

## RELAYVIO: MOBILE APPLICATION FOR DOCUMENTING DOMESTIC VIOLENCE

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### ABSTRACT

RelayVio is designed and developed as android based mobile applications for all users, particularly users of domestic violence victims and their families in Malaysia. The main function of this app is to encourage domestic violence victims to document evidence of violence by way of writing notes, capturing images and recording dates and times of the occurrence. The app also allows victims to sending messages to a domestic violence hotline (Talian Nur), or can directly connect to 999 in the event of an emergency. The app also aims to educate the general public on the signs, dangers and help they can get relating to domestic violence abuse, through the use of animation (3D stop motion). getting information about the act of domestic violence. The method used in the development of mobile applications is ADDIE, which consists of analysis, design, system development, implementation and evaluation. An interview with a sociologist was conducted as an expert review, as well as a usability study of the app. Results show that the majority of the participants agreed that RelayVio app will be able to facilitate victims of domestic violence to gather information and keep documentation of the abuse as a form of evidence against their abusers.

Keywords: mobile app, RelayVio, domestic abuse, animation.

### INTRODUCTION

Domestic violence is the abusive behaviour committed by one or both partners involved in intimate relationships. Abuse can be targeted to either partner or child. This includes wives or husbands, child abuse and other abuse committed to endanger family members. Domestic violence is a repeat behaviour or interruption action, which involves the creation of unwanted attention or making unnecessary contact with certain individuals or individuals in order to create fear or cause harm. This threat can be done directly or indirectly. Many cases of domestic violence have been directed to women and children.

Based on statistics by the Malaysian Royal Police (PDRM), 57,519 cases of domestic violence against women have been reported from 2010 to March 2017 (Shuib et al., 2013). From the official health ministry's website, it has been pointed out that domestic violence can be in the form of physical, sexual, verbal, emotional, psychological, or financial abuse (MHED, 2017). Domestic violence may also include threats from acts, coercion or lack of arbitrary liberties, whether occurring in public or private life (Anon, 2017).

The Government has taken proactive measures to prove the Domestic Violence Act 1994 (Act 521, Domestic Violence Act 1994 (Malaysia)), considers the relevant agency's views and Non-Governmental Organizations (NGOs). The Act, which came into force on 1 June 1996, is aimed at providing legal protection for domestic violence situations and adjacent

households. This protection includes the protection afforded to the victim to continue receiving threats from abuse.

The main problem with domestic violence cases are that victims dare not report on the authorities and it is difficult to get strong evidence for cases of abuse of the victim's household. This problem is quite serious because if the report is not made because there is no evidence that domestic abuse cannot be sustained. Due to the well-known challenges, the effects and problems of the community relating to domestic violence and pose take-ups are important in order to take measures to address them objectively (Douglas & Kropp, 2002). It is however important that the perpetrators of domestic violence (beaters) are calculated to commit any malicious behaviour (Whitcomb et al., 2002).

One way that is proposed to help domestic violence victims is through the use of an app since mobile apps are the key technologies used by millions of people around the world nowadays. In addition, mobile apps are easy to use, where users can access everything at anytime and anywhere they want. Unfortunately, there is no mobile apps available in the Google Play Store for domestic violence that is developed for Malaysia. Most applications only from abroad such as India, United Kingdom and Russia. Even then, most of these apps only display basic information of the act, how to provide help and how to make an emergency call.

Thus, RelayVio app has been designed and developed as a medium to aid users of domestic violence to record information and get help from responsible parties. By allowing detailed description to be recorded, this app works as a proof that users have been abused by their partners. This app provides information on domestic violence act 2017 and there are calendar navigation pages is to include the event or event that occurred on that day. The camera feature can be used to take pictures of evidence of the incident of injury or the involvement of the family. A video animation is also available on the app which aims to provide an easy explanation on the issue of domestic violence. Moreover, the app can connect emergency calls to contacts and authorities immediately, and messages can be used to send emergency messages to the nearest contact or family.

This paper is structures as follows. Section I provides the background to domestic violence. Section II compares related work on mobile apps to help domestic violence victims. Section III provides the methodology of the app. The overall system implementation is given in Section IV. Results from the evaluation is discussed in Section V. Section VI concludes the findings of this study.

## RELATED WORK

Mobile communications technology has become the most common way of spreading in the world; it can deliver voice, data and services, and technology with faster spread. Mobile application is a program that is loaded into a mobile device and can be used anytime and anywhere (Islam et al., 2010).

Apps on mobile phones have the potential that can be used in education (Stockwell & Hubbard, 2013). Therefore, apps can be used to educate the public on the signs and dangers of domestic violence and how to report the crime correctly. Through animations, relationships or intermediaries about domestic violence can be explained visually. The animation character refers to a character that exhibits a sense of strength, weakness, goodness or bad character and what purpose to achieve. The combination of personality and attitude can make certain characters easy to remember (Kerlow, 2009).

A simple, low-cost animation to achieve this is through a stop-motion picture simulation. Stop-motion animation is often called clay motion because in its development, this type of animation often uses clay (clay) as a moving object. This type of animation uses minimal movement from one place to one place that involves the animated object of any "uninterrupted" object such as toys, blocks or any objects.

Similar apps have been developed for the same purpose of providing help for domestic violence victims. For instance, Bright Sky<sup>1</sup> is free to download mobile gadgets designed for use by those who experience household abuse or users who know and care about someone they know is going through abuse. It can also be used in an educational settings for those who want to know more about warning signs, effects and statistics that restrict domestic abuse. Figure 1 is the interface for this app are can be found at 'Google Play Store' and 'iOS play store'. Unfortunately, this app primarily caters the United Kingdom users and is only available in certain countries, but not including Malaysia.

The PurplePeople<sup>2</sup> is another similar app that works by letting users choose contacts to send help directly if they need to get help with the occurrence of domestic violence. This app is quite basic as it sends messages regarding abuse directly to the selected phone numbers. It does not, however, provide any more information on domestic violence. Nevertheless, the simplicity of its design, i.e. a single emergency button, serves its purpose as it is an intuitive cry for help and can immediately alert trusted families and friends of the abuse that is happening (Figure 2).



FIGURE 1. Interface of The Bright Sky App.



FIGURE 2. Interface of The Purple People App.

Positive Pathways3 is another apps to help women and families in real life situations who go suffers domestic violence in Western Australia. This app is available for free on IOS and android devices. It provides a space for victims to write relevant information and can also record audio for one function as proof of domestic violence (Figure 3). It has an added security feature where users need to enter a password before they begin. Although the password acts a way to protect the victim’s information on this app, the frequent password prompting can be a drawback.

Generally, each app has its own strengths and weaknesses. For instance, Bright Sky may have a relatively good interface and functionality, but it lacks in the security aspect. Positive Pathways, on the other hand, placed a lot focus on security, but its interface is not so user-friendly. Thus, RelayVio aims to address all of the features listed and hopes to be a platform uniquely helping domestic abuse victims in Malaysia.



FIGURE 3. Interface of The Positive Pathways App.

## RELAYVIO

RelayVio was developed using an ASUS X540L laptop, with Intel® Core™ i3-4005U Processor with Operating System (OS) Windows 10 of 64-bit. An Android device (OPPO Neo 7) was used to run the apps during testing. A mobile phone with relative good camera is preferred, as the system allows for photos to be captured as evidence of the mistreatment. Android Studio 3.01, Adobe Photoshop CS6, PdaNet++, DB Browser for SQLite and Sony Vegas Pro 13.0 were all used in the development of the app.

The functionalities of the app is includes Login (authentication), MyDay (diary and record keeping in text), Video (a short stop-motion animation which explains what domestic violence is), Contact (direct calling in emergency cases), Camera (taking photos as evidence) and Law (explaining the act of household violence and with links to file a report to the authorities). Examples of RelayVio’s interfaces are presented in Figures 4, 5 and 6, while Figure 7 shows an excerpt of the stop motion animation included in the app to create educate users on matters relating to domestic violence.

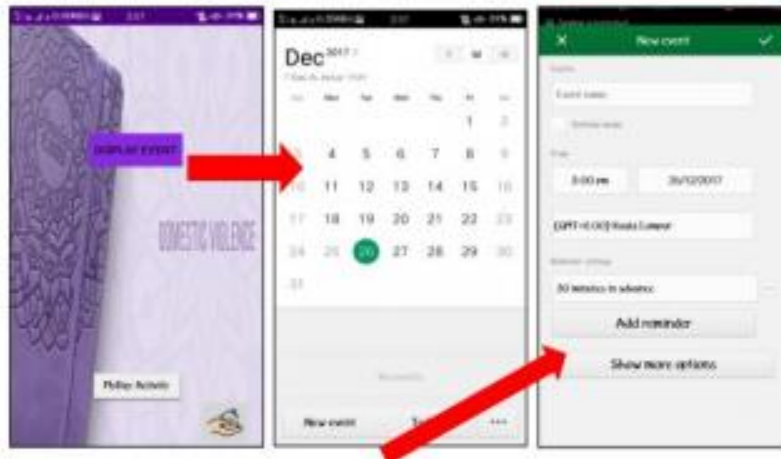


FIGURE 4. The Myday Function Of Relayvio, Which Is Linked To The Calendar, To Mark Events Of Attacks.

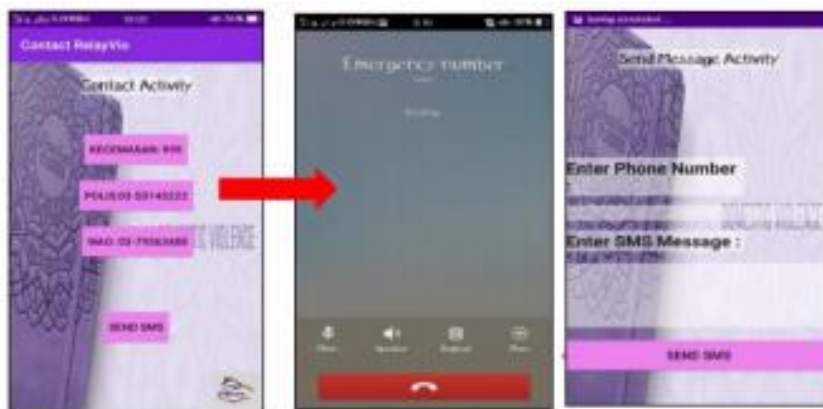


FIGURE 5. The Contact Function Of Relayvio, An Be Used To Either Directly Call The Emergency Number, Or A Short Sms Can Be Typed And Sent To The Selected Persons In The User's Contact.

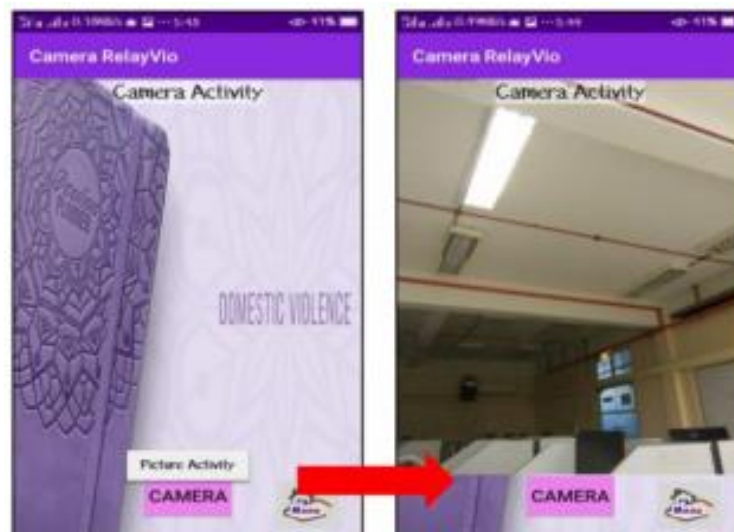


FIGURE 6. Relayvio's Camera Function Directly Takes Photos, I.E., Bruises, Abuser's Face, Etc., And Links It To The Calendar To Be Used Against As Evidence.



FIGURE 7. A Stop Motion Animation In Relayvio To Educate Users On The Signs Of Domestic Violence And The Help They Can Get.

## USER STUDY

A user study can determine the usability and acceptability of a system or app. In order to test whether the app had proven to be functioning accordingly, a user study was conducted on RelayVio. Nine participants of five men and four women aged between 20-30 year olds were recruited. Participants, who were recruited on a voluntary basis were required to install the app on their mobile phones. They were also provided with a blank sheet of paper as well as stationaries.

## ROLE-PLAYING

The study involved the participants in a role-playing task. Role-play is a type of prototyping or simulation technique that can help in quickly eliciting the user experience for a product or service from the target audience. The advantages of using role play is similar to prototyping, where it can be used as a way to gather data from an activity. This method is useful in figuring out user requirements, expectations, competencies, acceptance as well as instilling a feeling of ownership within the users. Typically, the participants in this method of research essentially play certain roles in a skit or a conversation, or are asked to imagine a scenario. In this roleplay, participants were asked to imagine the following situation:

“You are experiencing / knowing the acquaintances facing domestic violence. As a victim / witness how you reported this incident to the authorities. You are required to write this incident information down”.

In the role-play the situation above, participants had to complete a report-writing task, imagining that they had been abused or knew someone who was being abused, and needed to write a formal complaint to the authorities. The task was divided into two parts: paper and RelayVio app.

In the first part (paper), participants had to role-play the situation and write the formal report to the authorities on a blank piece of paper (Figure 9). In the second part (RelayVio app), participants had to role-play the same situation, but the report writing had to be done using the functions provided in the app. The time it took for each participants to complete the paper-based and app-based tasks were recorded to compare the efficiency of writing reports manually versus recording directly on to the RelayVio app. Half of the participants (five) started the

paper-based role-play first, while the other half (four) started with the app-based roleplay. All participants had to answer a set of questionnaires relating to their experience and also on the general usability and user experience of using the RelayVio app.



FIGURE 8. A Participant Writing A Paper-Based Report For An Abuse Situation That She Is Role-Playing.

#### EXPERT REVIEW

An interviewed was held with a well-known expert in Family and Child Ecology, Marriage and Parenting from the Department of Human Development and Family Studies, Universiti Putra Malaysia. The interview revolved around the issue of domestic violence and the significance of the RelayVio app (Figure 10).



FIGURE 9. An Interview Session With A Family And Child Ecology, Marriage And Parenting Expert.

#### RESULTS AND DISCUSSION

This section presents the user study results from the perspectives of efficiency, completeness, usability and user experience of using the RelayVio app.

##### EFFICIENCY

Figure 11 shows the efficiency comparison between manual report writing by using RelayVio application to fill in the information. It can be seen that, overall, by using the RelayVio app, the time taken to record the incident has been reduced to at least half (average time: 7 minutes for paper-based, 3 minutes 52 seconds for app-based). This could be due to the fact that in when writing on paper, a lot of thoughts and effort are required, particularly in a formal setting

such as filling in a form at the police station, as there no space to make error. By typing on the app, the digital text allows room for corrections, putting less pressure on the users to write 'perfectly', as revising is the most demanding process in any narrative writing (Kellogg, 2001; Alves et al., 2008).

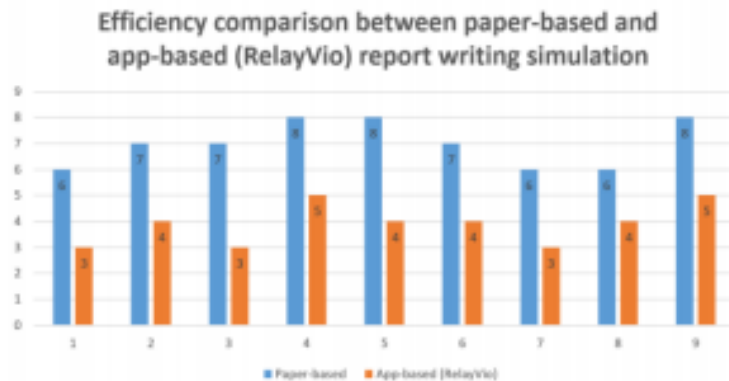


FIGURE 10. Efficiency Comparison Between Report Writing Simulation Using Paper-Based Versus App-Based (Relayvio)

### INFORMATION COMPLETENESS

It was also noted that participants were more prone to forget including crucial information in their report in manual report writing, i.e. date, time, location, what happened, name of abuser, victim prejudice and so on. Understandably, when humans are confronted with a traumatic experience, they tend to experience some form of memory loss or blockage of autobiographical memories [12]. This was confirmed in the interview with Family and Child Ecology expert, which states:

“(For manual report), may be they wrote journals and backgrounds of violence. But we see here in terms of emotion of the victim whether he is stable then or not. Manual reports relied on them”. [E1]

On the other hand, when the RelayVio app was used, these details were automatically captured 100% of the time as it is linked to the calendar function. Thus, users could focus on the narration without being mentally burdened by the nominal details. Figure 12 shows an excerpt of formal report writing of a role-playing abuse situation from this study, which is missing the nominal details such as date, time, name of abuser(s) and name of witnesses.

Apabila pertama yang menandakan itu berlaku dirumah saya sendiri, perasaan pada ketika itu tidak dapat di gambarkan. Saya dipukul oleh suami saya pada waktu malam. Pada masa kemarahan timbul disebabkan perkara kecil sahaja. Tetapi bila suami saya nak amik lalu memukul saya bermula dipukul di seluruh badan. Saya melompat ke simpanan. Mungkin jentan saya dengar oleh jiran sebelah rumah. Jiran datang mengetuk pintu, tetapi beres-beres. Saya terus mengentuk jiran merempuh pintu tersebut. Jiran melihat perkara yang terjadi lalu terus datang mengelamarkan saya tetapi jiran terus meneka saya meredakan semangat cuba untuk menenangkan suami saya. Namun sedikit pergelutan berlaku pada ketika itu. Kemudian saya terus meninggalkan rumah. Jiran terus membawa saya ke balai polis untuk membuat laporan. Saya bersejaja untuk ke balai polis kerana tidak mahu perkara ini berulang lagi. Terdapat tugas perlu diambil bagi membawa nasib seorang isteri. 05/11/2023

FIGURE 11. An Excerpt of A Domestic Abuse Report Writing From A Participant In The Role-Play User Study.



## VISUAL INFORMATION

Visual Information such as photos or sketches provide the evidence that may be useful to the domestic abuse allegations made, i.e. portrait of the abuser, snapshot of the weapons, self-photo of wounds and bruises, etc., as showcased in Figure 13. In the user study, none of the participants included any necessary proof of picture nor hand drawn sketch when writing a manual report. In comparison, when they used RelayVio app, most participants had attached at least a photo to go with the report made. The 'Upload Photo' function had successfully prompted the users to enclose any visual information if they had any.



FIGURE 12. Examples Of Photo Which May Be Used To Depict Domestic Violence  
(Disclaimer Of Graphical Content: This Picture Is From The Author's Collection And Is Fake, Included Solely For The Purpose Of This Study).

## USER EXPERIENCE

The basic experience of report writing between the manual, paper-based and the app-based RelayVio was studied. It was found that, in general, the participants preferred using RelayVio app more than writing the report on paper. 78% of the participants agreed that app-based was easier to use than writing on paper (Figure 14). Participants had commented that RelayVio app was easy to understand and its interface was user-friendly.

Easiness in Report Writing

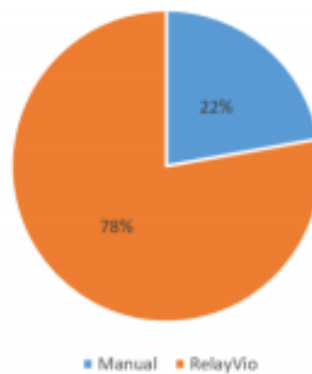


FIGURE 13. Comparison Of Easiness In Report Writing Between Paper-Based And App-Based Relayvio.

This was supported by the expert reviewer who commented,

“For me this app will have a market and welcome to the user because it has the latest technology. This application is suitable for use by the victim to be sure the victim knows to use the mobile phone. It’s not quite difficult for them to use this app.” [E1]

Participants had also mentioned that it was easier, faster, more consistent and that there was no risk of losing the information or of the data being breached due to the password enabled feature of the app. This was made apparent when one of the participants mentioned that,

“The security system for this application is controlled because whenever users want to use the application, users must enter the password for the purpose of storing information safely.” [P3]

67% demonstrated that they were more satisfied of using the app than writing in paper (Figure 15). However, several points were suggested to improve the performance of the app such as connecting it to wider audience that gathers victims in one platform, not charging the SMS or calls made to the authority and including the involvement of agencies a supporting the act of domestic violence in Malaysia.

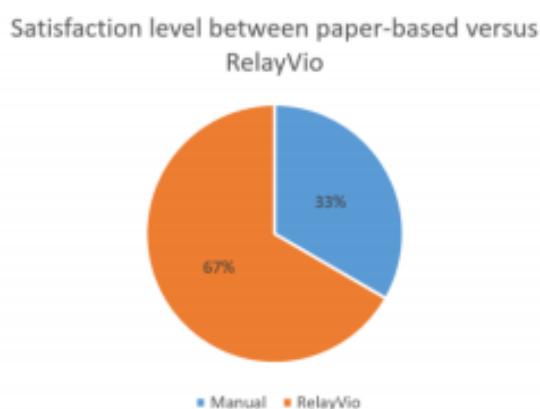


FIGURE 14. Comparison Of Easiness In Satisfaction Level Between Paper-Based And App-Based Relayvio.

“This application is very useful and successful. This app will be more successful if it gets support from a particular party women ministries and families and agencies that have supported the act of domestic violence and more agencies to be involved. (This way), this app can be shared information to make it easier for them to store victim's data safely.” [E1]

## CONCLUSION

RelayVio mobile app is designed to helps victim of domestic violence by providing a systematic way of documenting the details and visual information of the unfortunate event. This ways, the user can easily collect the information that will be provided to the authorities with regards to the abuse. This app is useful to friends and family victims of as study has found it to be easy to use, more efficient and secure. This project has potentials to be expanded into in the future to be further improved.

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