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The Development of Web-Based Surveying Platform for eHealth and Clinical Telemedicine

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Abstract: **Surveys remain important as an instrument utilized in medical research. Along with the growth and development of the Internet, web-based survey systems were implemented. Consequently, the need for a survey platform suitable for conducting questionnaires both in public health sector and in clinical environment arose. The platform www.mini-ankiety.pl was developed to meet those needs of the medical community. Most of the application's functionalities are available only for registered users. Various modules (videos, images) required for contemporary survey construction are available for questionnaire creators. Platform's design responds to modern requirements, such as a possibility to be operable on mobile phones and other portable devices with Internet access. Users can obtain various forms of reports, i.e. with graphs, percentages or detailed mode. Safety and reliability of the platform has been taken into consideration and is guaranteed by implementation of anti-cross site scripting, anti-SQL injection mechanisms and also by careful system development. On-going surveys focus on telemedicine, e-Health recognition by medical professionals, fracture healing assessment methods and many more. The examples confirm high usability of the platform and suitability for extensive surveying with a possibility to collect results in either open or secure (private) questionnaire's forms. International access to surveys is available. The usage of "mini-ankiety" has been successful so far and the prospect for further scientific implementations is good.**

Introduction

The survey remains a widely used instrument in medical research. Patients [1] and health professionals [2,3] are often subjects for the research designed to answer several research questions that may influence further health care improvement. Presented project describes the current development of a platform for eHealth and clinical Telemedicine surveys, despite its name can be used by anyone who needs to conduct a survey using either a PC or a portable device with Internet access.

Project's goal

The primary goal of the project was to develop and implement an on-line environment agent to conduct medical surveys working on mobile devices. The term "medical survey" is understood as any freely definable type of survey or questionnaire in the field of medicine used for collecting opinions from various social groups.

The first step needed to complete the project was to establish partnership between the medical and information technology environments. The next important step, which allowed getting closer to the main goal, was the selection of an appropriate methodology to carry out the project. At the same time, it was equally important to take into consideration how different areas of life such as: information technology (software development, multimedia), medicine, statistics, and even psychology, can be merged in computer software. The last necessary step was the implementation, testing and deployment of the software in online environment.

Project's Requirements

Main requirements [4] for the system were set as follows: innovation, usability, coherence and usefulness, safety, reliability, privacy and portability. The Innovation was fulfilled both by using a variety of modern technologies in the programming part and combination of different fields of knowledge in the analysis and design of the system. Additionally, innovation was achieved by incorporating into the portal's engine multimedia services. These can be images, sounds and videos from popular websites, e.g.: YouTube. The Usability was introduced thorough the transparent and intuitive use. Unnecessary steps and mouse clicks were eliminated from such functionalities as setting up user accounts, creating questionnaires, or interaction with users of the messaging system. High usability was one of the essential criteria determining expected success of the project. The Coherence and usefulness were ensured by the application's interface, which is not only intuitive, but also highly comfortable to use, and, a consistent color scheme. System components such as buttons, tables, etc. were arranged in predictable and similar configurations. The portal can be distinguished by many advanced solutions, provided by technologies such as: jQuery, jqPlot and other. The Safety and reliability were achieved by elimination of as many potential security vulnerabilities and risks as possible. In particular, attention was paid to neutralize XSS (Cross-site scripting) and SQL injection attacks. The Privacy was considered as an important element in development process to ensure and protect the respondent's privacy. It was set by undertaking two independent actions: by creation of the technology able to

keep the respondents data anonymous and by certain regulations determining what is allowed and what is not. Finally, the Portability, the key feature of the application, was designed to keep its compatibility with a vast variety of devices supporting the Internet. That resulted in the possibilities to answer survey questions on mobile devices, including those with low processing power and screen resolution.
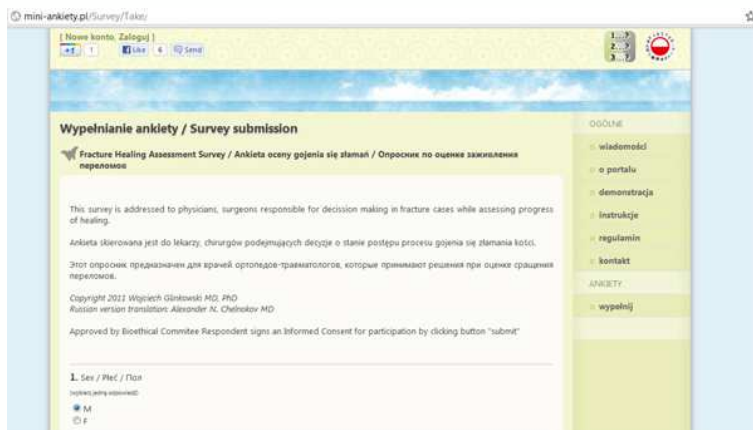

Fig.1 Screenshot from the survey website

Conclusions

Presented application gained all requirements described in the design phase. The system was launched on-line and remains active at www.mini-ankiety.pl. Seventeen different surveys were created from its start date to February 1, 2012. Seventy per cent of them are health related. Over twenty one thousand questions were answered in 642 completed questionnaires. Many of the surveys have already been used as the base for scientific work; others can help improving common life situations. Overall statistics confirm positive reception of the project in medical environment. We conclude that developed platform meets the user needs that confirm future perspectives for its future use.

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