

The Effect of Graphic Features of Web-based Health Communication On User Evaluation and Psychological Wellbeing

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The Effect of Graphic Features of Web-based Health Communication On User Evaluation and Psychological Wellbeing Background: The use of peripheral communication elements such as humor appeals or background music/graphics can influence user attitude toward communication [1-3]. Online health communication often presents potentially threatening information to health information seekers. Moreover, health information is typically sought by users when they face either actual or perceived health threats, which often generate psychological distress. Therefore, optimal design of web-based health communication should ideally provide pertinent information while at the same enhance users' psychological wellbeing. Based on existing literature [4-5], we expect that the use of positive peripheral elements in web-based health communication such as pleasant background images can enhance users' psychological wellbeing as well as acceptance of the communication. Objective: We examine the effect of positive peripheral visual features of web-based health communication on users' affective experience and evaluation of the website. Methods: 40 healthy women were randomly assigned to visit one of the three versions of a health communication website, which were identical in verbal messages, but differ in peripheral visual features: color or black-and-white (BW) pictures of pleasant natural scenery, or no picture. Pre-test shows that the color pictures are more pleasant than the BW version. The websites were evaluated in terms of organization, ease of finding information, speed of loading, and usefulness of information. Psychological wellbeing was measured by self-reported affect in response to the website. Results: The color version were perceived to have a better organization than the BW version ($p < .03$), easier to find information than both the BW version ($p < .06$) and the no-picture version ($p < .001$), and higher usefulness of information than both the BW version ($p < .04$) and no-picture version ($p < .002$). Further, participants reported more pleasant affect after viewing the color than the BW and no-picture website ($P_s < .02$). Finally, the effect of the visual features on evaluation and psychological wellbeing appear not to be cognitively mediated, as participants' retrospective evaluation of the pictures per se did not differ between the color and BW versions ($p > .20$). Conclusion: The use of positive peripheral visual elements can enhance users' evaluation of the website and psychological wellbeing.

References:

1. Curro V, Buonomo P, Onesimo R, Rose P, Vituzzi A, Tanna G, D'Atri A. A Quality Evaluation Methodology Of Health Web-Pages For Non-Professionals. *Medical Informatics*, 2004, 29 (2), 95-107.
2. Conway M, Dubé L. Humor In Persuasion On Threatening Topics: Effectiveness Is A Function Of Audience Sex Role Orientation. *Personality and Social Psychology Bulletin*, 2002, 28 (7), 863-873.
3. Griffiths K, Christensen H. Website Quality Indicators for Consumers. *Journal of Medical Internet Research*, 2005, 7 (5), e55.
4. Fredrickson B, Mancuso R, Branigan C, Tugade M. The Undoing Effect of Positive Emotions. *Motivation and Emotion*, 2000, 24, 4, 237-258.
5. Fredrickson B, Levenson R. Positive Emotions Speed Recovery from the Cardiovascular Sequelae of Negative Emotions. 1998, *Cognition and Emotion*, 12, 191-220.

The RealU: A Web-based Intervention To Reduce College Smoking

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Background: The college years represent an opportunity to intervene to limit escalation in cigarette use and encourage early cessation. Working with the University of Minnesota's Boynton Student Health Service, the goal of this project was to test a web-based intervention to reduce cigarette smoking by UM Twin Cities undergraduates. Methods: This is a two-group prospective randomized controlled trial. Potential participants (any smoking past 30 days) were identified via internet health screening survey and invited to enroll. Individuals randomized to the RealU intervention group were offered a \$10 incentive to make weekly visits to the study site to (1) track their cigarette use, (2) take an interactive quiz to learn about their lifestyle and smoking habits, and (3) view an on-line college life magazine with general lifestyle and smoking related content. Outcomes include 7-day abstinence at weeks 6, 12, and 20 evaluation points and 30-day abstinence at week 20 (with carbon monoxide (CO) validation). Results: Invitation email was sent to 25,000 UM undergraduates yielding 6492 completed surveys (26% response) identifying

1857 smokers (29% prevalence) of whom 517 enrolled (usual care=260, RealU=257). Weekly participation exceeded 89% (range 89%-98%). The prevalence of 7-day abstinence from smoking in the RealU group was higher than in the control group at 6 (42% vs. 25%, $p < .001$), 12 (42% vs. 33%, $p < .05$), and 20 weeks (59% vs. 38%, $p < .001$). The rate of 30-day abstinence at week 20 was also higher in the RealU (40%) vs. usual care (23%, $p < .001$). CO validation showed low rates of underreporting (<1%) with no difference between the groups. Conclusion: Internet health screening is an effective means to identify large numbers of college smokers. The RealU on-line intervention achieved and sustained high participation rates, reduced the 7-day point prevalence of smoking, and increased 30-day abstinence.

Knowledge-Based Teleinterpretation of Hepatitis Serology Test Results

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Background: Automated interpretation of any combination of laboratory test results of a specific medical field such as hepatitis serology - including rare and frequent, or even inconsistent, combinations - contributes to quality assurance in patient care, enhances the productivity and efficiency of medical work, and may also reduce costs in health care. A knowledge-based system for the interpretive analysis of hepatitis serology test results, named Hepaxpert, that covers any combination of hepatitis A and B serology test results was developed, tested, and routinely applied at one of the laboratories of the Vienna General Hospital [1]. Later its knowledge base was revised, extended to include hepatitis C serology, and discerned from its surrounding software. The established Hepaxpert knowledge modules [2] now comprise 64 possible combinations of test results for hepatitis A, 61440 possible combinations for hepatitis B, and 16 possible combinations for hepatitis C serology. Objective: The general aim is to incorporate the Hepaxpert knowledge modules into a multi-lingual web-based system to allow for teleinterpretation of any hepatitis A, B, and C serology test result from any part of the world. The specific aims are twofold: first, the Hepaxpert knowledge modules will be integrated into a web server application to allow the input of test results via a web browser; second, the Hepaxpert server application should be able to process Hepaxpert queries without going through a browser interface; it should be possible to send serology test results packed into a web-standard protocol query to the Hepaxpert server and return the respective interpretive text by the same technical pathway. Methods: The present Hepaxpert knowledge modules include a clearly arranged knowledge representation and an efficient inference method by structuring the knowledge domains into equivalence classes and using index calculation to access the respective interpretive text [1]. The main inference step will include pre- and post-processing. These knowledge modules offer input and output structures used to fill the given laboratory test results in coded form into the input and return the textual interpretation in the output structure. Results: The web version of Hepaxpert [3] is currently available in the German and the English language. It is linked to a number of medical web sites dealing with hepatitis, laboratory medicine, and patient education. Its browser-less version is routinely used at the Franz Josef Hospital in Vienna, Austria. The laboratory information system of the laboratory department of this hospital forms a query record based on HTML, sends it via HTTP to the Hepaxpert intranet web server, gets the interpretation returned, and includes it in the laboratory result sheet sent to the referring physician after verification. Conclusion: Teleinterpretation of hepatitis serology test results, either through a browser interface or in the browser-less mode through a network query, provides valuable support for the medical decision-making process and for quality assurance, especially in cases of rare and inconsistent laboratory findings.

References:

1. Adlassnig KP, Horak W. Development and retrospective evaluation of HEPAXPERT-I: A routinely-used expert system for interpretive analysis of hepatitis A and B serology findings. *Artif Intell Med* 1995 Feb;7(1):1-24.
2. Adlassnig KP, Horak W, Rappelsberger A, Hayashi, Y. Embedded knowledge-based diagnostic intelligence to interpret hepatitis serology test results. *Proc. of the International Conference*

on Computational Intelligence for Modelling, Control & Automation CIMCA 2005 jointly with the International Conference on Intelligent Agents, Web Technologies & Internet Commerce IAWTIC 2005;II:1080-5.

- Hepaxpert. Home page. URL: <http://www.medexter.com/Hepaxpert> WebCite: <http://www.webcitation.org/5H988oeVY> cached [5.7.2006]

Medical Intelligence Service Provider Based On Interconnected, Cooperating Medical Decision Support Systems

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Background: Knowledge-based medical decision support systems (MDSSs) were shown to be useful in patient care, especially when fully integrated into hospital or laboratory information systems, patient data management systems for intensive care, or medical practice software systems for the practitioner [1]. In order to remain medically up to date, the knowledge bases must be continually revised, extended, and made accessible to their sites of application. In addition, MDSSs are offered via the World Wide Web, to be accessed through a web browser or, browser-less, in order to receive queries and automatically return answers within a network-based communication protocol. Objective: The general aim is to establish a web application that not only offers single, autonomous MDSSs but also provides an array of interconnected, mutually supportive MDSSs. By doing this, parts of, or the entire, medical decision making process in patient care is mimicked. For example, an MDSS that assists in the clinical differential diagnostic process in hepatology, a field of internal medicine, might generate - on the basis of jaundice, enlarged palpable liver, and increased bilirubin levels - the hypothetical diagnosis of hepatitis, among others. Hepatitis serology laboratory tests will now be required in order to confirm or exclude a viral cause for the inflamed liver. The one system (internal medicine) demands information from the other system (laboratory medicine) and, if available, incorporates these results in its own decision. Methods: As shown previously [1], software-based medical knowledge modules are well suited to form the core of MDSSs. A next step is taken by providing a web interface that exhibits the different medical specialties as components that interact with each other, as (specialized) physicians do in actual medical situations. The components are backed by medical knowledge modules for the respective speciality. Calls for switching from one MDSS to the next and back, if appropriate, are triggered by the respective MDSS. Results: Based on several autonomous MDSSs (Rheumexpert [2], Hepaxpert [3], Thyrexpert [4], and Toxopert [5]) that have been routinely applied, a general web-based interface showing the specialties of internal and associated laboratory medicine is established. In this methodological and technical study, a blackboard system was used: it serves as a common communication platform between clinically oriented systems and systems for the analysis of laboratory test results. Conclusion: We report the initial steps taken to establish a web-based medical intelligence service provider that includes MDSSs for the many large and small specialties of practical medicine, and also follows the information and decision flow in actual patient care by means of interconnected, mutually supportive MDSSs.

References:

- Adlassnig KP, Horak W, Rappelsberger A, Hayashi, Y. Embedded knowledge-based diagnostic intelligence to interpret hepatitis serology test results. Proc. of the International Conference on Computational Intelligence for Modelling, Control & Automation CIMCA 2005 jointly with the International Conference on Intelligent Agents, Web Technologies & Internet Commerce IAWTIC 2005;II:1080-5.
- Rheumexpert. Home page. URL: <http://www.medexter.com/Rheumexpert> WebCite: <http://www.webcitation.org/5H98DxqFH> [cached 5.7.2006]
- Hepaxpert. Home page. URL: <http://www.medexter.com/Hepaxpert> WebCite: <http://www.webcitation.org/5H988oeVY> [cached 5.7.2006]
- Thyrexpert. Home-page. URL: <http://www.medexter.com/Thyrexpert> WebCite: <http://www.webcitation.org/5H98Caog5> [cached 5.7.2006]
- Toxopert. Home-page. URL: <http://www.medexter.com/Toxopert> WebCite: <http://www.webcitation.org/5H98AxtRB> [cached 5.7.2006]

Techniques for Customizing Patient's Diagnosis User Interface

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This paper proposes an approach of introducing a specific user interface (or diagnosis screen) to enter efficiently patient's diagnosis details. We discuss various aspects and techniques for providing efficient way to enter diagnosis details in efficient manner. However, there are few facilities in user interface development that are being covered and analyzed. We discuss methods for providing automatic data view by focusing on efficient design and effective viewing strategies so that user can fill up related information with less typing efforts. Various drag and drop window-screens will be provided to enhance various user interface styles. Data manipulation and data extraction features are introduced to manage a link with user interface for the user's better interaction.

Telecardiology System Using Internet and Picosatellite Connections

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Background: We have designed an experiment to research the performance of the telecardiology system using internet and picosatellite connections for telemedicine, the principal interest is to bring medical services to isolated communities Objective: The objective of this research is to evaluate the performance of a telecardiology system on internet and picosatellite networks. Materials: A fully functional telecardiology system was used on internet and network simulation system. Methods: the telecardiology system are composed by acquisition, compression and error control modules, we send compressed ecg data through internet to the ground station of the picosatellite network, later the data are sending to the satellite, they are received at the other ground station in remote place and transmit on internet to the hospital where there are medical specialist for analysis and diagnosis. Finally this communication process is used to return diagnosis data to source place where there is the patient. Results: We send compressed data through internet later we uses data for simulating satellite transmission using matlab communications toolboxes, as a result some doctors in Bogotá carried out observations to the results with ecg reconstructed in reception and they concluded that it is acceptable the ecg waveform for diagnosis. Conclusions: Using internet and picosatellite networks will enable the develop of integrated networks in order to establishing the infrastructure with the capability to develop space activities for special purposes on medicine. it is possible to take ecg data of a patient from remote place for attending the principal necessities of medical services in the community.

References:

- L.E. Aparicio, P.J. Arco, Telecardiology System on Internet Using Compressed and Protected ECG Signals, TECHNOLOGY AND HEALTH CARE, Volume 12, Number 5, 2004 ISSN 0928-7329 pg. 364,
- L.E. Aparicio, J.L. Cárdenas, Telecardiology Data Compression and Error Control System. IFMBE Proceedings, 4th volume, 2003 ISSN 1727-1983, World Congress on Medical Physics and Biomedical Engineering, Sydney Australia.
- B. Twigg and Ben Yuan . KatySat Project. Stanford University.
- <http://www.katysat.org>
- J.C Narvaez. Civil Aviation of Colombia. Conference: Kids are not too young for satellites. First International Space Camps in
- Colombia with the sponsorship of UNESCO, CNES(France),
- JAXA(Japan) and INPE (Brazil). November 28th to December 6th

Disability Informatics: Meeting the Needs of People with Disabilities

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Disability Informatics is an emerging field that seeks to better understand how individuals with disabilities can use information technology and information systems to address any functional issues they encounter, improve their self-efficacy and empower them to be as independent as any other person. Disability Informatics research often involves identifying and addressing the