Improvement to the Appointment System for Clinic: A case study in UUM Clinic

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Improvement to the Appointment System for Clinic: A case study in UUM Clinic

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By

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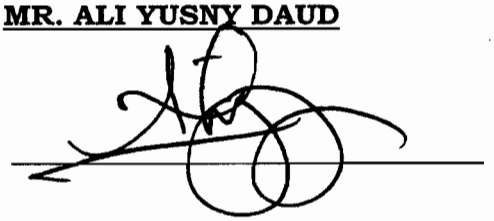
(Signature) : 

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Abstract

Success in emerging new technology can be vital for future prosperity; therefore, any clinic wants to provide high efficiency in presenting its services to patients and implementing efficient interaction activities between its department and patients through clinic online system. Patient services have played essential role in the health care for the society. Patient services and patient waiting time are problems that medical institutions centers faced, because desktop appointment system takes long time for the patient to meet the doctors. As a consequence, the aim of this study is to reduce long waiting time of patients. In actuality, doctor's efficiency will be increased in some certain level. Current appointment system normally runs in hospitals or clinic randomly. The patients who are appointed at the later interval will wait much longer time. The purpose of this research is to reduce the long waiting time through internet to make adjustments patients' appointment number and interval these appointments through internet. Consequently, patients can be able to make appointments through Web/WAP-based applications system service, to improve patient accessing, to enhance patient and physician satisfaction, and to increase practice productivity. Moreover, there is even evidence that promote better outcomes and lower overall costs of care.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

With the fast rapidity world people live in, people always look for better, faster, or more convenient ways to enhance their lives. If something makes sense, chances are people will take advantage of it and adapt it to their daily lives within reasonable cost. Obviously, the development of the internet is a perfect example in this electronic age, which has already made a huge impact in virtually every feature of our lives.

However, one of the majority important complaints from the lack of quality and convenience in the health care organization. The major key is to provide a meaningful accessibility and communication between the patients and their doctors in order to build a relationship of trust and reliability. As the world population grows and ages, the demand for health care services grows with it. Therefore, it is so much more essential and important to deal with those needs and attempt to provide a service with ease of use, accessibility, and scalability.

The contents of the thesis is for internal user only

References

American Hospital Association.(2007).Improving Patient Flow, Patient Satisfaction and Patient Safety.

Anderson, R., & Feldman, Barbara.(2007). What Patient's Want: A Content Analysis of Key Qualities That Influence Patient Satisfaction. *Journal of Medical Practice Management.*

Anderson, RT., Weisman, CS., Scholle, SH., Henderson, JT., Oldendick, R., & Camacho,F.(2002). Evaluation of the quality of care in the clinical care centers of the National Centers of Excellence in Women's Health. *Women's Health Issues*,12, 287–90.

Andrew, Racine.(2000). Use of a Time-Flow Study to Improve Patient Waiting Times at an Inner-city Academic Pediatric Practice. American Medical Association. http://archpedi.ama-assn.org/cgi/reprint/156/12/1203.pdf

Andy Press.(2001). How Online Patient Scheduling And Automated Appointment Reminders Can Help Doctors?, http://www.content4reprint.com/business/business opportunities/medical-practice-101-how-online-patient-scheduling-and-automated appointment-reminders-can-help-doctors.htm .

Athula, Wijewickrama., & Soemon, Takakuwa.(2006) . Simulation Analysis Of An Outpatient Department Of Internal Medicine In A University Hospital. *Proceedings of the 2006 Winter Simulation Conference.*

Broderick, Meg.(2003). D.H. Smaltz: E-Health defined.

Cem, Kaner.(2003). What Is a Good Test Case?. Department of Computer Sciences.

Croft, DR., & Peterson, MW. (2002). An evaluation of the quality and contents of asthma education on the World Wide Web. 121,1301–1307.

David, Pate., & Michael, Puffe. (2007). Improving Patient Flow. http://www.stockamp.com/newsfiles/1181679391638/1181679391654/Physician%20Executive%20Improving%20Patient%20Flow%205_07.pdf

Eysenbach, G.(2001).What is e-health?. Journal of Medical Internet Research,3(2),e20, http://www.jmir.org/2001/2/e20/.

Feenberg, A., & Licht, J. & Kane, K. & Moran, K. & Smith, R.(1996). The online patient meeting. *Journal of the Neurological Science*,139 ,129-131.

Fox, S., & Rainie., L.(2000). Pew Internet and American Life Project. Pew Research Center for People and the Press. (Vol 2001). Washington, DC: Pew Charitable Trust.

Francis, G., Belardi, Weir., & Francis, Craig.(2004). A Controlled Trial of an Advanced Access Appointment System in a Residency Family Medicine Center,36 (5).

Guo, M., M. Wagner., & C, West. (2004). Outpatient clinic scheduling a simulation approach. *In Proceedings of the Winter Simulation Conference*,Washington, D.C. Retrieved October 15, 2008, from www.informscs.org/wsc04papers/265.pdf.

Hai, Nguyen.(2000).SchedNetTM, a 24-hour Internet Patient Scheduling System. Retrieved August 20, 2008, from http://ieeexplore.ieee.org/iel5/6348/16959/00781264.pdf

Harper, P. R., & Gamlin, H.M. (2003). Reduced Outpatient Waiting Times with Improved Appointment Scheduling: a Simulation Modeling Approach. Spectrum, 25(2), pp. 207-222.

Hjortdahl, P., Nylenna, M., & Gerlow, Aasland. (1999). Internet to glege-pasient forholdet Tidsskr Norsk Laegeforening, 119 (29), 4339-4341.

Ho, C.J., and Lau, H.S. (1999). Evaluating the impact of operating conditions on the performance of appointment scheduling rules in service systems. *European Journal of Operational Research,* (112). 542-553.

Hoch, D., Norris, D., Lester, J., & Marcus, A. (1999). Information exchange in epilepsy forum on the World Wide Web. http://www.idealibrary.com printed 2000-03-20.

Ibrahim, Erdem., Tufan, Demirel., & Semih, onut.(2001) . An Efficient Appointment System Design For Outpatient Clinic Using Computer Simulation. Retrieved August 7, 2008, from http://www.scs.org/getDoc.cfm?id=1781.

Jamaiah, Sharif., & Suriani, Sukeri. (2003). Study on waiting time at the paediatric dental clinic, Kuala Lumpur Hospital. *Journal of Quality Improvement*, 7(1), 19 – 23.

James, Gubb. (2007). Waiting times in the NHS. CIVITAS Institute for the Study of Civil Society 2007.

Jason, Charvat .(2002). Rational Rose simplifies software development, Retrieved October 9, 2008, from http://articles.techrepublic.com.com/5100-10878_11 1049781.html.

Krueger, KP., Felkey, BG., & Berger, BA.(2003). Improving adherence and persistence: a review and assessment of interventions and description of steps toward a national adherence initiative. J Am Pharm Assoc (Wash DC). Nov Dec;43(6),668-78; quiz 78-9.

Leddy, KM, Kaldenberg, DO., & Becker, BW.(2003).Timeliness in ambulatory care treatment. An examination of patient satisfaction and wait times in medical practices and outpatient test and treatment Facilities. *J Ambul Care Manage,* 26,138–149.

Liu, L., & X, Liu .(1998). Block Appointment System Outpatient Clinics with Multiple Doctors. *Journal of the Operational Research Society*, 49, 1254-1259.

Luis, Anido-Rifon., Fernando, Agelet., & Olga, Artime. (2001). A Web-based Management Tool for Health Care Services with Appointment Required.

Marconi, Jennifer.(2002). E-Health: Navigating the Internet for Health Information Healthcare, Advocacy White Paper. Healthcare Information and Management Systems Society.

Martin, R.M., Sterne, J.A.C., Gunnell, D., Ebrahim, S., Davey Smith, G., & Frankel, S. (2003). NHS waiting lists and evidence of national or local failure: analysis of health service data. *BMJ* (326:7382), January 25, 2003. 188-209.

McManus, M.L., Long, M.C., Cooper, A., Mandell, J., Berwick, D.M., Pagano, M., & Litvak, E. (2003). Variability in Surgical Caseload and Access to Intensive Care Services, *Anesthesiology*, 98(6).

Mohamad, bin. Abdul. Rahman. (2004). Quality Management : Current Challenges In Patient Care Services .

Moore, C.G., Wilson-Witherspoon, P., & Probst, J.C. (2001). Time and money: Effects of no-shows at a family practice residency clinic. *Family Medicine* , 33(7), 522-527.

Murdock, A., Rodgers, C., Lindsay, H., & Tham, T.C.K.(2002). Why do patients not keep their appointments? Prospective study in a gastroenterology outpatient clinic. *Journal of the Royal Society of Medicine,* (95), 284-286.

Murray, Cote.(2000). Understanding Patient Flow. Trinity University.

Murray, Cote. (2006). Workshop on Healthcare Systems Engineering. Virginia: Arlington.

Nainil, Chheda.(2006).Health Care Strategist. USA: http://www.nainil.com/research/#Research_Interests.

Randolph, Hall. (2006). Patient Flow: Reducing Delay in Healthcare Delivery. USA: University of Southern California.

Reents, S.(2000). Impacts of the Internet on the Doctor-Patient Relationship: The Rise of the Internet Health Consumer. www.cyberdialogue.com/pdfs/wp/wp-cch-1999-doctors.pdf.

Revere, D., & Dunbar, PJ. (2001). Review of computer-generated outpatient health behavior interventions: clinical encounters "in absentia". *J Am Med Inform Assoc*,8(1),62-79.

Ronald, Giachetti., Edwin, Centeno., Martha, Centeno., & Ramakrishnan, Sundaram. (2005). assessing the viability of an open access policy in an outpatient clinic: a discrete event and continuous simulation modeling approach . *Proceedings of the 2005 Winter Simulation Conference.*

Ross, J., Chapman, C., Murray, C., Stevenson, M., Natin, D., & Rogstad, K.(2000). How much interest is the internet to patients?.

Sheila, Nelson., & Gordon, Lang. (2002). Using an Internet-based system to manage patient records.

Smith, J. (1998). "Internet Patients" Turn to Support Groups to Guide Medical Decisions. *Journalof the National Cancer Institute*, (90), 1695-1697.

Tuso, P.J., Murtishaw, K., & Tadros, W.(1999). The easy access program: A way to reduce patient no-show rate, decrease add-ons to primary care schedules, and improve patient satisfaction. *The Permanente Journal,* 3(3).

Vaishnavi, V., & Kuechler, B. (2006). Design Research in information system. Retrieved March 15, 2007, from http://www.isworld.org/Researchdesign/drisISworld.htm

Wijewickrama, A. A., & Takakuwa, S. (2006). Simulation Analysis of an Outpatient Department of Internal Medicine in a University Hospital.

Worley, MM., & Schommer, JC. (1999).Pharmacist Patient Relationship: Factors Influencing Quality and Commitment.

Yue, ZHOU., Jiahua, LI., & Fukuya, Ishino.(2007). Re-building a New Algorithm of the Out-patient Appointment System to Reduce Long Waiting-time—a Case Study, *Proceedings of the 2006 Winter Simulation Conference*, Monterey, CA.

Zielinski, K., Radziszowski D., & Rzepa, P.(2002). Access to medical databases through Internet tools - International Conference on Telemedicine, Jabłonna.

Ulrika, Josefson., & Ole, Hanseth.(2000). Patients' Use of Medical Information on the Intenret: Opportunities and Challenges. Some preliminary findings. *In Proceedings from 23th Information Systems Research Seminar in Scandinavia*