CHAPTER 10

CONCLUSION AND FUTURE WORK

10.1 Conclusion

This research has been conducted to investigate the current state of the Indian E-Governance websites in order to improve and maintain consistently high level accessibility and more successful E-Governance project development in India.

Based on the findings from the different tasks conducted within the framework of this research work, the following conclusions have been drawn.

From analyzing the existing literature related to websites accessibility, there was clear evidence from existing literature that supported to the research problems.

Firstly, the existing guidelines are not implemented properly on E-Governance websites, this because of the developer’s and manager’s unawareness of accessibility guidelines and not known about the requirement of disabled people’s needs on E-Governance websites.

Further, the recent research results found that the existing accessibility guidelines are not enough to provide better accessibility on websites. The standards and guidelines needed to be updated based on the technology growth (Patra et al. 2014; Manhas 2014; Gipson 2013; Rodrigo & Barbosa 2013; Mitchell et al. 2012; websiteoptimization.org 2012).

Finally, the existing web accessibility metrics are also not enough to rank the accessibility level of websites, because of most of the metrics are dependent on the existing accessibility guidelines and principles. When the guidelines are updated the metrics are
also updated based on the standards and guidelines to measure and rank the accessibility level of websites.

From analyzing the existing literature related to E-Governance websites accessibility, there was clear evidence from existing literature that supported the main aim of the research, which relates to accessibility being found as one of the principle factors to influence user interaction and adoption of E-Governance, which therefore determines E-Governance’s success.

In addition it was found that the existing research had not paid enough attention to investigating the accessibility of current E-Governance in developing countries, particularly in India. Therefore, it was determined that further research into accessibility evaluations of E-Governance websites is essential to be explored, as well as distinguishing any current problems with accessibility and offering specific prescriptions that will enable further improvement.

Furthermore, accessibility of E-Governance websites is useful for developing countries in general and India as a case study, the existing literature highlighted that Indian E-Governance websites suffer from a lack of consistency in principles and features.

Finally, due to the absence of various features for disabled people interaction process, it has been determined that there is a distinct lack of consideration relating to citizen expectations and needs. In other words, during the construction and design of Indian E-Governance websites, the expectations and needs of end-users have been ignored, and no account has been given of what disabled people want from the existing system. This indicates that there is still problem in E-Governance website accessibility in India.

Therefore, the aim of the study was achieved by conducting three studies and establishing proposed model and metric based on the outcomes.

From automatic evaluation tools perspective, the research was conducted with the goal of analyzing the current status of Indian E-Governance websites accessibility. The results showed that the maximum of Indian E-Governance websites are not meeting the needs of their disabled constituents in providing adequate levels of accessibility needs, and
a very few E-Governance websites come close to passing disability testing guidelines or legal mandates.

None of the tested websites, including the most accessible government sites, passed the WCAG guidelines; even though the six most frequently violated checkpoints have technically uncomplicated solutions if designers pay attention to them. This may imply that the website editor simply overlooked the errors, and for such editors, an automatic website monitoring program could be very helpful in identifying and correcting these errors on their website.

The first most frequently violated guideline was the alt text content doesn’t have alt text description. The alt text content includes images, smilies, animations, graphic images, table description and frame description. Second most frequently violated guideline was the clustered displays of web page, most importantly misplaced of title contents and missed title contents. Third violation is not providing enough time to read content for the disabled users (most of the tested websites are used marquee content and timestamp attributes, this will affect the disabled people access).

The fourth most violated checkpoint was usage of dead links, almost all of the websites having dead links. Dead links are the links which will not direct any web pages or websites. Fifth most violation was the contrast between the color of visited link text and its background for the element. The last most frequently violated checkpoints are the fixed font size, fixed color scheme, fixed layouts and fixed form of supporting language (i.e., almost all of the websites are developed based on English only, there is no option to change language).

From managers and content developers perspective, research was conducted with the goal of investigating the level of accessibility of E-Governance in India, it can be concluded that lack of accessibility awareness amongst the management, developers and citizen participation during the websites design phase are considered as the main reasons behind not having accessible websites.
In addition, the limited budget allocation to E-Governance websites and lack of expert web page designers are also considered as significant problems inhibiting the improvement of the accessibility of E-Governance websites.

Furthermore, from the outcomes of the study, it was concluded that not paying enough attention to the end-user requirements before establishing the E-Governance websites, or after launching the E-Governance system for further developments, is another problem for getting inaccessible E-Governance websites.

Moreover, based on the outcomes of the study, it was also concluded that not attending any training on the accessibility of E-Governance websites by the majority of the staff before or after the project establishment is one of the reasons behind not having sufficiently accessible websites.

The users study was conducted in order to build a clear overview about the status of E-Governance website’s accessibility in India from end-user’s perspective. This was achieved by investigating main principles of WCAG on E-Governance websites to have an accessible website for disabled people.

The user study discovered that the existing E-Governance websites have not properly implemented the WCAG principles (perceivable, operable, understandable and robust) for disabled people access. The study concluded that there is a lack of experience in developing accessible E-Governance websites, which reflects limited knowledge about user interfaces and lack of clear understanding about accessibility guidelines within the team responsible for the E-Governance project. This undoubtedly has a negative impact on the accessibility of Indian E-Governance websites.

Further, it was clearly evident that the Indian Government websites generally do not have a high level of accessibility, and that there is a lack of understanding of the needs and requirements of the disabled people.

In addition, this study discovered that there is a lack of testing and monitoring of the E-Governance websites, the lack of involvement of end-users at design stage, poor collaboration and coordination, poor standardization, lack of trust and satisfaction.
Furthermore, the results indicates that Indian E-Governance websites have two serious accessibility problems. Firstly, there is an urgent need to improve the total size, minimize the number of external objects, size of images used etc to make E-Governance websites to be more effective, highly user-centric and easy accessible for the citizens (Patra et al. 2014; Manhas 2014).

Secondly the resolution support (Gipson 2013; Rodrigo & Barbosa 2013; Amy Mitchell et al. 2012) of Indian E-Governance websites, now-a-days most of Indian people’s are using thin clients to access the E-Governance services. But the websites are not getting accessible with the thin clients; it needs individual websites interfacing applications to access the website. It is difficult to download and install each website’s interfacing applications on thin clients and access the E-Governance services.

Despite all the investment by the Indian government into the E-Governance project, the absence of accessible websites inhibits the E-Governance project from moving forward; hence, from an analysis of the previous three tasks, it has been concluded that there is a need to establish a model for developing accessible E-Governance websites in India as well as there is a need of novel metric to access the accessibility level of Indian E-Governance websites.

Hence we proposed an AESD model developing and enhancing the accessibility of Indian E-Governance websites. The Accessible E-Governance Site Development model is an outline or a roadmap that will provide a guide on how to have accessible E-Governance websites. The model is designed to enable the people who are in charge of E-Governance websites to build accessible and sustainable websites in order to allow all users including people with disabilities to access governmental information and services easily without barriers.

The proposed model has addressed the main challenges or issues that are highlighted in the conducted studies to ensure the success of E-Governance websites in India in terms of accessibility. The model highlights the components (E-Gov Monitor Tool, website manager and designer, end-users, usability committee, design process) that should
focus on the development of accessible websites for people with disabilities in India to reach the government services to all citizens.

The proposed model was evaluated by three groups (specialists in E-Governance, experts and academics) in order to ensure its validity. Based on the evaluation, it was concluded that the proposed model is capable of achieving accessible websites in India, as many of the assessors involved has a favorable view towards the proposed model. They believe that the model is a major contributor in aiding awareness and solving challenges highlighted in the main objective of the study.

At the end we proposed a replacement metric “AAEM” for measuring accessibility assistance needed for a website that meets the needs as a measurement for scientific research and additionally addresses the current issues occurred by the technological growth in websites.

The Cronbach’s alpha test’s alpha value showed that the proposed metric is reliable to assess the accessibility assistance and the comparative test result of AAEM scores with WAB scores are showed that the novel metric is a valid one for measuring the accessibility assistance needed for the E-Governance websites.

The proposed metric can be used for objective analysis and comparing accessibility between different websites, different groups of web pages, and different websites or groups of websites at different points in time. The accessibility assistance evaluating metric we developed is meant for the target and systematic measurements of the accessibility assistance required for the web page. This metric is associate acceptable metric for checking the accessibility of a personal computing machine for the aim of accessibility repair or redress.

Finally, on summary, the whole data presented from this study will be seen as a roadmap towards improve and maintain consistently high level accessibility on E-Governance websites and more successful E-Governance project development in India. In addition, the whole data presented from the study can be also contributed to further research.
10.2 Directions for Future Work

Regarding the future work, the research has raised some ideas and suggestions for future work that can be developed in further studies.

As this research focused on highlighting aspects related to design, further research is necessary and should be focused on a variable’s influence on websites accessibility, such as website contents.

In addition, future research should focus to investigate the model for the possibility of using it to other sectors and find out if it is appropriate, for example in E-learning. Moreover, research should focus to investigate the model for the possibility of using it in other applications, such as e-learning websites. Besides they can be compared with E-Governance websites (with differences being observed).

The research conducted here can be repeated in other developing countries with a view to examining whether this produces similar results that can aid in the enhancement of the generalization. Alternatively, further research may be able to apply the model in other countries to discern whether it can be repeated successfully. These studies can also be repeated on different websites to allow for a deeper insight into accessibility, and it could also be conducted in other companies to ascertain whether there are any further differences.

Further, the evaluation of the model was subjectively done, so it will be useful to deploy the model and conduct an extended evaluation in real life, and then perform the necessary alignment.

Finally, the proposed metric is supposed as a proxy measure of accessibility, not a true live measure of accessibility, which needs manual checking and human judgment. The metric doesn’t take account of the modem speed, disabilities types, the location of the barrier that may have an effect on accessibility of the website (the higher the location of the assistance in a website hierarchy, the higher the potential impediment for accessibility). The modem speed, location of the barrier, manual checking and human judgment can be incorporated in future revisions of the metric.