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An Online Advisory System to Empower Victims of Domestic Violence

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Abstract:

This feasibility study examines the use of intelligent, online advisory tools to address the informational needs of domestic-violence (DV) victims. We examine the practical and conceptual challenges faced when helping emotionally stressed DV victims to make crucial life decisions. Our focus is on the information needs involved in the early phase of the decision process, viewed in terms of both the transtheoretical model and empowerment theory. We review DV victim-support sites in Australia, the U.S., and the UK to highlight their best-practice design elements. We further illustrate these elements with a paper-based prototype of a DV victim Online Advisory System (OAS) that uses personalisation techniques to provide a sense of empowerment for the DV victim. Empowerment increases the DV victim's level of self-esteem, reduces their tendency towards self-blame, and reduces their level of anxiety.

Keywords: decision support systems, individual impact, societal change, exploratory research, Online Advisory Systems, personalisation, empowerment, domestic violence

An Online Advisory System to Empower Victims of Domestic Violence

If you are going through hell, keep going....
Winston Churchill

I. INTRODUCTION

Domestic violence (DV) is a significant, worldwide social problem. It involves one member of a family exerting power over others via physical or psychological intimidation and abuse. Women are usually the victims in cases of extreme violence that require police intervention [Vazquez, 1996]. Self-report surveys consistently point to the high rates of DV that are prevalent in every country. For example, self-reported data suggests that more than five million women in the United States (U.S.) [Westbrook, 2008], one in four women in the United Kingdom (UK) [Mirlees-Black, 1999] and one in three women in Japan [Anonymous, 2002; Radford and Tsutsumi, 2004] are DV victims. Broader-based DV studies find that DV against males is less common but still significant, with males suffering up to one-third of DV injuries and accounting for 25 percent of DV-related deaths [Kelly, 2002; Straus et al., 2006].

Protecting DV victims, particularly women, who tend to be in a weaker and more vulnerable position than men (physically, psychologically, and economically), is, therefore, of critical importance. Early and effective intervention is imperative to reduce violence episodes at home. However, ensuring protection is often difficult, as a substantial number of DV victims (both male and female) refuse to disclose or even acknowledge the cause of their trauma. Levels of acknowledgment and disclosure remain low, even when DV victims are admitted to hospital emergency departments and healthcare professionals interview them [Rhodes et al., 2006]. Moreover, a variety of strong influences act on the DV victim, including emotional or financial dependence, self-blame [Johnson and Ferraro, 2000] and the Stockholm syndrome [Graham et al., 1988] (where the victim shows loyalty to the aggressor irrespective of the prevalent danger [Herman, 1992]). DV victims tend to hold to a naive belief that renewed pleading with the abuser will stop the violence. Yet this often means that victims repeatedly return to the abusive relationship, without having identified or resolved any of the underlying issues [Chang et al., 2006]. Many victims also find it difficult to take decisive action as a result of the cyclical nature of the abusive relationship. Abusive DV relationships cycle through four phases: honeymoon, calmness, tension-building, and incident [Corcoran and Melamed, 1990; Shurman and Rodriguez, 2006].

Online Advisory Systems (OASs) provide potentially useful capabilities for addressing DV issues [Li et al., 2009]. OASs are especially suited as early intervention support tools. OASs are interactive, online, computer-based systems that suggest alternative choices based on situation descriptions provided by the decision maker. The OAS allows the user to explore other options in order to make more informed decisions [Jansen and Steehouder, 1994]. OASs empower citizens, especially those in relatively weak bargaining positions [Li et al., 2007], such as people who need legal advice but cannot afford lawyers [Zeleznikow, 2002]. Therefore, we propose a victim empowering OAS that incorporates decision support system (DSS) functionality and analytic technologies, such as data mining. Through this empowerment process, DV victims will be able to identify and control their situation.

Consequently, we explore how an OAS based on empowerment theory can help a DV victim make well-informed life decisions. We also examine the desirable design features for such a system. Given the novelty of the research topic and the challenges associated with recruiting participants who have had first-hand experience, we adopted an innovative, iterative and nonlinear process of enquiry, which involved:

- Developing an understanding of DV and the decision-making challenges posed by typical DV situations (Section II)

- Examining relevant theory that explains how an OAS can empower decision makers

- Reviewing relevant best-practice guidelines to draw theory and practice together so as to identify the system requirements of a DV OAS (Section III)

- Presenting a prototype based on the DV OAS empowerment model to DV workers to receive feedback on our initial design (Section IV)

Outstanding issues, limitations and future directions conclude the article.

II. UNDERSTANDING THE NATURE OF DV

The DV context has system access and information requirements that are peculiar to this domain and type of user. In this section, we begin by providing an overview of the nature of DV and its impact on those affected by it. We describe the process that victims go through to be able to take action. Four interviewed DV victims provide the data. The data clarifies the challenges faced in identifying and helping DV victims. Finally, we look at the external and internal barriers facing DV victims that negatively impact on their decision-making processes.

The Recursive Nature and Destructive Impact of DV

Despite the destructive impact of DV, many victims do not leave abusive relationships. Despite life-threatening incidents, a surprisingly large number of DV victims who do leave subsequently return to the abusive scenario [Shurman and Rodriguez, 2006]. Brown [1997] reports that around 33 percent of women return within a week of entering emergency accommodation and 60 percent return within two months. Chronically violent relationships tend to be a recursive cycle of the phases shown in Figure 1. DV incidents can take the form of verbal abuse or physical abuse. Following violence, the relationship enters a honeymoon phase that is characterised by exemplary behaviour, contrition, and forgiveness. These positive feelings gradually deteriorate, with relative calmness being displaced by tensions that build within the relationship. The DV victim then moves into a survival mode as the tensions ultimately erupt in an incident of violence [Straus et al., 2006]. In the absence of professional intervention, the severity and frequency of these DV incidents will usually escalate over time. The honeymoon phase may also disappear entirely as the violence becomes normalised [Schuller and Vidmar, 1992].
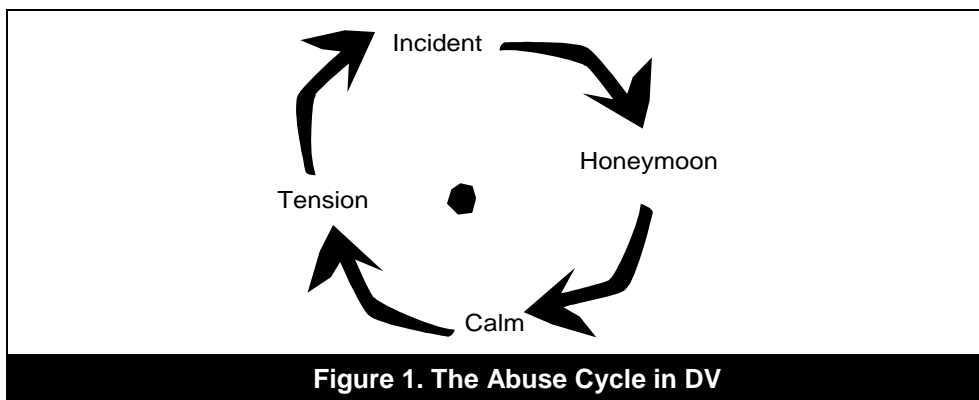

Figure 1. The Abuse Cycle in DV

DV adversely impacts not only the direct victim but also the children who witness the abuse, close contacts who deal with the aftermath, and, ultimately, the society at large. Prolonged exposure to abuse frequently leaves direct victims suffering from a variety of physical- and mental-health issues. It can take many years for DV victims to escape from the emotional shadow left by the abusive relationship [Walker, 2000]. Children who grow up in this environment often suffer from behavioural, somatic, and emotional problems, with poorer than average educational and employment prospects. Exposure to abusive behavioural modelling puts these children at increased risk of abusing their own future partners [Jaffe et al., 1990; Shurman and Rodriguez, 2006; Tolman and Rosen, 2001].

The Victim's Decision-Making Process Towards Ending DV

Understanding the victim's attitude towards ending an abusive relationship is an important first step when developing an intervention strategy because attitude affects the efficacy of individual strategies [Tutty et al., 1993]. Many studies [e.g., see Brown, 1997; Burke et al., 2001] discuss the application of the transtheoretical model [Prochaska and DiClemente, 1984] in this regard. Figure 2 depicts the model's key decision stages. This model adopts a problem-solving perspective with the most appropriate intervention strategy in any given case being dependent on the individual's current stage in the decision process. An intervention to assist in a DV case is expected to be most effective when designed according to the victim's state of readiness to take action (for example, ending the relationship). The model describes five stages: *precontemplation*, in which the victim is unaware of the severity of the problem; *contemplation,* in which the victim identifies the abuser's behaviour as DV; *preparation,* in which the victim considers whether to leave the relationship; *action*, in which the victim takes actions to end the abuse; and *maintenance*, in which the victim has moved on with life and remains separated from the abuser [Shurman and Rodriguez, 2006]. However, the model is iterative. Victims can return to earlier stages or even move nonsequentially backward or forward from one stage to another. Figure 1 depicts the relationship dynamics between the victim and the abuser. Figure 2 depicts the decision states of the victim. At any point in time, the victim can concurrently be in any one of the states shown in Figures 1 and 2, though some states may be more likely to occur concurrently. For example, if the victim is in the contemplation decision stage and in the honeymoon or calm state in the abuse cycle, it is unlikely that the victim will be motivated to move to the preparation or action stages.
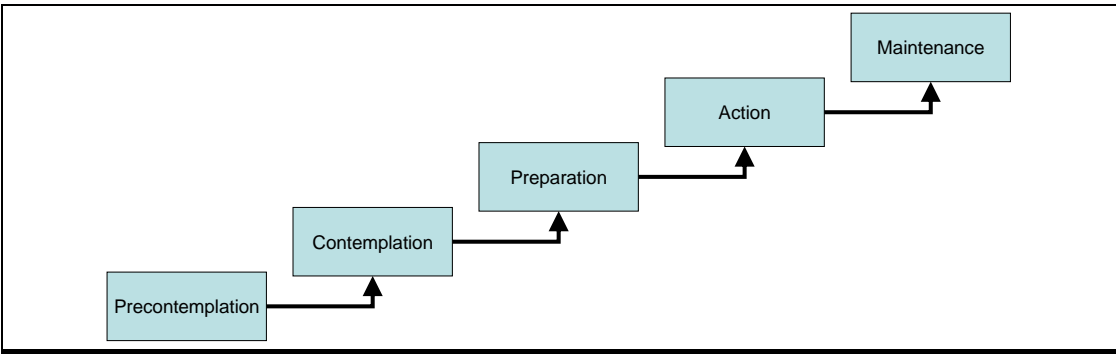
Figure 2. The Five Decision Stages DV Victims Go Through to Take Action in an Abusive Relationship

Previous studies have extensively reported on DV victims determined to end DV (i.e., victims in the *preparation, action,* and *maintenance* stages). Help offered to such victims includes the provision of professional intervention (for example, counseling), emergency shelters, job services, or legal protection [Westbrook, 2009, 2008]. However, DV victims in the *precontemplation* and *contemplation* stages are difficult to identify [Ellsberg and Heise, 2005]. Consequently, few studies address the informational needs of those in the *precontemplation* stage—who have not identified the abuse they experience as a problem—and DV victims in the *contemplation* stage—who are aware of their problem and are contemplating a change, but are not yet committed to doing so [Shurman and Rodriguez, 2006]. However, assisting *precontemplators* and *contemplators* would potentially be the most effective strategy to interrupt the abuse cycle early on. Early interruption would allow for a wider range of interventions, reducing the likelihood of serious physical and psychological harm to the DV victim [Wolfe and Jaffe, 1999]. Our study focuses on helping the victim to consider and self-identify their situation while still in the early phases of the decision-making process. Consequently, we aim to target *precontemplators* and *contemplators* by providing relevant information via a nonthreatening and accessible medium controlled by the DV victim.

Challenges in Identifying and Assisting DV Victims: The Victim's Viewpoint

To further inform our understanding of the decision-making process, we interviewed four female DV survivors. This involved a system development exercise using the paper prototyping technique [Snyder, 2003]. Interviews were conducted in Australia, Japan, and China. Each participant approached the author via indirect, word-of-mouth contact from another person in a similar situation. All women were Asian, aged between twenty-five and forty-five, and had been in a relationship between six months and four years. Quotations from these interviews appear in Sections II and III. Quotations have been included with the consent of each individual, and all personal information has been removed.

> *I wish I had left him earlier. I just keep on making excuses for his abusive behaviour: he is stressed or he is starting his new job …. Every time, when he shows regret and pleads to me, I suddenly developed lots of sympathy for him, I remembered the time when he treats me nicely and felt that he would definitely change …. In many occasions, I even apologise to him, since I felt that I cannot live without him. I might have done something wrong, you know, like not being patient enough, so that it provoked his anger. That is what he said to me as well.*

The above quotation is indicative of the strong emotional tie often found between victim and perpetrator. Indeed, the victim often shows great loyalty towards the perpetrator, even when there is significant personal risk—a form of Stockholm syndrome[1] [Wallace, 2007]. In addition, because the abuse follows an iterative cycle, returning to an abusive partner typically reinforces the victim's emotional dependence on the abuser. This often results in feelings of desperation and learned helplessness [Bargai et al., 2007]. The emotional complexity of the situation, as perceived by the victim, is evident in the following statement by a battered wife, explaining her decision to return:

> *I know myself too well. I am not ready yet. I see no future for the two of us, but each time I left him, I eventually come back to him. Look, I know I shouldn't, but I don't know why. I just feel so tied up to him and is this love? Really I have no idea….*

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[1] Stockholm syndrome refers to a response exhibited by some hostages after an extended period of abduction, where the hostage shows signs of loyalty to the captor, even though the hostage is in considerable danger. It is believed to occur when the captive cannot escape and is isolated and threatened with death, but where the perpetrator, at times, also acts with kindness toward the hostage [Kuleshnyk, 1984]. It must be noted, however, that the Stockholm syndrome in this context is the subject of some academic dispute, with a 2008 review of DV literature casting considerable doubt on its existence [Namnyak, 2008].

To provide victims with appropriate support, it is important for society, in general, and social workers, in particular, (including DV shelter staff) to understand these psychological difficulties. Understanding these difficulties is also potentially helpful to the victims in that it may encourage self-reflection on whether an emotional attachment is indeed love or an unhealthy emotional tie that is being confused with love [Shiu-Thornton et al., 2005]. A DV survivor, after being sent to an emergency department as a result of a confrontation, commented:

In the end, this idea [that his abusive behaviour will change] has proved to be a dream …. At that time when this [the violence] happened, I felt so shocked, troubled, and helpless that I do not know what to do next. All these complex feelings come to me and I am totally overwhelmed. I was asked whether I wish to call police at that time by a doctor. But my mind is not so clear as yet. Honestly, I am also scared by the fact that if he is not arrested, he might become angry [at the fact that I reported to police] and attack me again through some way.

These statements reflect a number of primarily internal (psychological) barriers faced by DV survivors. These barriers are well-supported by findings in the literature, as discussed below.

Barriers to Objective Evaluation of Options in a DV Situation

Both external and internal barriers contribute to the difficulty in leaving an abuser. We introduce these barriers below. Section III presents a summary of the barriers alongside OAS solutions.

External Barriers

External barriers faced by DV victims attempting to change or leave an abusive relationship include economic factors, housing difficulties, and heightened concerns over personal safety [Shurman and Rodriguez, 2006]. Even discussing the matter is an external barrier. Healthcare providers and victims are reluctant to initiate related discussions. This unwillingness to disclose often results in misdiagnosis of the problem and prolonged silence between patient and healthcare providers [Rhodes et al., 2006]. Further, many victims live in the fear that, despite seeking legal protection or leaving the relationship, the abusers, who frequently are highly manipulative and persuasive, will manage to gain control over their lives through social opinion and pressure [Dutton and Golant, 1997]. Their fear is not baseless as abusers tend to engage in activities that make change or escaping difficult, such as persuading common acquaintances to be allies [Mederos et al., 2005].

A particularly difficult and important barrier to address is the societal or cultural norms that influence the decision-making process. In Asian societies such as Japan and China, people formerly considered DV to be an in-house affair and would hesitate to intervene [Aiko, 1995]. In general, societies viewed DV as personal crises that "take place behind closed doors" [Westbrook, 2008, p. 22]. DV victims do not receive the same level of attention and social support as victims of public crises such as the 9/11 terrorist attack in 2001 or the sarin poison attack on the Tokyo subway in 1995. Family and friends also frequently fail to offer support. When DV victims attempt to escape, relatives and friends often persuade the victim to return, stressing the importance of maintaining their marriage. An old Chinese proverb exemplifies the cultural pressure that DV victims face: "worse to break/separate a couple than break down a temple." However, increasing globalisation and the growing awareness of human rights have succeeded in making some inroads into cultural attitudes and behaviours towards DV. While our study also seeks to challenge societal and cultural norms, our focus is on change and challenge at the individual level, i.e. empowerment and personalisation of the DV victim. We concern ourselves directly with addressing the internal barriers of DV victims.

Internal Barriers

Internal barriers mostly relate to the victim's inner psychological issues that interfere with the decision-making processes [Shurman and Rodriguez, 2006]. Some victims continue to have a strong emotional tie with their abusers (also cf. Stockholm syndrome above); others are confused by the varied facets of the abuser's personality that emerge with different people or under different situations. For instance, the abuser may be a responsible parent or treat the victim very well in the honeymoon stage. These conflicting thoughts, as expressed in the above quotations from victims, frequently lead the wo/man to harbour a low level of self-esteem and a sense of guilt and anxiety towards his/her own behaviour. Lowered self-esteem, guilt, and anxiety of DV victims add to the belief that the abuse is the victim's fault or that the victim deserves to be treated in this way. Over time, these beliefs result in learned helplessness, a characteristic of the battered-wife syndrome [Schuller and Vidmar, 1992; Walker, 2000].

The precise strategy adopted by any victim to eliminate DV must involve personal choice. The success of any strategy depends on situational factors such as the readiness of both victim and abuser to make changes. This study passes no judgment on the rightness or wrongness of DV victims' choices. Instead, the purpose of this research is to help victims overcome external and internal (psychological) barriers in order to make better decisions on the future directions of their lives. OASs can address many of the above external barriers, as they do not require

disclosure to a healthcare provider. OASs can answer questions around professional help, housing, finances, legal rights, and so on by being both accessible and informative. However, to breach the internal psychological barriers and confront the external barriers, we need to draw on theory relevant to the DV context in the design of an appropriate OAS.

III. FRAMEWORK DEVELOPMENT: MERGING THEORY AND PRACTICE

How Can an OAS Help?

Evidence shows that simple computer-based screening increases the likelihood of a victim disclosing his/her DV situation to a health professional [Rhodes et al., 2006]. A trial involving a computer-based, self-administered admission questionnaire at two emergency departments in the United States showed that a higher proportion of people were willing to disclose a DV-related reason for seeking treatment via a computer-based form than during a face-to-face interaction. This suggests that DV victims who are considering different options for getting out of an abusive relationship may prefer using a self-administered online assessment (using an OAS) to approaching a professional with their DV issues. Further, an OAS can potentially provide timely assistance to DV victims and assist those in the earlier stages of the decision process to recognise their situation.

Recognition that a problem exists is not enough. The solution must address the DV victim's sense of helplessness, anxiety, and low self-esteem. In contrast to the mindset of victims, survivors speak of being *empowered* to overcome their circumstances. Thus, in this section we consider how an *empowerment* goal can underpin the design strategy for an OAS. We propose that an effective DV OAS could empower DV victims by providing access to personalised and informative support relevant to the victim's decision stage. To incorporate current good practice, we will examine the bases for these ideas and review the existing online services for DV victims. We will then present our proposed system in the subsequent section.

Empowerment Theory and an Empowerment Model of OASs

Empowerment refers to the process through which people, organisations, and communities gain mastery over issues of concern to them [Rappaport, 1987; Zimmerman, 1995]. This concept includes "beliefs that goals can be achieved, awareness about resources and factors that hinder or enhance one's efforts to achieve those goals and efforts to fulfill those goals" [Zimmerman, 1995, p. 582]. Empowerment theory is frequently used to explain how minority groups or those in weak positions gain power over their issues of concern [Conger and Kanungo, 1988]. Empowerment is appropriate in a DV context because a sense of control and self-confidence must be developed to help a victim escape an abuse cycle. Empowerment commonly encompasses the themes of power and control [Zimmerman, 1995]. To apply empowerment theory, Zimmerman [1995] suggests examining both "empowering processes" and "empowerment outcomes."

Empowering processes are "efforts to gain control, access to resources, and develop a critical understanding of one's sociopolitical context" [Zimmerman, 1995, p. 583]. Processes can be top-down (e.g. when authorities direct people to develop an intervention program) or bottom-up (e.g., when members of a community actively participate in a program of their own accord). Processes include all activities "where people create or are given opportunities to control their own destiny and influence the decisions that affect their lives" (p. 583). Empowerment outcomes refer to the measurable effects of empowering processes [Zimmerman, 1995].

In the case of a DV victim, empowerment should enable the victim (typically a woman) to have a good understanding of her particular situation and access to the information she needs to determine future action [Zimmerman, 1995]. The underlined requirements in the previous statement reveal the importance of good information. The italicised requirements suggest that the information must be personal and tailored to the individual's circumstances and needs. Thus, informativeness and personalisation are key elements of the empowerment process that is essential for a victim to take action to end DV (Figure 3). We believe that an informative and personalised DV OAS will lead to measurable outcomes by ensuring the following: providing the basis for improving self-esteem and a sense of self-worth, reducing feelings of anxiety and desperation, enhancing the sense of perceived power relative to the abuser (so that the person is more likely to stand up and object to such behaviours), and increasing the sense of control over one's life. To explore Figure 3 further, we next consider each of the empowering processes and outcomes.
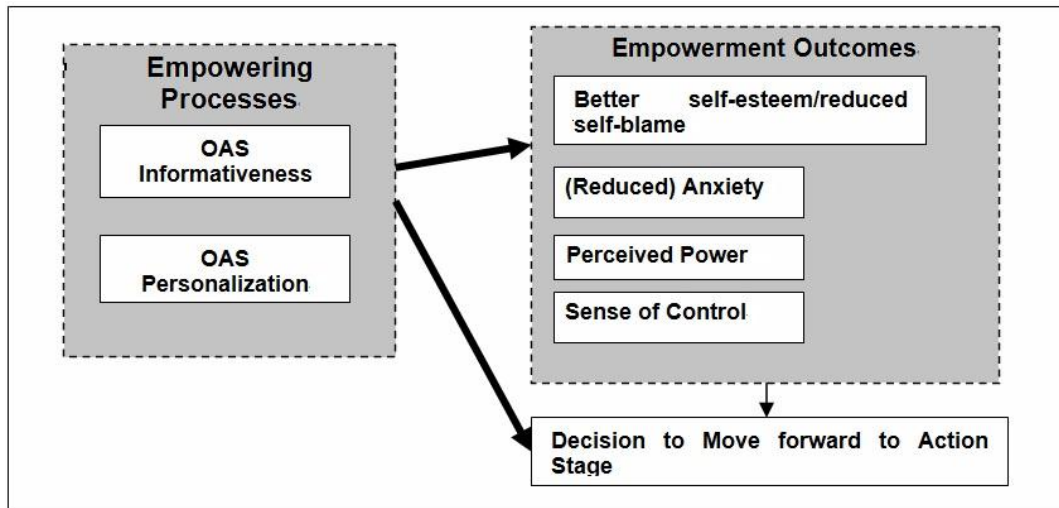
Figure 3. DV Victim OAS Empowerment Model

Empowering Processes

In the context of this study, having access to *informative* and *personalised* advice supplied by an OAS (see left-hand side of Figure 3) is a key aspect of the empowerment process. In an OAS, the users not only choose to seek advice, but also control the links and the content that they read. In other words, the OAS acts as a form of self-guided assistance, helping victims to have a better sense of control and self-efficacy.

OAS Informativeness

Informativeness is the extent to which an OAS improves a user's awareness of facts and alternatives relevant to a decision. Becoming more informed is essential for a victim to move from precontemplation to contemplation and ultimately to action [Beck, 1995; Prochaska and DiClemente, 1984]. This implies that services provided by an OAS should help a user reflect on (or reappraise) their current situation. This reflection or reappraisal is the foundation for moving into the *preparation* stage and ultimately into the *action* stage. Resources that may assist DV victims, particularly in the early stages include legal information about DV, relevant real-life cases and contact details of people who can provide psychological and physical help (see Figure 4).
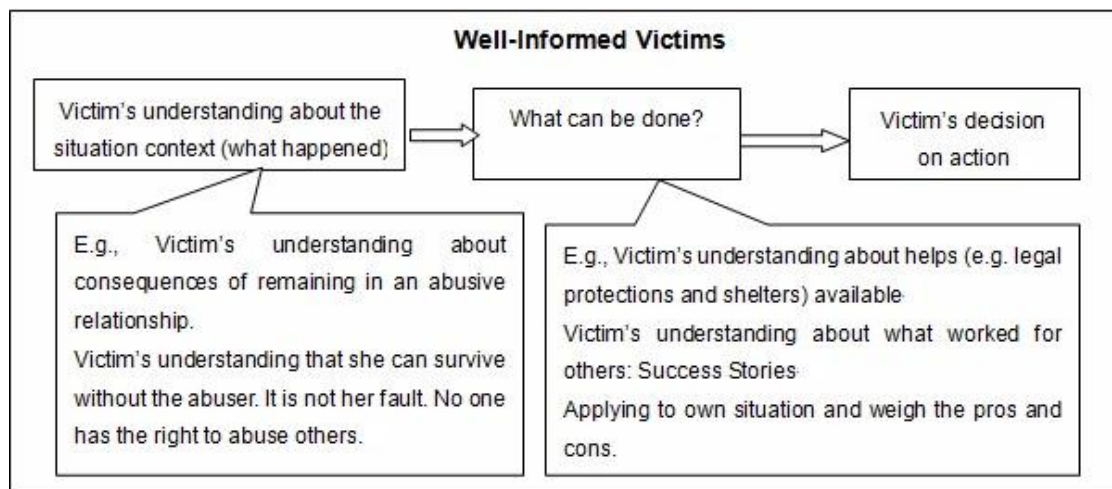
Figure 4. Illlustrating the "Well-Informed DV Victim Taking Action" Process

What information content should be accessible to a victim to ensure that an OAS is *informative* for that person? Table 1 lists the sixteen information–content items in the four-part, person-in-progressive-situation framework proposed by Westbrook [2008, p. 26]. We propose that Westbrook's [2008] comprehensive framework outlines the specific information needs of DV victims that an OAS would need to satisfy. Built on well-established research literature on DV survivors' experiences [Westbrook, 2008, 2009], it is an ideal base from which to develop an

informative DV OAS. Aligning the sixteen items of information in Table 1 to the victim's needs and situation, we can roughly equate the four parts of Westbrook's framework with the *contemplation*, *preparation*, *action* and *maintenance* stages, respectively, in the transtheoretical model in Figure 2.

Table 1: The Four-Part, Person-in-Progressive-Situation Framework by Westbrook [2008, p. 26]			
PART I Consider option to leave abuser	PART II Consider use of police as resource/protection during or after escape	PART III Build a viable life immediately after escape	PART IV Build basis for viable, long-term independence after escape
1. Warning signs of an abusive relationship	4. A referral to police for help with DV, in general or to a specific officer	8. Referral to victims' services program	12. Medical aid
2. Safety or escape planning techniques	5. Definition or explanation of what constitutes DV in that jurisdiction	9. Referral to a social service agency (governmental or nongovernmental), that offers services for survivors	13. Job services
3. Contact information for a safe house	6.A statement on or explanation of protective orders	10. Referral to emergency shelter other than the safe house	14. Addiction recovery services
	7. Explanation of process for notifying victim of offenders' release	11. Referral to legal aid or assistance	15. Suicide prevention services
			16. Counselling services

Note that items number 1 and 2 are most applicable to the *precontemplation* and *contemplation* stages, which are frequently overlooked on DV websites (for example, see existing DV websites discussed below).

OAS Personalisation

Personalisation entails service providers efficiently satisfying their users' needs by developing a one-to-one relationship [Riecken, 2000]. Satisfaction in the context of software usability is that "the system should be pleasant to use; so that users are subjectively satisfied when using it; they like it" [Nielson, 1993, p. 26]. OAS personalisation goes even further by seeking to satisfy the user's personal needs and not merely their liking of the software. Efficiency means that the service provider must be able to ascertain those needs in a reasonable time frame and with minimal effort on the part of the user.

In Web-personalisation literature, three strategies have been identified: (1) user-driven personalisation (i.e., a user specifies in advance the desired Web layout and content); (2) transaction-driven personalisation (i.e. personalisation is driven by data gathered from the customer's previous transactions); and (3) context-driven personalisation (i.e., use of adaptive mechanisms, such as click-stream analysis or Web mining to infer the user's interaction in real-time). For a more in-depth review of these strategies, refer to Ho et al. [2008] and Tam and Ho [2006].

Context-driven strategies are deemed relevant for this study, owing to the sensitive nature of user information in a DV situation. This is due mainly to safety reasons. Other types of personalisation store the user's previously entered information, which may be detected by the abuser and could lead to more anger and violent behaviour. Our study concerns two types of context-driven personalisation strategies. The first type is content-tailoring personalisation, whereby the OAS dynamically adapts its information display to address the victim's information needs. The other type is self-referent personalisation, which is simply addressing the user by name in greetings or any other messages. This makes the user feel that they are being treated respectfully and that the service is personal.

Contemporary theory in human–computer interaction (HCI) claims that when the information given is highly personalised, it is more likely that the recipient (the victim) will process this message through his/her central route of information processing [Tam and Ho, 2005]. Content with a high level of preference matching leads to more elaboration (a key activity in the contemplation stage) [Tam and Ho, 2005]. As a result, highly customised features of an OAS, such as providing users with the most relevant content based on click-stream analysis or data-mining techniques, are more likely to result in successful persuasion and intervention. Personalisation plays an important role in managing information overload. For example, a personalised, intelligent OAS system could dynamically filter,

summarise, and recommend expert, tailored advice. Prior-victim experiences could also be matched to the DV victim from the vast volumes of data contained in databases. OAS hosting agency databases or reliable, external, screened, and expert-approved sources would be used. Searching for and distilling the relevant information would be very time consuming and overwhelming for the victim. Likewise, information that personally targets the user's situation will have increased persuasion and intervention power. This would improve the chances of helping the DV victim to break away from their psychological dependency on the abuser.

Empowerment Outcomes

We identify that p*erceived power* (relative to the abuser) and *sense of control* (relative to self) are the key empowerment outcomes based on the themes recommended by Zimmerman [1995]. These two themes are central in the empowerment-theory literature [Zimmerman, 1995]. Sufficient power and control needs to be granted to the empowerment targets (marginalised, minority, or weak end groups) through these intervention strategies. Battered-women syndromes [Schuller and Vidmar, 1992] result in *reduced self-esteem* (e.g., *self-attributed guilt* and *learned helplessness*) and an *increased level of anxiety.* Low self-esteem and high anxiety combine to prevent the victims from making sound decisions relating to ending abusive relationships. Thus, in addition to the outcomes of greater *perceived power* and better *sense of control*, we propose that increased self-esteem and reduced anxiety be used as viable dimensions for evaluating empowerment outcomes (see right-hand side of Figure 3). The four outcome variables are elaborated below.

It is important to note that the chosen empowerment outcome variables are nonexclusive. We also note that some variables can be potentially correlated. However, in this exploratory stage of the study, it is outside the scope to discuss their interrelationships. Our key focus is on examining the effectiveness of a DV OAS to empower victims, rather than in studying the relationships between these dependent variables of interest.

Perceived Power

Perceived power refers to the victim's sense of *having power relative to the abuser*. This perceived power relative to the abuser is critical for victims to decide to take action towards ending DV. In an abusive relationship, victims can feel that the abuser has such a strong hold over them and is omnipresent [DV_CASE_STUDY, 2008]. An OAS can provide sources of help and support, including those from DV victim communities, shelter staff, police, and government agencies. This information increases the perceived power of the victim and increases the likelihood that the victim will take action to end the abusive relationship.

Sense of Control

The victim's *sense of control* over their destiny can be significantly and increasingly undermined by the abusive partner [Umberson et al., 1998]. Psychologically, this low sense of control impacts on an individual's thought patterns and emotional arousal, affecting changes in coping behaviour and actions. Consequently, an undermined sense of control stops victims from being able to end abusive relationships [Umberson et al., 1998]. Therefore, a highly informative and personalised OAS, which equips users with knowledge, advice, information on sources of help, and closely related real-life cases, could help DV victims to build up their own sense of control. A sense of control will enable them to be emotionally ready to get out of the unhealthy relationship. This sense of control also helps them to not return to the abuser in the future.

Self-Esteem

Self-esteem, in the DV context, refers to the victim's evaluation of their own self-worth, especially in relation to self-blame for the DV situation. Low self-esteem is one of the key factors of the battered-women syndrome. The low self-esteem that is typical of victims has multiple facets, including self-attributed blame, feelings of powerlessness, and a sense of resignation. Prior research shows that women who remain in an abusive relationship have higher levels of sense of guilt and poorer self-image compared with those who successfully escaped from the relationship [O'Neill and Kerig, 2000]. To address these feelings, an OAS can provide success stories from former victims. This approach would enable victims to understand better why the abusive behaviour occurs (and that the victim is not responsible), and would also increase self-esteem by helping the victim to develop a more positive self-image.

The low self-esteem of DV victims can be explained by a phenomenon called *learned helplessness*. The phenomenon explains why some women remain or keep on coming back to abusive relationships [Shurman and Rodriguez, 2006; Strube, 1988; Walker, 2000]. The phenomenon states that those DV victims, whose efforts to improve or terminate the relationship keep on failing, learn that their desired outcomes are unachievable because of past unsuccessful experiences. They frequently attribute the failures to themselves, and as a result, they experience depression and less motivation to end the abusive relationship [Shiu-Thornton et al., 2005; Straus et al., 2006]. Reduced motivation to end the abuse, in turn, results in greater emotional reliance on the abuser and lower self-esteem and perceived ability to change or end the abusive situation. This circular relationship quickly develops into a

vicious cycle that is hard for DV victims to break out of without informative and personal(ised) guidance. Unfortunately, highly qualified professionals are not always available. An OAS could be an effective replacement measure in this situation [Umberson et al., 1998].

Anxiety

Anxiety refers to a future-oriented mood state in which one is ready or prepared to attempt to cope with an upcoming negative event [Barlow, 2002]. Prior studies report that anxiety among battered women is three times higher than those who experience no abuse in their relationships [Fiore, Lerner, and Kennedy, 2000; Tolman and Rosen, 2001]. The anxiety correlates negatively with confidence in terms of leaving an abusive relationship and positively with temptation to stay in the relationship [Shurman and Rodriguez, 2006]. Sufficient information could help victims to objectively appraise the situation they are in. Tailored information and services could allow them to quickly locate the relevant information they need, at the same time reducing their cognitive load. Consequently, we propose that the victim's level of anxiety is a key concern that an OAS's informative and personalised support improves or addresses.

Decision to Move Forward to Action Stage

A victim's *decision to move forward to the action stage* can take many forms, although it is typically a decision to leave the abuser and start anew. We prefer to refer to this as the *decision to move forward to the action stage,* rather than the *decision to leaving the abusive relationship,* is because there are many different ways to end an abusive relationship, such as directing the abusive partner to a counselling service (which takes a considerable amount of time and effort) or simply cutting the connections with the abuser. In addition, the *suitability* of a choice is hard to measure, since it really depends on many complex factors, including personality cues, the nature of the abuser, and time. Therefore, we hope that effective (highly informative and personalised) OAS tools will help victims regain their confidence and self-esteem, reduce their anxiety (which diminishes both their physical and psychological health), regain their sense of power and control over their own destiny, and, finally, take actions towards ending the abusive relationship.

In line with the DV victim OAS empowerment model and above discussion, we offer the following propositions:

H_1: A highly informative OAS will empower a DV victim in terms of

H_{11}: increased self-esteem (or reduced self-blame)

H_{12}: reduced anxiety

H_{13}: higher sense of perceived power relative to the abuser

H_{14}: greater sense of control over their destiny.

H_2: A highly personalised OAS will empower a DV victim in terms of

H_{21}: increased self-esteem (or reduced self-blame)

H_{22}: reduced anxiety

H_{23}: higher sense of perceived power relative to the abuser

H_{24}: greater sense of control over their destiny.

H_3: A victim who feels empowered by an OAS is more likely to take positive steps towards ending an abusive relationship

Existing Online DV Services: What Can We Learn from These Examples?

Providing support to DV victims is not a new idea. Numerous websites across the world target DV victims. Following the review of a number of English-language sites from Australia, the U.S., and the UK, we found examples of desirable features and of poor practice. We summarise the strengths (+) and inadequacies (−) of five sites that use the OAS empowerment variables of informativeness and personalisation, apart from other aspects, in Table 2.

Governments and community-based organizations around the world provide a variety of websites that contain a significant body of potentially relevant information. Some examples of Australian-based sites are the Queensland Domestic Violence Resource Centre (http://www.dvrc.org.au/) and the NSW Women's Refuge Resource Centre (http://www.wrrc.org.au/). The pages provide general contact information and a number of further links to gainspecific information (e.g., specific to aboriginals or lesbians). These sites use attractive color schemes and photographs of real and caring people (see Example 1 in Figure 5). In contrast, the Australian Federal Government site is more businesslike, focused on providing information about its activities associated with DV (Australian

Table 2: An Analysis of Strengths and Inadequacies of Selected DV OASs in Australia, the UK, and the U.S.		
Personalisation	Informativeness	Other aspects
NSW Women's Refuge Resource Centre http://www.wrrc.org.au/		

− Simplistic and noninteractive design for general user information
− Does not guide victims in their decision making
− Difficult to filter irrelevant information and identify relevant information
− Does not provide tailored advice
+ Does identify some alternative stakeholders/ audiences
	− Limited information available to help people in the precontemplation and contemplation stage
	+ Contents provided for specific groups of people
	+ Contains some specific information for minorities
	− No hierarchical decompositioning
		− Broken links
		Synthetic aspects
		  o cold colours on home page
		  o nonencouraging; difficult to generate a sense of involvement and mutual support
		  o nonprofessional appearance— different look and feel on pages
		− No Emergency *escape button* feature

Queensland Domestic Violence Resource Centre http://www.dvrc.org.au/		

− Does not assist victims in their decision making
− Does not provide tailored advice
	− Limited resources and information available to help people in the precontemplation and contemplation stage	+ More synthetically pleasing compared with the NSW one
		+ No Emergency *escape button* feature
		− Synthetic aspects
		  o cold colour
		  o Nonencouraging; difficult to generate a sense of involvement and mutual support

Australian Government: department of families, housing, community service and indigenous affairs http://www.fahcsia.gov.au/sa/women/pubs/violence/np_time_for_action/national_plan/Pages/default.aspx		
− Does not assist victims in their decision making − Does not provide tailored advice	− Limited resources and information available	+ Professional look − Business like and politically focused − Serves only as a directory − No Emergency *escape button* feature
US National Domestic Violence hotline http://www.ndvh.org/		
+ Community support + A sense of involvement − Limited support for victim's decision making − Do not provide tailored advice	+ Multiple sources of information + Multiple sources of support + Champion, e.g., celebrities used to champion the site and DV victims + Content rich − Difficulty locating information effectively	+ Emergency *escape button* feature + Professional look + Synthetically pleasing o generated a good atmosphere of care and support
UK DV website http://www.womensaid.org.uk/landing_page.asp		
− Does not provide tailored advice − Limited support for victim's decision making	− Difficulty locating information effectively − Content is well-organised; however, it is not as rich as the US site.	+ Emergency *escape button* feature + Mostly synthetically pleasing o generated a good atmosphere of care and support
Legend: Strengths indicated by + Inadequacies indicated by −.		

Communications of the Association for Information Systems

Government: Department of Families, Housing, Community Service, and Indigenous Affairs from http://www.fahcsia.gov.au/sa/women/pubs/violence/np_time_for_action/_national_plan/Pages/default.aspx). The US National DV Hotline website demonstrates numerous desirable features, as shown in Examples 2–5 in Figure 5.

1. Warm and caring images and colours (DVRC 2009)

2. Notice the Escape Button (NDVH 2009)

3. A recently added feature: Encouraging people to share their success stories and experiences (NDVH 2009)

4. Using various popular channels and celebrities to promote this centralised resource on DV to the public (NDVH 2009)

5. Warning victims about browsing traces (NDVH 2009)

Figure 5. Examples of Desirable Features for DV OASs

From our review of websites, we have identified the following desirable features:

1. Use welcoming, friendly, and caring pictures with real people and warm color schemes (see Example 1 in Figure 5).

2. Provide educational material about DV (see Example 2 *Get Educated* menu)

3. Provide contact details and links to places and further resources (see Examples 1 and 2).

4. Provide an *Escape* button to immediately clear the buffer and redirect the user to Google.com. This precaution is to help women who are caught in an urgent situation requiring an immediate solution such as when the abuser suddenly walks into the room. The website informs the user: "if you are using our website and need to quickly get away to an unrelated site, click the escape button in the top right corner and you will be redirected. Please test these features on your computer right now to ensure that they work" (see Example 2 in Figure 5).

5. Include a feature that encourages people to share their success stories and experiences (see Example 3 in Figure 5).

6. Use various outreach channels and celebrities to promote the DV site. In Example 4, we can see Dr. Phil during his live TV episodes, advertising a personal visit by Vice President Joe Biden to the hotline. Support from other celebrities promotes this centralised resource on DV among the public.

7. When the user enters the website, a warning dialog box pops up to warn victims of any possible safety threats as a result of using the website and related solutions. The website prompts: "Safety alert: computer use can be monitored and is impossible to completely clear. If you are afraid your Internet and/or computer usage might be monitored, please use a safe computer and/or call the National Domestic Hotline at…" (see Example 5 in Figure 5).

Similarly, the UK website (http://www.womensaid.org.uk/default.asp) contains a *cover your tracks online* warning and button (features 4 and 7), access to contact details (feature 3), information about the A–Z of DV (feature 2) and sharing of personal experiences (feature 5). We intend to build on these best practices but also to use our DV victim OAS empowerment model presented in the previous section to create a design that will particularly reach out to those in the early phases of DV.

System Requirements for a DV OAS

Collectively, existing online DV help systems contain many innovative and helpful features. However, they often only help women in a specific geographical area to deal with a limited range of problems (e.g., locate the nearest shelter/refuge). Due to the focus of each system being quite narrow, the advice provided can even appear inconsistent. Unfortunately, DV victims tend to be under great stress after a DV incident, which limits the victim's ability to locate and make use of personally relevant information. As one victim commented:

> I don't feel like talking to people or going anywhere …. A good friend of mine [went] to [a] counselling service and [brought] back a couple of websites [for me to visit]. [They were not] much help. They are too theoretical and just not applicable to my situation.

An OAS needs to be informative and well-advertised to provide personalised DV advisory services. The current study proposes that the many government agencies that are involved in DV issues should combine resources to set up a single-point-of-contact OAS service. This would better help those who are still in abusive relationships. Through this service, professionals can: (1) help each victim develop a clearer understanding of his/her current situation, and (2) through this more objective appraisal, help each person to be more aware of personally relevant and viable alternatives. Situational awareness is particularly important because, when involved in an abusive relationship, people are often not able to assess the situation and its impact objectively.

A misplaced sense of guilt or shame may prevent a victim from seeking face-to-face help. Women with recent abuse histories (within the past year) tend to resist even routine inquiry by health professionals [Boyle and Jones, 2006]. For male victims, anonymity may be even more important because, apart from a misplaced sense of guilt or shame, many report "revictimisation by the system." Examples of revictimisation include refusal from DV helplines to receive the victim's calls, ridiculing the victim, or accusing him of being a batterer [Hines et al., 2007]. Therefore, for both female and male victims, an OAS is likely to be effective because an online environment offers complete anonymity (i.e., identity and gender). The comparative distancing supplied by online systems means that victims: (1) will feel more secure about their disclosures, (2) will be more likely to disclose the abuse honestly to themselves, and (3) will not need to worry about the possible reactions of other people to the disclosure [Jackson et al., 2000].

When designing an intervention to help battered women, professionals should recognise the victim's readiness for change to make the intervention more effective [Prochaska and DiClemente, 1984]. Online systems, therefore, should use a short questionnaire to determine the victim's readiness for change and provide advisory services accordingly. Drawing on the literature and insights from potential users, Table 3 provides a list of OAS functionalities. Table 3 also highlights how each functionality addresses specific external and internal barriers, including how the integration of decision support functionality with data-mining techniques can generate a pool of success stories from women in a similar situation. This functionality can significantly contribute to empowering the victims.

IV. PROTOTYPE DESIGN AND EVALUATION FOR A CENTRALISED NATIONAL RESOURCE FOR DV ONLINE AID

We developed a prototype system based on (a) the empowerment model in Figure 3, (b) the desirable features discussed in Section III, and (c) the functionality presented in Table 3. We call our prototype the DOVE (DOmestic Violence advicE) support system, as the dove is also a symbol of peace. In light of the features identified to help DV victims overcome decision-making barriers (Table 3), our prototype offers step-by-step guidance, convenient

Table 3: How OASs Address the Major Barriers DV Victims Face to Make a Sound Decision		
Source	Major Barriers	Online Advisory System (OAS) functionalities
	External Barriers	
Shurman and Rodriguez, 2006	Concerns over • economic factors • housing difficulties • personal safety • impact on children	Informativeness Through an OAS, victims have • convenient access to advice on how to seek help regarding access to money, housing and education (esp. for children). • a centralised DV information resource. This centralisation of DV help resources greatly reduces the stress and time involved in hunting for correct and useful information. • their information needs about DV are met. Knowledge is Power. Self-protection steps are made simper. They will be advised by the OAS on how to proceed, such as how to get a protection order. • a better understanding that DV is a crime and of how the offender will be dealt with at law. • more knowledge of various professional assistance and legal support available, including a protection order.
Mederos et al., 2005,	Many offenders are logical and persuasive: • Spreads disinformation • Denies own behaviour while blaming partner • Recruits support	Informativeness and Personalisation An OAS provides step by step guidance on: • how to collect and present evidence of DV • how to self-assess the severity of a DV injury • how to deal with psychological pressure from the abuser (via case studies that are selected based on browsing history and personal profile or inferred via data mining techniques integrated into the OAS)
Aiko, 1994; Ho, 1990	Culturally rooted attitude and beliefs towards DV by the victim's relatives and friends, or by the victim	Informativeness An internet-based OAS transcends cultural, local and national boundaries and provides more justified viewpoints on DV and helps victims to protect their basic rights. OAS provides victims with knowledge such as • DV is a crime, regardless of culture. • No-one deserves to be beaten. • Many women escape violent relationships and subsequently lead a happy life. • The victim must take ownership of the situation.
	Internal Barriers	
Wallace, 2007	• Sympathy toward the batterer • Loyalty/commitment toward the batterer	Personalisation Online Community Support. Victims may trust a person with experiences similar to their own rather than an abstract theory.
Schuller and Vidmar, 1992	The victim developed/felt • Ashamed to discuss issues or seek help • A strong emotional tie with batterer • Confusion about current situation • Confusion about the multifaceted behaviour of the batterer in different situations or in front of different people.	Informativeness and Personalisation • Online OAS allows the victim to conduct self-help rather than having to disclose this to other people. • The victims can receive a more objective appraisal of what happened through the OAS providing professional advice and similar cases pooled from real life cases. • An OAS with personal stories of others allows the pre/contemplator to recognise their situation, that what they experience is common to others and they should not feel ashamed. • Online OAS would let victims know that professional counselling and other interventions are usually required (as well as the forms of intervention that are possible) and that even with professional intervention, change may take several years. • Online OAS would help victims understand better the options available and to assess the likely consequences of those actions (e.g., that ending the relationship sometimes results in an escalation of violence).
Walker, 2000	• Low self-esteem • Sense of guilt • Learned helplessness	Personalisation • Use click stream analysis and data mining algorithms to dynamically determine the user's likely goal. On this basis, the OAS can filter relevant success stories for users. Positive role models and stories of success can counter feelings of fear and low self-efficacy and encourage the start of a positive decision process. • Locate support resources for victim (e.g., an online community or a therapy service). Many victims find it difficult to approach any close acquaintances immediately following a DV incident (particularly if the victim is geographically separated from family and close friends). Locating support services is particularly difficult for male victims, many of whom report being revictimised by a support system that assumes that the male is always the aggressor [Hines et al., 2007].

Internet-based access, and a wide range of tailored information. This information includes personal stories, expert advice, resources, and support services. This personalised information can be accessed in a self-help manner. Unlike existing systems, our prototype is interactive and tailored to the individual based on that person's unique situation.

Appendix III shows examples of key screens and one possible screen sequence. As shown in Figure 7, a *please describe your situation* prompts the user to describe his/her problem and current environment. The system uses data-mining techniques to identify key words and phrases in this text that classify the nature of the problems being faced in a way that is meaningful to the computer-based system. The content provided in Figures 8–10 depends on what was entered in Figure 7 and will vary for each individual. In the example interaction sequence given in Appendix III (on the left side of Figure 8), there is a link to an online assessment survey *Are you in Danger?* because the story entered by the user indicated a strong risk that the user was in physical danger. The language used in the survey is personal (i.e., *you* is used in each question). In keeping with empowerment theory, rather than taking users directly to the survey, the decision is left with them. For some users, particularly in the *precontemplation* phase, just being asked to consider if they are in danger will be confronting enough for them. *Precontemplation* phase users may need further time before they are ready to complete the survey. Figure 9 seeks to provide clear, caring, persuasive, and individualised steps and advice.

In Figure 10 we see that the user repeats his/her input. The design rationale for reminding a person what has been said previously is to help the user contemplate his/her situation and recognise that the system is making recommendations based on that input. Positive messages such as *you can do it too* are used to reduce anxiety and encourage positive action (which, in turn, should increase self-esteem and diminish the sense of helplessness). Providing accounts of the experiences of others who have been in a similar situation (as shown in Figure 10) is designed to build a sense of community and provide encouragement.

For initial feedback on our ideas and prototype, we conducted a semistructured interview with two senior and long-term DV workers. Each interview lasted two hours. The first twenty minutes were devoted to a general discussion on the challenges related to DV support: a perpetual lack of resources, the unique and complex nature of each case, the difficulty in getting victims to recognise their situation and take action, and the cyclic nature of the problem. We then conducted a walkthrough of the entire site for the workers (Figures 6–10). Appendix I groups interview excerpts by themes: novelty of the system; personalisation (use of name and/or customised content) and anxiety, power, self-esteem, and reduced helplessness. Overall, the interviewees' evaluation of the DV victim OAS empowerment model was favourable. Most notably, the DV workers were "blown away" by the feature that allowed the victim to type in a description of their own situation and receive content, both expert and experiential, related to their situation. The key advantages of our mock site over current sites, noted by these workers, were the *amount of personalisation* and *the range of different types of information* available.

The questions listed in Appendix II guided the semistructured interviews. Most responses to Question 2a were not specific to any online system, expressing instead a more general need for information that might help people develop a better understanding of their current situation and future options. A common theme in these responses was that people who access online resources may not be ready to talk to anyone and may in fact want to use Internet-based resources to help themselves. This theme supports our control empowerment proposition, which holds that self-discovery leads to increased self-esteem. Lack of access to the Internet was seen as the main impediment to obtaining this help.

There was considerable discussion around questions 3 and 4, with both interviewees emphatically rejecting the idea of addressing the user/visitor by name, for example *Hello, Marina*, even if it was a pseudonym. The use of any name to create a sense of personalisation was seen as "too confronting." DV workers explained that it is a "bit scary to see your name in black and white" or to think that the site is "about me [the user]." A pseudonym was seen to defeat the purpose of making it personal, confirming that it was best not to ask for any name. Clearly, transaction-driven personalisation was seen to be too risky, as it would require storage of personal details from previous sessions. In contrast, interviewees felt context-driven personalisation (i.e., tailored content based on input from the current session) was desirable. They felt that "getting links to resources and experiences based on their own situation was a really intriguing idea" that would "quite likely" help a victim to easily locate situation-relevant information from the enormous pool of information available on the Internet. As one DV worker suggested: "No one likes a Google search with a 100 pages."

With regard to the *perceived power* outcome in our empowerment model, in response to Q5 on the impacts of being well informed, both interviewees cited the catch phrase *information is power* and said that with all other things being equal, "yes, being well-informed is better." As one DV worker pointed out, "[you can] *draw strength* from other

women's experiences." They again highlighted the importance and value of empathy derived from sharing stories with one another.

In summary, in Table 4, we list the features included in our prototype using the personalisation and informativeness factors in the OAS empowerment model together with *other aspects*, as used in our review of existing systems. The evaluation column includes the results of our own heuristic evaluation using the same criteria from Table 2 and the feedback we received from DV workers highlighted in grey.

VI. DISCUSSION AND CONCLUDING REMARKS

Through a review of relevant literature and informal interviews with battered women, we identified the informational needs of DV victims. By providing DV victims with anonymous online access via an OAS that encourages reflection on their own situation, we address the gap in the strategies for combating DV. Our prototype meets the need for information and support in the early stages of the DV cycle. Addressing this gap is potentially of great practical benefit to both victims of DV and organizations that assist in these difficult circumstances. One DV victim who had successfully started a new life commented on the idea of having an online OAS, such as DOVE, saying:

> I think such a system could be very helpful. I wish it was available to me when I was suffering in my
> previous relationship. Originally, I thought online resources and theoretical stuff would not be useful to me
> at all since my experience is unique. However, it is surprising to see how those theories helped me to
> understand my own desperate situation. After so many years, I finally see why I kept forgiving and going
> back to him.

One of the major benefits of an online DV tool is the improved access to information such as contact details of local professionals, personal experiences of others, and expert advice. Of course, it must be acknowledged that breaking out of an abusive relationship is subject to the individual taking action. Thus, the DOVE system described here is not a complete solution; however, it does offer directions for future systems designed to empower individuals in this situation. In particular, designers should examine how well existing systems allow people to assess their circumstances, share their stories and receive the information and support that they need. These elements jointly contribute to a sense of empowerment throughout the *precontemplation*, *contemplation,* and *preparation* stages of the decision process.

Our study also contributes to advancing theories in the design of OASs. The use of the empowerment theory to develop design principles for this type of system maximizes the relevance of information in the DV context. In particular, the informational needs of DV decision makers are most likely to be met if (1) we know the user's decision stage (*precontemplation, contemplation*, or *preparation*) so that stage-specific information can be delivered, (2) we know the user's physical location and environment so that recommendations can be tailored to the user's location and personal context, and (3) we know the user's personal information preferences to ensure that we take into account individual differences, including the user's decision-making style and formatting preferences, when constructing recommendations. Extrapolating these principles to the design of online assistance tools in general clarifies that personalized assistance requires a context-sensitive solution. Unfortunately, the use of popular user-centered design methodologies, such as participatory design and contextual design, can yield entirely different solutions for separate contexts, if each context is treated as a separate solution space. To avoid this, we propose that the development of this type of system must be theory-driven at the top level. Allowances can be made for specific contexts (e.g., urban versus remote), but making the effort theory-driven will help to ensure that the system is coherent.

These insights have implications for domains other than domestic abuse. For instance, the empowerment model applies to other problematic interpersonal situations such as bullying (both online and in-person) and dealing with "difficult" people. The OAS empowerment model seeks more generally to use personalisation and informativeness to improve self-esteem, reduce self-blame, reduce anxiety and increase perceived power and sense of control. Although outside the scope of this article, we believe that this model can be used to assist teenagers with depression, alcoholics, drug addicts, long-term patients, aged individuals, or any person in a position of weakness who needs to take a decision to move forward. If the nature of the situation features of the user and barriers faced are similar to those identified in Section II for the DV context, we believe the model may be directly applied. The main changes to the same-context OAS would be at the content level. Where the context is different, modifications to the model and OAS design would be needed. Our model provides a sound basis for exploration by researchers in these areas. Domain-specific refinements of our theoretical model may lead to a validated, generalised model of OAS empowerment.

This brings us to a limitation related to the current study: we did not assess how the racial, ethnic, and cultural background of each participant influenced either the type of information required or the most effective way to present

Table 4: Summary of Features and Evaluation of a DV OAS Prototype		
	Features	Evaluation
Personalisation	Captures victim's story (provides implicit rather than explicit search terms)	+ Intriguing, engaging/interactive, provides a sense of involvement, assists contemplation + gives sense of ownership, control and choice (i.e., empowerment) + provides a voice while remaining anonymous + could reduce anxiety for some people - will be painful and stressful to enter own story - too confronting to see own story - some risk of (temporarily) recording own story *Need to re-enter the story each time, but this allows fresh assessment.
	Provides tailored content, steps, expert advice, and personal stories based on victim's story and/or quiz	+ reduces search effort and anxiety + interactive design for specific information + guides victims in their decision making * Dependent on relevance and accuracy of the data mining techniques used - specific to the individual rather than alternative groups of stakeholders/audiences *unique, unlike any other existing website
	Addresses victim by name/pseudonym or uses "you"	+ promotes a feeling of caring and personal relevance to the individual - providing real name adds an element of risk - too confronting to see name in black and white
Informativeness	Provides extensive range of information	+ information is power + focused on tools, resources and information to help people in the precontemplation and contemplation stage - current prototype is lacking content - doesn't include champion or celebrity endorsement
	Includes Westbrook's information	+ includes useful and essential information for people in preparation, action, and maintenance stages, but less for precontemplation and contemplation stage
	Information and advice provided is based on victim's story	+ personalised/tailored content (cf. "personalisation") - general browsing and access to general information is reduced - does not contain specific information for communities, minorities, stereotypes, or groups - some relevant information may be missed - user has less control over what content they consider
	"Are you in danger?" survey	+ requires the victim to provide input and engage with the problem + assists in contemplation of their own situation + provides specific steps and content according to the survey responses - system/survey is not a substitute for assessment with a human DV worker *Questions and resulting content and advice need to be appropriate
	Reminds victim of their story	+ encourages reflection and a decision to be made + may be too confronting to see their situation in black and white
	Provides other's stories	+ experiences of others matched to the individual's situation + seeing how others have succeeded can be encouraging + provides empathy effect - victims may fail to see the relevance of other people's stories that don't exactly match
	Well structured steps/ advice	+ user is assisted in decision making - No hierarchical decompositioning of content makes general browsing difficult
Other Aspects	Internet-based	+ promotes accessibility + some women do not want to talk to others and prefer to look on their own - some victims may have limited access to the internet - site would be "open to crackpots" *Sites need to be validated, this involves overhead. *Multiple sites exist to "suit different layers." *Need multiple ways to get access to the site and draw resources from numerous other sites.
	Escape button/cover tracks	+ nonpolitically focused + more than a directory - could be more professional looking with warmer colours and pictures - no community forum provided
Legend: Strengths indicated by + Inadequacies indicated by − Neutral comments/observations indicated by *.		

that information. We ignored these factors, first because the attributes of an ethnoracial group are not individual-level attributes. Indeed, an ethnoracial profile is actually no more than a collection of stereotypical attributes with which a given individual may or may not identify [Bargai et al., 2007]. Second, ethnoracial effects tend to be subtle and vary considerably from one group to another. For example, African-American women often internalise a

culturally derived but unhealthy identity of a person who has the power to withstand all adversities independently [Bell and Mattis, 2000]. Designing interventions around the stereotype will help some women, but will also alienate those who do not identify with the image.

Economic background, educational level, and the presence of children could also influence the type of information required and the feasibility of the solutions. While the moderating effects of the factors do not invalidate our model, we acknowledge that these issues (which cannot practically be investigated in a single study) must be considered carefully during the system development process. National culture is similarly likely to influence information needs, but is beyond the scope of this stage of the research program. To that end, the next stage of the research project involves further evaluation of our prototype system in Australia and Japan. Further testing will allow us to assess how culture influences information requirements and how that information should be provided.

The interviews conducted with the DV workers provided support for the propositions that an OAS with high informativeness (H_0) and personalisation (H_1) is more likely to empower DV victims, by increasing their self-esteem, reducing anxiety, increasing perceived power and increasing the victim's sense of control over their future. The DV victim's quotation at the start of this section provides lends support to the end goal of this study: victims empowered via the OAS might take positive steps toward ending abusive relationships (H_2). Testing such a proposition is problematic and would require an extended, longitudinal study. Conducting such a study would itself be problematic and questionable, given the complexity and recursive nature of abusive cycles, the impossibility of conducting a controlled study owing to ethical considerations, and, as noted above, an OAS is only one piece of the puzzle.

The evaluation of our prototype revealed a number of concerns, particularly around ensuring that sufficient information was included in the system and was appropriately retrieved. As captured in our model, achievement of the empowerment outcomes would be dependent on the effectiveness of the informativeness and personalisation processes. Such processes are mainly affected by the content (validity, coverage, and structure) and the intelligence of the system to provide relevant, thought-provoking, and helpful assistance. Of lesser concern, but still essential in a deployed system, was that the prototype was lacking content and needed improvements in structure and appearance.

The DV workers interviewed suggested that *outreach workers* were probably the most appropriate people to provide future feedback on our system as they have personal experience in combating DV and helping other women. Before the next evaluation, we will include features such as a discussion forum to build a sense of community and sharing, and more content. We will also improve the structure and look of the website to allow for general browsing and access to content and to provide a greater sense of warmth and caring. Further, we will be evaluating a number of language-technology and data-mining techniques to allow testing of the relevancy of the content retrieved based on personal stories, click-stream analysis, and other user inputs.

With due consideration to the purpose behind our research, we conclude with some final words of encouragement for DV victims:

Never, never, never, never give up.
Winston Churchill [Churchill 2011]

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:
  1. These links existed as of the date of publication but are not guaranteed to be working thereafter.
  2. The contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
  3. The author(s) of the Web pages, not AIS, is (are) responsible for the accuracy of their content.
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APPENDIX A: EXAMPLE INTERVIEW EXCERPTS

Table A-1: Example Interview Excerpts

Key Themes	Example Excerpts
Comment on the Overall system —Novelty of the proposed information system	The idea is very interesting. I've never seen one before.[I1] This is a novel idea, I need to go back and think about it.[I2] People may not be ready to talk to someone and also some women like to look around the Internet working things out for themselves.[I1] Access to the Internet is a possible impediment to getting help online.[I2] [Centralized point of access] Different organisations are there for different purposes. [After this has been clarified...] Yes, nationally available access point is not a bad thing, it is a positive step. Actually, Australia is also setting up a national hotline for DV. [Examining the U.S. website] can you send me the link which has the escape button on it? Does the agency have any interest in continuous improvement of their Web services? [Raised design concern] Quality and accuracy The quality and accuracy of the content needs to be ensured.[I1] What if the system gives misleading answer?[I2]
Personalisation [Personal cue: Addressing name]	I think it needs to be anonymous.[I1] Although addressing the person by name allows that person to feel that the computer program is talking to them, it can be confronting for some people.[I2] [It was] a bit scary to see your name in black and white" or that what they were reading about was "about them."[I2] [What about pseudonyms?] It is not very relevant, it is a computer program, not a person, therefore, calling the user by a pseudonym he/she chooses is not relevant.[I1]
Personalisation: [customised content]	It would be interesting to trial it, clearly we haven't thought about it before. For me there are some dangerous aspects, for example there are certain things the system may not be able to answer. It is a complex area.[I1]
Personalisation -> anxiety	Getting links to resources and experiences based on their own situation was a really intriguing idea which, [user's feeling] would quite possibly be better.[I1] [It helps to customise the contents, providing most relevant information to help the user.] Yes, it can be useful, no one likes getting an 100 page Google results; it surely reduces the anxiety of some people.[I2] [Personalised content] definitely has empathy effect.[I1]
Power	[Tailored content] Information is power[I1]. Yes, [when users are well-informed], Information is power.[I1, I2] You can draw strength from other women's experiences. We have some outreach workers who help by giving [this type of] insight [to other women].[I1]
Reduced self-esteem/ Reduced self-blame	[When well-informed, they would] possibly [feel more confident in getting out of the abusive relationship], but it also depends on the individual.[I2] It helps to draw strengths on other women's experiences.[I1] When all other things [external factors] being equal, yes, [being well-informed] it was better in giving them confidence.[I1]
Reduced Helplessness/ Sense of Control	Women sharing their success stories with one another—the empathy will be valuable.[1]

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APPENDIX B: INTERVIEW QUESTIONS FOR DV WORKERS

Table B-1: Interview Questions for DV Workers
Q1. Which stage do you think such a system would be suitable for?
Q2. a. What do you think are the major reasons people seek legal aid or related help online?   b. What do you think are the major barriers that prevent people from seeking legal aid or related help online?
Q3. As you can see, we try to personalise the online legal aid by addressing the user's name in the system, e.g., Dear Marina. Is it a good idea to do this? What are the potential impacts of this on the user?
Q4. We have tried to tailor content according to the particular situation of the user. Is it a good idea? What are the potential impacts of this on the user?
Q5. We have tried to provide relevant information for the user. What the main benefits of helping the victim user become better informed?

Further probing questions….

Would such an online legal aid help someone ….
… to have a better understanding of their situation?
… to appreciate how these solutions have worked for other people?
… to see how to weigh the pros and cons of each option and apply a solution to their own situation?
… to make a decision toward action (rather than bear with violence)?
Would someone feel more confident getting out of an abusive relationship when they are provided with above information by DOVE? Why?
Would someone feel less anxious towards making a sound decision about his/her relationship when the person is well-informed about the above information by DOVE? Why?
Would someone feel more powerful when they provided with the above information by DOVE? Why?
Would someone feel more control over their destiny when they are provided with the above information by DOVE? Why?
Would the personalised advice provided by DOVE be more empowering to people (more confidence, less anxiety, more perceived power, and control)? Why?
What other features do you wish to see in the intelligent system?
Would DOVE empower someone who is in need of DV legal and related advice? Why?
Would such a system encourage someone to take some action toward ending DV?

APPENDIX C: SAMPLE SCREEN SHOTS AND FLOW FROM PROTOTYPE DV OAS—DOVE SUPPORT SYSTEM (THESE WEBSITES BASED ON HYPOTHETICAL AGENCIES)

Figure C-1. DOVE Initial Information/Welcome Page

The user starts with an overview of the purpose of the system. The user's name (e.g., Marina) is obtained at this point via a popup box and then inserted into the text.
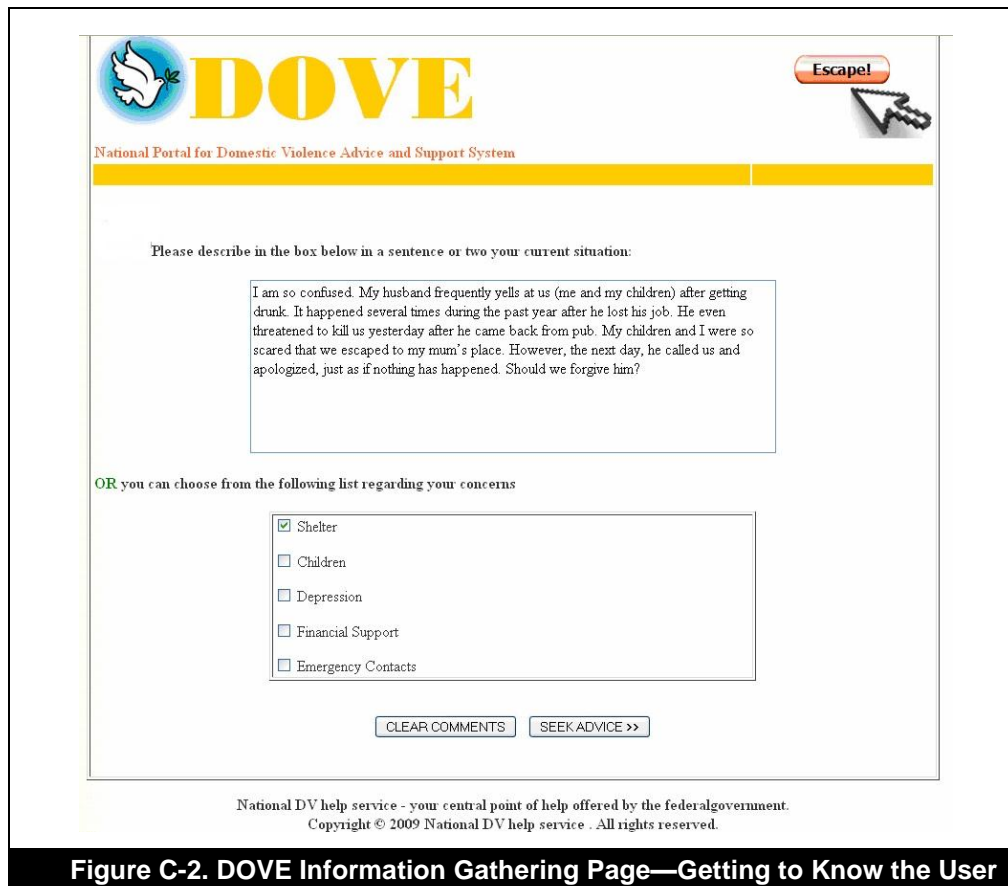
Figure C-2. DOVE Information Gathering Page—Getting to Know the User

The system then asks for information about the user's current situation and immediate needs.
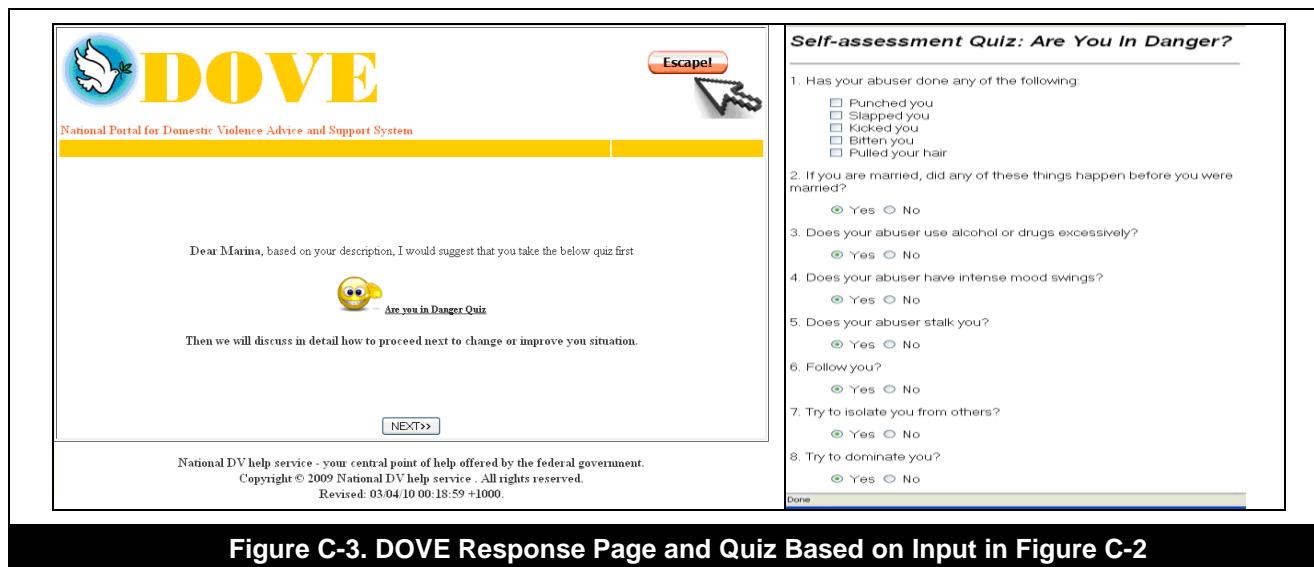
Figure C-3. DOVE Response Page and Quiz Based on Input in Figure C-2

The system now uses the user's situation and needs data to select further information and input screens. Based on the personal story entered, the system has determined that the first priority is to determine if the user is in danger, and so Figure C-3 is displayed.

Figure C-4. DOVE Guidance Based on Input in Figure C-2 and Response to "Are you in danger quiz?"

Completion of the "Are you in Danger?" survey (Figure C-3) indicates that the user is at risk. The system has constructed three steps to assist this person: (1) Read a brief article and then provide further information about needs, (2) Read expert advice that has been determined to be relevant, and (3) Read case studies of people in a similar situation.

Figure C-5. Sample of Tailored Expert Advice and Matched Case Studies Provided by DOVE

Possible output for steps 2 and 3 in Figure C-4 by providing tailored advice (LHS) and also providing expert opinions and similar experiences of other victims (RHS).

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