participants, with the transmission of the content presented: audio, text, videos, photos and display of anatomical specimens by video conference to 5 other hospitals located in different regions of the country with a fluctuating audience of approximately 20 people from different medical and non-medical specialties.

Because the meeting is based on case discussions, after the initial presentation a broad debate is held based on the literature and the outcomes of each case, leading to the participation and networked consensus on the therapy, possible causes of treatment failure and advances for future cases. The involvement of participants from all of the connected centers is widely encouraged.

RESULTS: We have had 55 meetings since 2010, reaching an average of 110 people per meeting, which are currently distributed to a network of 5 hospitals located at the following points: Salvador/Bahia, Manaus/Amazonas, Recife/

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Pernambuco, São José do Rio Preto and São Paulo in State of São Paulo, and it remains open to new participations.

The exchange between these professionals creates knowledge and leads to the conduction of other activities, such as internal meetings in each hospital, presentation at Conferences, Forums and Symposiums.

CONCLUSIONS: This activity has shown great educational potential for resident physicians, students and technicians, promoting the interaction between tertiary centers for the treatment of congenital heart disease, which allows the discussion of research protocols focusing on the practical application of the results obtained. It also generates, in terms of social welfare, the support to the implementation of national databases based on the knowledge of the morphology and nomenclature of defects. ■

Impact of the use of Web conferencing as a training tool for healthcare applied projects: example of the "Cardiac Implantable Electronic Devices Multicenter Registry"

Rosângela Simões Gundim[1]; Katia Regina Silva[2]; Evelinda Trindade[3]; Tatiana Satie Kawuachi[4]; Lucas Bassoli Alves de Oliveira[5]

INTRODUCTION: Prospective multicenter studies are challenging and expensive. A well-conducted multicenter study needs to assure standardization, uniformity of procedures, high data quality, and collaboration across sites.

We are conducting a large Prospective Multicenter Registry aiming to investigate the safety and cost-effectiveness of pacemaker and implantable cardioverter defibrillator procedures associated with the development of an electronic Adverse Events Reporting System. This study is being performed in 13 cardiology centers of Brazil.

The main data source adopted is a web-based system named REDCap (Electronic Data Capture System). REDCap is a secure web-based software and workflow methodology for electronic collection and management of research data. To ensure effective collaboration among participating investigators and a standardized trainnig program on the use of REDCap it was needed to find a manner to train them properly.

Thus, the Telemedicine and Telehealth Center of our Institution presented Adobe Connect, a web conferencing virtual room, licensed for our institutional use by the University Telemedicine Network of the National Research Network, (RUTE/ RNP). After an initial training, it was adopted for REDCap semi-structured training sessions with the researchers across all sites.

This paper aims to present the user's assessment regarding the web conferencing tool and its impact on the project.

METHODS: We describe this experience according to the user's opinion about the web conferencing tools. The following questionnaire was developed by the telemedicine team.

1. From your perspective, what are the advantages of using the web conferencing tool?

2. What is the total number of sessions envisaged, including meetings and training, or other issues to be held through the web conferencing tool?

3. How many participants are expected, on average, in each session?

4. What is the geographic location of the session's participants?

5. If participants were due to travel to attend the meetings, how many travel tickets and accommodation days would it be involved?

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6. Is there a cost estimate for these travelling arrangements?

7. If, on the contrary, the meetings were multiplied to one by each research site: how many expected travelling arrangements would be needed for meetings and training sessions?

8. What are the total estimated costs?

RESULTS: 1) From your perspective, what are the advantages of using the web conferencing tool?

• The web conferences allow easy and fast access to research sites without issues as time and money for travelling arrangements;

• The possibility of recording the meetings allows the research sites teams to review its content, to solve doubts, strengthening subject's knowledge;

• The tool allows training in "real time" / "recorded" access to electronic systems that we are using in the research project, overcoming problems of distance and scheduling.

2) What is the total number of sessions envisaged, including meetings and training, or other issues to be held through the web conferencing tool?

At the initial phase, we conducted a total of six meetings, which were repeated at two time periods, 2 pm and 7 pm, aiming to discuss the project overall scope and operational issues, RedCap data collection system and patients' monitoring aspects. Monthly meeting are scheduled until September 2015.

3. How many participants were expected, on average, in each session?

On average, 6 participated each session varying amid the 13 teams, with a maximum of 10 and a minimum of 1 person.

4. What is the geographic location of the session's participants?

There are 13 centers, 6 in São Paulo State, 2 in Minas Gerais State and one of each at Mato Grosso, Paraná, Piauí and Rio Grande do Sul States.

5. If participants were due to travel to attend the meetings, how many travel tickets and accommodation days would be involved?

As per Project Protocol, two yearly one day meetings were planned, with at least one team member from each research site.

6. Is there a cost estimate for these travelling arrangements?

The Project Protocol reserved a total of R$ 14.400,00 travelling arrangements budget.

7. If, on the contrary, the project was not using the web conferencing tool: how many expected travelling arrangements would be needed?

The forecast was 2 trips, one for each year of the project. But, for sure, it would be insufficient for proper training and research centers follow-up.

8. What are the total estimated costs?

If the yearly meetings were to be held in São Paulo State Capital, 10 teams would have travelled at least one day yearly.

CONCLUSIONS: According to the experience reported above, we conclude the Web conferencing tool has not only met the user's needs, but has also expanded the project experiences. Amid its advantages, it was mentioned: practicality, convenience, ease of access, decrease time and operating costs (e.g. travelling, accommodation, feeding or diverse expenses) for at least 10 researchers, besides managers or others involved in the project.

We conclude the Web conferencing tool is effective (06 meetings were performed), and has already saved, since at least, 60 travelling arrangements or more would have to be done for such achievement.

Assuming domestic air flights at R$500.00, and at least one participant only from each of the 7 centers outside São Paulo State, at least R$ 42,000.00 would have been required just for travelling tickets.

In addition, the recorded sessions are a permanent legacy. It has not only contributed to facilitate REDCap tool understanding, but also improved participants' performance, consistency of the data captured and may, consequently, have improved project achievements. ■

Teleconference to support the teaching and research in Pediatric Radiology

Stephanie Cathren Fenizola dos Santos da Silva[1]; Janduy Gil[2]; Alexandra Monteiro Grisolia[3]; Munique Santos[4]

INTRODUCTION: Distance learning and research support programs are becoming more frequent, and wide acceptance by doctors and medical students. In this modality, there is the use of teleconferencing that allows the integration in "real time" between different groups. The objective of this work is to present the experience of Pediatric Radiology teaching and learning using teleconferencing for communication between national and international centers of excellence.

METHODS: The period from March 2005 to June 2015, were held monthly teleconferences with the participation of radiologists, pediatricians, doctors from other areas and medicine undergraduate students located at university hospitals and Brazilian centers of excellence. The activities were composed of lectures and workshops with the participation of Brazilian lecturers and other countries like USA, Canada, Spain and Australia. For the conference was performed the association of video conferencing and web conferencing technologies that allowed increasing the number of participants with points interactivity of all voice by video conference and chat by web conference. All events are recorded and made available in the virtual environment of the Telehealth Laboratory of University of Rio de Janeiro state for reuse groups.

RESULTS: In total were carried out, 117 teleconferences, divided into 25 lectures and 92 seminars. The average time of connection to the seminars was 3.5 hours and for classes of 1.5 hours, with about 256 participants per event. The average number of points connected by videoconference was 13 and 48 web conference with participants from all regions of the country and other countries like Canada, USA, Germany, Chile, Argentina, Spain, Panama, Australia, among others. The level of satisfaction of participants regarding the audio and the video was 97.2% and in relation to the themes of 99.7%

CONCLUSIONS: The use of teleconferencing enabled the exchange of experiences between students and medical experts as well as between different groups in Brazil and abroad. In addition to facilitate their integration, in the discussion of new treatment methodologies and procedures to be adopted. This technological tool has enabled a continuing medical education thus leading to better patient care and more efficient and individualized medical approach. ■

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Tele-education in training health professional of the community: experience of telehealth center of the Federal University of Pernambuco for basic training in caring elderly

Tatiana de Paula Santana da Silva[1]; André Luis Vasconcelos[2]; Cleudes Hercila do Nascimento Lima[3]; Amadeu Campos[4]; Magdala de Araújo Novaes[5]

INTRODUCTION: Aging is associated with some functional limitations and burdens for the presence of disease, stress or accidents that require care. In this scenario, caregivers of the elderly, aims to ensure the welfare by providing a healthier aging and less functional impairment, as these professionals are able to recognize the typical disorders of diseases of aging, to ensure compliance appropriate. In an attempt to improve educational processes, it is emphasized that the provision of training in the area of elderly caregivers in distance mode besides contributing to the access of the diffusion process the information and training in this particular area, allows, in this case the expansion the presence of the University in other parts of the country, especially in the countryside, offering quality content at no cost to low-income people, and constitutes a strong social action. In this context, the objective of the paper is to present the report of the experience of Telehealth Center of the Clinical Hospital of the Federal University of Pernambuco in offering a semi-classroom course of basic training elderly caregiver.

METHODS: This is an experience report on the offer of a basic training course for caregivers of elders. We highlight that the course was a joint initiative of the extension Telehealth Center, *Hospital das Clínicas*, Federal University of Pernambuco, the Spiritist Fraternity Francisco Peixoto Lins - Peixotinho and Internet Health Solutions. The action had target audience people in the community and was developed semi-presential form, organized into three different class points throughout the metropolitan area and in the state (Recife, Arcoverde and Afogados da Ingazeira). All sessions were transmitted by web conference. The course was organized into four modules, where students were evaluated by frequency and activity programs, together with a lecture techniques, case studies and problem solving.

RESULTS: The course had approval ratings of 72% of its students, as well aswas recorded the withdrawal of 14 enrolled students who have not seen the course of the course during the course of the first teaching module. At the end of the last class, students and monitors were encouraged to respond to a questionnaire to evaluate the course, with questions related to the agility of the facilitators, program content, resources, among others. The returns analyzed from this assessment were very good, especially the following results in the survey: 82% of the research rated the course as excellent; 12% Very Good / Good and 6% did not answer the question; The average self-assessment performed by the students for their participation in the course was 8.27 points; The average course rating was 9.8 points. The first edition of the course of Caregivers of Seniors, we emphasize the success of the actions carried out by assigning to the joint effort, planned and coordinated as essential to the course of quality processes.

CONCLUSIONS: It is considered that the offer of the course contributed to the creation of a consolidated space for the production of knowledge in distance education directed the community through digital inclusion process, reducing social and regional differences by providing the same means of access education and information and democratization of access to education by breaking geographical barriers inherent in the process of access to information. ■

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A successful teledermatology experience in rural communities of Rio Grande do Sul

Thais Russomano[1]; Angus Wilson[2]; Lloyd Rickard; Ana Maria Bender Seidenfuss; Lucas Rehnberg

INTRODUCTION: The exponential advancement of information and communications technology (ICT) continues to aid the drive towards universality and equitability of global healthcare, telemedicine being one of the tools used to achieve this.

Since the introduction of the Unified Health System (SUS), access to healthcare has vastly improved for a significant proportion of the population. Despite advancement, the Brazilian healthcare system continues to face major challenges in achieving sustainability and equality. Telemedicine is considered one of the ways to bridge this gap.

Teledermatology has become a successful area of telemedicine, being implemented all over the world. Images of lesions, and even histopathology slides lend themselves well to this speciality in telemedicine that has flourished.

In the state of Rio Grande do Sul, these public telemedicine services are limited. In partnership with the Telemedicine Laboratory of the Microgravity Centre at the Pontifical Catholic University of Rio Grande do Sul (PUCRS), a telemedicine mission with specialist medical services was offered to remote rural communities.

1. To offer a teledermatology service to rural areas of Palmares do Sul, Camaqua City, and Cerro Negro, in Rio Grande do Sul

2. To audit and further refine the methodology of providing an effective telemedicine service

METHODS:

Phase 1: Training

Six medical students from the United Kingdom were recruited to work alongside the Telehealth Laboratory, Microgravity Centre at PUCRS. Training was undertaken in several areas; data entry using the electronic patient software, understanding of the patient consultation process, and familiarization with the equipment. The software and equipment used on this mission was developed by the Telehealth Laboratory, and has been validated in previous telemedicine missions.

Phase 2: Telemedicine Mission

The mission involved telemedicine projects at several locations within and around Palmares do Sul and Camaqua City. Between 25th April and May 9th 2015 a project of teledermatology was undertaken in partnership with local health services. A team of six medical students and English to Portuguese translator, with the support of the eHealth League of students of PUCRS, travelled to several locations and gathered clinical data for the specialist to review in Porto

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Alegre. The patient consultation process involved 3 stages to maximize efficiency of clinical time:

1) initial triage of patients using paper records

2) digital photography of skin lesion(s)

3) Entry of clinical data onto the electronic patient software.

With readily available access to transport, telecommunication equipment was not required for data transfer. Instead, the 'store-and-forward' technique was used for secure data transfer to the appropriate specialist in Porto Alegre.

Phase 3: Data Analysis

Necessary parts of the electronic patient records were translated into Portuguese prior to transfer to the appropriate specialist via secure servers at PUCRS. Once the specialists received a patient's data, they then gave their clinical diagnosis and management plan. This was relayed to the local health centres where local healthcare professionals implemented this advice. Patient demographic data, occupation, environmental exposures and dermatological exposures were compiled into Excel spreadsheets for auditing.

RESULTS: During the mission, a total of 49 dermatology consultations were carried out. Two patients required input from both cardiological and dermatological services during the mission. The gender divide of the patient population was 29 being female and 20 being male with patients ranging between the ages of 6 to 79 yr. The mean (± SD) age of all patients seen was 44.9 (± 21.4) yr. Of these patients, 27 were employed, in jobs including nursing, cleaning, fishing and farming.

An extensive medical history of all patients was taken and inputted into the electronic patient software alongside a digital image of the relevant dermatological issue. For each lesion, we took 2 pictures of the lesion. A 'General' picture to get a scale of the lesion and demonstrate it's location, and a 'Local' image to get a high resolution image for the specialist to identify and diagnose the lesion. Every picture has a scaling ruler in the frame to accurately determine its size.

Patients were seen in various locations throughout the state of Rio Grande do Sul. Of the total 49 patients, 15 were seen in Camaqua city, 12 in Palmares do Sul, 9 in Cerro Negro, 7 in Asilo Municipal, and 6 in Banhado da Coligie.

The team were able to provide specialist services to patients that needed it in these communities. It was evident that many in these rural communities had been neglected by their local healthcare system. In the UK, General Practitioners help diagnose minor or benign conditions and regularly oversee the management of long-term conditions.

This includes some conditions such as acne, of which we had 5 patients presenting with this complaint, dermatitis and psoriasis, of which we had 11 presenting complaint. From the consultations, the team saw several patients who had their condition for almost a decade without any treatment or specialist input, simply because they didn't have access.

CONCLUSIONS: Telemedicine is at the forefront of a medical revolution. In developing countries, such as Brazil with different geographical, cultural and socioeconomic characteristics, telemedicine can bring healthcare to those that simply don't have any. There are many isolated urban and rural communities in Brazil, from the Amazon tribes to the patients we saw, and public healthcare should strive to be equal throughout all levels of society.

What made this missions different to those in the past was the use of healthcare professionals and translators. The team showed that trained clinicians, with some technical training, can provide an effective teledermatology service to rural communities, potentially superior to having just trained technicians to collect patient data. This mission showed that teledermatology should not just be a one-off service, but should become a regular service to these rural communities to monitor their dermatological conditions; thus improving their quality of life and reducing the risk of future pathology.

This telemedicine mission supports other projects that suggest telemedicine can be a useful tool for rural healthcare facilities. They can act as regular clinics for tertiary hospitals in Porto Alegre and aid in the monitoring, management and diagnosis of dermatological disease for family doctors. ■

Teleducation in Brazil Telehealth Network: evaluation of distance education in the context of the Family Health Teams, Introductory Course, Telehealth Center in Mato Grosso do Sul

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INTRODUCTION: The first class of the "Introductory Course for Family Health Teams (ESF): Using tele-education resources for large-scale" as tele-education activity Telehealth Mato Grosso do Sul, took place in the period of April to August 2013, with 280 vacancies offered, divided into 14 groups and 24 teams participating, with 235 professionals that completed the course. Offered by the Center, located in the Telehealth State Coordinator, in the State Secretary of Health of Mato Grosso do Sul, the logic of the course was the participation of the entire team simultaneously using active methodologies with problem-situations to trigger the teaching-learning process to each of the four modules, and materials organized in the library for the study of topics, discussion forum for module and a task in Moodle to be made as a team, able to contribute to the improvement of the work .Thus, this paper aims to describe the perceptions of Family Health professionals that evaluated the course through questionnaires in the environment virtual learning of the course.

METHODS: This is a study with a quantitative, descriptive approach, based on secondary data from the completed questionnaire in the 4 modules of the virtual learning environment (AVA) that made up the course offered from April to August 2013. A survey was conducted by modules and in each of them, there were sought perceptions of students regarding the material (teaching guide, textbook, problem situation, readings, videos), forums, tasks, tutor, self-assessment, peer assessment and the virtual learning environment. As it was not compulsory to reply the questionnaire, not all students did it. From 277 students who began the course, 235 finished. The evaluation questionnaire was made available at the end of each module, and students were told to fill it out by the course coordinator and tutors. Thus, the total of students who completed the course (235), the module I, whose central theme was the Unified Health System (SUS) in Brazil SUS, 204 answered; the module II, about Health Promotion, 219; in module III, referring to the Labour Process in Primary Health Care, 163 answered; and in Module IV on the care coordinating role the Health Care Network of Family Health Strategy, 181 students answered. Preceding data collection was requested authorization from the State Department of Health, which hosts the website of the State Coordinator of Telehealth MS. The collection was started after approval by the Ethics Committee of the Federal University of Mato Grosso do Sul (Opinion 825 863, of September 30, 2014, Platform Brazil).

RESULTS: According to obtained data from the evaluation of the material, it was found that text by module guides met the objectives and orientation of the joint materials. The textbook compared to other materials and proposed

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activities (problem situation, readings, videos) forum and tasks, although with little difference was better evaluated by students (86,83% rated as excellent or good). The organization of the content was performed by professionals from the Primary Health Care and Distance Education and were produced based on materials of the Ministry of Health - Brazil, scientific articles, state documents and was very highly rated by most students (87.35% assessed as excellent or good). With regard to the tutor racing aspects, various items were evaluated, and it was possible to verify the excellent evaluation by the majority of students. It was observed in this study group that tutors adequately fulfilled their role in the teaching-learning process of the course. Tutors were followed by the pedagogical coordination of the course, and before each module there was a presential meeting of tutors to study together the module of time, ask questions, pass on content, forums and tasks. Also the pedagogical support was given when necessary, being made feedback to tutors by course coordinator every module. The presented data also indicates that half of the students that answered to the survey, assessed how great the response time for questions at the forum. It is important to relate that the selection of tutors took into account experience in Primary Care, in active learning methodologies as well as in distance education, which resonated with an average of 53.25% of the tutors considered great in the evaluation performed. More than the half of students felt great (55.0%) or good (29.7%) with the encouragement of the tutors for the use of Virtual Learning Environment. The self-assessment carried out, enabled the analysis of the students in their learning process. Most considered "Good" performance and autonomy. Student responses indicate better interaction and collaboration group, while the course was developed, which can be observed with the highest percentage in the concept "Great" in modules 3 and 4 compared to modules 1 and 2. The Distance Education is presented as an appropriate strategy for achieving the Introductory Course for Family Health Teams. Regarding to the course structure, the data show the material, forums and task, content, tutor and the virtual learning environment serve and retain motivated students to complete the activities.

CONCLUSIONS: In the period from 1998 to 2011, when the State Public Health School of Mato Grosso do Sul coordinated the supply of Introductory Course, there were 275 classes, having been trained 5637 teams of professionals. However, due to high turnover of professionals in teams and as new teams are constantly deployed, there is the need to expand access with the possibility of greater number of places simultaneously in order to provide the skilled labor, results, changing the practices. Thus, the avoidance of course was 15.17%, considered excellent for a distance learning course, as percentages of evasion EAD to certification courses exceed 60%, according to local data in Brazil. Therefore, this method can be considered successful, although further studies should be conducted, always including opinions and perceptions of all subjects involved in these teaching-learning processes. So, how tele-education action, the evaluation allows the affirmation that the course is presented as a powerful tool in continuing education health, expanding access of PHC professionals in Mato Grosso do Sul to information, promoting the upgrade practices and fostering discussion about improving access and quality of care, fulfilling its role within the Brazil Telehealth Networks National Program. ■

Assessment of the diagnosis capacity and the impact of the EAD (Distance Learning) course "Stomatology in Primary Health Care" held by TelessaúdeRS to public

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INTRODUCTION: Oral cancer has a high mortality rate in Brazil, and it has not changed much over the last few decades. Such data may be explained by the substantial number of cases in which the diagnosis is late established. Updating courses in the field of oral diagnosis for professionals acting in Primary Health Care (PHC is not well known and it is a strategy that will likely change this picture). The main purpose of this study is to evaluate the diagnostic capacity of health care professionals who participated in an updating course in Stomatology, held on the remote mode, offered by Project Telehealth RS/UFRGS. Secondary purpose is to verify if the course impacts in the improvement of professionals' diagnostic ability.

METHODS: The study is descriptive, with convenience samples from 24 dentists, 11 nurses, 2 nutritionists, and 14 participants who did not inform their professional class. Those professionals were members of Family Health teams in the state of Rio Grande do Sul, who were part of Project Telehealth RS/UFRGS, enrolled to the course "Stomatology in Primary Health Care". Such course was held from August to December 2014. All participants were invited to perform a diagnostic capacity test (pre-test) composed of 33 pictures of oral lesions. From these images two questions were asked: (a) Question 1 (P1) – In your opinion, is that a benign lesion (inflammatory lesions or benign tumors), potentially-malign disorder (lesions that predispose the patient to occurrence of malign tumors) or malign tumor? and (b) Question 2 (P2) – What is your diagnostic guess? Twenty-seven (27) participants answered the pre-test. Then, all participants in the course had access to contents related to the clinical exam and different types of oral lesions, totaling 26 hours of course throughout 4 months. After such period, all participants were invited to repeat the performance of the initial test (post-test) in order to evaluate the course impact.

RESULTS: Only 8 dentists (30% of respondents in pre-test) answered the test. For sensitivity and specificity analysis, potentially-malign disorders and malign disorders were considered as a single group, in view of the similar clinical presentation observed in some cases, and due to the fact that they require high priority in decision taking. Pre-test analysis pointed out that the rightness index for P1 (64% x 38%), for P2 (46% x 5%) and for specificity (73% x 39%) of dentists was higher than that of non-dentist professionals (Student-t test, $p<0.01$), but sensitivity was similar among groups (68% x 62%, Student-t test, $p=0.38$). Comparison of rightness test from 8 dentists, before and after the course, showed an increase from 48% to 56% in the rightness rate for P2 (paired Student-t test, $p=0.05$). In relation to P1, sensitivity and specificity showed no change after the course. Study results indicate that the health professionals of PHC present satisfactory diagnostic capacity and non-dentist health professionals may contribute in tracing oral

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lesions. However, this offered course did not significantly improve the diagnostic capacity of participants regarding oral cancer detection of potentially-malign lesions.

CONCLUSIONS: Based on the results, it may be concluded that permanent education strategies related to oral lesions should be qualified, aiming to improve diagnostic capacity of health professionals regarding oral cancer diagnosis. ■

USE of ICT: In Health Promotion and Prevention through the telehealth tools

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Emanuel de Jesus Soares de Sousa[3]; Amanda Sueli Souza Peres[4]

INTRODUCTION: The scenery changes occurring in the midst of social, political and economic ends up directly affect the quality of life and the constant quest to achieve improvements in access and quality of life of users of the Unified Health System - SUS passes the technology to be an important tool for the empowerment and involvement of professionals from public health. As resource optimization strategy focused on the field of public health, specifically the NHS was officially created in 2009, the space nominated Laboratory Telehealth / Telemedicine, belonging to the State University of Pará-UEPA, with the aim of organizing, implementing and sustaining the projects in telemedicine and telehealth in the areas of health education, tele-education and tele-assistance through training ethical professional and able to act in the SUS, with craftsmen of paradigm shifts in assistance on Health population.

OBJECTIVES: Improving quality of care in primary care in the SUS, with positive results in solving the primary care level; Cost reduction and time shifts, health professionals Fixing in hard to reach places; Optimizing the care provided, thereby benefiting the users of SUS.

METHODS: The activities of the UEPA Telehealth Manager Core can be described succinctly in synchronous and asynchronous. In synchronous activities, teleconferencing technologies are used (web conferencing), with the high-speed (video conferencing) and high definition (telepresence) and a skype service as a facilitator for computer support. Distance learning courses are available in the forms, semi-distance and distance exclusively to healthcare professionals at all levels linked to the system.

RESULTS: The Telehealth Management Center, in partnership with the state Department of Public Health of Pará and other organs, performs actions in favor of Telehealth Networks Brazil Pará Project, among the actions taken have the technical visits in Basic Health Units, in several municipalities, following a design schedule of the 13 Regional Health Centers. - CRS, Pará In when the technical visits seeking a situational diagnosis, more accurate. Until now, it has been held technical visits in eight state health districts.

CONCLUSIONS: The creation of a physical space within the Pará State University - UEPA that promotes education to support health through virtual environment, specifically with various resources branch of the Information and Communication Technology, as well as of its apparatus consists of a team of Technical Information is a pillar promote integration among professionals working in the Family Health Strategy, with professional experts who work in the capital, metropolitan region of Belém. Since this is a unique opportunity to realize the interactivity and promote continuing education of these professionals working in the municipalities of difficult access. Seeking in this way break certain paradigms and promote a work outlined in the perspective of universal service. ■

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Telemedicine pilot project in a Pediatric Intensive Care Unit of a University Hospital

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INTRODUCTION: The use of telemedicine in critical care has been rapidly increasing over the last decade. Its potential benefits include decreasing healthcare costs and length of hospitalization, improving parental satisfaction and reducing quality gaps even in well-staffed intensive care units. We describe the use of a wireless, mobile, robotic telecommunication system in the Pediatric Intensive Care Unit (PICU).

METHODS: We have designed and applied an evaluation protocol for the use of a robotic telecommunication system during daily multidisciplinary rounds (through a desktop computer in the PICU) and during night shifts and weekends (through a tablet). A questionnaire was filled in by the intensivist after the rounds. The portable device used was the semi-autonomous RP-7i® robot (Intouch Health, USA). The project was carried out during October, 2013, when we started using the above mentioned robot.

RESULTS: We analyzed all the protocols related to 21 telemedicine sessions in the PICU. As to the visual quality, image resolution was considered excellent in 14 sessions (67 %) and good in 7 sessions (33 %). Image transmission was considered bad in only one session. Communication between users and usability were considered excellent in almost all the analyzed sessions (more than 95 %), as well as the impact on the care provided to the patients in the PICU and the development of daily activities by the intensivists.

CONCLUSIONS: The telemedicine pilot project results seem favorable to the use of the robotic telecommunication system as an evaluation tool of patients in the PICU by the intensivists. Its greatest advantage is to allow for a more objective patient evaluation by the intensivists, as well as for easier communication among the critical care team, during night shifts and weekends. This could enable more consistent clinical programming. This mobile system also allows for multicenter discussions and remote specialists consultation. These promising results have encouraged us to continue to use the device in our routine practice in the PICU. ■

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Teleconsulting on multiple platforms. The experience of SC Telehealth Center with use of mobile devices.

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INTRODUCTION: The Santa Catarina State Telemedicine and Telehealth System – STT is the new generation of Telemedicine and Telehealth portals that were developed in 2005 (beginning of Telemedicine) and 2007 (beginning of Telehealth in the state). In 2010, it evolves to a new and modern website version that unified the Telemedicine and Telehealth programs in Santa Catarina state. Focused on the Primary Health Care level and avaliable in all municipalities of Santa Catarina state, the STT is a web system that offers the following services: Clinic Teleconsulting, Work Organization Process Teleconsulting, 0800 Teleconsulting and Dermatology Clinical Management; Web Conferencing; Distance Learning Courses; Telediagnostics and Telemedicine in Hospitals radiology sectors .With the Internet and mobile devices popularization, new health services might be offered to health professionals through smartphones and tablets.

With telehealth services accessible by mobile devices, regulators can refer teleconsultation and the professionals attended by the system can use the application to request teleconsultation, access them when answered and watch the recorded web conferences through their smartphones.

The aim of this study is to present the migration experience of the services offered by Telehealth-SC to *Android* and *iOS* mobile technologies.

METHODS: Initially, several meetings were held with the telehealth staff, health professionals and Information Technology (IT) analysts involved in deciding which telehealth services would be migrated and which technologies would be used for development. Considering that the application would be used by all users (administrators, teleconsultants, consultant regulator and health professionals), it was decided that the application should include the teleconsulting, web conference and web conference collection services.

During these meetings it was decided that the application should offer something more. It is known that many health professionals can not always participate in the web conferencing when they are happening online, so it was decided that the application should permit access to all the material produced in these web conferencing (electronic presentations, documents and recorded video). It was also decided that it should be possible that the application could be accessed by mobile phones and tablets and should have two versions of applications: a version for the Android platform and another for the iOS platform.

After collecting and analyzing the requirements through these meetings, the development of application called "Teleconsulting" was started. This development process was divided into four steps: 1 - Design of the system screens; 2 - System Development; 3 - Development of a web service for communication with the STT database; 4 - Testing.

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In the first step, the system screens design was carried out by following usability standards of each platform and adapting them to different types of devices (smartphones and tablets).

To the system development it was used the Java and the Objective-C programming languages. The Java language was used for the application development for the Android platform and the Objective-C language for the iOS platform. The software life cycle followed the Scrum model, which is divided into three phases: Pre-planning, development and post-planning. To guarantee that Teleconsulting application could access the data recorded on the STT database, a web service development was needed to send the information stored in the database to the application, and vice versa. This web service was developed in PHP language and transported the data using the JSON data format. And finally, the last step was the testing to verify that the application attends the user requirements.

RESULTS: The teleconsulting application is free and available in the Apple Store and Google Play store. However, to use the application, the user needs to be registered in the SC Telehealth Center.

The application has two modules: teleconsultation and Collection. Through the Collection Module, users can watch videos and look at the materials available on web conferencing; the teleconsultation module features are customized for each user profile on the system.

Each user registered in the system may receive one of the following profiles: Student (professional), Tele-regulator, Teleconsultor or Administrator. The student profile user can access the following features of the teleconsultation module: teleconsulting request; view his teleconsultings; and evaluate his teleconsulting request. The Tele-regulator profile user can view all teleconsultings requested by the student profile users, correct questions, set a theme for each teleconsulting and refer the questions to a teleconsultor. The Teleconsultor profile user can view the teleconsultings sent to his user profile. The administrator can view all teleconsultings.

The main advantage of having access to health services by smartphones is the breakdown of the mobility limitation and the possibility to use it anywhere, considering that the smartphones are like pocket computers.

The use of the Teleconsulting Application facilitated the health professionals access to their teleconsulting requests. In addition, it enabled the visualization of web conferences held and shared on Collection.

The system is also being widely used by professionals working in the SC Telehealth Center that are requested to follow teleconsultings and also track the responses time. Furthermore, it brought a greater facility for tele-regulators because they can refer the teleconsultings requests to teleconsultants as soon as possible, thus extending the answer time within 72 hours.

Currently, the system has already been installed by 282 users, with 197 on the Android platform and 84 on the iOS platform.

CONCLUSIONS: Contemporary mobile devices are becoming increasingly popular, have sufficient computational resources for running services, and hence are a natural device for telehealth applications.

Unsurprisingly, although people are increasingly out of time, they are more connected, and the smartphones are the mechanism to make it happen. It is also known that APPs tend to arouse some interest and curiosity in people. Thus, appropriating this "fever", the applications supply for mobile devices is a great chance to add more users to the STT

system and transform theTeleconsulting Application in a more common tool in the health professionals daily life, what gives phones and tablets applications a key role.

The presented technology solution provides another resource that can be used by SC Telehaelth Center users, taking into account that the use of such equipment is increasingly widespread by people.

Specifically in relation to the Tele-regulator profile features, the application allows the quick teleconsulting refer to teleconsultor respond, saving time and increasing the service quality. Furthermore, teleconsultants can monitor the teleconsuting demand to answer questions even if they are not near a computer. ■

Telehealth: The territory achievements and the limits of digital inclusion in Primary Health Care of Sergipe

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INTRODUCTION: The new information and communication technologies (ICTs) are present in almost everything. In health area, these innovations have provided the increase in care, qualifying diagnoses and ensuring possibility of better treatment, through greater propagation and speed access to information, make it accessible to scientific research and therefore intervening in decision making. Nevertheless, there are still limitations to ICT implementation, whether through infrastructure due to the country territorial extension hindering the internet coverage, despite of the existence of programs that aim to enable and/or expand access, be through more subjective issues such as the real possibility of experiencing and be allowed to use ICTs. In this context, Telehealth comes as a support tool to the needs that appears during the care process construction in the territory, establishing ties and providing the process construction of different make from the Family Health Teams (FHT). Thus, this study aimed to demonstrate and analyze the experience results of Sergipe Telehealth in the technologies approximation to Primary Health Care (PHC) professional's daily works, strengthening the value of use of this tool and facilitating to health information, optimizing existing resources and qualifying health care.

METHODS: The methodology was guided with the activities and workshops of the field work´s team, considering that were during these actions that had an approach and the possibility to visualize and feel the difficulties of the use of ICTs, as well as present the importance of using telehealth, approach and detect the needs for digital workers inclusion. It has as methodological itinerary the following steps: awareness workshop and training telehealth platform. These meetings were held on the own unit, using telehealth deployed points, 01 FHT at a time and 04 hours duration, and closing, with the Platform Training. It was fundamental to building links and made the employees think about their care practices, teamwork and importance of continuing healthcare education (CHE). The training was important to show and make them use the tools offered by telehealth Sergipe, such as telehealth platform, the search for second formative opinion and virtual access to web conference room. In addition, emails have also been created to the workers who haven't had it, giving special attention focused on each employee need. Another step performed was the analysis of reports records of the field work, between February and June of 2015, analyzing the speeches record of the employees about the difficulties of digital inclusion and the results of semi-structured surveys. This instrument had a specific question about the desire to carry out basic course in computer usage and internet and the professional identification was optional.

RESULTS: The workshops allowed the workers realized in telehealth a powerful professional qualification tool through the technology usage, and cause moments of reflection, led them to think about how to act in PHC, favoring during

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training, a propitious movement to identifying their needs and difficulties regarding digital inclusion. In addition, it allowed the use by people who were technology afraid, because they were stimulated, from their practices, to use the telehealth platform, research the second formative opinion and to know the web conference room. The email creation for employees allowed a closer relation and a beginning to the digital inclusion process, through the explanation of the use, care and importance, making them realize the team willingness to help them in this process and in their future use. Analyzing the speeches record of the employees, it was identified that a significant part of the employees had fear or shame to use the computer, because it is a distinct reality of their daily work and before Telehealth, there weren't equipment availability with internet access that could be used. Through the survey it was noted that of the 435 employees, only 39% said they needed to participate in a basic training course for the use of ICTs. Representing a significant number and this may be greater, in view of factors like fear to take on this deficiency, because of the 72.2% who spoke, didn't specify the professional category they belonged to, because the optional identification. Among the professional categories who expressed, 21.8% were community health workers, 3.0% oral health auxiliaries and/or technicians, 1.8% auxiliaries and/or technicians nursing, 0.6% doctors and 0.6% nurses. These data shown the need to create an alternative to identify each employee and his difficulty with computer use, so in June/2015 was added to the entries' monitoring spreadsheet, used at the workshops beginning - each employee checks your registration data – the questioning about their difficulty with computer use. The field team explained why the questioning and through a more individualized attention, was able to identify professionals who have difficulty in the use, which is allowing better know who and what professional categories have this difficulty.

CONCLUSIONS: The Telehealth can minimize the current context of the FHT, in his little reflective and shared daily work, with moments of qualification and continuing education, but to break this practice is important to find ways to promote digital culture, receptivity and adaptation to changes which are essential to the program success. In this regard, efforts have been made to identify and assist those who were in need and approach and sensitize the more resistant employees to know the importance and potential use of ICTs, particularly of Telehealth in daily work. Front profile of the FHT and qualification deficit, it is necessary to have a specific look of welcoming and strengthening of these workers, understanding the dynamics of each daily reality so that the Telehealth program can effectively move aiming to SUS universalization and consolidation. Bringing the needs of conducting basic course for digital inclusion of PHC workers covered by the program in the State, as subjects in the space of interaction and communication of new forms of collaboration, interactivity and knowledge for it occurs more pleasant, functional and efficient, increasing the use value and the actual prospects of access to information and building knowledge. ■

Paradigms of the insertion of new information technologies in primary care

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INTRODUCTION: Ordinance n. 2554, October 2011, instituted, under the Rehabilitation Programme of Basic Health Units, the informatization component and Telehealth Brazil in primary care, integrated into the National Telehealth Brazil Networks Program. One of the services offered of telecare is the Second Formative Opinion which consists of structured and systematic response to questions put by the Family Health Teams, from Telehealth points and the Advanced Telehealth points, on topics related to diagnosis, planning and execution of actions, individual and collective, about the work process or linked to clinical cases attended at Family Health Units. The program in question is structured in network form, which includes University Nucleus of Telehealth, Telehealth points and advanced points Telehealth. The computerization of health units is given from the installation of computers with internet, multimedia kit and webcam. Besides the registration of these units as telehealth points in the National Register of Health Establishments which is conducted by the health secretariat of each county consortium to the respective Nucleus of the region to which it belongs. Report this process of implantation in basic health units, the challenges encountered by the monitors and professional of units is the objective of this experience report.

METHODS: A qualitative study of type experience report of the implantation of telehealth program in health units of the Limoeiro/PE, in January 2014.

RESULTS: The organization of implementation activities and training of professionals was previously agreed with the coordination of Primary Care, which dispensed the professionals from the health units registered to participate of the training. This action occurred after adequacy of computers in the Units and the internet installation. For everyone to participate was made available by health secretariat a school with 20 computers for it to be possible to carry out the training of team members and clarify doubts. The goal and applicability of telehealth program were presented as well as emphasizing the benefits for permanent education of professionals and resolubility of actions for users. Later, it was request to professionals make available their respective digital address to register on the platform. Presented a tutorial to access the platform and how to perform the second formative opinion, with problematized examples from the reality of professionals. At that moment it was clear the difficulty of some of the professionals in basic computer issues, although the system has an easy handling interface. The improvement of health professionals to use technological tools demand a multiple approach: learn about computers and its applications for health; learn through computers, using it as a facilitating tool for continuing education; learn with computers, incorporating it into their routine work as an ally in clinical practice. The resistance of professionals to adhere to the new technologies can be evidenced by the difficulty in handling the equipment. The popularization of computers occurred in the decade and some professionals have not had the chance to incorporate this new technology in their professional formation. Face

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of this result, monitors of Telehealth guided professionals to seek conduct training on the computers of the units and raise awareness regarding the use of this tool as an ally care, emphasizing its benefits and that this should not be reduced just one more task.

CONCLUSIONS: The use of information technologies in health care is an innovative tool that enables and requires that health units have an appropriate infrastructure as well as a reorganization of activities to encompass this new instrument. It is necessary that the difficulties expressed by professionals to adhere the new technologies are identified and thus work for this tool to be seen as a opportunity of search of the integrality of care provided in a timely manner, increasing the potential for solving of primary health care and without shifting of customers to great centers of secondary care. ■

Tele-NICU Project in Minas Gerais State, Brazil: an experience report

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INTRODUCTION: The development of information and communication technologies has propitiated important contributions to projects of the health sector, and have favored the perspectives of sharing knowledge between diverse levels of care and management, leading to the qualification of the assistance. Tele-ICU can be defined as the provision of care to critically ill patients by health care professionals located remotely. There are different kinds of Tele-ICU systems. It is possible to use fixed or portable equipment, centralized or decentralized staffing strategies, and open and closed communications architecture scheme. Tele-ICU programs have the potential to target processes that are associated with better outcomes and higher rates of adherence to critical care best practices. In the state of Minas Gerais, Brazil, neonatal mortality is still high. A partnership between the Federal University of Minas Gerais (Universidade Federal de Minas Gerais - in portuguese language) and the SES/MG (State Health Department, Minas Gerais, Brazil/ Secretaria de Estado de Saúde - in portuguese) permitted to develop a Tele-NICU (Tele-Neonatal Intensive Care Unit) project in order to improve neonatal care throughout the state. The child mortality rate in 2010 was 13.1 deaths of child under one year old per 1,000 live births.

METHODS: This is a descriptive study of the NICU Telemonitoring Center project that was active from December 2012 to Setember 2014 in the State of Minas Gerais, Brazil. In a pioneering form in Brazil, activities of teleconsultation and webconferences were developed as a form to offer support care to neonates. Pediatricians and nurses, experienced in neonatology and intensive care are available 12 hours per day, seven day a week in the Telemonitoring Center to discuss the cases with the professionals directly responsible for the assistance via online teleconsultation. Quantitative analysis of the data was done. The study was approved by UFMG and SES/MG Ethics in Research Committee (CAAE: 32401214.4.0000.5149). The newborns parents agreed to provide information for the study by signing the Informed Consent Form (Termo de consetimento livre e esclarecido - in portuguese).

RESULTS: From December 2012 to July 2014 at about 6,903 teleconsultations were performed between the Telemonitoring Center and 17 NICUs. The teleconsultations to subspecialists were requested in specific more complex cases. During this period, 149 teleconsultations with subspecialists were performed. The data demonstrated that the more requested subspecialists were cardiologists (n= 42), neurologists (n= 23), pediatric surgeons (n= 22), infectologists (n= 19), nutrology (n= 16) and geneticists (n= 11). Hospital transfers were avoided with this service. The Hospital Bed Regulation Center interfaced with the Central and it was important for the best decision of transfers and triage of the neonates. The content of the webconferences is chosen according specific needs of the professionals. The presentation lasts 30 to 40 minutes and, at the end, it is possible to clarify doubts through chat. The webconferences are

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recorded and, later, made available to all the professionals. In addition to that, the professionals of the Telemonitoring Center prepare medical and nursing protocols, in order to supply care subsidies for the colleagues of the NICU to be open. Best practices were improved and the training in service was possible. Scarcity of specialized medical staff is a widespread problem and telemedicine can help to solve this problem. The NICU model can be extended for other Brazilian regions as there is professional resources scarcity, in special of pediatricians and subspecialists with experience in neonatology and intensive care. This system also has the potential to reduce costs by reducing expensive and sometimes risky transportation of neonates for subspecialist consultation.

CONCLUSIONS: Telemedicine can improve the quality of care, the efficiency and effectiveness of resources and provides support for remote areas health professionals in order to qualify the neonatal assistance, decrease the rate of transfer to higher levels of care and consequently reduce neonatal mortality. This Tele-ICU project was pioneer in Brazil and its development was important as a model of facing disparities in access to specialist physicians. Further study is required to adequately analysis of Tele-ICU models with regard to clinical outcomes and financial sustainability. ■

Relato de experiência das atividades de telerregulacão de solicitações de teleconsultoria assíncronas para educação na atenção básica – São Luís- MA

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INTRODUCTION: Adequate training of professionals working in Primary Health has encouraged the development of new tools for education in primary care. One such tool is the information technology, through the Telehealth Program Brazil Networks which has a central role in the dissemination of distance learning. In January 2013, the University Hospital Telehealth Nucleus of the Federal University of Maranhão in the state of Maranhão, began its activities for the implementation of Telehealth Project, preparing your staff through workshops and training, with participation in courses offered by the National Research Network. In April 2014 began the deployment of telehealth points in Basic Health Units and initiated the Telecare actions contemplated in the municipalities. The teleconsultation requests are made as Asynchronous and Synchronous and are tele-regulator for teleconsultants trained in Primary Health Care. This study aims to report the experience of tele-education service, through teleconsultation, the Telehealth Program in Brazil Networks Telehealth Center, University Hospital, Federal University of Maranhão, in São Luis.

METHODS: This is a descriptive study, the case report type from the experience of Tele- Education of Telehealth Nucleus HUUFMA service. The data are from the database provided by the Telehealth Program Brazil networks - Scientific Technical Center of the University of the Federal University of Maranhão Hospital, the period of its implementation until June 2015.

RESULTS: The telemedicine center at the University Hospital of the Federal University of Maranhão intensified tele-education activities, through the answers asynchronous and synchronous teleconsultation from June 2014. At the time account teleconsultants 11 (including five doctors, three nurses, two dentists and a psychologist) and a tele-regulator (doctor). The teleconsultation is requested by telessaude.ufrgs.br platform, analyzed by a tele- regulator that sends the teleconsultants with experience in the relevant topic. The Telemedicine Center of the University Hospital of the Federal University of Maranhão since its implementation until June 2014 asynchronous requests received in 1151, 616 being read and evaluated, 187 completed, 172 waiting reading, 51 awaiting evaluation, 73 canceled, and the other at the time of data were collected with the answer running.

CONCLUSIONS: It is concluded that the University Hospital Telemedicine Center of the Federal University of Maranhão made a positive result, given that the 1078 tele answered 57.1% were read and evaluated quantitatively and one made up of 50% well accepted by professional attention Basic. In total 1151 applications only 6.3% were canceled and 17.3% of answered consultancies have been finalized constituting a minor percentage because many times these cancellations have occurred due to user error in the handling platform. With effective participation and interaction of the Telemedicine Center, University Hospital, Federal University of Maranhão is helping to improve the quality of care and primary care in the Unified System of Maranhão state Health, integrating teaching and service through the use of technology tools information. ■

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Over two millions electrocardiograms by distance: a milestone for telecardiology in Brazil

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INTRODUCTION: Minas Gerais is a Brazilian state with large territorial dimension, with an area equivalent to France, and important social, cultural, economic, infra-structural and geographical contrasts. As the whole country, specialized care is concentrated in the largest cities. Despite being simple, inexpensive, easy to perform and available at all levels of healthcare, the interpretation of the electrocardiogram (ECG) in small towns is difficult due to lack of trained professionals for analysis. The Telehealth Network of Minas Gerais (TNMG) is a public telehealth service that performs teleconsultation and telediagnostic services, including ECG analysis, to help improving healthcare for the population who live in distant and poor regions. The objective of this study is to describe the evolution of the telediagnostic service provided by the TNMG.

METHODS: This is a descriptive study. From the union of experienced and qualified researches from 5 university hospitals, the TNMG was funded (Universidade Federal de Minas Gerais [UFMG], Universidade Estadual de Montes Claros [Unimontes], Universidade Federal de Uberlândia [UFU], Universidade Federal do Triângulo Mineiro [UFTM], Universidade Federal de Juiz de Fora [UFJF]) in 2005. It started to perform telehealth activities in 2006 as a research project. As cardiovascular diseases are the leading cause of death in Minas Gerais and remote areas have a serious shortage of cardiologists, the project was focused on telecardiology, specifically tele-electrocardiography, and included primary care centers of 82 cities. The project proved feasible and financially sound, and this success led to successive expansions to other cities and incorporation of other activities, with financial support from federal, state and municipal governments. In 2009, the Universidade Federal de São João del Rei (UFSJ) was included in the TNMG. Using low-cost equipment and simple technology, TNMG has employed various strategies to overcome barriers and to improve/increase telehealth use. The utilization rates are monitored by a specialized team. The telecardiology system was developed in Java EE and PHP associated to a PostgreSQL database for compatibility with others software developed in the service. Progressive expansions were performed to other cities and other levels of care, and new applications were developed and validated, to increase the exams performed, such as Holter, ambulatory blood pressure monitoring and retinography analysis. A new tele-electrocardiology application to use in Androids was also developed, to allow usability in ambulances. Technology and maintenance methodology are constantly evaluated and improved. Periodic audit was implemented to assure quality of the ECG analysis.

RESULTS: The TNMG currently attends 780 of the 853 cities of the state, including 4 secondary care units, 7 emergency care units in Belo Horizonte, the state's capital, and 48 ambulances in the north of the state, as part of a myocardial

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infarction system of care. The TNMG has analyzed over 2.1 million ECGs, a remarkable milestone for telehealth in Brazil, and 66,361 teleconsultations, 169 ambulatory blood pressure monitoring readings and 663 Holter recordings. During the whole period, the monthly ECGs' service utilization rates were around 90%, that shows that the service was well accepted by the healthcare practitioners and incorporated to the health system of the municipalities. Therefore, the telecardiology is nowadays a regular health service in the state, integrated to the healthcare system. The service proved to be economically sound, promoting savings of 45 M USD for an investment of 10.2 M USD, an outstanding achievement for telehealth in Brazil (return of investment = 4.4 and benefit-cost ratio = 5.3). The tele-electrocardiography in the ambulances and the organization of the services in the north of the state are expected to decrease myocardial infarction mortality. Preliminary data has shown an absolute decrease of 5% in hospital mortality in acute myocardial infarction patients after the implementation of the myocardial infarction system of care. Some factors support the sustainable and continuity of the TNMG: government-academia partnership, support of public managers, services provided by a collaborative network, systematic monitoring of the services, periodic auditing of EKG analysis and teleconsultations, short response time, ease use of the system, growth and diversification of telehealth activities, research development and economic viability monitoring.

CONCLUSIONS: The telehealth model developed in Minas Gerais, Brazil, has produced good clinical and economical results. As a consequence, it is now a regular health service in the state, covering 780 of the 853 municipalities and integrated to the healthcare system. The model and technology characteristics permit the replication in other parts of the world. ■

Teleconsulting as orthopedics queue approach strategy in the Unified Health System

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INTRODUCTION: The National Telehealth Program began in 2006 as a pilot project in nine Brazilian states to support primary care in order to improve the quality of care in the Unified Health System - SUS , integrating education and health through Information and Communication Technologies (ICTs) .

However, it is noted that these activities are still underutilized. To address this problem the telehealth teams of the Faculty of Medicine of the City and of Belo Horizonte Health Department set out to develop a methodology to stimulate the use of teleconsulting as a tool to reduce queues in specialized consultations in SUS, one of the great problems faced by the health system.

A pilot project was proposed in the orthopedic specialty, one of the three specialties with the highest number of people in the queue. In this area, the cumulative queue of patients requiring specialty was 1,900 users in November 2014 in 21 health facilities in the Northeast Health District, chosen as pilot for the project.

The aim of the pilot project was to develop a methodology in which the Teleconsulting be used in a planned and managed way , impacting on the qualification of referrals for specialty and reducing waiting list.

METHODS: The project was developed from November 2014 to May 2015 in health centers that integrate the regional Northeast and accumulated a row of 1,918 patients waiting for a specialist consultation in Orthopedics, following the steps:

- Orthopedics protocol update with the inclusion of teleconsultation and referral flow design incorporating support services of primary health care - APS.
- Talk with district managers and managers of health facilities to define deployment strategies;
- Training of doctors in health centers in orthopedics protocol of SMS-BH for the use of telehealth platform.
- Call of users to clinical reassessment performed by community health workers, by phone or home visit.
- Structuring a stream of attention that allowed the realization of the MRI scan suggested by teleconsultants.

RESULTS: We evaluated 9 health centers which had a total of 777 patients queue. When the quantitative systematization of data was made, it was observed that participated in the project 619 patients, who made the following route: 271 (43% of them) were discharged administrative; 239 (39%) were reevaluated clinically and 109 patients (18%) did not attend the revaluation. Of these 239 patients clinically investigated by the family health doctors, it was observed

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that 81 patients (33%) were discharged from the clinic, 39 patients (17%) were referred to the APS support services and 119 patients (50%) had their cases discussed via teleconsulting.

In 119 cases evaluated through teleconsultation, a significant number of non-registration of conduct adopted by the PHC professional, so 94 patients (78%). Records calculated 19 (15%) remained in the facility or were referred to support services and 9 (1%) remained on the waiting list of orthopedics, but to the degree of priority reclassified. In addition to the direct benefit to users, there was also the training of professionals to work in similar cases.

These data point almost entirely the importance of training the use of institutional orthopedics protocol as well as the advantages in the use of teleconsulting tool, which despite being available in health facilities, was not used by most professionals. It also pointed out the difficulty of available time on the work agenda for this activity, due to high demand of users for medical attention.

CONCLUSIONS: The results show that the set of measures used to reduce the waiting list for orthopedic consultation was very effective, reducing by 47% the queue, if considered high by revaluation in the PSF (352) and high after performing the teleconsulting (19). It is believed that this methodology may be reproduced for other specialties in which the time between the request and the completion of the consultation can be long.

Another point to note was the incorporation, from the project of telemedicine as a key tool in improving the solvability of primary care, not only in each case individually, but also in solving the problems faced daily, depending on the fostered learning process the discussion of the protocol and the discussion of cases with teleconsultants. ■

Sergipe Telehealth: movements and connections for qualifying the practice of the primary health care professionals

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INTRODUCTION: Nowadays, the changes and updates are faster, in health, this is more intense, because the health`s panorama changes constantly and It requires constant training and search for new knowledge. This reality becomes a challenge for the primary health care (PHC) professionals because many of them are far from the Major training centers and the primary health care complexity demands from this professionals different acquirements to attend the necessity of this level of care, but many of them, during their graduation, were trained and educated far from the reality they will find in their day-to-day job, which difficult to think over health care and his importance. Therefore, believing in Telehealth as a permanent education instrument, it permits to improve the health work process, through the exchanging experiences, scientifically based, the incentive to reflection and to develop teamwork in Health Unique System (HUS-SUS), promoting a better health care. Betting in these aspects, the Sergipe Telehealh, through the team of fieldwork, developed a different approach, with critical, active and problematized pedagogical perspective called sensitizing workshop. This study aims to evaluate as the workshops and monitoring are impacting in the Telehealth use, understand it as a permanent education instrument for the health professionals.

METHODS: The workshops were developed with the perspective to transforming the health care practices, stimulating the reflection-action on purpose to improving the quality of health services. They were performed during four hours, with professionals of only 1 team of family health strategy at a time, from the Health unit with deployed points of Telehealth, in 33 cities in Sergipe (Brazil), during the period from September/2014 to May/2015. These workshops are organized in three moments: 1) welcome, 2) reflection about the work process and how to act as a team in the PHC and 3) discussion about permanent education and how the Telehealth contributes to the practice of day-to-day care, including a case discussion. During the workshops, the professionals are encouraged to reflect on their practices and analyze problem situations in which the Telehealth could help them, for it has use value and practical significance to these workers. At the end, platform training is conducted, in which during or after the explanation, they can use the platform, based on a case discussed by them during the workshop, to link theory to practice, from the experienced reality of these workers. For the analysis of the impact, were structured instruments such as semi-structured questionnaire to evaluate the workshop`s satisfaction, filled anonymously; spreadsheet of analysis of the teleconsulting that were fulfilled on Telehealth platform, during or after the workshop, to measure the impact of that on teleconsulting; print report of the team of field work, which also have the record of the professionals' speeches about the discussions. Another instrument developed was the monitoring instruments to give subsidy to the team of field work in its actions and encourage the Telehealth use by the health professionals. This monitoring was designed in order to identify these barriers, for this, have developed monitoring tools of the field work, the register and monitoring spreadsheets of the

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use of resources offered by telehealth, which are being evaluated. The monitoring spreadsheet aims to monitor and assist in the difficulties of health professionals on the use of the platform and the computer, guide and encourage participation in internet lectures offered by Sergipe Telehealth and stimulate the relationship with health professionals and managers. The register spreadsheet aims to keep up with the register data, the participation in workshops and training and the need for digital inclusion of health professionals of the family health strategy (FHS), who were present or not during the workshops.

RESULTS: Were carried out 63 sensitizing workshops for 674 health professionals from 65 teams of FHS of Sergipe (Brazil). Due to some difficulties, two workshops were held with two teams and some professionals could not participate, either because management or professional. About the record of the professionals speeches, there was reflection and strengthening of teamwork; understanding and recognition of the importance of permanent education in the in the PHC practice and Telehealth incentive for teamwork, permanent education and improving their care practices in PHC. This data can also be confirmed, in assessing the satisfaction with the workshop for professionals, 94.7% reported that the workshop helped to understand the importance of Telehealth to their practice, 88.4% satisfactory or very satisfactory and 93.7% that the workshops stimulated the interesting to use the Telehealth platform, of which 76.7% reported that stimulated a lot. By analyzing the teleconsulting, it was noted that during or after the performance, there was an increased number of them, being held 154 teleconsulting by the professionals who participated in the workshops of a total of 228 teleconsulting held during the period of this study, meaning 67.5% of the teleconsulting. Moreover encouraged the health professional's participation internet lectures. Among the 38 cities that participated in these lectures, March to May/2015, 24 had participated in the workshops, and 13 of them in three or more lectures, totalizing 610 participants. In addition to these results, the workshops have identified some barriers to use of Telehealth as: the lack or little support from management for the use of Telehealth, the difficulty in digital inclusion, high demands and organization of the work process of health workers, and the little or lack of motivation by these professionals in their day-to-day work. To evaluate these barriers, were used register and monitoring spreadsheets, therefore, were performed 112 contacts, with 73 health professionals from 27 cities at Sergipe (Brazil), between March and May/2015. From there the team of field work realized the need to create a tool for assessing the difficulty with the use of computer or digital inclusion that is being applied and filled in the register spreadsheet.

CONCLUSIONS: The workshop provided health professionals reflection about their care practices and made them to be encouraged to reflection for action, seeing Telehealth as a permanent education instrument and feel more motivated to use the same, because they were able to identify possibilities to improve the care in PHC. These data could be well seen by satisfaction with the workshop, through the professionals` speeches record, the increasing number of teleconsulting and the number of participation in Internet lectures. In addition, it allowed the identification of barriers to the use of Telehealth, as issues related to the difficulties inherent to workers and managers. This intervention demonstrated that is even necessary to advance and develop strategies for how to intervene in these barriers to encourage more use of Telehealth by the health professionals. And so the team of fieldwork, has developed monitoring and evaluation tools that are enabling to organize and enrich the work done in order to stimulate and to possibility the building of the use value of Telehealth in the PHC practices, being a powerful device of permanent education and of quality in the health work. ■

Support of TelessaúdeRS in the implementation of e-SUS AB in Porto Alegre

Ana Maria Frölich Matzenbacher[1]; Fabiano Basso dos Santos[2]; Amanda Gomes Faria[3]; Angelo Paim[4]

INTRODUCTION: TelessaúdeRS is a project by the Federal University of Rio Grande do Sul (UFRGS) to qualify the practice in Primary Health Care through support to professionals who act in this area. Support to the implementation and use of Information Systems and Electronic Medical Records in Rio Grande do Sul stand out among the several services offered. The new information system is officialized from the Department of Health Ordinance no. 1.413/2013, in force for purposes of funding and adherence to programs and strategies of the National Basic Health Care Policy, the Health Information System for Primary Care. This new strategy of the Basic Health Care Department, called e-SUS AB, intends to restructure information systems of Basic Health Care in Brazil and aims at offering tools to expand care and improve management follow-up. In order to officially provide support for municipalities in this process, the State Health Secretary of RS executed an agreement with TelessaúdeRS in 2013. Current work has the purpose of describing the support of TelessaúdeRS in the implementation of e-SUS AB, whether in the Simplified Data Collection (CDS) mode and/or Citizen Electronic Medical Record (PEC), in the city of Porto Alegre.

METHODS: Such support has been given by the TelessaúdeRS Field Team, comprised by Field Coordinators, Telehealth Monitors (health care professionals) and fellows, also graduating students from the health area. Initially, the team contacted Basic Health Units (BHS) with the purpose of measuring the informatization scenario. If there were conditions to implement PEC - priority option in the city - we would schedule an in loco training. The municipal management had a demand of 143 BHS (179 teams and, in partnership with TelessaúdeRS, developed a training plan to implement e-SUS AB. Supported by the Technology Information Management (GTI), of the Primary Health Care Coordination, Outpatient and Substitution Specialized Services (CGAPSES) and the Data Processing Company of the City of Porto Alegre (PROCEMPA), the process occurred at different times: identification of units in conditions to start using PEC; awareness raising of professionals and confirmation of the necessary conditions to use PEC; on-site training of professionals to use CDS and PEC in BHS; and follow-up and monitoring of health teams to use CDS and PEC. It is worth mentioning that new strategies to implement e-SUS in 100% of BHS of the city in May of this year were also adopted. Having as goal complete coverage of basic health units regarding e-SUS, some professionals of health units who did not have technical conditions to use PEC were selected. Regarding trainings to use PEC conducted on-site, a time schedule with three shifts was created. The first one focused on the presentation of actions from TelessaúdeRS (Tele consulting, Outpatient Regulation, Tele diagnosis, Distance Education and Help Desk Support), followed by presentation of the e-SUS AB Strategy and its use. The second and third shifts were intended to follow-up professionals in the use of PEC in customer service hours. Specific situations, such as lack of access to internet, were also challenges faced in the implementation. It was decided to use off-line CDS application, which collects data without using external network, in order to solve this problem. Later, data generated in such health units was collected and imported by

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GTI for processing in e-SUS.

RESULTS: From April 2014 to May 2015, 36 out of 143 BHS received in loco training on the use of PEC, 18 for use of CDS files, which totaled 54 UBS. In addition to trainings conducted for BHS, TelessaúdeRS also provided support for professionals of Programa Mais Médicos (More Doctors for Brazil Program). A course on e-SUS for supporters of eight district managements of the city was offered. We trained 25 groups overall on the use of CDS, totaling 485 health professionals from BHS, Family Health Strategies and Family Health Support Centers. From these actions, 100% of basic health units and support strategies received training in the city of Porto Alegre. With the promotion of TelessaúdeRS actions *in loco* trainings, there was an increase in the number of Tele consulting about e-SUS, in addition to increased tele consulting in the clinic scope, via 0800 (free call) and the platform, as well as other actions conducted by TelessaúdeRS.

CONCLUSIONS: Joint and planned action of TelessaúdeRS with the city of Porto Alegre enabled the use of a wide range of training offer, which comprised the differences and specifics of the BHS set related to their level of informatization and internet access. With this, it was noted the success in the process by meeting training and e-SUS implementation goals foreseen. Although it was not measures, e-SUS implementation action also served to promote other actions of TelessaúdeRS always focused on assisting health professionals and improving population's health. ■

Telenutrition in the Telehealth Context

Cintia Chaves Curioni[1]; Flavia Barbosa Brito[2]; Celia Lopes da Costa[3]; Alexia Luiza Regis Silva[4]; Beatriz Senna Ferreira[5]

INTRODUCTION: In Brazil and other South American countries, initiatives by local governments, universities and other institutions, have been undertaken. It could be considered as the first step for building public policy processes and systematization of knowledge in the area of education and health information. In this perspective, Brazil Telehealth Networks Program, implemented in 2007, is a national action with the aim of contributing to the quality of health service in the "Sistema Único de Saúde – SUS" (Unique Health System), training and integrating workers and health professionals through the use of technologies and infrastructure of computers and telecommunication to promote Telecare, Formative Second Opinion, Remote Diagnostics and Tele-education. The project is currently developed in twelve of the twenty-six Brazilian States. In the State of Rio de Janeiro (Telehealth-RJ), the program is managed by the State University of Rio de Janeiro (UERJ). The Telehealth-RJ comprises several areas of health, including Nutrition. The Telenutrition conducted since 2009 in partnership with the Institute of Nutrition/UERJ, is responsible for food and nutrition topic, with the aim to promote discussions with health professionals, as well as, to integrate professionals and students. The aim was to report our experience of Telenutrition over six years of existence.

METHODS: This is a descriptive study, case report, from the lived experience in the Telenutrition-RJ. The information was collected in the database related to the activities of the Telenutrition, generated by Telehelth-RJ, as well as the personal statements of the authors' participation in the process of deployment.

RESULTS: Until 2010, Teleconferences bi-weekly were held, addressing themes on health, food and nutrition. From 2011, Telenutrition, as well as other areas of telehealth-RJ, redesigned their way of presentations, offering monthly teleseminars. Other tools used by Telenutrition as asynchronous support included: virtual libraries, chats and on-line forums. Due to limited use within the Telehealth-RJ, such tools have been disabled in 2013. In 2012, the activities included Formative Second Opinion with a maximum time of response of 48 hours. Another activity that should be cited refers to update courses. These are performed exclusively on-line and have duration of 15 hours spread between classes and written evaluation. In consonance with the proposal of Telehealth-RJ, Telenutrition project implemented and developed activities in the scope of under graduation and *lato sensu* and *stricto sensu* post-graduation, involving professors and health professionals through the dissemination and transmission of strategic seminars, master's and doctoral defenses with remote evaluators online. Telenutrition has partnership with the Centre for Food and Nutrition School of Institute of Nutrition-UERJ (NUCANE-UERJ). This collaboration was made through the State Food Network and School Nutrition (REANE), which provide technical and operational support to 92 municipalities in the state of Rio de Janeiro, being a space for exchanging experiences and for integration of the actors involved in The National School Meal Programme (PNAE). Telenutrition is recognized as a NUCANE key partner because it contributes to the

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disruption of physical barriers, easing the need of face meetings, and enabling the integration of professionals and the advance of debates, broadening the scope and impact of the actions undertaken by the Centre. Another important partner that should be mentioned is the Regional Council of Nutritionists - 4th Region (CRN-4), which strengthens and expands the visibility of Telenutrition, resulting in commemorative teleseminars, held annually on the Nutritionists Day (August 31). Teleconferences and Teleseminars addressed all nutrition areas: nutrition through the lifecycle, nutrition in public health, food technology, marketing, clinical nutrition and food supply to collectivities. In respect to the update courses, at the moment there are four available courses: food, nutrition and diseases related to pregnancy; nutritional advice for childhood and adolescent obesity; management of PNAE and; promotion of healthy food in school environment. There is a low demand regarding to the Formative Second Opinion. The requests were made primarily by nutritionists, followed by doctors, nurses, speech therapists and community health workers.

CONCLUSIONS: This is the first step. The only Telenutrition is conducted in Rio de Janeiro. At the moment, we could observe, as main tool, tele-education based on transferring and spreading their healthcare capacity to remote areas with less healthcare capacity. The low demand of second formative opinion is regarding that this kind of teleconsulting is a new way of working, but still not inserted into the daily life of primary care health professionals. They need new routines, requiring planning and restructuring for to be incorporated in daily practice. In the future, we can envisage the possibility of Telenutrition being developed in regional networks, improving health system, through the use of most modern technologies, including, teleconsulting by videoconferencing system as well as tele-monitoring. For this, trained professionals with knowledge and experience both in food and nutrition as well as in information and communication technologies are needed, greater investment in the area and increased level of consciousness not only of telenutrition capabilities but also of telehealth in general by health managers and professionals. ■

Telehealth Centers Network in Pernambuco (RedeNUTES) - Strategies to support the implementation of e-SUS AB System in Pernambuco

Elisabeth Lima Dias da Cruz[1]; Karolina de Cássia Lima da Silva[2];
Luciana Lima Dias da Cruz[3]; Magdala de Araújo Movaes[4]

INTRODUCTION: The Brazilian National Telehealth Network Program delivers digital health services in order to support planning, intervention, monitoring, and evaluation of the primary healthcare services. The Health Information System for Primary Care (SISAB) was created by the decree n. 1.412 of July 10th, 2013. As a new system in transition up to July 2015, it will replace the Primary Care Information System (SIAB). The Primary Care Department (DAB/MS) in partnership with the Informatics Department of the Unified Health System (DATASUS) and the Health Departments of States and Municipalities, has already initiated a series of actions to training staff and managers during installation, implementation and application of this new tool in daily practice. The telehealth strategy presents certain advantages, such as incorporating all the expertise and organization in their sites, as well as a collaborator in the SISAB's implementation process and their associated tools. In Pernambuco, the RedeNUTES supports the DAB/MS in this action, creating conditions to facilitate and speed up the implementation of e-SUS AB. This study aims to describe the activities developed by RedeNUTES in the process of supporting the implementation of the e-SUS AB System in the primary care providers of municipalities in the state of Pernambuco.

METHODS: This is an experience report on the process of planning, intervention, monitoring and evaluation to support e-SUS AB implementation in the state of Pernambuco. All 185 municipalities in the state of Pernambuco were contacted by phone or e-mail to participate, but only 61 of them have given formal consent by the local Health Authority and were included in this study. Based on a national strategy proposed by DAB/MS for all telehealth centers in Brazil, the following actions were defined: teaching materials for supporting the implementation; training of the staff; in site support, and monitoring during implementation. The activities developed have considered the strategies already adopted by RedeNUTES for implementation of telehealth, and the implementation status of e-SUS AB in 2014 in Pernambuco.

RESULTS: A workgroup was created composed by SES-PE, DATASUS-PE, COSEMS-PE, UNASUS-PE and RedeNUTES-PE to unify all activities proposed by the different partners related to e-SUS AB. In mid- June 2014, a workshop occurred in 12 Management Health Regions in partnership with the Pernambuco Health Department (SES/PE). This workshop was conducted by the coordination and technicians staff informatics of the state Primary Care department and addressed general information about the SISAB and the technological infrastructure needed for the implementation of the CDS and / or PEC in the USFs and Health Departments of the municipalities. At the same time, the Open University of Unified Health System from the Federal University of Pernambuco (UNA-SUS UFPE) structured a training for im-

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plementation of the system e-SUS in the Primary Care, which was offered by e-learning to health staff and municipal managers during the period of Jul. 31st to Dec. 19th, 2014. In May 2015, RedeNUTES in partnership with the SES-PE, DATASUS and COSEMS-PE, has started the offer of synchronous teleconsultation by webconference on Thursdays from 10:30 am to 12:00 pm, and asynchronous teleconsultation, available 24 hours per 7 days a week, through the Telehealth Platform HealthNet. The clinical and technical staff of the municipalities can use both channel to make queries about the process of implementation of e-SUS AB. In addition, the RedeNUTES portal (www.redenutes.ufpe.br) provides information about the e-SUS AB in the "Highlights" section. Materials such as guides, and instructional videos will be also available. In the near future, besides the virtual activities, the 61 municipalities will have support on site by RedeNUTES team for staff training and technical support. A continuous process of monitoring is in place. In April 2015, a new evaluation cycle conducted by SES-PE found that 19% (35) out of 185 municipalities haven't yet start the implementation of e-SUS AB. As immediate intervention, a new training workshop was held in Recife in May 2015 to address the situational diagnosis of these sites and to give support based on the real needs of each municipality.

CONCLUSIONS: The development of activities to support the implementation of the e-SUS AB System faces many challenges. We can point out some aspects such as the fragile technological structure in the USF and in the Municipal Health Department, including low quality Internet connection, as well as a low availability of technical staff with appropriate skills and competences in health information systems. Cultural aspects is a main issue, a long period of adaption of the primary care staff is needed to deal with the transition from an old one to a new health information system, from SIAB to SISAB. Is expected that this interconnected electronic record to SUS patient card will integrate health information on the three levels of care in SUS, providing better conditions for planning health actions for the user and community. ■

An overview of the implementation process of the Telehealth Centers Network in Pernambuco

Elisabeth Lima Dias da Cruz[1]; Luciene de Souza Coutinho[2]; Luciana Lima Dias da Cruz[3]; Magdala de Araújo Novaes[4]

INTRODUCTION: The Telehealth is the use of modern information and communication technologies for distance health-related activities at various levels available in the healthcare system. The Telehealth Centers Network in Pernambuco (RedeNUTES) is a member of the Brazil's Telehealth Network Program, which develops distance education activities, remote consultation, computer assisted diagnosis, mass screening for mobile, computer network management, in order to implement telehealth services in the National Public Healthcare System – SUS. The distance education activities include seminars and courses via web conferencing, as well as access to the e-learning. The remote consultation can be synchronous or asynchronous to answer questions about clinical cases or work process in healthcare facilities by teleconsultants experts. The computer-assisted diagnosis allows performing additional tests remotely transmitted to a specialized center for issuing reports. For mass screening, the use of mobile protocols for diseases screening in the population, initially, of mental problems in childhood. The computer network management is known as the use of technology to perform planning, analysis, research, monitoring and evaluation of healthcare services. This paper aims to describe the strategies to enlarge the RedeNUTES in the state of Pernambuco.

METHODS: This is a report based on experience of the RedeNUTES to implement telehealth sites in healthcare facilities of municipalities in the state of Pernambuco in 2014-2015. The activities were planned according to steps. First, welcoming meetings and workshops were conducted in place; followed by the subscription of telehealth sites, managers and healthcare professionals in the RedeNUTES web portal; next, training sections for managers, healthcare professionals, and teleconsultants experts; Then, delivering telehealth services for all sites, such as teleducation, remote consultation, computer-assited diagnosis, mass screening for mobile, computer network management. All steps are monitored and Evaluated by the attending team which plan interventions such as internet connection tests, technical visits, monitoring meetings by webconference. Reports are produced systematically to healthcare managers at municipalities and at the federal level, the Ministry of Health. In September 2013, it was applied a project for the Ministry of Health entitled "Telehealth Centers Network in Pernambuco, Brazil's Telehealth Network - Phase V" through National Program for Improving Access and Quality of Primary Care (PMAQ-AB). This project proposed to enlarge the telehealth sites from 357 to 543 healthcare primary care facilities – USF in 134 municipalities of Pernambuco, mainly at the primary care level. For selection of the sample was chosen active municipalities, those who used any telehealth service from january 2014 until june 2015, as well as those who had the "More Doctors Program for Brazil" established, and the Professional Enhancement Program of Primary Care (PROVAB).

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RESULTS: The municipalities of Pernambuco selected for the project sample were 134 (72.5%) out of 185. From those, 84 (62.7%) had used the telehealth service of RedeNUTES and are eligible for maintenance, and 50 (37.3%) require new sites deployment in the 2014-2015 period. Currently, there are 150 (81%) municipalities with telehealth sites, where 6 are classified as extra sites in the project, thus missing 35 municipalities supposed to be implemented in the period of the project. All telehealth sites are healthcare units registered in The National Register of Health Institutions - CNES, however, there are inconsistency between which are registered in RedeNUTES and CNES. A first diagnosis to assess the structure of the USFs was performed thought telephone calls, and revealed that they had differences regarding the connectivity. During the period, a situational diagnosis instrument was created to keep data about the municipal management, the Family Healthcare Strategy (ESF), telehealth sites, healthcare facilities, information technology of the municipality, electronic health record system - e-SUS AB implementation and training in telehealth. The meetings and workshops activities promoted to the municipalities managers and healthcare professionals aim to disseminate telehealth, demonstrate its applicability, direct and indirect benefits, infrastructure needed and evaluate the utilization of telehealth services, as a way of sharing responsibility between the different actors of the project. The connection test measures the performance of the Internet connection speed, classifying it as eligible or not eligible for use of telehealth services. And in March and April 2014 were carried out meetings and workshops, and training for professionals from the "More Doctors for Brazil Program" in the remote consultation HealthNet platform, during the welcoming week for physicians of the program.

CONCLUSIONS: The implementation process of telehealth sites in the municipalities of Pernambuco is a challenge in SUS, considering that the technological infrastructure in USF and Municipal Health Department are fragile, regarding the Internet connection distribution in the territory and human resources deficiency in obtaining adequate development of abilities and skills in the use of health informatics. Another difficulty found relates to the rotation of managers and health professionals preventing the acculturation of tools and program implementation process, failing to keep the telehealth points working. Yet, the need to prioritize telehealth activities in the workplace routine of health professionals and the USF Health Department, incorporating the demands of e-counseling to the care regulation of the municipality process, as well as in the instruments Planning System SUS (PlanejaSUS). ■

Telemedicine/eHealth - Global Networking

Frank Lievens[1]; Malina Jordanova[2]

INTRODUCTION: The recent exponential growth of Telemedicine/eHealth is based on the ubiquitous digitalization of all sectors of our society. Nowadays Telemedicine/eHealth is everywhere and may offer health service at any time and reach those that are in need on land, at sea or in the air.

The presentation uses as a baseline the importance of Global Networking as a *conditio sine qua non* for a successful worldwide implementation of Telemedicine/eHealth. Its aim is to highlight the role of international bodies and initiatives for facilitating (a) the global networking in Telemedicine/eHealth as well as (b) for creating and applying of a "glocal" approach when the strategic goal is wide Telemedicine/eHealth implementation. The presentation will specifically underline the driving force of networking in understanding, developing and implementing Telemedicine/eHealth.

METHODS: Using as examples the wide range of activities of one non-for-profit international organization, the International Society for Telemedicine and eHealth (ISfTeH, www.isfteh.org), and one annual forum, The International Educational and Networking Forum for eHealth, Telemedicine and Health ICT (Med-e-Tel, www.medetel.eu), the authors present a range of successful educational, networking, standardization, etc. actions, based on global networking.

The strategic goal of the Global Networking in Telemedicine/eHealth is to facilitate the international dissemination of knowledge and experience and to provide access to recognized experts in the field worldwide thus supporting national organizations as well as IT and medical professionals, policy makers and citizens. Global Networking is essential in exchange of knowledge, in influencing local policy, when the role of Telemedicine/eHealth in the health care sector is considered; in building public awareness about Telemedicine/eHealth and its potentials; building multi-stakeholder consensus on principles, policies, and strategies related to effective Telemedicine/eHealth implementation; in educating citizens and creating awareness of eHealth potential thus contributing to most wisely implement Telemedicine/eHealth solutions in existing healthcare systems respecting local needs, traditions, cultural diversities etc.

Results from policy decisions as well as best practices will illustrate various aspects of Telemedicine/eHealth development. Examples of successful implementation of ICT in healthcare at national and regional levels in order to transforming the classical health care system into a citizen centered service will be given.

RESULTS: The presentation is designed around several topics for which global networking play a crucial role, i.e.:

- How does Telemedicine/eHealth helps to leverage the difference in healthcare services between various countries and regions?

- What can be done to reduce healthcare budgets and still to provide high quality health services?

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- What are the networking activities to overcome the lack of standards and legislations in the field of Telemedicine/eHealth?

- How can various partners benefit from networking and international collaboration?

CONCLUSIONS: The necessity of "glocal" view on Telemedicine/eHealth development, planning and readiness to learn from the others is a must as contemporary achievements in ICT provide the chance to share healthcare knowledge and skills more easily across the globe. The way forward is networking and partnership in order to make the benefits of Telemedicine/eHealth available to everybody. ■

Institutional Support for Reorganization of the Telemedicine Center at UFRJ

Gláucia Regina Motta Da Silveira Castro[1]; Eduardo Oliveira Dos Santos[2];
José Augusto Panza Dias[3]; Rosemarie Galvão Portella De Merino[4]

INTRODUCTION: The UFRJ houses eight telemedicine centers linked to the Telemedicine University network - RUTE. All these nuclei are located in the University hospitals, these being: *Hospital Universitário Clementino Fraga Filho* (HUCFF), *Hospital Saint Francis of Assisi School* (HESFA), *Instituto de Pediatria e Puericultura Martagão Gesteira* (IPPMG), *Maternidade Escola* (ME), *Instituto de Ginecologia* (IG), *Instituto de Neurologia Deolindo Couto* (INDC), *Instituto de Psiquiatria da Universidade do Brasil* (IPUB) and *Instituto de Doenças do Tórax* (IDT). Until 2013 there was a shy development in telemedicine activities at UFRJ. However, it is indisputable the latent potential of these cores. In order to promote its development, the staff of UFRJ's Pro Rectory from personal (PR4), motivated by the activities of the Special Interest Group (SIG) Server's Public Health (SSP), began a series of conversations and negotiations with Prof. Dr. Luiz Ary Messina, national coordinator of the University network for telemedicine (RUTE), in order to know better the areas of interface between the two institutions. Were invited to participate in this dialogue the Coordinator of SIG SSP, Gláucia Castro, HUCFF core Coordinator, profª Maria Leide Oliveira, Mr. Eduardo Oliveira dos Santos, Coordinator of Health policies of UFRJ and Prof. Arthur Chaves, Coordinator for distance education from UFRJ.

METHODS: Then were carried out with the participation of the technical coordinator of RUTE, Mr. Thiago Lima Verde and the Coordinator of the SIG SSP, Nurse Glaucia Castro visits to all existing telemedicine units at UFRJ. In These visits were carried out software updates, troubleshooting and maintenance equipment, updating of the data and responsible for cores and dialogue with the General engineers and technicians in order to meet the difficulties for the exercise of activities. Several issues have been identified for the conduct of activities in telemedicine, many of them related to problems of infrastructure and lack of qualified personnel to work in the nuclei. It was also reported by the coordinators of the lack of an institutional policy of support telemedicine activities. Those visits has produced a joint report that was sent to PR4 that called a meeting where they met most of the directors of the hospital units, coordinators of the nuclei, the nurse Gláucia Castro, Mr. Eduardo Oliveira, Prof. Miriam Struchinni, Director of the Center for educational technology for health (NUTES/UFRJ), the Director of the Faculdade de Medicina da UFRJ, Prof. Dr. Roberto Medronho, the Rector of the FEDERAL UNIVERSITY, Prof. Dr. Carlos Levy and a couple more guests. At this meeting it was agreed that the representatives of the nuclei will be invited to participate in meetings of discussion on the development of telemedicine centers.

RESULTS: Has identified need for change, among them, the creation of a general central coordination of the nuclei. This change should go beyond the individual logic in which the nuclei were created and provide aggregation, dialogue, collaborative development and facilitate the communication of the nuclei with the rectory and its processes

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of management of University resources. In this way, the PR4 went on to encourage visits by nurse Gláucia Castro, profissional of the technical staff of the UFRJ, for assistance to the development of activities in telemedicine and support for centers and their coordinators and this in turn went on to share the outcome of visits and decisions made with the Working Group and they discussed the activities and supported the decisions that are to do. From this advice, the difficulties of the nuclei and their potential began to be reviewed and processed. Were also identified new units with potential for the development of activities in telemedicine and cores with potential in support of these units. From this advice, the difficulties of the nuclei and their potential began to be reviewed and processed. Were also identified new units with potential for the development of activities in telemedicine and cores with potential in support of these units, such as the Campus Macaé, visited by Profª Dra. Maria Leide Oliveira and by the Nurse Glaucia Castro. Were initiated dialogues and dialogue with the Rectory, with other units of the UFRJ and with external Institutions in order to foster partnerships that help the development of the activities of the nuclei and requested the creation of two positions to centralization and Institutionalization of the activities of general coordination of the nuclei. Executive Coordinator, which would be occupied by a professional Technician with competence in the area of implementation of telemedicine and telehealth and other Academic Coordinator to be occupied by a Profiled faculty dedicated to developing teaching and research activities in telemedicine and tele-health.

CONCLUSIONS: At approximately six months of beginning of the activities in support of the nuclei, the panorama presents its improvement, with prospect of SIG's activities acceleration of which these nuclei participate and/or coordinate, creation and development of two new cores and a new SIG. IPUB core was advised to dialogue and partnership with the Telehealth UERJ and it was agreed to carry out mini courses in the field of Psychiatry opportunity you could be opened in the future to other cores of UFRJ. The internal activity of the centers also showed improvements since there was increased interaction between them creating the chance of these perform in partnership activities. The centers have been encouraged to assign features like equipment and know-how to the centers in creation and the interested units began to collaborate with activities and resources of interest to centers and hospital units where these centers were situated. Were arranged agreements and technical cooperation activities between the nuclei and between units of the UFRJ and the nuclei, so that some units and centers of course began a process of "sponsorship" with each other and in this way was made possible the emergence of new centers and new activities in partnership. ■

Training on e-SUS AB: A partnership with the Nucleus of Telehealth of São Lourenço da Mata / PE

Josueida Carvalho Sousa[1]; Thassia Thame de Moura Silva[2]; Danielli Gavião Mallmann[3]; Michelline Santos de França[4]; Ednaldo Cavalcante de Araújo[5]

INTRODUCTION: The e-SUS Primary Care (e-SUS AB) is a strategy of the Ministry of Health, through the Department of Primary Care, to restructure the information from primary health care, modernizing its technological platform in order to computerize the basic health units, provide tools to expand care and improve monitoring of management. The Health Information System for Primary Care (SISAB), created by Ordinance No. 1412 of July 10, 2013, will gradually replace the Primary Care Information System (SIAB) and other "software" systems in modules used in primary care. The e-SUS seeks to replace the information of SIAB that are delivered monthly by each health unit in print for digital filing. The Nucleus of Telehealth of São Lourenço da Mata / PE offers communication and information technologies and uses these services to collaborate on SISAB installation process in order to qualify health professionals to use of the features in the e-SUS system. For health services that do not have a computerized system is available the Simplified Data Collection Model (CDS) that allows the integrated and simplified registration through registration records from the home and users of individual care, dental care, collective activities, procedures and home visits, information that will compose the SISAB.

METHODS: Descriptive study of qualitative approach, of the type experience report conducted with the professionals that make up the Family Health Units of São Lourenço da Mata / PE.

RESULTS: Previously, the programs were installed in the CDS mode on the computers of the units and made registration of all professionals. In parallel, a schedule according to availability of teams and the training occurred in each unit was built. The training was conducted by the team of the Nucleus of Telehealth with supporting presence of primary health care coordinator. Two moments were proposed: distribution of new records of care and guidelines for organization of the work process, being specified in detail as would be filled for Community Health Workers, Nurses, Nursing Technicians, Doctor and Dentists; the second time was practical for handling system and testing for importing data. Questions emerged from professionals about the numerous assignments in the unit and availability of time for typing the records. From the discussions, proposals were listed as scheduled in the unit, once every week for typing the records, being incorporated into the schedule of each unit. It was verified the difficulty of professionals regarding the handling of computers, which spends more time during the training in an attempt to identify these difficulties. There is gap regarding the correct use of the computer, especially the mid-level professionals, which culminated in the proposal to the professionals who were with this difficulty to schedule an appointment at the nucleus to receive guidelines for computer technician in order to solve basic computer doubts, besides receiving printed tutorial for using the e-SUS SDS and exporting data.

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CONCLUSIONS: The modernization of the SIAB to a unified system is necessary for qualification information and health services. It was found that the partnership of the team of Nucleus of Telehealth in training for the implantation of e-SUS AB allowed assist professionals on the use of new technologies that are fundamental to the modernization of health information systems. Moreover, with the system deployment actions it was possible to identify the fragilities of professional regarding the use of the computer, as some had no basic notions of informatics, minimum requirement for using the system. Thus, it becomes necessary professional training in informatics for the SISAB reach the desired goals in primary care. ■

Challenges and perspectives in implementing telehealth strategies to support indigenous healthcare teams in the northeast of Brazil

Kátia Cristina Guimarães Correia Silva[1]; Jeane Maria Lacerda Araújo Couto[2]; Flávia Maria Martins Vieira[3]; Kleber Soares de Araujo[4]

INTRODUCTION: The telehealth unit of the Institute of Integral Medicine Professor Fernando Figueira (NTES/IMIP) has established a partnership with the workforce management and healthcare education secretary, as well as the indigenous healthcare special affairs secretary from the Ministry of Health of Brazil for the purpose of implementing telehealth services to support multidisciplinary healthcare teams that attend indigenous communities in the northeast of Brazil. Telehealth may be considered a strategic tool to reduce the distance between specialized care and local healthcare policies. This strategy represents the possibility of connecting a large variety of knowledge and practices and brings the resources to build an effective integration of technology and healthcare. A regional meeting was conducted in May 2015, in order to better understand the challenges and perspectives in implementing this telehealth project from the indigenous healthcare management level teams point of view. The main objective of this initiative was to collect and analyze suggestions from management teams of six special indigenous sanitary districts (DSEI) of the northeast of Brazil, (DSEI Alagoas/Sergipe, DSEI Bahia, DSEI Ceará, DSEI Maranhão, DSEI Potiguara, DSEI Pernambuco).

METHODS: During the meeting, small groups were presented to challenging scenarios and then participants were asked to propose solutions based on their local healthcare networks, giving emphasis to tele-education and remote interprofessional consultations as tools to support their healthcare teams. The audience was composed by managers from the Ministry of Health of Brazil (national telehealth program, indigenous healthcare special affairs secretary and workforce management and healthcare education secretary) and regional and local indigenous healthcare network managers. At the end of the meeting, each small group synthesized and presented the proposed solutions to the larger audience. Afterwards, a quali-quantitative analysis was conducted by the telehealth team and the findings can be found in this abstract.

RESULTS: There were forty-nine participants, 53% were local managers of indigenous healthcare centers (Alagoas, Sergipe, Paraíba e Pernambuco states); 12% were DSEI general coordinators; 12% were healthcare coordinators (DIASI/DSEI); 6% administrative representatives and 17% were Ministry of Health representatives (SGTES and SESAI). In addition, six members of the telehealth unit worked as group facilitators. Regarding the first question, "How to stimulate the implementation process?", twenty-two activities were submitted, 59% of the suggested activities related to awareness, capacity building and changes in the healthcare teams working processes; 18% related to proving efficiency and providing feedback to the healthcare teams; 14% proposed increasing healthcare management team

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involvement and 9% focused on infrastructure (ambient and connectivity). Another question assessed the needs for distance learning courses and fourteen themes were suggested, among the most proposed areas were mental health (30%) and healthcare planning (30%). A different set of questions addressed positive and negative aspects of telehealth implementation, 20% of positive aspects were related to efficacy and 27% of negative aspects were related to connectivity.

CONCLUSIONS: The ministry of health teams, as well as the indigenous healthcare management level teams of the northeast of Brazil strongly contributed in proposing solutions to face the challenges of the implementation phase of the telehealth project to support multidisciplinary indigenous healthcare teams in the northeast of Brazil. Therefore, a positive expectation has been established regarding the future participation of indigenous healthcare managers in supporting the implementation and use of telehealth services like remote interprofessional consultations and tele-education by their local healthcare workforce. ■

The itinerant exams practice electrocardiogram (ECG) telemedicine in rural and urban areas of the city of Montes Claros - MG

Kleber Teixeira de Souza[1]; Marcos Gabriel de Jesus Rodrigues[2]; Tatiane Marques Dantas Silva[3]; Ravena Amaral da Conceição[4]; Rosimara Viana Dos Santos[5]

INTRODUCTION: Patients who live in the city of Montes Claros were waiting in a long line by an electrocardiogram exam schedule (ECG) on regular days of the week as a result because the same is not made on Saturdays. It was developed a collaborative and voluntary project-based in Telemedicine among the Department of Health of Montes Claros, nursing students and Biomedical Engineering of St. Augustine College - FASA and Colleges United North of Minas - FUNORTE, respectively, to reduce the waiting list and reduce the time of examination report. The working group was named Group of Nursing and Applied Biomedical Engineering (GEEBA) and coordinated by Mr. Kleber Teixeira de Souza from Department of Health of Montes Claros.

METHODS: The nucleus from Telehealth Center of the University Hospital Clemente de Faria - Unimontes became available the ECGPC TEB software - UFMG - Version 6.2 - Revision 1, with operation through the site http://www.telessaude.hc.ufmg.br/. The Municipal Health Department from Municipality, became available the equipment Telemedicine (a Intelbras i826 notebook, 3G mobile modem VIVO, electrocardiograph ECGPC - serial 101 418 207 - TEB for the acquisition of ECG and the ECGPC TEB software - UFMG - Version 6.2 - revision 1, with operation through the site http://www.telessaude.hc.ufmg.br/), existing in the Emergency Health Service from the Municipal Hospital Dr. Alpheu de Quadros (PAMDAGQ) on loan, as also a vehicle for displacement inside units to primary attentions. The first action of GEEBA occurred in November 2013, after the availability of equipment and logistical support. The service model has been tested, optimized and approved to be used on the field. The Department of Health from the Municipality of Montes Claros-MG, through the Primary Attentions Coordination Department, tracked the health unit more pent-up demand for ECG tests with the same chosen and notified of the action of this program. The date and time of the examinations were sent to patients, the community health agents (ACS). The medical tests were carried out from 7:30 am until at 1:00 pm and only on Saturdays. The action was held at the Family Health Strategy (ESF) closer to the homes of those patients. On the day of action, the vehicle of the Department of Health sought the professional volunteers in their homes, carrying them to the PAMDAGQ where the equipment Telemedicine, was dismantled and taken to the location of the action. Scholars of Biomedical Engineering mounted the telemedicine system, while nursing students conducted the examination previous history.

RESULTS: They were done 37 actions between November 2013 to May 2015, only on Saturdays in the morning. Four rural communities have benefited. 1,436 (one thousand, four hundred and thirty-six) ECG tests and reports delivered

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to the ESF were performed. None of the actions were delayed or canceled for failure or equipment problems or physical structure of health unities. One interesting data was noticed because the fact of all test were conducted near the residence of the patient avoided spending on travel and low absence rates (average 15%). The predominance of female patients (68% female / 30% male / 2% infantile-pediatric) was observed. In some places it was necessary to make adjustments due to the absence of dedicated furniture, while respecting the existing technical and health standards. The team was formed by people of both sexes to avoid embarrassment and refusals at the time of the exam. After the examinations the reports were delivered within 48 working hours for the ESF guidance to patients.

CONCLUSIONS: The use of a telemedicine system in hours of easy accessible to the public, the fact of the tests happen very close to their homes was able to reduce the queue of calls and provide the examination of the report within 48 working hours. The logistics allowed achieve the minimum of 10 tests per hour. It was verified the predominance of female patients, and the infantile-youth public was held examinations to surgical risk. It is recommended that this initiative be presented to other regions, it presents low cost solution for serving the population, and that the data obtained must be evaluated in future research to determine the causes of the motivations for the examination and determine new public health campaigns. ■

Telehealth strategies in tertiary hospitals for children and women: the quest for adequate web conferencing tool

Angélica Baptista Silva[1]; Leonardo Gonçalves Martins[2]; Amanda Amaral dos Santos[3]

INTRODUCTION: Background: Since 2010, the National Institute of Women, Children and Adolescents Health Fernandes Figueira (IFF/Fiocruz) needs to play its role in Brazilian Health System: to make applied, biomedical and basic research in pediatrics, pediatric surgery, medical genetics, neonatology, food and nutrition, gynecology, obstetrics, pathology, clinical pathology and human milk bank. As well as its mission in teaching and assistance activities, aiming the investigation of women, children and adolescents health.

In October 2012, IFF/Fiocruz launched the Telehealth Laboratory (Labtel) as part of the consolidation as a National Institute. The Laboratory intends to coordinate and implement actions related to the telehealth projects of IFF and to develop information technology in health.

There is a plenty of different researchers in IFF/Fiocruz, few resources for travel and the requirement for capacity building of other hospitals at distance. There is a strong and permanent demand of ongoing training of inner experts too.

Objective: Implement a low cost and high-resolution web conferencing tool for internal and external use.

METHODS: A literature review was made, allied to a national consultation in Brazilian group of health's informatics specialists. Our findings corroborate the usefulness of *Mconf* as a complete open source web conference system built on top of BigBlueButton, other software that enables remote students to have a high-quality learning experience since 2009.

After that, the IFF/Fiocruz signed a nonprofit agreement with a public technical school of telecommunications and informatics. Professors, students and the Labtel team customize the tool with the help of telecommunications researchers of a Federal University of Rio Grande do Sul – UFRGS.

The adaptation of the IFF/Fiocruz's internal network presented two challenges: to establish safe conditions for the use of the tool and raise awareness of informatics sector of hospital. Actually, an internal and dedicated *Mconf* server machine can transmit ultra definition video and audio in all the units and buildings of the hospital complex.

Concurrent to this, there was a working of awareness among sectors to use the tool.

RESULTS: As an immediately result, we have implemented the tool without cost to the hospital and with the prospect of therapeutic support to children and adolescents seriously ill in long hospitalizations.

CONCLUSIONS: Ownership and acceptance of clinical sectors about information and communications technologies in their daily are not immediate. The improvement and customization of the web conferencing tool for the therapeutic target are essential to make this comes true. ■

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The Special Interest Group of Hansen´s Disease experience in Brazil

Maria Leide W. Oliveira[1]; Marco Andrey C. Frade[2]; Luiz Claudio Dias[3]

INTRODUCTION: According to Castells (1999) [1], information technology (IT) brought an historical change in the space concept of the humanity. Therefore, it is well accepted that many virtual communities could utilize a symbolic territory -the cyberspace- and the information and communicational flowcharts created on this add productions never possible in the physical space of those participants from different institutions and regions. The Special Interest Groups (Sigs) are the main scientific activity of the Brazilian University Telemedicine Network (RUTE), comprising 68 specific fields of the wider domain of health assistance, research, learning and informatics (http://rute.rnp.br/). [2, 3] Leprosy, called Hansen´s Disease (HD) in Brazil, is endemic in all states of this country, responsible for more than 90% of all cases of the American Continent. The Special Interest Group of Hansen´s Disease (SIGHD) was created in July, 2013, supported by RUTE Network and coordinated by the University Hospital of UFRJ (HUCFF) with a partnership of Clinical Hospital of Ribeirão Preto (FM/USP) and a Reference Center of Dermatology (FUAM-Manaus).

Objectives: To mediate technical and scientific discussions of HD by teleconferences or other synchronic and non-synchronic activities; to promote collaborative e-health activities between university hospitals, scientific societies and all levels of leprosy control policies.

METHODS: The methodology of work follows the guidelines of Telemedicine Network (RUTE) for SIGs. It was a collection of collaborative actions, mainly performed during videoconferencing sessions, scheduled according to previously prioritized issues, involving all members. The criteria utilized to compose the coordination between institutions (UFRJ, USP-RP and FUAM-AM), considered the role of its participation (via the Dermatology sector) in training/ research, in the leprosy scientific society and as well as control activities in the country. These activities are recorded in (http://rute.rnp.br/) site.

RESULTS: In its short existence, this SIGHD agglutinated the professors and technicians from 11 universities (8 federal, 4 state and 01 private); 03 reference centers, the National HD Program of Ministry of Health, and Control Programs of Rio de Janeiro (RJ) and Amazon (AM) states. One singularity of this group is the involvement of the Brazilian Society of Hansenology (SBH) offering opportunity to technical definition consensus and no least important, the inclusion of the self-care groups of HD, formed by HD patients and health personal involved in physical rehabilitation activities (physiotherapist, nurses, social workers and occupational therapist), from RJ and AM. Efforts are triggered to improve the affiliation of universities and states control of HD, coordination in order to cover all states and metropolitan municipalities of Brazil. In addition there are some initiatives to integrate some Latin American endemic countries, as one of SIGHD partner (FUAM) is an official reference unit of leprosy of Panamerican Health Organization (PAHO).

Unfortunately, Hansen´s Disease control requires time to obtain impact, and the Brazilian epidemiological and

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operational situation demands a long- term mobilization of universities, government and health professionals, to face this problem. The SIGHD has been covering the scope of its original proposal and presents a perspective to expand and consolidate its activities, with a recommendation to improve learning activities, comprising graduation courses of health professions, as well as continuing education, focused on health professionals acting in Primary Health Care (SUS).

So far, four of the most interesting virtual activities supported by SIGHD have been identified: one session occurred as one activity of the Brazilian congress of Hansenology held in Recife, in 2013; a consensus of leprosy relapse, conducted by the Brazilian Society of Hansenology, with the participation of the National Brazilian Program of Dermatology of Ministry of Health utilizing some meetings in 2014/2015 and the annual session of patient self- care groups, in December 2013/2014.

CONCLUSIONS: Conclusions: the SIGHD is already consolidated and recognized by Hansen´s disease workers in Brazil. As this virtual space is also real and in expansion, it could offer new possibilities of telepresence and innovative resources of scientific interchanges in the future. The perspective is its prosperity, so that, it will contribute to health workers updating knowledge, and patient group empowerment. ■

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Experience in the Implementation of Strategic Planning in a Telehealth Center

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INTRODUCTION: Strategic planning is a management process of objectives formulation which creates action plans and that takes into account the internal/external conditions of the organization and its evolution. Brazil has a network of telehealth centers distributed in various regions of the country that develop actions of great social impact both in health and education. The establishment of strategic planning in telehealth centers shall provide a strategic vision of developed activities and improve management.

Objective: To describe the development of the strategic planning of the Telehealth Center at the University of Pernambuco – NUTES UPE.

METHODS: A descriptive study of the structure of the strategic planning of NUTES UPE which consisted in gathering information by applying checklists, identification of strategic goals and drawing up the action plan with work teams, construction and monitoring of activities with software use, carrying out workshop with managers and presentation of the activities report.

RESULTS: Eight strategic goals and thirty-six actions with related indicators, targets and responsibilities were identified. A spreadsheet was created to carry out the monitoring of activities by the NUTES UPE team.

CONCLUSIONS: The introduction of planning provided a more strategic vision of the activities developed at the telehealth center, it set tools and targets for the achievement of results and contributed to the improvement in management. ■

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Telehealth applied to a program of health actions at offshore petroleum and gas production platforms

Regina Celi Bianco[1]; Karla Kurtz

INTRODUCTION: This study aims to report the experience of a multidisciplinary health care team (doctors, nurses, nurse technicians, nutritionists and fitness trainers) working in offshore oil and gas production platforms in the Campos Basin, Rio de Janeiro, Brazil. This team uses advanced communication and information technology resources to carry out health services, training, planning, and management activities.

The operating model is focused on individual and professional competencies and is designed to prepare and develop a set of knowledge, skills and behaviors that allow the health practitioners to apply best practices in individual or collective health. The ultimate goal of this process is to increase the efficiency of services in health in a work environment as peculiar as offshore.

METHODS: The oil industry in Brazil, as well as strategic, became fundamental for the Brazilian economy. The offshore labor activity has grown substantially in the last decade and has mobilized a large workforce. In general, the work conditions and life in the offshore production platforms are considered complex. Virtually the entire facility is set up as a hazardous area and even simple everyday tasks are guided by procedures that establish rigidity of conduct.

Currently, those risks are mitigated applying an effective safety system and that include procedures to execute any type of work. In this environment, the health professional plays a fundamental role in the aboard population welfare. He or she acts in accident situations as well as in individual health demands, such as sickness, diarrhea, headaches, muscle discomfort and other daily demands. The health professional onboard also performs other important activities, such with: periodic medical and nutritional examinations, height and confined space work health permits, health briefing for a new crew member that comes onboard of the platform, health lectures weekly, rescuer training, sanitary inspection and enforcement actions, water quality and air conditioning system analysis, food safety, inspection of food containers, hygiene and cleaning.

Investing in advanced communication methods and information technology was one way to standardize and improve the health processes among professionals that are far apart. This paper describes the author's experience implementing and using an advanced on-line and iterative communication system and information technology, such as: teleconferences, chatrooms, Internet and blended learning, to leverage the health promotion activities onboard.

Health promotion activities are oriented by a corporate health program and have been implemented in all offshore operating units. For the systematic implementation of the process it was necessary data collection related to the health of the offshore workforce (periodic medical and nutritional examinations), analysis of the indicators related to health and hygiene at the platforms, technical visits, interviews with experienced health professionals, as well as with workers and managers working offshore. In addition, was carrying out a research on references and available

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information for similar applications.

RESULTS: Teleconference meetings are held bi-weekly with various offshore production units led by the operations base in Rio de Janeiro's office. At least, nineteen health offshore professionals and ten on land joining the meeting to discuss technical content issues, planning and management activities.

Within the content covered, three are the main ones: health-disease (care provided onboard), health work processes (Management indicators and action planning), and the perspectives on health promotion (which is divided into 3 Programs: Prevention of cardiovascular risks, Healthy Eating and Physical Activity).

CONCLUSIONS: This enhanced practice enabled health professionals to acquire and consolidate knowledge, improve the practices on health promotion and disease prevention onboard and has been very successful. As a result, there is a greater integration among the actions on health recovery and rehabilitation, improving the assistance for offshore oil and gas employees. ■

Elderly Health: Perception in Learning and its Applicability in Virtual Learning Environment conducted studies

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INTRODUCTION: The Brazilian Institute of Geography and Statistics (IBGE) pointed in 1980, a life expectancy of 62,5 years at birth, a difference of 12,4 in relation to 2013. The Brazilian population is aging quickly, both because of the decline in fertility as mortality.

Moraes (2012) refers that in Brazil there is a growing process in relation to the increase in life expectancy, where a Brazilian that is 60 years old will live on average to 81,8 years.

According to the Commission of Justice and Citizenship Constitution (2012), the actual projection is that the rise will continue with continuous increases by 2050 when IBGE estimates that we will have 73 elderly people per 100 children.

Given this perspective, the Open University of SUS, from the State University of Rio de Janeiro (UNA-SUS/UERJ), in 2013, in partnership with the Federal University of Maranhão and the Federal University of Ceará developed and offered the Specialization Course on Health of the Elderly in the E-learning, with the objective of waking in the health professionals an inducer vision of changes and perceptions. Thus, the aim of this project was to analyze the acquired learning of the health professionals in the completion of this Course.

METHODS: It is a qualitative, quantitative, transversal and observational study, with the aim of analyzing the perception about the acquired learning of the health professionals in the completion of the Specialization Course on Health of the Elderly offered from 2013 until 2014, with 390 hours and 500 students. The course was developed through Moodle (Modular Object-Oriented Dynamic Learning Environment), which is an open software utilized by many learning institutions because it is an environment that provides synchronous and asynchronous interactions in learning, and it is executed in a Virtual Learning Environment (AVA).

According to this feature, we utilized data from the "User Profile Form" which fulfilled the course in its entirety from the axis Nº1 to axis Nº2, and it was prepared inside the "Introduction" module with questions to identify features like: gender, age, career, time since graduation, work experience in the career, region of Brazil where the professional operates and experience with E-learning.

The "Module Evaluation Form" was available in the end of every module; however, a cut was made only in Module VI – Fragility of the Elderly: The falls and its consequences, offered from 01/04/2014 to 24/04/2014, which addressed the vulnerability of the elderly people; as well as the consequences related to the falls and their inferences regarding the evaluation of the elderly that falls, and the monitoring of the fractured elderly. This theme pointed the need of studies that aimed the problem and its consequent increase of attendance in health facilities, as well as the need for

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training of health professionals to ensure aging with quality of life. The data related to the research instruments were tabulated and analyzed by percentage.

RESULTS: Quantitative analysis of the "User Profile Form" pointed out the participation of 238 students, 88% female. Since 99.6% of those aged 25 years to 60 years, which shows professionals interested in independent training. And in the total of 74% who are already trained for over six years, we have 34% of nurses, 11% of dentists and only 5% are doctors. Although the course has been offered for the Southeast and Northeast the questionnaire was answered by 80% of the Southeast. Most students reported that they had autonomy in learning and 38% report a positive impact on navigability, interactivity and accessibility in the materials available in the AVA. These data are relevant, since 69.13% had already done an online course.

Qualitative analysis of the "Module Evaluation Form", taken from the VI module, students were asked to reflect on the knowledge that the course provided and vote from 0 to 5, in order to ascertain if the teaching process learning contributed to his practice in health care.

Reports showed that the performance and interest was accentuated because it is a recurring theme in health facilities and very close to the experience of each professional. Another point made was that the virtual environment provided in the module contributed to the students in the training of professionals in dealing with the health teams improving their practices in working with the elderly, falls and immobility. Many reported that such knowledge would be applied daily and would work in a better way with his patients after the course.

Still, according to the qualitative data, you can analyze the interest of students in the timely delivery of activities in attendance in the virtual classroom, the motivated behavior in relation to the materials and the commitment to acquire the learning to their professional lives. It was found that the majority showed no problem accessing the materials and the delivery of activities, the ones that presented some difficulty had assistance from the tutor, the pedagogue and still counted on the technical support for issues relevant to navigation.

CONCLUSIONS: The implementation of the Specialization Course on Health of the Elderly added knowledge to health professionals in order to bring to their praxis new applicability, that is, the specifics presented in the VI module - Fragility of the Elderly: The falls and its consequences, provided a new view to the doctors, dentists and nurses about effective performance and excellence in service to the elderly in health facilities.

The study materials available converged on a motivational purpose, in which the students analyzed that the knowledge acquired in the module would bring a expertise within its area of operation, i.e., the material was of great importance in the lives of health professionals aggregating new knowledge to their daily lives.

Moreover, the training conducted in the E-learning pointed that the availability of the course and materials, with respect to navigability and accessibility, contributed for the training offered by the module to be carried out satisfactorily.

Thus, the online platform has provided students a specialization that contributed to the formation of proactive student, able to build knowledge collaboratively, awakening new knowledge within a critical and recurring perception in health facilities. ■

An architecture for electronic prescribing in physiotherapy in Belgium

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INTRODUCTION: Prescriptions are a cornerstone in most health systems: in the paper world, the prescribing health worker (general practitioner, specialist, dentist or nurse) writes down a medical, physiotherapy or nursing prescription on a pre-formatted piece of paper, signs it and usually hands it over to the patient. The patient then collects the medication, written on the paper prescription, in a pharmacy or visits a physiotherapist or a nurse of his choice.

Since 2014, in Belgium a national rollout of the electronic medical prescription system took place, organized within the Recip-e project. At this moment approximately 29,000 medical prescriptions are created by 3,101 general practitioners (GP) on a daily basis, which corresponds to 31% of the GP's in Belgium. There are currently 2,843 (57%) of the Belgian pharmacists connected to the Recip-e system. Currently no reference is found in the literature about the development of an e-Prescription system in the field of physiotherapy. This abstract describes the architecture for the electronic physiotherapy prescription (EPP) in Belgium that is currently put into place, based on the model for the ambulatory medication prescription but taking into account the particularities that apply specifically to the physiotherapy domain.

METHODS: The proposed model architecture consists out of the technical building blocks, the prescription content, data-flow and use-cases.

The building blocks for the EPP are based on existing technologies and are currently used in the Recip-e system.

1. Internet communication protocols/web-services

2. The Kind Messages for Electronic Health Records (Kmehr-bis) XML format, including the physiotherapy prescription, (Belgian medical document exchange standard).

3. Patient and medical worker identification by the appropriate electronic cards (eID or equivalent)

4. Advanced digital signature, via the eID resident signing certificate and recognized as equivalent to handwritten signature

5. Accessible and sound encryption technology

6. Adequate authentication portals, identifying the role of prescriber and physiotherapist

7. Operational diagnosis coding databases

8. Cheap and secure database storage.

Some building blocks are provided by the national eHealth-platform, which offers basic technological services for the whole e-Health sector in Belgium, including time-stamping, logging, authentication, end-to-end encryption.

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The content of the physiotherapy prescription exist out of three parts: Regulatory data (minimum requirement), optional data and data that are required in certain specific situations. Additional structured elements, such as international coding standards, are added in the electronic message (ICD / ICPC-2).

After consultation with experts in the field a complete data-flow schema was produced. Also different use-cases were composed to describe in detail all possible flows of prescription data between the prescriber and the receiving physiotherapist. The general data-flow consist of a three step:

1. The prescribing physician prepares the prescription in his medical software system. He indicates the regulatory items. The prescription is signed digitally (either each prescription is digitally signed or the prescriber´s session is authenticated via the electronic identity card [eID] + pin code of the prescriber). Then the prescription is transmitted in encrypted format to the Recip-e server. A RID (Recip-e ID = unique identifier for each accepted prescription) is attributed. The prescription is printed, using the legal format, comprising the RID as a barcode.

2. The patient visits a physiotherapist of his choice and presents the paper prescription containing the Recip-e barcode. When the physiotherapist decides to treat the patient, he can collect the EPP from the Recip-e server by scanning in the barcode on the paper prescription and verification of the patient's eID.

3. An optional feedback will be sent to the prescriber confirming the start of the physiotherapy treatment, using the designed feedback channel in the Recip-e system.

RESULTS: Besides the "normal" flow for the EPP treatment prescription (e.g. Prescription for 9 physiotherapy treatments for an ankle sprain) that is presented in the method section, also more "complex" use-cases (e.g. extensive physiotherapy for patients that are post hip replacement surgery) were elaborated. Since the latter requires additional data on the prescription that is often omitted during the creation of a paper physiotherapy prescription. Therefor in step 3 the physiotherapist will use the feedback channel of the Recip-e system, as described earlier, to ask the prescriber to fill in this missing information (e.g. surgery date or number). The questions will automatically pop-up in the software system of the prescriber. The prescribing physician, after being notified about the missing information, makes use of an additional notification channel to send an updated prescription containing all necessary information to the physiotherapist. This is not a new prescription, but it contains an addendum with the missing information. Therefore it keeps the same RID number. Other situations where more complex use-cases will be used are transfers of patients between treating physiotherapists.

The implementation of the EPP in Belgium will consist of different phases. Currently we are designing the architecture, of which this paper describes the proposed model. The next step will be a pilot phase that will start beginning of 2016. During this pilot phase three infrastructures will be set up: 1) A test-environment, 2) an acceptance environment, integrated into the eHealth-platform's acceptance bus, servers and database hosted by Belgacom (the national telecom company and commercial datacenter provider) and 3) the production environment, integrated into the eHealth-platform's production bus, servers and database hosted by Belgacom, managed by Recip-e. The goal is set to start the roll-out phase after one year of piloting, in the beginning of 2017.

Currently also a patient portal is put in to place where the patient can manage (list, delete, forward) the medical

prescriptions related to himself, residing on the Recip-e server, that will be made available via the network of mutual insurance instances of the country and other health portals. The patient can also deny certain access rights for health care professionals to his pending prescriptions. Mandates should be managed outside Recip-e, but be part of a more general system, in which the eHealth platform plays a central role. The same portal will also be used for the management of the physiotherapy prescription in the future.

CONCLUSIONS: The proposed architecture for the EPP is currently being designed. A generic model that is consistent with current Belgian legal regulations regarding the physiotherapy prescription and uses to a maximum technologies that have already been put into place (the current medication prescription system Recip-e, as well as the basic services of the national eHealth platform). Moreover it adds functionality by including international coding standards.

Although build on an existing model for medical prescriptions, the presented architecture takes into account the particularities that are specific for the physiotherapy domain, such as missing data on prescriptions but also the possibility to transfer between physiotherapists during treatment.

To our knowledge, Belgium is the first country where a structured exchange for prescriptions will be put into practice. We are convinced that this model can serve as a good starting point for a fully structured physiotherapy record in Belgium, but also contains many elements there are generically applicable.

As with other health information technologies, user acceptance and integration into professional and organizational practices is key to ensuring the success of this system. Therefor an evaluation of the implementation and acceptance of the project will be set up, founded on existing models for evaluating e-prescription systems. ■

Influence of Different Models in the Municipal Management Program Implementation Telehealth Brazil Networks

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INTRODUCTION: The Continuing Health Education, proposes that the process of training of health professionals, formed or in formation, to do according to the questioning of the work process, and that all training model is made according to the needs of population involved. The telehealth becomes one of the listed policies for assistance, administrative and educational purposes in health, its appearance, is provided on the resolution of the World Health Organization, which gives opportunity to its Member States formulate new education policies geared towards the transformation of current health practices. From the decree No. 2546 / GM / MS, published on October 28, 2011, there is the redefinition and expansion of Telehealth Brazil program, which now, municipalities may take Centers Technical and scientific telehealth through a consortium network, with in order to enter the Rehabilitation Program of Basic Health Units component of computerization and continuing education of professional more equitable and effective manner. Given the outlook for expanding the ministerial program, we aim to identify the influences of different models of management of syndicated municipalities to technical and scientific core in the deployment process of Telehealth Brazil Networks program.

METHODS: Descriptive study of qualitative approach, the type experience report. Performed during the deployment process of Telehealth Nucleus and municipalities consortium RIT São Lourenço da Mata PE. The positive and negative influences were observed, the different forms of management of syndicated municipalities during the implementation of telehealth program. The network manager that makes up this core is made up of 11 municipalities in the state of Pernambuco: São Lourenço da Mata, Carpina, Paudalho, Limoeiro, Frei Miguelinho, Primavera, Moreno, Condado, Itaquitinga, São José da Coroa Grande and Pesqueira, composing 80 points telehealth 140 Family Health Teams registered.

RESULTS: According to the completion of the first phase of deployment of the Intermunicipal Network Telehealth - São Lourenço da Mata (RIT-SLM), 45.6% of the municipalities completed the 1st stage of implementation, namely: Sao Lourenço da Mata, Moreno, Pesqueira, Limoeiro, Condado, of these, only the cities of Pesqueira, Limoeiro and Condado installed computers in 100% of the Family Health Units (USFs), thus adding 18 points telehealth to more than planned in the initial design. Municipalities that have failed to complete the deployment steps, 9% gave up the implementation of the program and decided to leave the consortium network; another 9% were in lawsuit against former municipal management, the lack of use of the financial allocation for the purchase and installation of multimedia kits on USFs, perpetuating yet, this legal trading level. 25% signed the adhesion agreement, agreeing with

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the implementation, but could not finish the steps for operation of these, the following problems were reported: bureaucratization of bidding mechanisms for purchase of equipment, lack of managers and professionals regarding the importance of the program, structural precarious USFs, difficulty Internet connectivity. Discussion: The municipalities that managed to deploy telehealth show greater interactivity with the Center Manager, in addition to having an individual municipal coordinator, merely responsible for solving the demands of telehealth, which proves the sensibility these municipalities to promote growth of this policy. Corroborating other studies, difficulties were reported in the implementation of financial resources with lack of knowledge about the processes of government, little integration between the financial and legal areas in municipalities with bodies responsible for the development of activities and mismatch between the definition and planning of health actions and activities and the legal and budgetary aspects of public administration. As for the lack of managers and professionals before the telehealth, it becomes evident that health work management faces limits on the inclusion of new care strategies, especially of technological innovations in primary care. This diagram can be evidenced by little approach this theme in the formative curricula in health care, since knowledge and information are very important to support the decision making of public managers and health technicians, mainly related intervention in extreme situations of risks to health and the construction of public policies for social needs, supported in the scientific technical knowledge. Even with project restructuring USFs, challenges related to infrastructure, environmental, cultural and architectural factors influence the construction of models in telehealth...

CONCLUSIONS: It is evident that different policy management models of the consortium municipalities of São Lourenço da Mata Telehealth Nucleus influenced in telehealth deployment process in a positive or negative order. Noting that the identification of the need and managers on the political level of information, in addition to aspects related to the structure of USFs, offering connectivity to internet, specific individual distinction coordinator for telehealth and greater interactivity with the core manager, contributed for the best development the stages of program implementation. These facts identified that the study on public policies can not avoid investigating the inner life of each consortium member unit, as institutional arrangements, attitudes and objectives of the actors, the instruments of action and public policy are important explanatory factors on the genesis and the route of the programs as a whole. ■