DESIGNING FOR ACCOUNTABILITY FROM ISLAMIC PERSPECTIVES USING VALUE SENSITIVE DESIGN

Fadzlin Ahmadon[1] Rosmawati Nordin[2] Rashidah Md Rawi[3]

[1]*Faculty of Computer and Mathematical Sciences, UiTM Shah Alam, Selangor, Malaysia*
fadzlin[1] @tmsk.uitm.edu.my, roswati[2] @tmsk.uitm.edu.my, rrawi[3] @tmsk.uitm.edu.my

Abstract

The value of accountability is important to the stakeholders of HUSM Psychology Clinic and is compromised with the current system in use. A change to the system in use is essential in order to support this value. Value Sensitive Design (VSD) is a design approach that focused on how moral values can be embedded in a system. Due to this feature, VSD is chosen as a design technique to develop a new system for the clinic. In order to define what accountability means and how it can be designed, studies were done on Islamic sources of Qur'an and Sunnah of the Prophet Muhammad in addition to definition by mainstream ethicists and works on system design literatures. The result is a system that employs design strategies that support the value of accountability. The works in this paper shows that it is possible to refer to Islamic traditions as a point of reference for designing ethical information system. This work can be expanded in the future by having more design suggestions based on Islamic sources for other values and issues especially those concerning the Muslim society.

Keywords*: Value Sensitive Design, Islamic ethics, Accountability*

1. Introduction

William Gibson a popular science fiction author that coined the term "cyberspace" was quoted as saying "*I think that technologies are morally neutral until we apply them. It's only when we use them for good or for evil that they become good or evil*" (Josefsson, 1994). This idea that technology is a neutral tool that only acquires values when used for particular purpose however has been opposed by scholars. Technologies are in reality value laden and "*are developed in a social context that pushes and pulls and shapes its environment*" (Johnson, 2004). In system design literatures, one of the proponents of the idea that technology is not morally neutral is Philip Brey. In his paper titled "Disclosive Computer Ethics", Philip Brey argued that the current mainstream computer ethics that focuses on morality of practices is not enough because technology itself plays active part in shaping its environment and should also be a subject of moral scrutiny (Brey, 2000).

When an environment demands stricter ethical considerations, system developed should also be designed with the intention to include higher moral standards. It means designing the system itself to be morally equipped, limiting possible interactions to only a set of actions that are considered as ethical. According to Holmes (2002), ethics is about the good (values that should be cultivated) and about the right (what our moral duties may be). A method to understanding this question is by referring to different approaches to ethics (Theaker, 2004). Approaches can be based on normative ethical theories like Utilitarianism which defines something is morally right when it produces the greatest amount of happiness on the whole (Sidgwick, 1907), Virtue Ethics or Deontology among many others. It can also come from the understanding of one's culture. According to Herskovits, "Judgements are

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based on experience, and experience is interpreted by each individual in terms of his own enculturation" (Herskovits, 1972)

Ethics in Islam comes from two primary sources; messages revealed by God to Prophet Muhammad and captured in the Qur'an, and the characterization of those messages by Prophet Muhammad's actions saying and norms categorized as Sunnah (Azim, 1991). Islamic ethics are universal standards of right and wrong that prescribe what are the actions humans ought to do as taught by the Qur'an and characters of Prophet Muhammad. It is all actions that are characterized as virtuous deeds in the terminology of the Qur'an (Abdulahi Hashi, 2011). Because of this, it is flexible in the way that it allows human to think and find suitable ethics as long as it in compliance with revelations. Islamic ethics can be said as holistic and comprehensive because of this feature (Mamat, 2008). It is also values that are not in opposition with human values as it recognizes all human rights considered necessary for the every individual in a civilized society (Hayat, 2007).

Value Sensitive Design is a system design method that puts the focus on values (Friedman, Peter H. Kahn, & Borning, 2002). While it supports all human values across the board, a higher emphasis is placed on values with ethical import. In another paper written extending the concept of Value Sensitive Design, Friedman, Kahn and Borning made a study on what values are frequently implicated and they came out with twelve values, involving human welfare, ownership and property, privacy, freedom from bias, universal usability, trust, autonomy, informed consent, accountability, courtesy, identity, calmness and environmental sustainability (Lewis, 2006). They suggested that these values are considered when making investigation on what values are important to users.

2. Literature Review

Literature review was done to get understanding of how the concept of accountability is commonly defined. Also, understanding how accountability as seen in Islamic perspectives, design suggestions for accountability in a system and also interpreting how Value Sensitive Design methodology works is done in this stage.

A. Accountability

Accountability is defined by the Merriam-Webster dictionary as "the quality or state of being accountable; especially: an obligation or willingness to accept responsibility or to account for one's actions" (Merriam-Webster, 2007). Accountability is also defined as "answerability, blameworthiness, liability, and the expectation of account-giving" (Dykstra, 1939). It is a value desirable in many organizations including the corporate (Brennan & Solomon, 2008) and public sectors (Gilmour & Jensen, 1998).

According to Bovens (2010), European Commission in their White paper on Governance defined accountability as synonym not only for clarity, transparency, responsibility, and also broader concepts such as involvement, deliberation and participation. While these definitions are loose, the common theme is that accountability is seen as a desirable quality of public officials and organisations (Bovens, 2010). Being accountable can also be extended to mean providing some things that were not asked for, or for which they were not yet targets (Considine, 2002). In the modern moral theory, according to Josephson (1998) Deontological Ethics means that individuals have duties and we are expected to demonstrate the values of accountability, integrity, trustworthiness, respect and caring.

In this paper, the designing of accountability into the system come from cues in verses in the Qur'an, Hadith and also design suggestions by system design literatures. However these cues also correlate with the definitions in the paragraphs above especially on the aspects of

answerability, involvement and participation. This shows that what are defined by Islamic ethics are not opposite of what mainstream ethicists discussed.

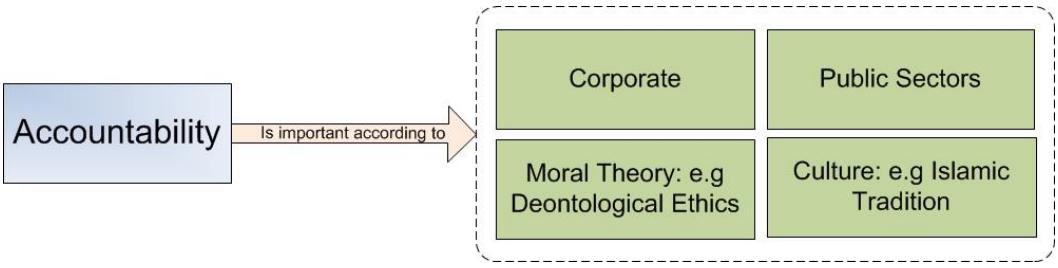

Figure 1. Accountability and its Importance

B. Accountability in Islam

Accountability is a concept stressed in Islam. As believers, we are told that we would be held accountable for all our deeds, good and bad. That in Judgement Day, our record book will be revealed:

Every man's fate We have fastened on his own neck: On the Day of Judgment We shall bring out for him a scroll, which he will see spread open. (It will be said to him:) "Read thine (own) record: Sufficient is thy soul this day to make out an account against thee." (Qur'an 17:13-14)

Humans are accountable for even the smallest actions; it will not go unnoticed as revealed in this verse:

Then shall anyone who has done an atom's weight of good, see it! And anyone who has done an atom's weight of evil, shall see it. (Qur'an 99:7-8)

According to Muslim scholars, "*amanah*" or usually translated as trustworthiness is one of the characters said to be possessed by the Prophet Muhammad. As the Messenger of God, he was given the responsibility to spread the messages of the Qur'an. In the final year of his life, he delivered a final sermon at Mount Arafat; for each Commandments of God that he repeated to his followers, he asked if he had properly conveyed the Message and asked God to be witness of his followers that had answered "Yes you have conveyed it!" (Gülen, 2000). Prophet Muhammad (peace be upon him) was also once quoted as saying in this Hadith related by Bukhari and Muslim:

Each one of you is a guardian and each guardian is accountable to everything under his care. (Afifuddin & Siti-Nabiha, 2010)

Scholars have also studied how accountability can be practiced through the traditions found in Qur'an and Islamic laws. Lewis (2006), for example described that accountability can be implemented through mutual consultations or *shura.* One should consult to experts and scholars when making decision as based from the verse:

It is part of the Mercy of Allah that thou dost deal gently with them Wert thou severe or harsh-hearted, they would have broken away from about thee: so pass over (Their faults), and ask for (Allah's) forgiveness for them; and consult them in affairs (of moment). Then, when thou hast Taken a decision put thy trust in Allah. For Allah loves those who put their trust (in Him). (Qur'an 3:159)

Another act that supports accountability from Islamic perspectives is through relevant disclosure of information. This can be seen on how Islam advises that the rate of alms tax

(zakat) to be disclosed to the public (Jalili, 2006). Islam not only preaches Muslims to stay on the right path, it also discloses how Muslims can be on this path. This highlights the significance of disclosing necessary information:

Wherewith Allah guideth all who seek His good pleasure to ways of peace and safety, and leadeth them out of darkness, by His Will, unto the light,— guideth them to a Path that is Straight. (Qur'an 5:16)

Such is the importance of being accountable that Muslims are constantly being reminded in the verses of Qur'an, Hadith and also through the studies of the Prophet's (peace be upon him) characters. It can be said that being accountable is a duty and responsibility of all Muslims, a duty that can gain us good deeds when we do them or make us answerable to God if neglected.

C. Accountability in System Design

In system design literatures, Sara Eriksén suggests that when designing a system that supports accountability, the questions of who defines it, by whom and for whom should be posed (Eriksén, 2002). Additionally Bellotti and Edwards suggests four context-aware principles to support intelligibility and accountability to include informing the user of current contextual system capabilities and understandings, providing feedback, disclosure of identity and action and also providing control to users over system and other users actions that may impact them (Bellotti & Edwards, 2001). In another literature, a fully accountable system is a system that has these characteristics: undeniable, tamper evident and certifiable (Yu & Cysneiros, 2002).

There have been many attempts to design accountability into a system. A UML model of authorisation was designed for healthcare applications. It features a new authorisation role that is an extension of UK Healthcare Model (Longstaff, Lockyer, & Thick, 2000). In another paper relating to Electronic Health Record, a "patient-centric" monitoring system is proposed where the patient is assigned as owner of their own patient record and they are informed when their records are used or updated (Mashima & Ahamad, 2012). Another study on accountability in system is a paper that discusses an authorization system that assigns obligations to users. These obligations are called accountability. One of the features of this system is the use of role-based access control (RBAC) to assign roles (Pontual, Chowdhury, Winsborough, Yu, & Irwin, 2011).

D. Value Sensitive Design

Value Sensitive Design (VSD) is a design method proposed by Friedman, Kahn and Borning (2002) as a way to include moral values within a system design. VSD is made up of three investigations: conceptual, empirical and technical.

In conceptual investigation, direct and indirect stakeholders are identified. How the stakeholders are affected from the technology is also defined in this stage. Also consideration of affected values, value trade-offs and the development of working definitions on values of import are also done in this stage drawing from existing works in ethics and philosophy (Borning, Friedman, & Kahn, 2004).

In empirical investigation, human activities in the environment are observed, measured and recorded. This stage is focused on the human context and the tasks performed by humans of the system environment (Friedman, et al., 2002).

In technical investigation, tasks are divided into two steps. The first one is to determine how current technology support or interfere with moral values. The second one is works on

designing a new system that support values of import identified in conceptual investigation (Friedman, et al., 2002).

3. Current System in HUSM Psychology Clinic

This study was done in a psychology clinic located in Hospital Universiti Sains Malaysia (HUSM) located in the eastern state of Kelantan, Malaysia. This psychology clinic receives patients referred not only from the hospital's own internal doctors, but also from other neighbouring hospitals that don't have their own psychologist. Usually most patients are referred to the clinic after being treated by other doctors in the same hospital. In the current system being used by the hospital, a patient has one integrated file that is accessed and used by all doctors that treat the patient regardless of wards and clinics. While it might not be a problem for a doctor in surgery ward and another doctor in oncology ward to look at each other's notes on the patient's file, psychology progress record is not supposed to be disclosed. Patients confide to the psychologist under the assumption that their information will stay private. However, under the current paper-based system, all doctors and nurses handling the patient's file is privy to the psychology progress record and the patient's privacy is infringed.

A psychologist is responsible to make sure that patients' progress records are confidential with access to other people kept to the very minimum. But currently anyone can see or even add in their notes to the file whether they are authorized to do it or not. Additionally in certain conditions the progress record should be made viewable to others, like when the psychologist wants to discuss the patient's case with a psychiatrist or doctors in other wards. This condition however should be made controllable to the psychologist whereby she can choose *who* can view *which* file, and not a free-for-all viewing access like what is currently the case.

4. Research Methodology

Because psychologists are urged to take steps to establish and maintain confidentiality of information from their sessions (Ali, 2009), it is a need for the psychologist in this study to keep and maintain her own file system separate from the one used by the hospital. An electronic file system is a logical move. It would not require additional physical infrastructure in the psychologist's office and also other features that promote accountability can be implemented in a computer system. In this study, the computer system was designed using the design methods of Value Sensitive Design.

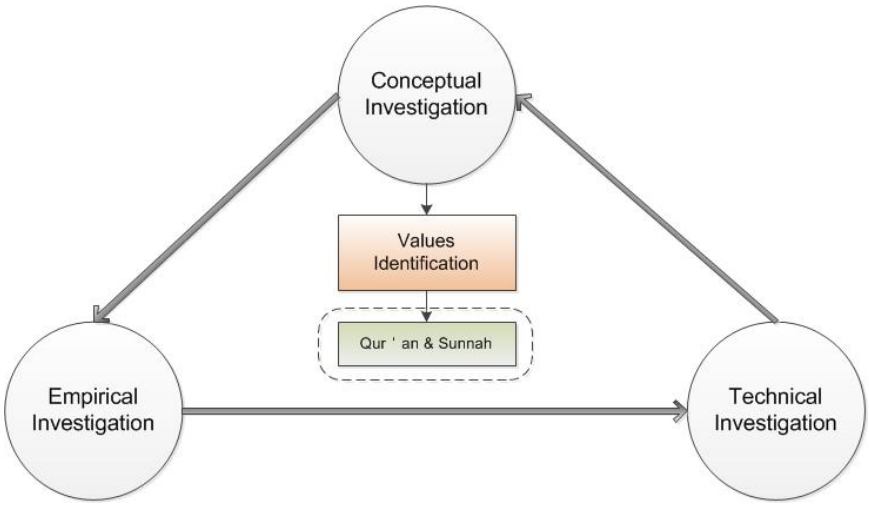

Figure 2. Value Sensitive Design Methodology and showing where Islamic Values are referred

A. Conceptual Investigation

The focus of Conceptual Investigation stage is to identify the direct and indirect stakeholders of the system. Direct stakeholders are users that interact with the technology and indirect stakeholders are those who are not users of the system, but are impacted by it (Cummings, 2006). Often in system development the values of the indirect stakeholders are ignored because they are not the end users of a system. However for certain cases like psychology patient information record system in this case, it is their rights that should be protected most. The psychologist in charge of the clinic, Dr. Azizah Othman was interviewed with a semi structured interview based on literature review on Value Sensitive Design.

After interview sessions were conducted, the direct stakeholders are identified as such:

Psychologist is the main user and owner of the system. The psychology clinic currently only has one psychologist that handles therapies. The clinic receives patients every Monday and Tuesday. The psychologist is responsible for a lot of tasks regarding the psychology clinic including decision to accept patient for treatment, assigning appointments, making treatment plans, updating progress records and also writing up reports on patients' psychological conditions. These reports are sometimes required for patients on official businesses such as registering for special needs class.

Psychiatrists are medical specialists with psychiatry as their expert field. These doctors work in the same university hospital and are the ones that treat patients with psychiatric disorders. They are doctors that are authorized to diagnose and prescribe medications to patients. Psychiatrists refer the patients that can benefit with psychotherapy to the psychology clinic. In this case, patients' progress records may be shared with psychiatrists when discussions are needed for patients' better treatment.

Referrers are medical doctors other than psychiatrists that refer the patients they are treating to the psychology clinic. They can be internal doctors from the same hospital or from external hospitals. Referrals can also come from the corporate arm of the university hospital.

Staff Nurses of this system are the nurses that are stationed at the psychology clinic. They help the psychologist in clerical works and also in administering psychological tests during clinic sessions.

Indirect stakeholders of the system meanwhile are the **psychology clinic's patients** and **relatives and close friends of the patients**.

Values of import that has been recognized to be upheld from Conceptual Investigation are accountability, privacy, informed consent and ownership and property. However in this paper the discussion is only on the value of accountability. Based on the values extracted, reference was made to the Islamic sources of Qur'an and Sunnah as depicted in Figure 1. Additionally system design literatures were also referred to get additional understanding on how to implement accountability into the system.

B. Empirical Investigation

Human context that are recorded at the clinic starts with receiving of referrals. These referrals currently are received in reference forms submitted to the staff nurses manning the counter at psychology clinic. Referrers can also submit their referrals by calling or emailing the nurse or psychologist at the clinic. They will then fill up the reference form on behalf of the referrers.

All referral forms will be reviewed by the psychologist. If it is accepted, patient will attend session at the psychology clinic. If it is the first time the patient receives treatment at the hospital, a new file will be opened for the patient. If the patient has previously received treatment at any other wards, staff nurse at psychology clinic must first retrieve the patient's file at that ward.

During clinic session, patient's progress note will be filled in by the psychologist. The document will then be filed under the segment of the ward that sent in patient's referral. If the psychologist think that it will benefits the treatment, the patient's progress note may be shared with psychiatrists from the same hospital for their insights. Psychologist may also request to us the patient's case to be used for research or training purposes, in this case she will contact the patient first for agreement.

C. Technical Investigation

Conceptual investigation of the psychology clinic system has highlighted the need for a better system to be in place. The current paper-based file that is used while relevant and convenient for other doctors in the same hospital doing their rounds are unsuitable when it comes to guarding the privacy of psychology clinic's patients. The decision of who should be able to view their records should be on patient's hand; additionally patient should be assured that care has been taken to make sure their confidential information will stay confidential.

Design works were done to satisfy the privacy consent of patients and accountability requirements of a psychology clinic environment. Using the design principles from mainstream literatures and Islamic sources, an online system for Psychology Clinic Information System were developed.

5. Results

The system developed employs several design strategies to support the value of accountability in its features. First of all role-based access control is implemented where each user's access to the system is limited by the role they are assigned with. Thus, patients' information is only made viewable to those authorized for it. This allows the psychologist to only give access to any part of patient's information only to those authorized to view them. The roles created are those identified during conceptual investigations: psychologist, psychiatrist, referrer and staff nurse. Psychologist has the highest access level and is also the owner of the system, the one responsible to assign access level to all users of the system.

Table 1. Islamic Perspectives of Accountability Designed in the System

Design	Requirement	Description	Islamic Reference	Figure
Role-based access control	Non-functional	Psychologist can give access to only those authorized to view	*Each one of you is a guardian and each guardian is accountable to everything under his care.* (Bukhari & Muslim)	Figure 3
Disclose identity and action	Non-functional	Time-stamp name of user that last changed a document	*Then shall anyone who has done an atom's weight of good, see it! And anyone who has done an atom's weight of evil, shall see it.* (Qur'an 99:7-8)	Figure 4
Provide control to user over other user actions	Functional	Informed consent section allows patients to decide to share information or not	*..and consult them in affairs (of moment).*(Qur'an 3:159)	Figure 5, Figure 6

Consultation with expert	Functional	Psychologist can add in Psychiatrist to discuss patient's case	*..and consult them in affairs (of moment).*(Qur'an 3:159),	Figure 7

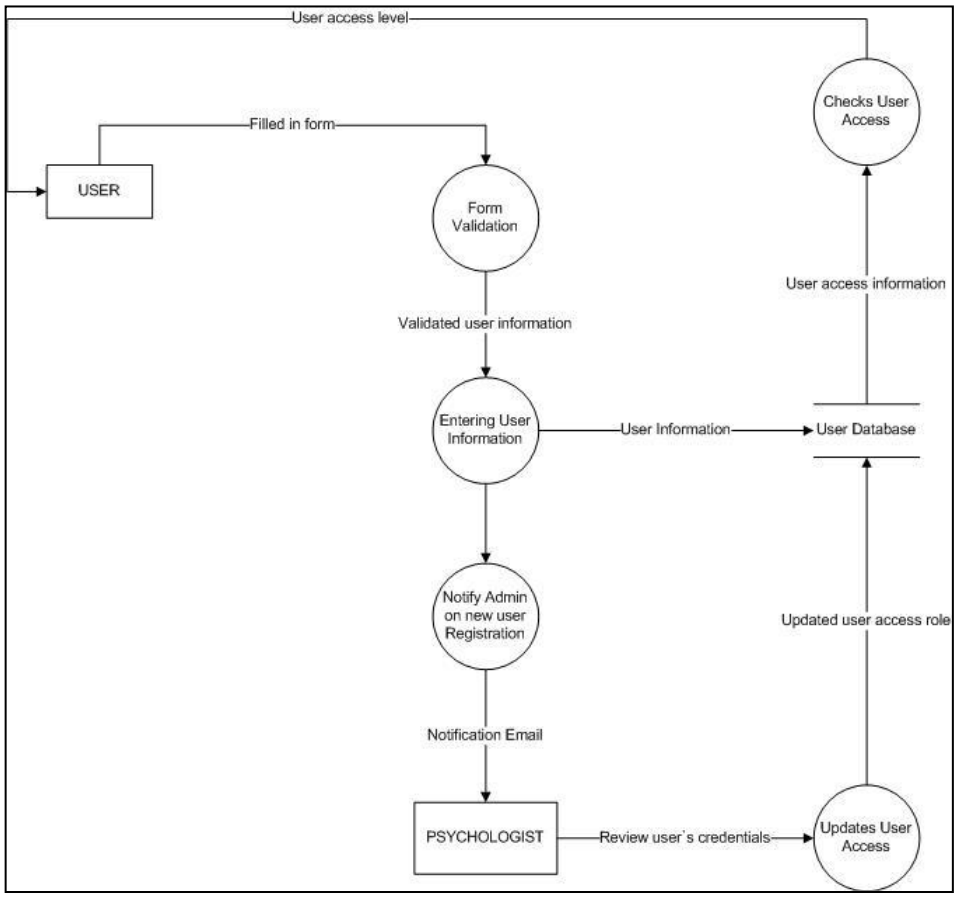

Figure 3. User registration and administrator assigning role to user

System design literature suggestion to disclose identity and action is implemented through the feature of time stamping of the name of the user that created and last changed patient's document. With this feature, any discrepancy can be traced to the user that last edits the patient's document. This also serves as a reminder to all users that they are accountable for their inputs to the system.

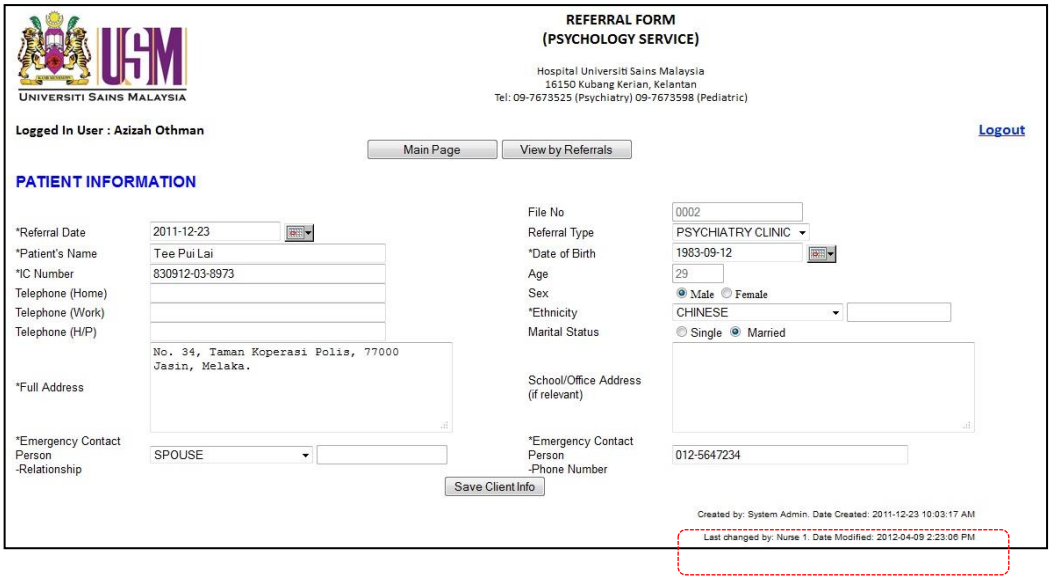

Figure 4. Document created by and last edited by stamped to the patient's record

Mutual consultation is one of the suggestions by Islamic values to promote the value of accountability. This system employs two features that allow for consultations. The first one is an informed consent section, whereby patients are given choice whether to keep their information fully confidential or to allow it to be shared with psychiatrists or for research purposes. This also satisfies the condition of relevant disclosure of information where patients are informed *who* may also view their records and *why* the records may need to be viewed by others. This consent document is designed to be printed out and patient can put down their signature on the document.

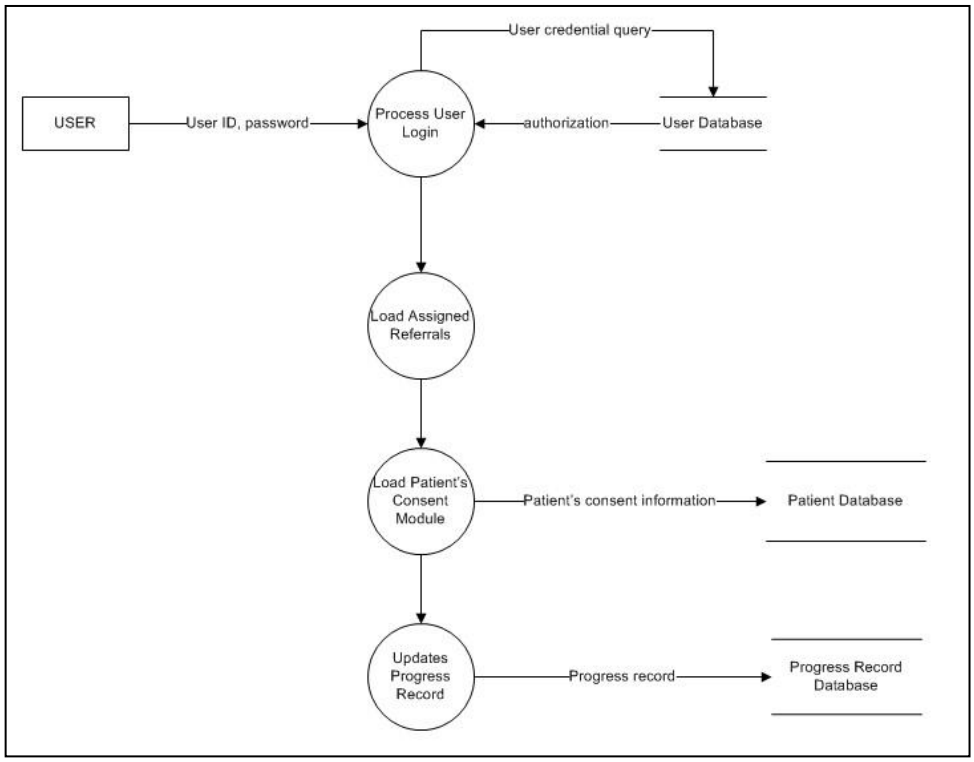

Figure 5. Recording patient's consent on personal information usage

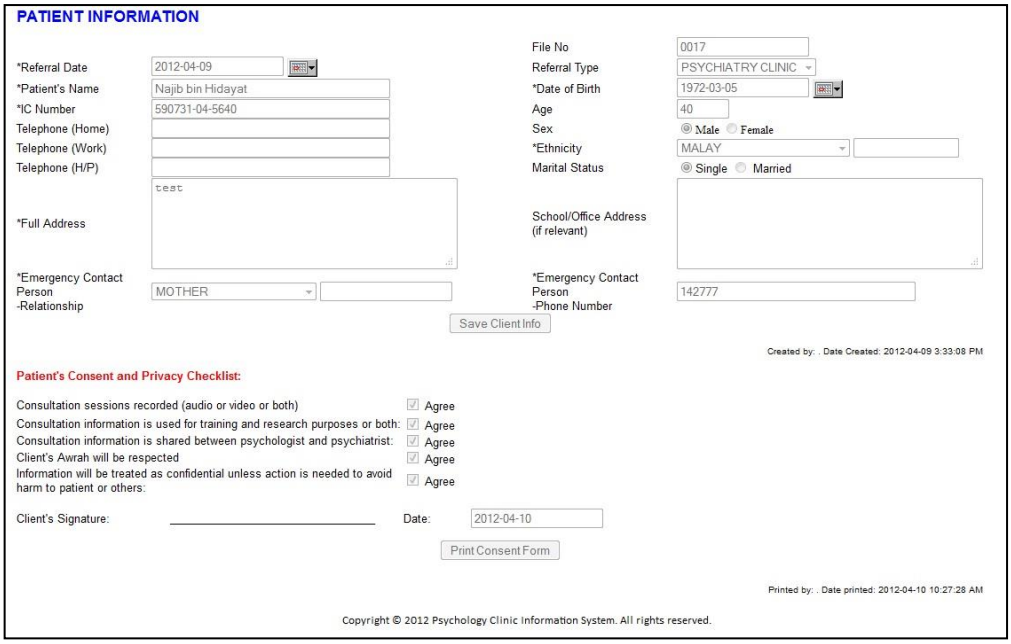

Figure 6: Patient's consent document to be printed

The second consultation feature of the system is the ability to add in psychiatrists for discussion on patients' treatment. This feature is dependent on patient's consent on the consent and privacy checklist. The system also limits the sharing to not all users with role "Psychiatrist" but to specific user selected by the psychologist. This feature allows discussion with other experts on the field when making decision, a feature that is an ideal way for believers to conduct affairs.

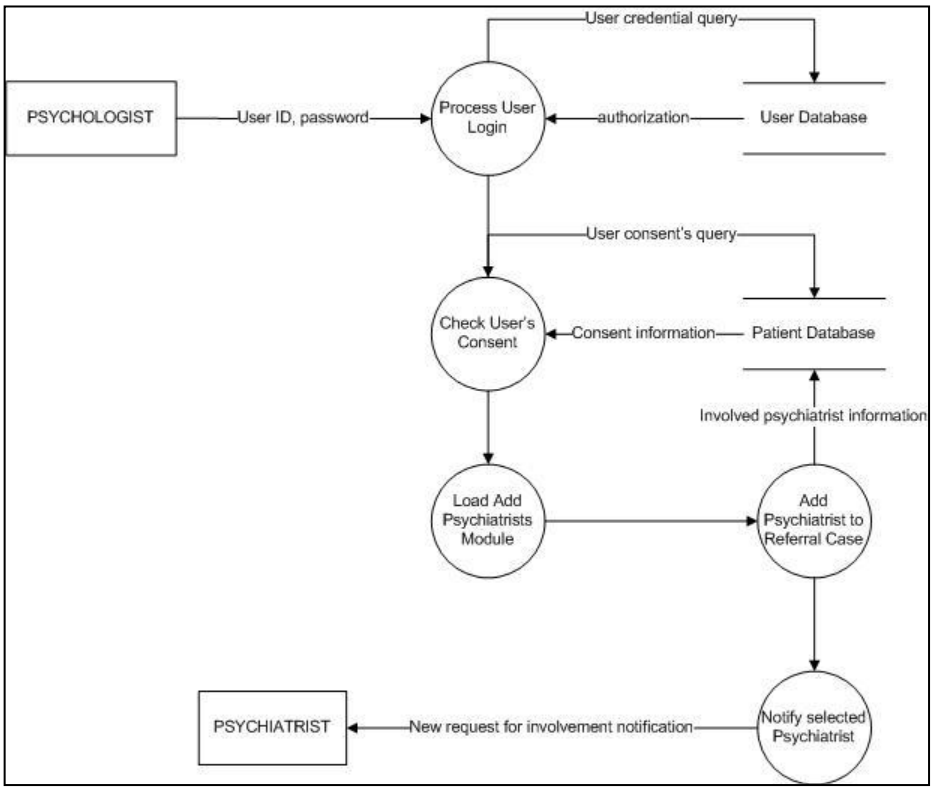

Figure 7. Adding psychiatrist to a case

6. Discussion

This study benefits from the introduction of technology where it impacts accountability positively. The system was designed to support this value and deliberation on what it means to be accountable, and how accountability can add value to the system resulted in design strategies that fit both functional and non-functional requirements of the system.

However technology can also hinder accountability in the sense that making the information online may bring unauthorized access to a larger amount of audience. This brings home the point Value Sensitive Design is making, that a focus on moral values should be in mind even before the design of the system itself. This way, introduction of technology can come along with measures to support and safeguard the values important to users.

7. Conclusion

Failure to address human values is one of the reasons that information system fails. Human values like accountability should be examined by system designers before and during the design phase of a system. Islam has a very rich tradition in regards to moral values, the religion does not oppose human values however there may be difference in execution or recommendation. This study draws the definitions of accountability from Islamic traditions and system design literatures. Then it uses the techniques from Value Sensitive Design to develop a system for Psychology Clinic Information System to respond to the infringement of the values of direct and indirect stakeholders from the usage of current system in use. The developed system helps in keeping confidential information private, making it easier for the psychologist to be accountable of the trust given to her by the patients and to what expected of her profession.

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