An Exploration of the Usability of a Learning Management System: A Case Study of a Victorian Prison

By

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Abstract

Updating knowledge and learning of new skill is an essential part of the formal cycle of training in the organisation. It is crucial too as it allows for the learners to be aware of the recent developments and to use evidence-based practice in practice, all employees must be regularly trained regarding the new updates, evidence and other important information that can help them discharge their duties adequately. Therefore, to streamline learning amongst employees the LMS (learning management system) is being implemented by organisations across the globe. The LMS originates from the e-Learning system that was in use in the past. However today LMS has already been deployed in colleges and universities and many organisations also use LMS to train their employees and even help them be updated regarding the latest requirements, policies, and procedures.

Learning Management Systems (LMSs) are an essential medium for facilitating learning activities in organisations. They offer several features, functionalities and are used in different organisational settings. The proposed study will examine the factors of usability that support effectiveness and learnability of LMS in a Victorian prison. The second objective of the research is to identify the users' perception of flexibility and acceptability of LMS.

The research methodology comprises of four stages process that adopts Design science research method. A case study design aligning with the qualitative approach is used to explore the usability factors in Victorian Prison. Semi-structured and focus group questionnaire is developed for the Prison's staff in which the perceived usefulness and level of acceptance are analysed in case of the workplace. Data collection methods comprise of the past systematic review, semi-structured interviews and focus groups while thematic analysis approach is used to analyse data with the help of NVIVO 11. The four factors of usability- effectiveness, learnability, flexibility, and acceptability have been explored to evaluate the LMS usability in Victorian Prison. The administrators, Correctional officers and Managers are the main participants to evaluate the current training system. The research identifies the barriers to LMS implementation as Lack of communication, lack of knowledge, lack of technical support, lack of flexibility and overloaded irrelevant information. These results feed into the development of the Learning Model with the help of the Learning Grid.

The contribution to research knowledge includes the creation of learning DSR Model findings derived from Round A, B and C analysis processes. The study has provided some initial insights to other researchers to conduct more studies which will be useful to not only the prisons that are being studied

but also to others here in Australia and globally as it could make training systems more effective. This study also makes recommendations to the business on improvements of their current LMS.

Declaration

"I, Renu Sabharwal, declare that the Master by Research thesis entitled '**An Exploration of the Usability of a Learning Management System: A Case Study of a Victorian Prison'** is no more than 60,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature  Date 05/08/2020

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Dedication - To my father, who never lived to see the fruits of his advice and dedication.

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IT	Information Technology
LMS	Learning Management System
LCMS	Learning Content Management System
E-LMS	Electronic LMS
HCI	Human-Computer Interaction
DSR	Design Science Research
DSRM	Design Science Research Methodology
TAM	Technology Acceptance Model
TOE	Technology Organization Environment
HR	Human Resource

Chapter 1. Introduction

1.1 Overview

The fast-developing technologies have modified the methods of teaching and learning in educational institutions since the late 1990s (Pishva et al., 2010). This integration among technologies and educational surroundings has facilitated the communication among students and instructors, however on the equal time raised new challenges as well (Pishva et al., 2010). Likewise, Kakasevski et al. (2008), *"Learning management systems allow students to view multimedia lectures, communicate with their teachers and each other in learning communities, download course materials, take online quizzes and submit homework"* (2008, p. 613). If the online training system is usable, the user satisfaction ratio is higher; this results in a well-trained and more productive workforce, who then deliver improved services to the business. To ensure that a learning management system (LMS) is friendly depends primarily on its usability which has been explained in details in chapter 2. Melis, Weber, and Andrès (2003) described two types of usability for LMS within confines of education: – technical and pedagogical, and they explained that technical usability includes several methods that will ensure a user-friendly interface with LMS, while pedagogical usability goals assist the learning and teaching process. Cooper, Colwell, and Jelfs (2007) stated that "*usability, in an e-learning context, as is the effectiveness, efficiency, and satisfaction which users can achieve specified learning goals*" (2007, p. 232) and the authors explained that the usability helps users to accomplish goals in the learning environment. The authors also suggested that if a system is less usable, due to its low level of accessibility, as usability and accessibility are related to each other and the study also assessed usability, *"the system works well in user terms when the user does not have to resort to any help and is able to control the program, and not the other way around"* (2007, p. 189).

The objective of this first chapter is to introduce the research topic by presenting an overview of the background of the research problem and the rationale and justification of the research. Moreover, this chapter focus on research perspective; research aim and objectives, research questions, research setting and research stages. Lastly, research significance and structure of the research also be presented.

1.2 Background to the Research Problem

Organisations, whether they are large or small in operation, must ensure that they are not just focused but dedicated and inclined towards efficiency (Alomari, Awawdeh and Alolayyan 2017). The term

efficiency is a very important term in the sense that once it is implemented and made part of the organisational culture, chances of mistakes are reduced while the expectations of better outcomes are improved. However, for best outcomes, it is crucial that efficiency is not just part of the organisational culture but it is applied to the human element too (Malhotra and Jain 2017). The human element is referred to as the human resource to highlight the importance this element has regarding an organisation and its success. Therefore, when it comes to efficiency regarding the human resource (HR) of an organisation it may mean the need to have an updated and well-informed HR. The chief reason why it is stated that the HR should be updated and informed in an organisation to attain efficiency lies in the outcomes that can be attained from such an endeavour (Nezam, Ataffar, Isfahani and Shahin 2016).

For example, organisations the world over are dependent on the HR of the organisation to help achieve the organisational goals and much more (Pradhan, Kumari and Kumar 2017). However, if the HR or the human element of the organisation is not well trained regarding the current updates, it may not be able to lend a helping hand to the organisation. For instance, Australia is one of the richest nations in the world with a significant number of organisations. However, despite being an advanced nation it does not mean that all organisations are devoted toward keeping their employees updated regarding the innovations and changes. Indeed, most employees tend to undertake training themselves so that they are updated, but such an undertaking may not be as effective as it should be and it may not contribute towards the efficiency of the organisation (Deloitte 2019).

Furthermore, the Australian prison system is a big employer and it also has a very significant responsibility of ensuring that the employees working in the prisons are assured of the best possible working environment (Andrew, Barker and Roberts 2016). However, despite all the rules and procedures that are in place, Victorian prisons in Australia are not considered as the best place to work. Instead, Victorian prisons are known for being dangerous, unhealthy and at times deadly. Most employees working in the Victorian prisons are stressed and they are also overworked as the workload is on the higher side. Furthermore, the number and severity of incidents that take place in the Victorian prisons are on the rise and it detrimentally affects the health and wellbeing of the prison staff, officers and all others who are part of the organisational setup (Knaus 2019).

However, if the reasons behind the overwork, overstress and injuries suffered by the Victorian prisons staff is assessed, it leads to a conclusion that it can very well be a result of outdated training (Cluff 2019). Most prison staff in Victorian prisons are trained in either TAFE or universities before they join the prisons, but that is where the training seems to end. Although, regular retraining is provided,

it seems that the training provided is not as effective as it should be. The reason, why doubts are being raised regarding the level and quality of training provided to the prison officers lies in the fact that not only are accidents and incidents rising but injuries suffered by the prison staff is on the rise too (Greaves 2018). The accidents and incidents are all attributed to mistakes, procedural errors or lack of focus and concentration. These mistakes are also there because the staff are overworked, under stress and less agile and active as they should be. Overall, the impression that can be generated from the rise in incidents in Victorian prisons is that the staff tend to forget after a while that their workplace is different from other workplaces around the nation. The staff at the Victorian prisons are affected by complacency where they mistakenly believe that nothing outward will take place but this is however not the reality. Instead, the lack of ongoing training and regular assessment of the awareness of the staff is the chief reason behind the serious incidents and accidents at the Victorian prisons and there is a need to manage these issues immediately (Greaves 2018). Moreover, the current training and knowledge assessment system must be updated and replaced with LMS which has the ability to assure that not only is the workload, and many functions at the Victorian prisons are automated, but all the staff members are very well aware of the current updates in policy and programs and how they can all stay safe while working in the prison system (IBAC 2016).

However, before any attempts are made to suggest the use of LMS at the Victorian prisons, it will be wise to discuss what LMS is and why is it being suggested as the way forward towards reducing injures and accidents at the Victorian prisons.

1.2.1 LMS and its usefulness in the given case scenario

LMS stands for learning management system and it is mainly an online method of information dissemination, training, evaluation and much more (Rahrouh, Taleb and Mohamed 2018). In other words, LMS is a type of software applications for the administration, documentation, tracking, reporting, automation and delivery of educational courses, training programs, or learning and development programs. Another research by Hronova & Srpova (2019) stated that LMS is a software application which is developed by ICT expert and can be used as training platform. Indeed, an LMS is a highly flexible platform that is not just inclusive but it can be optimised for adequate and timely delivery of lessons and tasks. For example, in a prison environment, the LMS can be used to deliver lesson plans (Kasim and Khalid 2016) that are based on the updates in the law and regulations, and any new and important information related to prisons and security and how to better implement changes.

For example, the single most crucial as well as the worrisome aspect of the working in a prison environment is related to the safety of officers (TGSA 2018). Likewise, the second area that requires change and update is in relation to the workload and case management (Trends 2016). For instance, the LMS can be used to improve the safety of the prison staff and others by helping them be aware of the security updates and any threats through training. Training and awareness are known to be the key to safety in a prison workplace and the LMS can be used to develop weekly tasks that are there to helps staff be aware of the requirements.

For example, it was evident through research that most incidents in prisons which may be leading to staff injuries and accidents are mostly because of a complacent attitude (Naylor 2015). Likewise, staff members do tend to forget that they are working in a prison environment and the situation can go from well to worst in an instant (Colangelo 2020). Therefore, LMS can be used to develop a daily task that reinforces the staff members to know they are working in a prison and it requires them to be fully aware as well consequences of the mistakes as well as risks involved. This task can be a one-minute small task or it can be a two minutes video task or multiple questions based task. However, it can be made compulsory before starting each shift and it can compel the staff to be aware of the dangers involved and how they can keep themselves safe. This task takes cues from the dead man switch and other fail-safe devices that are designed in a manner that the alertness of the operator is cheeked regularly and it adds to safety (Liu and Geertshuis 2016). Therefore, this is one such example where the LMS can directly deal with the staff complacency and their tendency to forget that they can face a serious risk of injury if they always fail to keep themselves alert.

Similarly, the second most common issue found in prisons that are contributing towards workplace accidents and serious injuries in the staff is in relation to workload management (VPH 2015). Staff members in prisons are required to take care of the paperwork and other similar requirements. They may also be asked to develop case reports and case plans for individual prisoners and it can be a resource as well as time-intensive. However, LMS can be again used to help reduce the workload in this area too. For example, templates can be loaded on to the LMS with each task and client requirements already kept in mind. The staff members will have to simply select the case requirements and the general plans available can be downloaded by the officer. They can then select the most suitable plan and edit it if they want more changes. However, such use of LMS can readily reduce the workload (Moonsamy and Govender 2018), the stress on the staff and it can allow them to be more vigilant as well as an alert so that is can avoid any chances of injury or accidents.

Furthermore, LMS can also be used to update the working knowledge of staff members. For example, most prisons do not have an LMS in place, they are mostly using traditional training methods. A traditional training method is paper-based and will require staff members to learn about the cases or updates from a trainer (VPH, 2017). Such a method of learning is not flexible because all the staff must be present there and learn at once. On the other hand, the LMS is flexible and can be used in the desired manner. For example, new updates and tasks related to the prisons can be uploaded to the LMS and it can be in the form of a video or test. All staff members will be given a week or more to go through the material and answer the questions that follow. LMS can allow the staff members to learn as they go along and in a flexible manner (Berking and Gallagher 2016). However, the staff will be judged on their performance and they can seek extra help as and when required. This use of LMS can reduce errors through fulfilling the needs of the staff in prisons and by helping them to learn the way they want.

Furthermore, LMS allows for instant communication and alerts too (O'Sullivan, Krewer and Frankl 2017). For example, LMS can be used to connect with other members of the team and with the supervisors and others. Indeed, LMS can severe as a communicating portal where all the staff members are connected and they can use it to communicate as well as consult with each other. LMS works on both computers and hand-held devices and such a communication can be very useful in an emergency as well as in general learning. For example, staff members can seek help and advice from others and can even connect with the supervisors if they find a task difficult or they need extra help (VPH 2016). Such help can be provided and the staff can be motivated to learn and stay updated. Likewise, keeping the prison environments volatility in mind it is also possible to use the LMS communication system to interact with others an even update them of any possible change in a scenario that can turn deadly. Moreover, such a communication system can ensure that the staff members always remain connected with each other and they do not feel isolated.

Moreover, it is also evident that the staff at the prisons can feel overwhelmed, stressed, anxious, burnt out and strained (VAGO 2018). These all are signs of overwork, overload and lack of support and counselling. However, LMS can be also useful here too as the staff member can readily seek help from counsellors and from others who can help them this regard. The staff members can seek video counselling or face to face counselling if they are feeling exhausted and overworked. Such use of LMS will reduce the anxiety and overwork stress in the staff because they will not have to wait to see a counsellor after work, instead, they can do so right from their phone or computer and it will save a lot many staff members from getting burnt out and leave the field (Watson and Fardinpour 2017).

Likewise, there can be many more benefits for the prison and the associated staff when they use LMS and the benefits are far more than just the improvement in the learning. Indeed, it is very well evident that the users can gain in terms of training, better updates at security training and communication and a chance at better mental health and overall wellbeing (Ilyas, Kadir and Adnan 2017). These aspects can thus help the organisation as well as the staff to maintain a positive workplace where all employees feel safe and secure.

1.2.2 The suggested modules in the proposed LMS and their use

Firstly, it is necessary to understand that the LMS is a flexible modular system and it means that it can be updated and changed in accordance with the requirements of an organisation or the task that is required to be managed (Berking and Gallagher 2016). Indeed, it will be correct to state that the LMS is future-ready as it is a modular system that can allow more modules to be assimilated into the system and it can help the organisation that uses it to gain positive results (Berking and Gallagher 2016). The LMS that is being proposed at present will have the following modules and they can be changed and updated in the manner required.

1.2.3 Content module

The first and the most used module in the LMS is the content module and it is the one where the necessary training material is uploaded by the trainers, and the required documents for intervention plans and other important documents for the organisation will be stored (Imhof, Bergamin, Moser and Holthaus 2018). There are various tools available regarding this module and they are as follows.

1.2.4 Content Development tool

As the content development method suggests this is the tool that is used by the trainers to develop content that is used for training purposes and other exercises (Kabassi et al. 2018). For example, the LMS can use various file formats to develop the contents for users and the developers of content which in most case will be a trainer, they can use the commonly available tools like a laptop to create content that will be useful for training of the staff.

Moreover, the intervention plans, the plans for management of inmates and all other necessary content can be developed using the content development too. Moreover, in case it becomes evident that the trainer is unsure of the ways to develop tools then they can be imparted training to use these tools. Likewise, there can a provision of seeking ready to use content from outside providers. For example, LMS is used in a lot of many organisations and they all may not have content developers on-site.

Therefore, they all may use content that is tailor-made for them. The underlying assertion is that LMS may be new and it may require some training but there is more than adequate support available to ensure that its use is made successful. Likewise, in the case of prisons, development tools will be provided and training too but if required ready to use tailored content will be available and this will help reduce the stress on trainers in the system (Shkoukani 2019).

1.2.5 Content Management tools

Content management tools are also part of this module and they are designed to ensure convenient access, storage, and retrieval of content (Qwaider 2017). It is necessary for an LMS to be successful that the content is available 24 * 7 and from all possible locations. For example, it was discussed in the initial sections that the LMS is a flexible learning portal that allows the users to access it from any place and any time and they can download contents and learn at their own pace. Therefore, the content management tool plays a very crucial role in this respect and it allows the content to be available and accessible by the users after regular authentication and it ensures that the users are not delayed in any manner.

Likewise, the content management tools are encrypted and this ensures that there is no unauthorised access if the system is hacked and if there is any other kind of intrusion of the system. The content is safe and as there are always multiple copies available, therefore the LMS can ensure that no content is lost and all the data is secure and safe (Ilyas, Kadir, and Adnan 2017).

1.2.6 Content Distribution tool

Likewise, this tool allows for the content stored in the system to be distributed in the manner required (Rahrouh, Taleb and Mohamed 2018). For example, the content stored will be encoded and it may be required to be decoded for use, this task is carried out by the content distribution tool that is part of the content module, it also ensures that the content is available through a pre-detrained number of channels to ensure access. For example, in a prison there can be officers who may access the content at a given time, such a scenario requires that the servers have adequate channels available to ensure access. The content distribution tool can also be used to ensure that the content is accessible and available even if the entire staff attempts to access the content at the same time, they will be able to do so (Reid 2019).

1.2.7 Content Collaboration tool

Likewise, it is necessary and crucial that there must be a content collaboration tool that can allow collaboration from different trainers (Sompong, 2018). For example, in all modern setups, online collaboration is available and in LMS it is available too. Such a setup allows trainers and content creators to develop content and discuss it too, thereafter any changes required are carried out and this allows for best outcomes. Moreover, content vetting and content updates can be carried out in this way good. For example, there are different updates regarding the prison laws in Victoria and at times these are regular. However, there may be a need for different authors to contribute to the content that is available for use. Therefore, to ensure the best content creation, as well as its updates this tool, is used and it can allow almost all the content to be remotely updated and this ensures that the content available and all other material is up to date and useful for the users (Naveh and Shelef, 2017).

1.2.8 Content delivery tool

It is necessary that the content that is available on the LMS can be accessed from any kind of device (Imran, Belghis-Zadeh, Chang and Graf, 2016). Generally, it is expected that the prison staff will use the phone as well as tablets to accesses modules on the go and they may use a laptop and desktop to complete the task and other feedback related exercises. Therefore, it is evident that there is a need to ensure that the content can be tailored to the needs and in the correct format that is accessible by those using a selected device. Therefore, this tool ensures that the content is designed to be available on devices in three real-time using the required format that can allow for the best outcome for all concerned. This tool is part of the LMS and is updated and is part of the software but it will cater to the needs of the users and will ensure that LMS is a truly flexible learning platform where the content is available as and web required and on the desired platform (Qwaider, 2017).

1.2.9 Learning module

In any LMS the learning module is one of the most important ones and it is at the heart of the complete system too. For example, the LMS has a dedicated module that ensures that the learners which in this case are officers at the various prisons and detention centres are able to use their knowledge in a practical manner. Furthermore, the LMS and any such method of learning dwell on constructivism as the basic method of learning (Carvajal, Gonzalez, Martinez and Ramirez, 2019). The term constructivism refers to the method of helping learners develop skill as well behaviours effectively. Indeed, the chief methodology that differentiates LMS from any other learning methodology is the focus on the need to help develop new skills amongst the learners and also in helping the learners change their behaviour. Therefore, the LMS can indeed help the staff at various prisons learn not only

new skills but it can also help improve their behaviour effectively. The chief aim why the focus is being laid on the term behaviour change is because the sole reason for developing and implementing LMS is that it can help eliminate the current incidents related to lax behaviour of the officers working in the prisons. The research into this area has highlighted the fact that the current learning techniques as well as methods used to help keep the officers working in prisons informed as well as updated are not effective as ensuring that officers develop a safe behaviour trait. The trait that is required in the given case is alertness at all times and avoiding complacency, as these two have been at the heart of the current issues. Most officers working in prisons tend to lose their focus of the fact that the prisons are one of the most dangerous workplaces to work in and it can directly and detrimentally change in an instant. Moreover, lax attitude of officers towards their safety and that of others is also at the core of the current issue related to incidents in prisons where the officers get injured. Therefore, the sole aim of implementing LMS in prisons is to bring in a sea change in behaviour of the officers and to ensure that incidents in prisons involving prisoners and officers which result in serious injuries to the officers are minimised and eliminated. Moreover, constructivism which is indeed the philosophy on which the LMS is based is found to help in this regard to a significantly large extend (Trofimova 2017).

For example, in the current learning setup the officers do not have to undertake regular exercises or assessment of their knowledge as well as awareness regarding the scenarios they encounter. The current learning setup does not require such regular assessments and at times even if there are regular assessments, they are not designed in a manner that makes the officers aware as well as serious towards the dangers at work. Instead, the workplace is projected as similar to any other and this is one of the factors that contribute towards incidents in prisons. Therefore, the LMS and its emphasis on regular and appropriate testing of the officers in regards to their awakeners regarding security issues in prison event environment will help improve outcomes significantly. Moreover, the tests which can include quiz, assessments and even oral component can ensure that the message is forwarded to the officers that despite the past assurances that prisons are similar to any other workplace, the officers must keep their guard up at all times (Goel 2018). The new training methodology in the proposed LMS will try to avoid sending alarming messages regarding officer safety but it will also not contain any messages that comment that prisons are similar to any other workplace because that is not true. Prisons are and they will remain for the foreseeable future one of the most dangerous work places on the planet because their environment is volatile and can transform at any moment into a scenario which can threaten life as well as limbs of the officers. Therefore, the learning module of the LMS can be used to develop methodologies as well as exercises that are appropriate for ensuring that the prison officers are always aware of the dangers of the prison environment and they do not become complacent.

Moreover, the learning exercises designed for officers will be part of regular assessment and it can thus be effectively used to ensure that the officers remain vigilant and aware of the scenarios at hand (Goel 2018).

Therefore, the learning module of the LMS can be used to bring in the required behavioural changes in the officers at prisons to not lower their guard and to not take the prisons as a stable work environment similar to other workplaces (Goel 2018). Such a behavioural change is not just necessary but it is at the heart of the suggestion that LMS can be used to help bring in a change in officers' behaviour that will reduce their susceptibility to injuries from incidents with prisoners at prisons. This module of the LMS can indeed help bring in the required behavioural change and therefore it can thus reduce the chances of officer morbidity as well as mortality in the prison environment. Such a change is desirable because despite all efforts the current incidents as well as injury rate of the officers working in prisons is increasing and there is a need to find a way to stem the rise in incidents immediately. Lastly only a behavioural change that refocuses the attention of officers on their own safety can reduce the current risks officers take in prison by being lax and taking prison environment for granted, when instead they should never lower their guard.

1.3 Rationale and Justification of the Research

According to the Corrections Victoria, the main aim of Corrections facilities to not just ensure public safety by holding prisoners but it also has the duty to ensure humane treatment of prisoners (Corrections Victoria 2019). Likewise, it is also stated that the Corrections facility officers are also entrusted with the task of developing strategies to rehabilitate prisoners in their custody. Moreover, it is also part of the correction officers' role to tackle the underlying causes of crime so that it can lead to a reduced chance of reoffending of the inmates. Likewise, there are other requirements too like the need to manage prison facilities so that they are operated in the most efficient manner possible and much more. Furthermore, there is also a need for prison officers to be well versed in case management so that they can manage inmates better and ensure that they do not get violent and hurt themselves to be a threat to others (Corrections Victoria 2019).

However, it is evident that the current increase in violence in the Victorian prisons hint at a lack of training and updating of the correction officers regarding the ways to manage inmates and to ensure that there is no threat to the staff or the inmates too. For example, in the recent report published by Corrections industry standards Australia (Minton 2018), it was stated that there are multiple threats faced by the staff members of the correctional facilities and the most serious one of them is staff

shortage. Victorian prisons and prisons across the nation face a staff crunch that is leading to overwork, staff stress and errors. Furthermore, staff members face serious issues about training too (Minton 2018).

For instance, according to Minton (2018) around 61.23 % of all staff members are having a certificate 3 or 4 while around 18.9 % have a diploma or an advanced diploma. However, none of them is trained in all aspects of prison operations and such as lack of training affects their ability to discharge their duties adequately (2018, pp. 5-6). Corrections staff need training regarding rehabilitation services, relationship management skills and constant monitoring of prison and its inmates. The current training system is unable to help the corrections officers in this regard and therefore there is a need to have a better training system in place. Similarly, it is also evident that modern prisons are using technologies that are designed to track inmates and to carry out general duties related to security, inmate rehabilitation and more. These new technologies that are in use require more training and it is evident that the current staff of corrections facilitates has limited training in this regard and such a lack of training again raises the need to have a learning management system in place that can help improve the outcomes for all concerned (Minton 2018).

1.3.1 How an LMS can improve the current culture in Victorian prisons for women corrections officers

It is very well evident from research that the prison system is complex and at times prisons can be a very dangerous workplace with fatal consequences if necessary, precautions are not taken (Smith and Palin 2019). However, when it comes to female corrections officers, the potential for harassment, physical harm, sexual harassment and injuries increases manifolds (Boseley 2019). Women corrections officers are part of the Victorian prisons corrections teams but they are more at risk as compared to male officers and they indeed suffer the most too. For example, there are around 943 female correctional officers in Victoria which account for around 31 % of the total correctional officer's workforce (Boseley 2019). However, as the number of female prisoners is on the rise and they are increasingly getting violent and more aggressive, the female corrections officers are increasingly facing issues they are not trained for. For instance, female prisoners may be in prison because of many reasons and they may seek help from corrections officers about coping with the stress of the prison confinement. Likewise, female corrections officers may be required to develop plans to help the prisoners sort out their issues and be ready for their release. These tasks can place an extra burden on the corrections officers and as there is limited training, and female officers may feel extra stress. At the same time, women officers when deputed in male prisons face the threats of not only

physical injuries but there is also evidence of sexual harassment and much more. The training imparted to these female officers is not helpful in ensuring their safety and the increase in incidents of abuse of female corrections officers is proof that the current training mechanism is not adequate. However, if an LMS is in place it can be used to impart the required training to the officers so that they can adjust to the changing as well as the stressful requirement of the prisons (Cluff 2019a).

Likewise, female corrections officers are more prone to leaving their jobs in the prison system as they may not get the required emotional support and counselling (Cluff 2019). Indeed, there is a significant amount of evidence that states that female corrections officers are more inclined to leave their jobs because they may be unable to manage the stress they face in their jobs. Likewise, the current system that is in place to help support female prison officers regarding regard to their mental health and wellbeing are not effective (Cluff 2019). Therefore, if an LMS is implemented it can not only help update the training provided to the staff but it can be updated to provide counselling and emotional support to the corrections officers too and this can help reduce the current number of burnouts and stress faced by the female corrections officers.

1.4 Researcher Perspective

As discussed in the previous part, this current research serves as a systematic attempt to unravel the barriers and current conditions that might have influenced the usability of online training in Prison. Identifying the barriers to the usability of LMS in this research is included because such identification will permit the study to do further investigation about online training using LMS within different sectors. The current conditions are included in order to find out how LMS adoption has been impacted by usability factors. This research based investigation is a contribution in the corporate sector, which could provide a further contribution to the literature about online training using LMS. This study is worth Masters by research because of its focus on four usability factors – effectiveness, learnability, flexibility and acceptability and prepares the model which accommodate the above factors through users' feedback.

1.5 Aims and Objectives

As the researcher is a current employee of the organisation, found some gaps during online training which has been addressed to avoid the potential risks of the employees. There is no literature found which address the usability of LMS in a Victorian Prison so the primary aim of this study is to investigate the usability of LMS. Data has been gathered using semi-structured interviews and focus groups; then it analysed through the Applied Thematic analysis method using NVIVO 11 software.

This research informs users and trainers using prison as a case study where the main aim is to:

Explore the usability of an LMS.

A review of the existing literature has observed and found that not much apparent structured and comprehensive study about corporate LMS in Victorian Prison. Hence, this gap requires a systematic exploration.

These two objectives help to achieve the primary aim:

- Examine the factors that support effectiveness and learnability of LMS in a Victorian prison.
- Identify the users' perception of flexibility and acceptability of LMS.

1.6 Research Question

An adequately investigated and framed research question directs a research program. A researcher can develop research questions from their theoretical knowledge, previous research in a similar area, knowledge obtained from the literature, personal experience, and practical requirements at the workplace (Creswell 2013). The review of literature and gap identification has helped in setting the following research questions for the proposed study.

- *What does the LMS in a Victorian prison provide to facilitate more effective online training for users?*
- *What features of the LMS assist users to improve learnability?*
- *What are the factors that would provide flexibility to the LMS at Victorian prison?*
- *What promotes the acceptability of the LMS?*

These research questions are concerned with the generation of necessary data related to the usability of LMS. The users (administrators, correctional officers and managers) at LMS are the actual sources of information. The learners are better aware of the effectiveness, the potential of learning, efficiency and flexibility of the LMS. The executive and operational staff can be another option to answer the research questions. The essential data about this research program can be generated from these three vital sources.

1.7 Research Settings

According to Correction Victoria, there are 11 public prisons and three privately operated prison and one transition centre in Victoria which are holding approximately 8,101 inmates according to Correction Victoria states. The below map shows the location of all the Prisons in Victoria.

This Victorian Prison established in late 2017. The organisation's primary role is to deliver better corrections, and in doing so, help create a safer community. This research-based on a Victorian Prison purely focused on a convenience sample that has a diverse employee population of approximately 500 staff located at Victoria. Name of the organisation has been withheld for confidentiality reasons.

The convenience sample is elected because of the satisfaction of two basic criteria from an analytical point of view- target population and accessible population (Etikan et al., 2016). In addition to that, Convenience Sampling is easy, affordable and the data are readily available for the researcher.

The organisation is insured through the external insurance company and follows safety guidelines and aims to maintain a healthy work environment for employees, contractors and visitors alike and to ensure that the organisation has used off-the-shelf LMS to deliver training programs to those who work or visit the organisation’s premises and have implemented a safe working culture through the anonymous program.

Figure 1: Location map for Victorian Prisons

(Sources adapted from Correction Victoria)

The main aim of these training programs to guide users, so they are aware of potential risks for them to eliminate the risk of injury. The organisation has agreed to participate in the research, to explore the usability of LMS in improving the interaction with the users. The approval has been obtained in writing before conducting the research which has been presented in Appendix D. The outcome has been discussed with the executives which will be provided in the form of a report to the organisation with recommendations.

1.8 Methodology Overview

Design Science Research (DSR) methodology has been selected as the research method for this study. To achieve the aim of this research, data will be collected from the prison staff regarding their current training issues and providing them information regarding the ways in which the LMS can be useful. Thus, the process involves seeking information from the staff and then analysing the statements to understand the requirements and how can the LMS be used to manage these requirements.

To gain statements from the officers the qualitative research approach will be used as this type of research allows for data to be collected in the form of statements and then they can be assessed to arrive at the conclusion (Jamshed 2014).

For example, to conduct this research, permission sought from the department to interview prison officers regarding their training and the areas that are leading to the issues and injuries amongst the staff. Once the permission is attained, an online request forwarded to all prison officers to participate in this research. From the pool of office who are willing to participate in this research a random sample of around 10 officers has been selected to be interviewed (Robinson 2014). The interview is a one to one interview as it is designed to get detailed information from the officers regarding the areas that are leading to the most number of incidents or accidents involving prisoners in the system. The interview uses open-ended questions so that detailed answers can be sought (Singer and Couper 2017). Likewise, once the data is collected, it is coded using the coding process (Elliott 2018) to find out the themes that may emerge from the statements of the officers. The process of thematic analysis and coding is integral to qualitative research as they can help in understanding the issues and the themes that may present (Vaismoradi and Snelgrove 2019). For example, in this case, it is very well evident from research that the current training of the corrections staff is lagging in many areas. The evidence that supports this assertion is the increase in the number of incidents and accidents involving prisoners in the Victorian prison system. The number of injuries, assaults and harassments suffered by prison's staff at the hand of the prisoners is increasing and this is a sign that the current training is lagging. Likewise, it has also been discussed that the women or female staff, members are more likely to be the victims of abuse, sexual harassment and they are more like to leave their jobs because they are at times unable to cope with the stress. Likewise, there is hardly any robust mechanism in place regarding stress management and training for the staff. The current training is inadequate and there is, therefore, a need to find out from the prison officers the state of affairs and how can this scenario be improved. Lastly, it is also evident from the above research that there are special needs prisoners in the prisons like the Aboriginals, past drug users, clients with mental health issues and at times cognitive impairment. These prisoners are special needs prisoners because they may have requirements that are different from other prisoners (HRW 2018). However, managing such prisoners by developing management plans for them and taking care of them can be a stressful task for the prison staffers who may not be fully trained in this regard. However, as a result, of such stress, the prison staffers may suffer from anxiety and they may make mistakes due to stress and such mistakes can cost dear. Therefore, it is necessary to find out from the prison staffers the issues they are facing in managing prisoners and how can they be regularly trained to manage the prisoners and even provide help and counselling for them to manage the stresses and strains they may face.

Therefore, it is necessary to conduct interviews with the staff members to understand the areas that need improvements and how can efforts be in place to improve the outcomes for all concerned.

1.9 Research Stages

Stage One: The Ethical clearance has been obtained from Victoria University (Human Research Ethics Committee) before proceeding for data collection which has been presented in Appendix E. After getting ethical clearance, the researcher arranged final access to the Victorian Prison. This stage aims to prepare for data collection. In this stage, volunteers were selected for the focus groups and interviews. The data collection schedule was planned according to the volunteers' convenience.

Stage Two: In this stage, focus groups were conducted followed by interviews. Focus groups involved 7 users in one group and run 2 groups. Semi-structured interviews were planned with 9 users including managers and non-managers.

Stage Three: This stage was for data analysis which adopted the Thematic Analysis approach using NVIVO 11 software.

Stage Four: In this stage, findings and results were derived from the previous three stages and the thesis have been written. This stage also helped to show the research contribution to the research committee.

The four research stage activity figure is presented below:

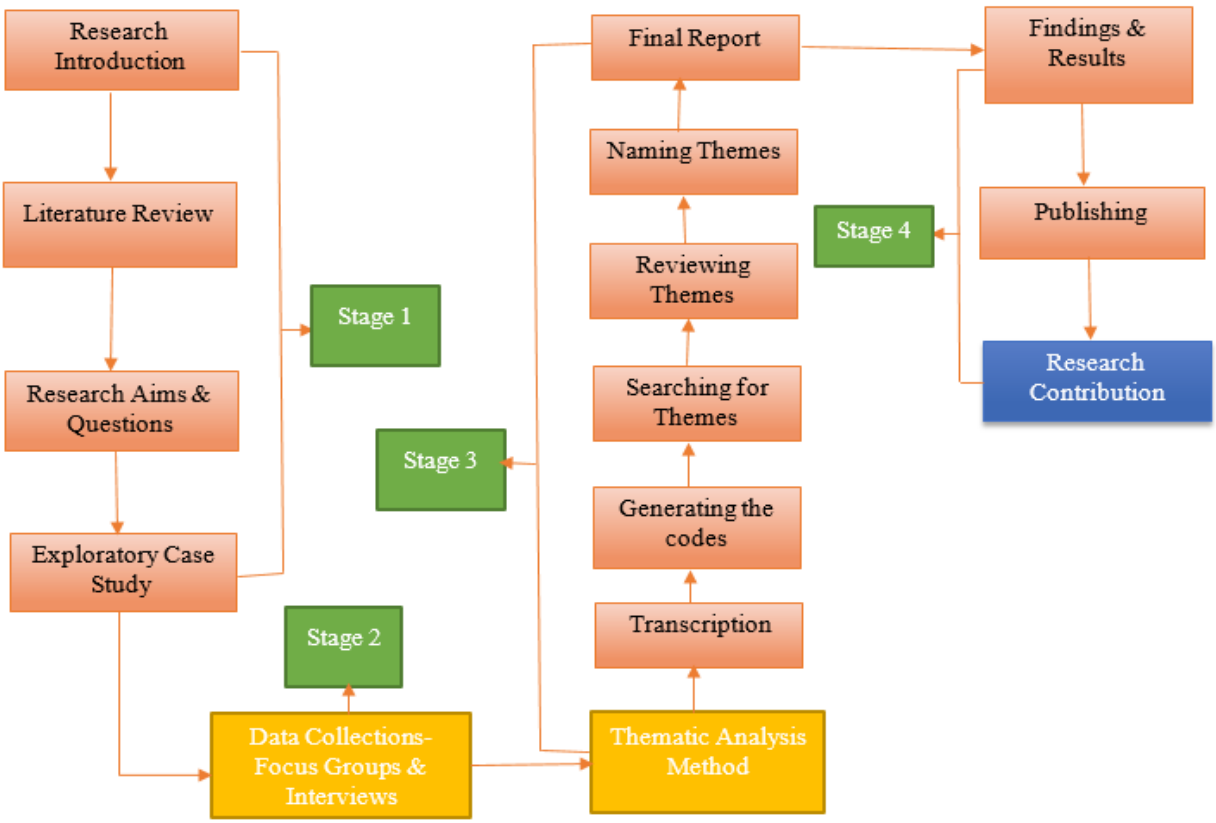

Figure 2: Research stages Activities

(Researcher's construction)

1.10 Significance of the Research

Many studies have been carried out on learning management systems in the past few years (Adzharuddin and Ling, 2013; Coates, James, and Baldwin, 2005; Awang and Darus, 2012; Avgeriou, Papasalouros and Retalis, 2003). The study by Kimiloglu et al. (2017) explained that LMS adoption consists of many elements such as cost-effectiveness, functionality, customisability, and maintainability. The authors found that online training is a flexible and efficient way to develop employees' skills and knowledge. Whereas Lin et al. (2018) examined the correlation between the employees' perceptions and job characteristics, self-regulated learning and attitude towards web-based continuing learning. The research analysed of 203 employees' response on three questionnaires which revealed that employees' anxiety regarding web-based continuing learning has a direct influence on their decisions. However, prior studies have mainly examined learning management systems in the education sector which can not apply to Victorian Prison due to the distinction between users' need.

In this research, the current deployed LMS man has many gaps which are addressed to prevent the risk of injuries of the employees by examining the usability factors of LMS of Victorian Prison. Many research on LMS has been conducted in the past but unable to find any research which addresses the LMS issues in the Prison context. The research also demonstrates an understanding of LMS capabilities by examining, explaining and defining features of an LMS.

The four factors of usability - effectiveness, learnability, flexibility, and acceptability are evaluated through the users' perspective. This additional field of research is to enable a more accurate reflection of the usability of LMS. The contribution to the knowledge of this research provides a theoretical and practical contribution to the usability of LMS in a Victorian prison.

Another significance of this research is conducting the meeting with the employees and understanding the LMS typology from the employees point of view and provide a report to the organisation with recommendations. This research has designed an ideal model as an output of the research. Basically, the research contributed to a theoretical enhancement ability of the current level on the existing literature on LMS usability which achieved by designing the research model. In terms of research practical contribution, the finding of the study is to aid the use of LMS in a Victorian prison.

The study is also significant to future researchers pursuing similar topic focusing on different sectors or organisations. Further, the study’s significance is seen to attempt to bridge the gap in knowledge and research on LMS practice and actual use of online training within one particular Victorian prison, which can be extended to other prisons using different LMS to train their employees.

1.11 Structure of the Thesis

The below framework of this dissertation depicts the research process followed in this study:

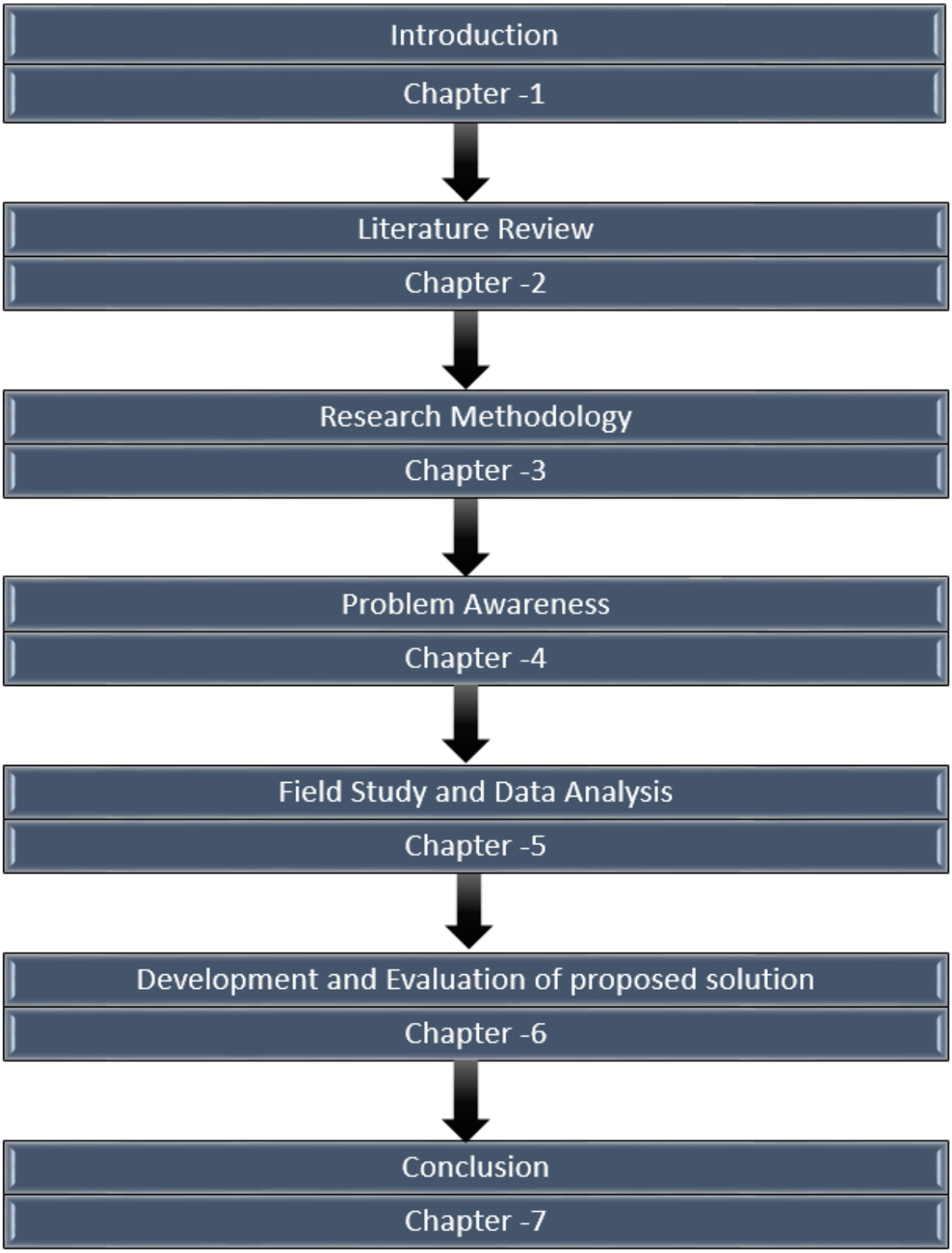

Figure 3: Dissertation Structure

(Researcher's construction)

Chapter 1 – Introduction

This chapter provides an overview along with the discussion of the background to the research problem; rationale and justification of the research; researcher perspective; aims and objectives; research questions; research settings; research stages and significance of the research.

Chapter 2 – Literature Review

The second chapter contains a general review of the extant literature on the research topic which correlates with the diverse attitude of learning management system. This chapter presents the definition of 'learning management systems' by various authors and how LMS connected with Usability and also provide Technology acceptance model to view the employees' acceptance of using the technology. The purpose is to establish an understanding of the concept. This chapter also provides an insight into Workplace learning and how Victorian Prisons are lacking to train their employees.

Chapter 3 – Research Methodology

This chapter explains the design science research methodology and explained how it justifies the philosophical world overview. This includes the descriptions of the philosophical bases of DSR, the activities and artefacts and DSR. This chapter explains the comparison of different design science research models and provides a brief about selecting Hevner 2007 DSR model. It also provides a brief description of DSR seven guidelines, eleven steps road map and three-cycle process- Relevance, Design and Rigor cycle. It also explores Data collection instruments and methods which includes Round A, B & C data analysis process. The systematic review will be discussed in detail along with data reliability and validity and then ethical consideration.

Chapter 4 – Problem awareness

This chapter establishes the awareness of the problems. The deeper insights will be provided concerning usability and learning management system in the context of the workplace as presented in the Systematic review of the literature. The systematic review consists of Usability& LMS, LMS adoption, Barriers & Problems of LMS and then discussion and conclusion.

Chapter 5 – Field Study and Data Analysis

The results of the interview are presented in this chapter. The PDCA cycle will be discussed. The purpose is to directly answer the research questions identified in Chapter 1. The Thematic analysis process will be discussed in detail including the creation of the theme.

Chapter 6 – Development and Evaluation

This chapter demonstrates how the development of the conceptual solution took place. It presents the finding from the data analysis process and how it will align with the Intended outcomes. This chapters will present the solution proposed by the study to solve the identified problem area. Moreover, the Learning Model will be created and explained as a conceptual solution.

Chapter 7 – Conclusion

This chapter provides a conclusion based on the analysis, as well as the recommendations for future research. The Dissertation is reviewed and all relevant information such as theoretical contribution, implication & limitation will be presented. The concluding remarks will be explained of how Correction Victoria should take further steps to ensure staff safety.

1.12 Chapter summary

The Introduction chapter describes the background of the research problem, justification of this research as well as aim and objectives of the study and articulates the research questions: What does the LMS in a Victorian prison provide to facilitate more effective online training for users? What features of the LMS assist users to improve learnability? What are the factors that would provide flexibility to the LMS at Victorian prison? What promotes the acceptability of the LMS? The four-research question parted into sub-questions into research data collection. The hunt for this research is to identify the usability factors from the users' perceptive. In order to answer the research questions, the four usability factors have been explored and research model is created using the new framework. This research is a single case study approach, with participants being Prison's employees at a Victorian Prison.

Chapter 2. Review of Literature

2.1 Introduction

The literature review chapter discusses and reviews the issues and problems discussed in Chapter 1, which defines Learning Management System, Usability and Technology Acceptance Model were combined to review the existing literature as well as provide justification of using the current research. The workplace learning has been explored which defines the current issues in Training within Prison context.

2.2 Define Learning Management System

According to Pankaja (2015), Learning Management Systems (LMSs) began to evolve in the 1960s after the first system was developed at the University of Illinois, Urbana Champaign; new features were developed that enabled different users to interact with each other, so students could complete course materials, and assessors could mark them online. In 1983, the Massachusetts Institute of Technology (MIT) announced Project Athena, a five-year initiative to explore the innovative use of computers for teaching. In 2002 an open-source Internet network called LMS Moodle was released; in 2008, Eucalyptus was released as the first open-source, AWS API-compatible platform for deploying private clouds, and in 2012, a modern LMS system was hosted in the cloud, freeing companies from the burden of installing and maintaining 'in-house systems'.

Figure 4: LMS Features

(Researcher's construction)

LMS has a well-defined way to plan, implement, and assess specific training packages (Ellis 2009). In recent years, online training is becoming more important, whether for education or workplace skill-based learning. This contemporary way of delivering training not only eliminates having to access learning material, but it also increases interaction between trainer and trainee. LMS enables training material to be delivered via the internet and intranet, so employees can gain the knowledge and skills needed to perform their work tasks from anywhere and at any time. To enhance the usage of LMS for employee training, usability must be explored, but this aspect is generally ignored. Usability is the extent to which a system can be used by specified users to achieve specified goals effectively, efficiently, and satisfactorily in a specified context (Karat 1997), and if the e-learning systems have poor usability, users can spend more time learning the system itself rather than learning the content it delivers (Wong 2003).

An LMS is a software application for the administration, documentation, tracking, reporting and delivery of electronic education courses or training programs (Ellis, 2009). The focus of LMS is to deliver online training to employees while managing and keeping track of their progress and performance across all types of training activities in the organisation.

Job satisfaction can be determined by increasing employee's level of motivation, and while there are numerous ways, efficient and effective training programs are vital because they increase skills and help them acquire new knowledge. Employee training can be carried out off-site or on-site, which is why LMS technologies are useful. For example, HP allows regional trainers in different countries around the world to select the best delivery modes for training while emphasising its motto "one size does not fit all" (Derouin, Fritzsche, & Salas 2005). Corporate sector managers visualise LMS as an essential way to deliver the training needs of their employees, which is why various organisations around the world are looking to embrace LMS to provide training. Australia's growing focus on LMS in Victorian Prison has resulted in an increasing diversity of online training due to compliance, regulation and record-keeping (Kahlon 2018). The online training for users is becoming a necessity of the organisations in order to keep them abreast of all the changes and LMS is an effective way of training the corporates, using specific training modules. LMS is a web-based application that allows organisations to deliver content or resources to their users, which can be utilised or changed according to the needs of the organisation.

With these ongoing developments in LMS, it has become essential to explore and analyse the usability of LMS within the outline of corporate organisations (Shahid and Abbasi 2014). Various researchers have studied LMS in the past few years. Adzharuddin and Ling (2013) and Coates, James and Baldwin

(2005) explained learning management systems in educational environments, whereas Awang and Darus (2012) evaluated an open-source learning management system and Avgeriou, Papasalouros and Retalis (2003) discussed the design of learning management systems. Numerous researchers have examined the learning management system within the domain of education; they have not examined the usability factors of LMS of Victorian Prison. Therefore, this study will focus on the usability of LMS within the corporate domain and also attempt to bridge the gap by defining the four usability factors- effectiveness, learnability, flexibility, and acceptability.

LMS is essential to providing the highest quality and most efficient training to users and make them aware of compliance and skill developments. To implement and adopt LMS, an organisation requires planning and preparation which proved with this medical college research by encouraging staff to implement electronic LMS (e-LMS). The researchers have found the necessity to implement an e-LMS to consolidate external electronic educational resources, host internal electronic education resources and provide a space for developing new online learning content (Mahoney et al. 2016). With the help of 12 interviews to determine the features, this research examined about four LMSs and found the solution which has all the desired function to improve the teaching methods. On a similar note, Maina and Nzuki (2015), have studied LMS in higher educational institutions and various universities in Kenya. Six hundred lecturers, administrators, technical staff, and students were surveyed to know the reasons for the adoption determinants of LMS in these institutions. The determinants influencing behavioural intention to adopt e-learning are performance expectancy, effort expectancy, social influence and facilitating conditions. The five-point Likert scale has been used to assess various statements describing determinants above. Users find LMS as a tool to accomplish tasks more swiftly, enhanced their efficiencies and reduced their study load. However, the determinants of the adoption of LMS in Australian Universities as per Coates, James and Baldwin (2005) were educational, administrative, and technological issues. The survey has shown that almost 70% of the institutions in Australia, the United Kingdom, and Canada hold the license for either WebCT or Blackboard LMS, whereas De Bra et al. (2013) has studied Generic Responsive Adaptive Personalized Learning Environment, and Chen, Germain, and Rorissa (2011) used LMS, as a learning software in various educational institutions in the Netherland. According to Kasim and Khalid (2016), discussed a number of potential LMS that can be utilised for teaching and learning processes in the context of Higher Education Institutions.

Expertus and Training Company (2010) has surveyed 144 corporate and government professionals to understand the current and future state of LMS. The survey was designed primarily to understand how learning professionals would grade their LMS, top challenges associated with their LMS, features, and

functionalities are most critical to include in future LMSs. This survey covered 22 industries where the maximum share was 19% from Technological industry. The majority got A or B grade for their LMS, but the author has stressed the requirement of personalised learning plans, enterprise applications, informal and social learning integration, certification features. Webanywhere (2015); a popular website has conducted a survey worldwide on increasing usage of LMS for various purposes. The website has shown that India (55%) as the maximum share in the early adoption of e-learning followed by China (52%), Malaysia (41%) and Romania (38%). The usage of LMS from mobile devices has risen to 47% of total users in 2013 as compared to 36% in 2010. The study has concluded that to make plans for the future of LMS is to understand the present.

The users can access training from anywhere and at any time which improves the flexibility to adapt the training. Hamdan (2014), stated that the students' engagement in online learning helps them to develop greater planning and skills such as time-management and self-discipline at Saudi Arabia University and also showed how LMS could become an online tool to connect with professors and other students. Likewise, Boticario and Santos (2006), discussed issues in developing adaptive learning management systems. They concluded that any adaptive LMS should be capable enough to adjust evolving users' needs and preferences, adjustable to repetitive processes, offering interactive assistance tools and qualitative features related to service at hand. Maina and Nzuki (2015), explained the adoption of an LMS in higher educational institutions and various universities in Kenya with the help of a survey and concluded that the user's perceived e-learning management system to be extremely useful. Users find LMS as a tool to accomplish tasks more swiftly, enhance their efficiencies and reduced their study load. Matthee, Henneke and Johnson (2014) described the lack of adoption of e-learning in the mining industry using Activity Theory, by dividing the users into two groups and used interview data collection techniques, found the best adopting factors of e-learning.

LMS adoption is not just about users' satisfaction, and it should not neglect the trainer's satisfaction towards LMS. Paulsen (2003), discussed the experiences with LMS in 113 European Institutions across 17 European countries using surveys. The author concluded that respondents expressed satisfaction with their self-developed local systems. Such systems remove exact problems; complexity involved and are very cost-effective. In case of training institutions, those usually provide short, repeated courses in several versions requires quick administration and flexibility which are readily available in local LMS. Sejzi and Arisa (2013), have identified the growing popularity of learning management system (LMS) and Learning Content Management System (LCMS) at Virtual University in Malaysia. The authors have concluded that the scarce resources are competing for LMS and LCMS

enterprise applications. However, they have suggested that the needs should be identified at the very first instance and then invest upon these applications.

LMS offers a centralised source of training and the progress of the users can be tracked, recorded and reviewed at any time. The study by Watson and Watson (2007), has explained LMS and its significance in imparting computer-aided education to its users. These LMSs can generate customised training modules as per the requirement of the organisation. These LMS can integrate software applications to human resources, managing users' registration and their profiles, set training curriculum, assigning trainers, preparing schedules for various learning activities and awarding certificates. They stressed the optimum use of technology in imparting skills and recommended to identify more features of LMS for future research. Kekwaletswe and Kader (2012), have conducted their survey on SABA LMS used by Eleckom, a power generating company in South Africa. This software application has the potential to transfer expertise and knowledge. Workers also get offline material to have a better understanding of the online learning process. Thuseethan, Achchuthan, and Kuhanesan (2014) examined the usage evaluation as an integral approach to assess the efficiency of any e-Learning system in Sri Lankan Universities. They used two approaches to evaluate the usability of LMS. In the first approach, more than two hundred students from seven different universities with advanced computer proficiencies were surveyed using two standard questionnaires. The second approach involved the testing on the usability of the LMS using Shackel and Richardson (1991), four factors such as effectiveness, learnability, flexibility, and acceptability regarding cost and satisfaction. The authors concluded that LMS is preferred by the respondents and should be maintained as per HCI standards. Whereas, Back et al. (2016) concluded that instructors should put more effort into the provision of fact-oriented contents rather than the design of training modules.

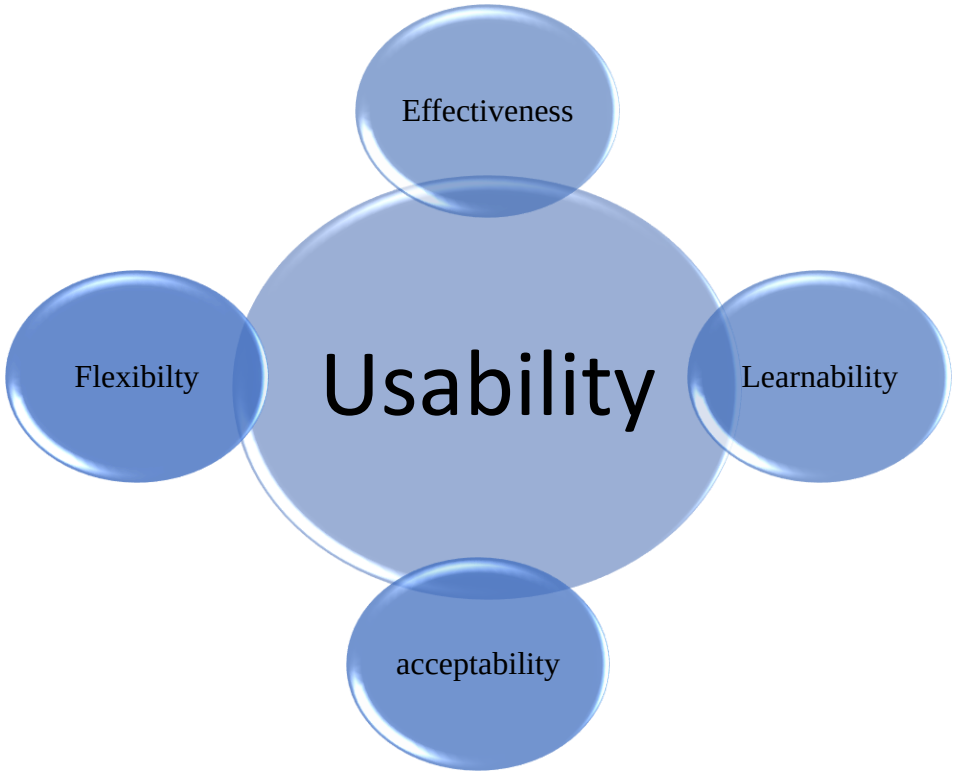

Figure 5: Usability attributes

(Researcher's construction)

The aim of this study is to explore the usability of LMS in a Victorian Prison. The term usability here refers to the effectiveness, efficiency, ease and satisfaction to the users and helping them to achieve certain pre-determined objectives. A particular LMS has the potential to prove itself on these parameters, is required a comprehensive evaluation through various methods. These usability measurement methods are difficult to apply and their evaluation differs and totally depends upon the expertise of the evaluators. Lin, Choong and Salvendy (1997, p. 270) have identified eight human factors pertinent to human-computer interaction (HCI) in an organization: compatibility, consistency, flexibility, learn-ability, minimal action, minimal memory load, perceptual limitation, and user guidance.

Lin, Choong and Salvendy 1997 defined that *"Well-designed computer software should be easy to learn. Humans can learn through several formats such as rote learning, learning through understanding, or learning by exploration. The learning process will be enhanced and the result will be retained if users are presented with a well-designed, well-organized interface."* (1997, p. 271). A proper usability evaluation of LMS will enhance the usefulness and effectiveness of learning management. The usability of any learning management system lies in its effectiveness, efficiency,

learnability, flexibility, acceptability, competence, ease and satisfaction with which particular users achieve specified objectives in a particular environment. (Shackel 2009) has viewed that a system is said to be quite usable if it has the potential to achieve effectiveness, learnability, flexibility and acceptability in terms of cost and contentment.

However useful content and resources supplementing supportive and congenial environment are significant interactive factors of human with computers (Chen 2011, p. 32). Usability plays a crucial role in the achievement of online training programs because of the remote nature of LMS. The users spend more time to learn the system rather than the training content if the LMS is not usable enough (Wong et al. 2003). According to research done on the usability of e-learning at the University of Sargodha Women Campus Pakistan, right user interface always accomplished excellent user fulfilment level (Shahid and Abbasi 2014). The authors compared with Nielsen ten heuristics technique and concluded that the e-learning success has three primary features- efficiency, effectiveness and user satisfaction. Al-Khalifa (2010), stated*, "Usability as an element of Human-Computer Interaction (HCI)"* (2010, p. 1) and measured usability as a convenience with which a user can learn to perform, prepare inputs for, and interpret outputs of a system. Many reasons impact negatively on online training, including fear of technology, the confusing content of online training and lack of support (Nisar 2002).

Likewise, Usability is a related but complementary concept that defines the quality of the interaction between people and systems (van Kuijk, van Driel and van Eijk 2015). In this study, the idea of usability was explored to describe the quality of human interaction and experience, by comparing four multi-national markets with the help of 19 interviews. The study concluded that usability and user-centered design are two factors that influence the product-market company target. On a similar note, usability is a way that integrates various aspects of digital systems and allows us to characterise the quality of their design from the perspective of the user's experience (Medina-Flores & Morales-Gamboa 2015). This research designed an instrument to evaluate the usability factors and performed the usability test on the development of in-house built LMS called Meta-campus.

Shackel (2009), focused on improving the usability of HCI and viewed a system to be used if it can achieve effectiveness, learnability, flexibility, and acceptability regarding cost and users' satisfaction. The author stated *that "the capability in human functional terms to be used easily and effectively by the specified range of users, given specified training and user support, to fulfil the specified range of tasks"* (2009, p. 340) and concluded that a skilfully designed interface provided a gateway and served its users as per their expectations. Chen, Germain, and Rorissa (2011), further defined usability in

terms of, *"a system has visible working functionality familiar to its users, maximum readability, and useful content that is supported by its environment and aligned with the context of use"* (2011, p. 621). The authors have found 11 attributes of usability through content analysis by the Association of Research Libraries professionals, and the top three attributes were: User Characteristics, Effectiveness, and Learnability. Another definition of LMS usability produced by Althobaiti and Mayhew (2016) was, *"usability is a measure of more than simple ease of use; it refers to consumers' subjective experiences upon using an application"* (2016, p. 10). The authors have evaluated specific factors of usability included motivation to learn, which helped to determine the strength and the weakness of the users related to the usability of Jusur LMS, used in Saudi Arabia using a survey of 808 users.

The area of LMS implementation has been studied through researchers from unique communities. LMS researchers look the how and why some LMS works better and others fail. Associated within the topic is the study of permitting factors in the implementation of new technology, represented by communities that use in TOE (Technology-Organisation-Environment) Framework. It is also essential that the researchers who examine an individual's acceptance of new information technology, creating psychological concepts like technology acceptance models.

Many research emphasised LMS implementation problem which included lack of needed ICT skills, lack of support and lack of training provided by higher education (Elameer and Idrus, 2010b; Oye et al., 2011; Al-Mushasha, 2013; Bousbahi and Alrazgan, 2015). On the other side, some research explained LMS acceptance due to staff's limited experience, lack of usefulness and lack of enthusiasm (Al-Mushasha, 2013; Bousbahi and Alrazgan, 2015). The data collection process involves the technology acceptance model to find the employees' acceptance level for using the technologies within Prison. Elameer and Idrus (2010b) confirmed that human resource faces many problems for adopting e-learning in the higher education sector in Iraq such as lack of information and communication technology (ICT) abilities or infrastructure. However, the e-learning technique is regarded as a prospective manner to teach and learn in addition to a learning solution for all higher education troubles in Iraq. The study employed a modified Khan's learning framework for higher learning inside the country. Whereas Oye et al. (2011) found through the research that performance expectancy serves as having the most impact among the constructs on respondents' acceptance and use of new technology. On the other hand, Al-Mushasha (2013) identified that the university support, computer self-efficacy, perceived usefulness and ease of use analyse the acceptance of e-learning in the higher education sector. The study involved 224 students' survey responses to examine how student's intention to adopt e-learning can be designed.

The implementation, of the LMS as well as training of employees in the Victorian prisons, can face one more issue and that is related to the age as well as existing training of the employees. For example, it is expected that Victorian prisons will have officers ranging from quite young to mature ones and there is a high probability that some of them may have never used LMS or any similar software and, it may be difficult to train these employees (Guiney 2015). Likewise, with age the ability of the learners to learn decrease and the mature as well as aged officers may require extra time to be aware of the LMS, its uses and how can it be used in day to day operation. Such diversity in learning time may require the managers to be extra patient and be aware of the diverse needs of the staff. Moreover, to overcome this issue it may be necessary to extend training time, change the training plan and so on (Guiney 2015). Therefore, there can be a need to change the way the training is planned and implemented in accordance with the needs of the users.

2.2.1 Issues with LMS implementation and how to overcome them

The plan to implement LMS in Victorian prisons is a fairly big undertaking and its success is going to be contingent on the ways in which the training and other updates regarding policies are provided to the officers. However, it must be kept in mind that the officers are using the current methods since a long time and if they are prompted to shift suddenly to the new LMS it might lead to a resistance to change.

Resistance to change: The resistance to change is one of the most serious issues that a revolutionary change like the LMS implementation can face. The resistance to change is a natural response of employees and others who are going to be part of the change (Serban and Iorga 2016). For example, all humans have a natural tendency to resist change if it deviates from the old ways and if it requires training and updating operations. In the case of LMS these all attributes are there because it is a revolutionary change that will alter the ways in which current training and policy updates are provided to the employees. Therefore, the employee can resist change and in case they do so implementation of the LMS can be affected.

For example, resistance can be in the form of not taking interest in the LMS or not learning how to use it purposefully (Zhang 2019). Likewise, it may also be evident in the form of negative feedback regarding the LMS and so on. On the other hand, overt resistance can be in the form of open disapproval, refusal to use the LMS, not showing up for training and all other ways in which employees can convey to the managers that they are not interested in the LMS. These signs should not be ignored,

as ignoring them can lead to far bigger issues. However, there are ways to manage the issue of resistance to change and it is a follow.

Overcoming resistance to change: it is natural for employees to resist change but there are ways in which the issue can be reduced and eliminated. The First method is by informing the employees about the change, its importance, its benefits and how it will benefit the employees (Ragab 2018). For example, in this case, the LMS can be projected as a way to reduce injuries and accidents that take place in prisons by regularly updating officers regarding ways to reduce accidents. Likewise, LMS can reduce workload and errors associated with overwork. Likewise, it can update officers regarding new policies and procedures very easily and this can transform the whole system.

Likewise, apart from informing employees, they must be given a chance to give feedback and seek more information. For example, employees may have questions and these questions must be answered respectfully (UWA 2017). In case these questions or queries go on unanswered it can lead to negative outcomes and it may contribute to employee resistance. Therefore, managers must be diligent and devoted towards employee requirements and all queries regarding the change must be answered in as detail a possible and as many time as required. Patience is the key to success and any signs of impatience in mangers or supervisors regarding employee queries will be recipe for disaster and attempts must be there to be as patient as possible in answering queries (UWA 2017). Therefore, these are the ways in which the employee resistance to change can be managed. However, there can be one more issue and that is related to the IT/IS literacy and acceptability to learn which will be discussed in the next section.

2.2.2 Technology acceptance model - The significances of LMS in Victorian Prison are based on the usability of online training among the employees and the necessity to discuss it. If the employees are not willing towards accepting the LMS implementation, the formations of LMS in Prison organisation would not be achieved. Therefore, the usability of LMS needs to be evaluated. In this regard, TAM will be used to assess the usability of LMS. Gangwar, Date and Raoot (2014), advised that *"Among the many theoretical models, TAM is a widely accepted model for understanding IT adoption and usage processes"* (2014, p. 5).

The adoption of LMS depends on many factors within the organisation such as users' engagement, friendly interface, easy to use, pleasing appearance and user's behaviour. This quantitative study in Saudi Arabia (King Khalid University) focused on e-learning adoption with the help of 286

participant's behaviour. The researchers explained TAM3 worked well in Arabian culture and showed e-learning acceptance to promote factors (Al-Gahtani 2016).

To understand users' behaviour towards information technology, this study will use the Technology Acceptance Model proposed by Davis, Bagozzi and Warshaw (1989) as shown in below Figure. It illustrates how TAM plays an essential role in analysing the usability structure, motives and powers in Prison organisation from a technology perspective. The TAM is a concept that demonstrates how users are led to accept and utilise a certain technology. This model shows that when a new technology is supplied to users, they may be faced with its perceived usefulness and perceived ease of use, which function influencing factors to their choice on how and when to utilise such technology (Ku, 2009).

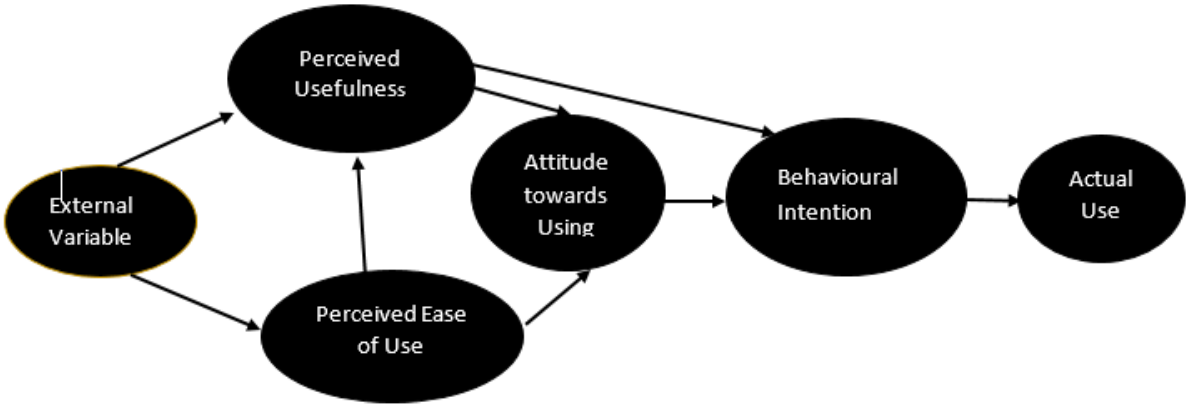

Figure 6: Technology Acceptance Model

(Source adapted from Ku 2009)

According to Davis, Bagozzi and Warshaw (1989), *"Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) are the two fundamental determinants of user acceptance of technology"* (1989, p. 320). In other words, PEOU is a specific factor of TAM in which someone concludes that the usage of a selected technology could be unfastened from attempt whereas PU describes that someone believes that the use of a specific system would enlarge their activity's overall performance.

PU may be prompted via PEOU, and it proves the fact that if the users find the technology is easy to use, they discover it as a useful technology. TAM is the term which creates the casual relationship between PEOU and PU with three other constructs "Attitude towards Using (ATT)", "Behavioural Intention (BI)" and "Actual Use (AU)".

TAM claims that both PEOU and PU have an impact on the users' mindset closer to the use of a technology According to TAM, PU and ATT immediately impact BI, BI is a degree to which someone has formulated plans to perform or not perform some specified behaviour (Davis, Bagozzi and Warshaw, 1989)

2.2.3 The use of the Technology Acceptance Model (TAM) in Victorian Prison

This section relates to the discussion of LMS in Victoria prison in that it provides a further discussion of accepting LMS implementation in the organisation.

Masrom (2007), explained the relation between TAM and LMS. The author proposed perceived ease of use and perceived usefulness of technology are predictors of user attitude towards using the technology, subsequent behavioural intentions, and actual usage. On the other hand, Holden and Rada (2011), represented TAM in below figure; for users to accept and use technology with the addition of usability as an external factor. The research found with the help of 99 teachers' responses that results are more variance and influential to TAM elements with the incorporation of usability than its absence.

Whereas, Fathema and Sutton (2013), claimed that System Quality had a significant effect on the Perceived Usefulness (PU), Attitude towards Using (ATT), and Behavioural Intention (BI). Their research surveyed 36 staff members and identified their attitude towards the adoption of LMS. Their survey results mainly covered content analysis and system problem. Within this research, TAM is carried out at both stages, before and after instantiation of the artefact. The precursor of TAM factors - the Perceived Usefulness (PU), Attitude towards Using (ATT), and Behavioural Intention (BI) are measured using Semi-structured interviews which explained in the next chapter involved interview technique and sample

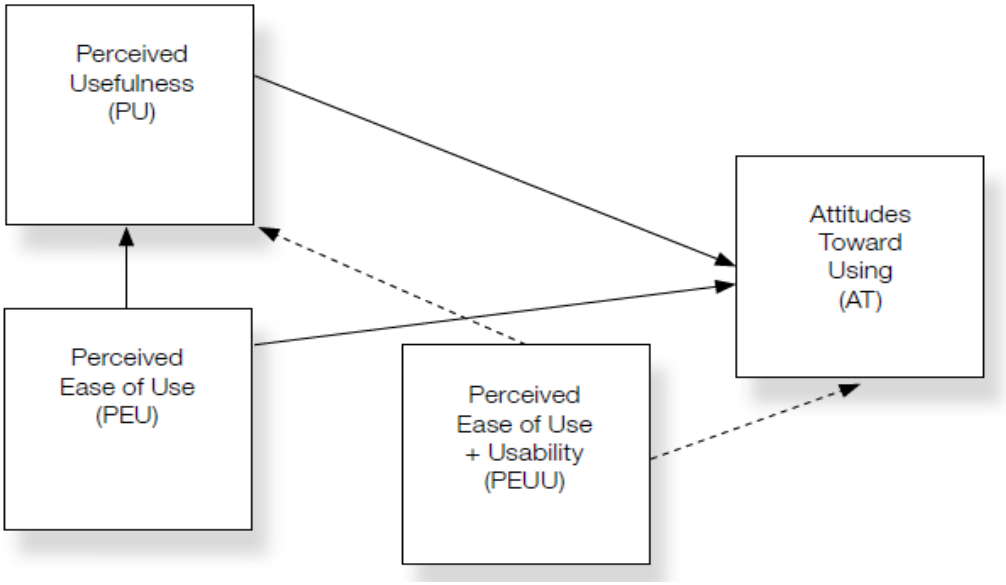

Figure 7: Usability in TAM

(Source adapted fromHolden & Rada 2011)

The proposed research will follow the above research model with the incorporation of external variable – Usability. Davis, Bagozzi and Warshaw (1989), defined external variables influence the individual behaviour which included system features and user characteristics. Holden and Rada (2011), explained usability in the research model to assess the influence of usability on usage behaviour. The researchers added four usability measures: learnability, functionality, navigation, and memorability to perceived ease of use.

The proposed study in bellow figure opted Ku (2009) research model with the addition of different usability factors such as – effectiveness, learnability, flexibility, and acceptability as external variables. The expected outcome may be more accurate than the original TAM as this research model will target the connection between the user and the technology and through this connection, will assess the users' technology acceptance.

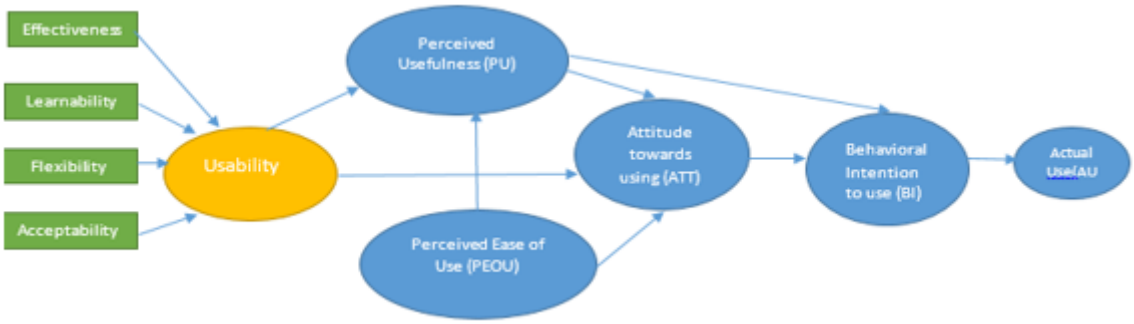

Figure 8: Usability effect on PU and PEOU

(Researcher's construction)

This section has explained TAM and justify the use within this research. The acceptance level has been checked in the seventh question of Semi Structure Interview which aimed to gain employees' intention to use the technology within Prison. The need to develop an LMS model was proposed by the researcher as there is little research being conducted on the actual use of LMS in the organisation and none in a Victorian prison. This study determined the extent of technology acceptance of employees is considered a gap in knowledge. TAM assist the research to examine the extent to which the prison's staff perceives how LMS is being utilised in the prison.

2.2.4 TAM-LMS factors

It is very well evident through the research that motivation, organisational support and load anxiety are important factors for users' perceived usefulness of LMS. Bousbahi and Alrazgan (2015) studied to introduce LMS to many universities in the Middle East. The researchers conducted a survey on IT staff to understand their perception of LMS integration. The authors prepared the model based on the staff's response to enhance TAM and LMS acceptance and assist to implement the LMS adoption.

The authors advised that the below figure represented the intertwined links between a variety of factors in technology acceptance survey regulated by computer efficacy perceived ease of use, perceived usefulness, and system usage which are impacted by other's use, system quality, organisational support, prior experience, anxiety and task structure. The instance gives an essential perception that staff's acceptance of a new technology operates on those elements, which therefore provides an understanding of the significance to prepare staff for the technology to be adopted.

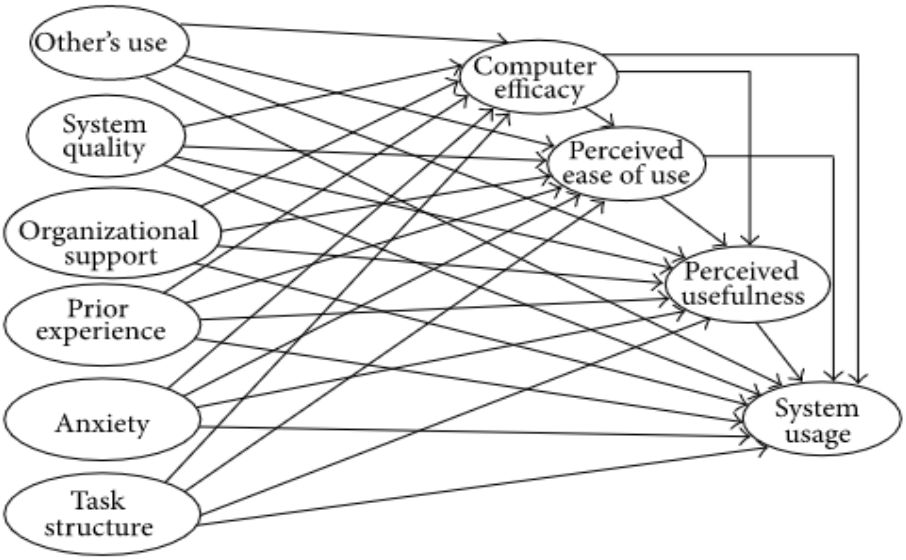

Figure 9: McFarland and Hamilton model of technology acceptance

(Source adapted from Bousbahi and Alrazgan, 2015)

2.3 Prison's learning

Workplace accidents, as well as injuries, are not uncommon, indeed they are quite regular and they vary significantly in their impact on the employees (Konda, Tiesman, Reichard and Hartley 2013). For instance, in the past occupational health and safety requirements across the world were lax and even today in the developing as well as underdeveloped parts of the world such laws are non-existent. However, in the developed parts of the world occupational accidents still take place and at times they can be fatal. Prisons and other facilities that are part of the corrections are notorious for staff and employee injuries (Konda, Tiesman, Reichard and Hartley 2013). For example, the USA with around 2 million prisoners and around 500,000 staffers, has a very high rate of accidents as well as injuries suffered by the prison staff. The rate of accidents, as well as injuries, suffered stands at around 544 per 10,000 employees and it is considered extremely high. Not only are staffers forced to take leave to get over the injuries but they also suffer mentally as well as psychological especially if they are repeatedly injured while taking care of inmates. Moreover, the rate of assault, as well as violent acts that left prison staff members seriously injured also stood at around 254 incidents per 10,000 staff per year and this is an equally serious as well as dangerous occurrence (Konda, Tiesman, Reichard and Hartley 2013). For example, staffers may get over accidental injuries which they may suffer because of exhaustion, lack of attentiveness and general trips and falls or injuries due to the closed environment of the prisons. However, when a staffer is directly as well as deliberately attacked and injured by an inmate, it can have very serious psychological as well as mental repercussions for the staffer (Konda,

Tiesman, Reichard and Hartley 2013). Not only will the staff member be afraid of their safety as well security, the family of the staffer will be worried for them too and this scenario can lead to dropping in performance, increase stress on the staff members and even contribute to high turnover in prisons. However, the most worrisome aspect of the complete scenario is that there is limited research in this regard and there is very less insight into ways in which prison environments can be made safe for staffers (Konda, Tiesman, Reichard and Hartley 2013). For example, 113 staffers lost their lives due to prison violence by inmates in a decade but such a huge loss of life has not brought in any significant change in the training of the staffers in regards to ways to protect themselves as well as their co-workers while in the prison. Therefore, not only is there a lack of adequate training that can help the prison staffers be aware of the ways in which they can protect themselves (Konda, Tiesman, Reichard and Hartley 2013). There is also a significant lack of research in this regard and also in the ways in which better training can be designed and implemented for the prison staff. The current training is grossly inadequate and it is at the heart of injuries, stress, strain, anxiety and fatalities suffered by the prison staff. Indeed, no employee should be afraid of going to work and above all, they must not fear for their safety at a workplace as such a scenario can be highly demoralising and is unacceptable (Konda, Tiesman, Reichard and Hartley 2013).

Likewise, the scenario in Australia is not much better than what is evident in the above discussion (Cook and Petrie 2013). For example, in Victoria State alone, 507 injury claims were filed by the corrections officers in the last 5 years. Moreover, of these claims, a staggering 27 were for fractures that the corrections officers have received while handling prisoners or due to violence suffered by them at the hands of the prisoners. Likewise, other injuries that have been reported in the corrections officers in Victorian prions include concussions, crush injuries, muscular skeleton disorders and even mental injuries (Cook and Petrie 2013). Not only are the corrections officers mistreated by the prisoners, but they are also overworked and undertrained to manage anxiety and stress and such scenario compounds the already volatile and dangerous environment where the officers work. Likewise, the overwork and overload faced by the corrections officers is also a big contributor to the issue (Cook and Petrie 2013). For example, it is evident that the staff numbers at prisons are stagnant and at times decreasing as this is not the most preferred workplaces. Moreover, the increased number of inmates at prisons have led to an excess of prisoners while the staff numbers are the same. However, such an increase in the number of prisoners leads to overwork, stress, anxiety and mistakes and these errors are responsible for accidents and injuries (Cook and Petrie 2013). The current training as well as the training schedules used to train and update, the existing prison staff is grossly inadequate as there are many areas that need change and lack of training is compounding the already complex and dangerous scenario in Victorian prisons. Therefore, it is high time that better training and better

facilities be accorded to the corrections staff so that the overall incidents of injuries and incidents decreases and the staffers can feel safe (Cook and Petrie 2013).

Likewise, it is also evident that not only is there an issue in Victorian prisons there are similar issues across the nation too (Vujanic 2019). For instance, in the last 8 months around 309 prison incidents have been recorded in the state of Queensland where injuries, as well as serious incidents, have been recorded including work stress and strain on the staffers. Not only are incidents rising but the number of serious injuries has increased tremendously too (Vujanic 2019). Staffers are getting injured mainly because they are not being provided with any significant training in the regards of managing inmates and the outcome is injuries. The staffers are mainly provided training at the beginning and minor training is provided during the job but they are not adequate as the incidents are rising and they are all adding to the trauma by the corrections officers across the nation (Vujanic 2019).

Likewise, one common issue that is often overlooked in relation to prison officer's safety is the impact of overcrowding in prisons and how it detrimentally affects the safety as well as the wellbeing of the officers (Vujanic 2018). For example, it has been reported that the Queensland prisons on Australia are at 125 % of their capacity and this has led to a 142 % increase in assaults on officers in the prison system during the same period. The most overlooked aspect of such overcrowding is, how it affects the safety of prison officers as it is generally believed that overcrowding increases incidents in prisons. However, it is not just overcrowding that has the ability to contribute to prison incidents, but there is no training imparted to the poison officers in regards to ways to manage to overcrowd and stressed prisoners. The matter of the fact is prison officers are trained in regard to dealing with inmates but not how to deal with inmates who are stressed and strained due to lack of space in prisons. Prisoners turn violent under continuous and ongoing stress and any demand by the officers to prisoners to act appropriately ends up in stress and incidents where officers can get gravely injured (Vujanic 2018). Likewise, most incidents of sudden unprovoked attacks on officers in prisons are attributed to over cowed persons. However, there is no training being imparted to the officers in ways to satisfactorily and safely handle prisoners who are at breaking point and may be inclined towards using violence as a way to vent out pent up anger. The overall understanding is that Australian prisons despite being deemed as safe, are unable to control prisoners' anger because officers are not trained to deal with such scenarios and at such an increasing frequency. Such a lack of training to manage prisoners is at the heart of the prison accidents and it is high time that the officers be trained in regard to ways to stay safe and secure even in the most overcrowded prisons in Australia (Vujanic 2018).

It must be stated here that there is a significant amount of complexities involved with the prison system and especially in regard to maintaining and upholding the security of officers (IBAC 2017). The challenges are immense and they are multiplying. For example, lack of training and that too ongoing training has-been highlighted by a recent report by IBAC, in regard to prison incidents. For example, prison accidents involving officers are not uncommon in Australia and they are evident in almost all prisons including the ones that are holding inmates far below their capacity. For example, in Victorian prison accidents invoking seriously injuries to officers have been reported in prisons which are at capacity or below capacity. The chief reason that became evident in relation to these injuries is the lack of adequate training in the officers in regard to managing prisoners (IBAC 2017). Officers are not trained to use minimum force or other means to motivate inmates to comply with the requirements of the prison environment. The prisoners are often subjected to excessive restraints, excessive use of force, and other unpleasant methods that increase the stress amongst the prisoners. Those prisoners who are regularly and repeatedly subjected to excessive isolation, or are punished with excessive use of force, they tend to be more violent as compared to those inmates who have been treated with humility. The chief reason is the lack of training in prison staff members in regard to the ill impact of excessive use of force on poisoners and how it detrimentally affects their mindset and their stress levels. Officers are unable to ascertain the signs of where and when the force used is considered excessive and what is the outcome of such an action for their safety (IBAC 2017). Not only is there lack of training in the staff members in this regards they also may believe that excess force use does not harm instead they assume it to be appropriate to maintain discipline. However, excessive use of force and lack of training to manage prisoners without the use of such means is at the heart of the current incidents involving prison staff in Victoria. Training provides to the staff is unable to help them limit the use of force and the officers themselves fail to understand the point beyond which force used on prisoners in excessive and harmful for all concerned. Lack of awareness is evident and it is the core reason for prisoners' actions and injuries in officers. Therefore, there is a case for better training of the prison staff in regard to the use of force and other means to motivate prisoners to adhere to prison rules. The need of the hour is better training that motivates the officers to be humble and treats prisons like humans (IBAC 2017).

Likewise, in a recent report published on the topic of managing prison assaults on the staff by the WA prisons, the lack of training of the staff members became evident (OICS 2014). For example, it was found that the staff members were increasingly being injured by inmates with mental health conditions or with new and hidden conditions. It can be termed as oversight as inmates with mental health issues are at the time housed in prisons like others and this is indeed a serious lapse. Inmates with Mental health issues are unpredictable and they are the ones who are likely to lose control the most and attack

officers. Moreover, prison officers are not trained to assess the condition of mental health inmates but they are also unaware of the ways in which mental what issues become evident in the inmates. Those officers with limited or no training in regard to handling inmates with mental health issues or those handling inmates with hidden mental health issues are most likely to get injured. Therefore, this is an extremely serious lapse in the current system which allows officers to manage prisoners with mental health issues and without adequate training thus leading to injuries (OICS 2014).

Moreover, there is one more factor contributing to staff injury in the report and it hints at the inmates who are not participating in any activity, as the most likely ones to indulge in violence (OICS 2014). For example, not all prisoners in prisons engage in work or education and there is a handful who will try their level best to stay away from work or education or training. These inmates are mostly the ones who will engage with officers in confrontations and they will be the ones most likely to injure officers. The current training of officers is not designed it motivate the inmate to participate in work that can help them with their boredom and can ensure that the prisoners stay away from stress. The lack of training in this regard adds to the problems faced by officers and again there is hardly any emphasis at any level to ensure that no prisoners are free, instead, all should be kept busy so that they are not the ones to indulge in violence. The oval scenario and the evidence in this report hint at a lack of foresight in the design of training imparted to the staff at prisons. Otherwise, how is it possible that prison officers are taking care of mental health prisoners without training and ways to manage any outburst. Likewise, prison staff is also not very well trained to ensure that no prisoners stay free and they all engage in work so that they stay away from violence. Therefore, it is evident that these are areas of change and the most important is the need to improve officer training to manage prisoners adequately and safely (OICS 2014).

Likewise, research by Trounson and Pfeifer (2017) in Australia as well as New Zealand on the subject of corrections officer's wellbeing and the significant level of harm suffered by them in the line of duty has led to some very surprising outcomes. For example, this research was based on the data collected from the past decades in relation to the incidents, injuries, psychological harm and other issues suffered by the corrections offices in Australia. The findings boil down to one conclusion and that is lack of appropriate training in the officers in regard to the ways in which they can help protect themselves. Indeed, it was found out that officer's wellbeing is not under focus even today and most of the training that is being discussed or an imparted is merely a patchwork arrangement. For example, the training programs in prisons for corrections officers in regard to ways to reduce stress or how to stay safe in such a dangerous environment are not evidence-based and this is why they not useful. For example, evidence-based training or practice is very common in professional spheres like medicine

and education, but it is not implemented in corrections offices training. The complete reason why any field or discipline applies evidence-based training is to improve the existing conducts and replacing them with better ones. Medicine and nursing and many other disciplines apply evidence-based training so that the overall quality of practice improves. However, it was evident through research that training programs that are developed for the corrections officers are not evidence-based and this is indeed the reason why the issue of correctional officers' injuries is not under control, instead it is increasing. Likewise, the conventional training methods are unable to implement the evidence-based training and there is a requirement something like LMS where evidence-based training material is uploaded and updated so that all officers stay safe. Therefore, lack of proper training that is evidence-based is at the heart of the current issues evident in corrections offices training and almost all the issues evident in prisons officer's safety can be satisfactorily managing by developing training programs that are based on evidence. Therefore, it is high time that findings from research like this one should be used to update the training programs for the corrections officers so that a chance of injuries to them are minimised and eliminated (Trounson and Pfeifer 2017).

Moreover, ICPA which is part of the United Nations in a recent fact-finding report has stated that it is quite surprising that there are so many incidents taking places in prisons the world over yet so little remedial action is there (ICPA 2017). For example, it has been stated that incidents of prison officers getting abused, injured and even killed in the line of duty are not rare and indeed these incidents are taking place in almost all countries across the world. However, the most disturbing fact is that no concrete action is been taken to once and for all manage the issue. The current PPE worn by the prison officer is outdated and it is not equipped to deal with the weapons a prisoner can pose and these weapons can of more harmful than expected. Likewise, the training available to these officers is lacking in ways to protect themselves adequately in case of an assault. Therefore, the question that arises is, why are the officers not given the best possible training as well as PPE to protect themselves, and what is the way out. The ICPA states that the current action of departments is reactive in nature where once prison officer gets injured, some reactive methods are used to update that aspect of security. However other aspects may be continuing to contribute to staff injuries are ignored and left for the next time. Therefore, it is recommended that instead of taking a reactive stance, the best way ahead is to be proactive and impart the best possible training to the staff members so that they all can stay safe. Likewise, it is also necessary that the staff be equipped in a manner that they can stay safe. The current reactive attitude towards prison officer safety has to be changed with a proactive one so that the incidents can be reduced and eliminated (ICPA 2017).

Likewise, according to Al Yammahi (2016), the safety training that is provided to corrections officers is not effective as well as useful in the real-life scenarios. For example, safety training, as well as the training provided to manage work-related stress to the prison officers is limited in its ability to help the officers much. For instance, this was a firsthand primary research and it led to the conclusion that not only is the current training methods inadequate but they are not focused on the injuries evident in the corrections officers. For example, correctness officers are not only at risk of physical harm but they are at risk of psychological trauma too but the current lack of focus on these crucial issues and injuries to officers is distressing. The current training merely touches these issues but there is no ongoing mechanism to ensure that the training imparted to the officers is covering the areas that are more likely to cause harm. Moreover, it is evident that the training feedback provided by the officers is not taken into consideration because the training still does not cover the necessary areas in detail. Therefore, corrections officers must be allowed to give feedback rereading the training being proved to them and how can this training be improved further. Not including the prison officers in training program development is giving rise to the current increase in incidents of injury and such incidents can be better-managed thigh adequate focus on training in areas that need change (Al Yammahi 2016).

Likewise, research by Trounson and Pfeifer (2016) states that the current corrections officers training is not just inadequate but is not evidence-based too. For example, the number of injuries both physical as well as psychological harm in the correction officers is increasing but the training is not keeping up. The main reason is the training is not evidence-based and industry-responsive training, which means it is not in accordance with the requirements, not only is the training causing more harm by exposing officers to risks it is also harming the morale of the officer's as they fear for their safety (Trounson and Pfeifer 2016).

Furthermore, in a recent report by NIJ (2018) it was stated that despite the large number of incidents related to prison staffers each year, the current methodology in place to manage them is not agile as well as successful. For example, each time an officer or officers are injured in a prison-related accident, some corrective measures are taken to help reduce and eliminate the chances of repeat incident in the given prison, but a similar change is not evident or implemented in all prisons. Likewise, it is not just a matter of a single prison, prison staff in any prison must not be scared of their work environment, they must all feel safe. However, it is evident that the current procedures and policy updates in relation to policing staff security take time and in almost all incidents the sheer lack of training is evident. Most prison incidents occur because the prison staff tend to forget that they are working in a dangerous environment that can turn deadly at any given moment. This can be attributed to training because the

staffers are not repeatedly made Aware of the dangers involved and their training is reactive and not proactive in ensuring that the chances of incidents are minimum and they all can stay safe (NIJ 2018).

Therefore, through better prison staff training it is very well possible for the staff to stay alert as well as aware of the threats that exist in the environment (NIJ 2018). Training is key to managing the issue of injuries is staff members in prisons and therefore a better and more dedicated plan should be in place. Furthermore, it must be stated that more and more women are joining the corrections staff and they are at a higher risk as compared to men. Likewise, there are aged prison staffers too who are also at increased risk of injury at work. Therefore, the old training process of once in a month or at times longer must be shelved and there should be a way to keep the prison staff well informed and aware regarding ways to manage the prison scenarios. Only better training can help reduce the chances of injuries in the staffers and this is the right way forward. The current mindset towards the security of prison officers is not very fruitful and it is indeed at the heart of the current issues evident in the prisons. Moreover, the current attitude towards not training the prison staff to stay more vigilant as well as informed is not effective. There is a need to redevelop and improve the current training programs so that the staff is able to better protect themselves in the current prison environment a stay safe too (NIJ 2018).

Likewise, not only are the expert opinions varying in regards to the reasons that contribute to the injuries suffered by the staff at prisons, the advice provided to avert such incidents also varies considerably. For example, according to Jaskowiak and Fontana (2015), there is much more to workplace society in a prison environment and the current strategy in use is not as appropriate as it should be. For instance, while there is a significantly large section of officers as well as others in the position of taking decisions who believe that the incidents inside prisons can be best managed by investing on arms the equipment of the staff members, protective equipment can help the officers be safe in case they are attacked. However, such a suggestion seems to ignore the fact that the equipment can be snatched and it can then be used against the staff's members at prisons too. Moreover, investing resources into equipment to protect staff and not focusing on improving the prison environment is at the heart up the issue. For example, person-environment is a seriously confined and stressful environment where weapons and protective equipment may have limited use (Jaskowiak and Fontana 2015). Moreover, there is always a fear of the weapons falling in the wrong hands. Therefore, resources should be invested in improving the overall environment of the prisons and ensuring that the staff at prisons are not overworked and the number of prisoners in the prison is nominal and to the capacity. Overcrowding is a threat to the prison environment and it must be kept under check too. Therefore, the sole focus on investing resources into providing better weapons and PPE to the staff

will not solve the issue of staff injury, instead, it can lead to more serious problems. Likewise, staff without training to use the equipment will not only place themselves in a vulnerable position but they can place others in a position that can lead to serious harm and injuries (Jaskowiak and Fontana 2015).

Furthermore, in a recent incident in Australia the need to not just impart the best training to the prison officers became apparent but also the need to help them be aware of the seriousness of the prison environment Kerr and Ferrier (2019). For example, prisoner rehabilitation is pretty high on agenda in prisons and more and more emphasis is being placed on motivating prisoners to rehabilitate and gain skills that may help them prevent reoffending. However, when officers are not well-trained, even such measures as simple as helping prisoner's rehabilitation can become a serious threat. For example, prisoners were provided with material to play cricket. The material was made up of plastic but it was still used as a weapon to seriously hit and injure prison staff members (Kerr and Ferrier 2019). The incident left 2 prison staffers with bruises and broken bones. An inquiry into the incident led to the revelation that the staff at the prison was not trained enough to manage such a scenario. Moreover, they believed that once they are friendly with the prisoners the threat of an accident decreases (Kerr and Ferrier 2019). However, that was not the case, instead, once the staff members let down their guard, the prisoners took the maters in their own hands and the bat that is given to the prisoners to help them play cricket was used to harm the staff. Therefore, lack of training and lack of awareness of the impact of a weapon in the hands of the prisoners led to this incidence. Therefore, the prison staff must always maintain a high degree of alertness and they must not assume that they are aware of prisoner's intentions as they can change instantly (Kerr and Ferrier 2019).

Therefore, it can be stated that comparing prison to any other workplace is not wise because there are much more complexities involved in managing inmates in a person. Indeed, prison staff are under constant threat and they are vulnerable too. The current PPE and weapons allocated to the staff at prisons are of limited use as well as benefit when the prison staff is ill-trained and overworked to manage their roles. The current prisons in Australia and worldwide all suffer from similar dilemmas and issues. Indeed, there is a need to better understand the issues involved and the most crucial of all is to ensure that the human element in prion management which is the prison staff is aware of the scenario and the dangers involved. Prison officers must be trained and regularly trained to learn ways to better manage prisoners. The current approaches are archaic in nature and they are also at the heart of the problem. Prison staff training is a serious component of staff safety but sadly it is missing and the result is ongoing injuries, incidents, morbidity and mortality of the prison staffers at the hands of prisoners. However, such a scenario is unacceptable and therefore, it is evident that the staff training needs a major overhaul and the current once on a blue moon training methodology needs to be updated

so that it can be used to improve the staff resilience in the prison environment. Australian prison staffers must not fear for their life and security while working in prison and the key to improving their safety is ongoing training which ensures that no matter what, staff do not let their guards down. Moreover, training will also ensure that the staffers treat prisoners humanely so that they do not go on rampage or attack in revenge.

Hence the gap in training is evident from the literature review and there is an urgent need to invest resources into improving the outcomes for all concerned.

2.4 Chapter summary

The goals of the literature review have been accomplished; the literature review established the current knowledge of the research and the practices of institutions with the constitutional flow to incorporate technology within a range of sectors. The literature covered the four factors and questions of usability which has been discussed in chapter 1:

- *What does the LMS in a Victorian prison provide to facilitate more effective online training for users?*
- *What features of the LMS assist users to improve learnability?*
- *What are the factors that would provide flexibility to the LMS at Victorian prison?*
- *What promotes the acceptability of the LMS?*

These above-mentioned questions assist the researcher to decide if following a well-defined model that consists of well-rounded learning and training taxonomy achieved with the help of DSR model and align with ISM policies will benefit the Prison's Operational, management, medical and admin staff.

Correctional officers are responsible for the day-to-day supervision of prisoners in the prison while also maintaining good order and the security of the prison. This is achieved through searches, escort duties, observing and assessing prisoner behaviour, operating security equipment and effectively responding to prison incidents. The prison officer role also involves collating information, writing case files and preparing a variety of reports. Prison officers are also responsible for contributing to prisoner rehabilitation, encouraging prisoners to establish goals for themselves and to begin engaging in positive behavioural change.

Prison officers provide prisoners with leadership, advice, support and guidance. Being a positive role model, having a positive impact on the prisoner's lives, and seeing prisoner behaviour change for the better can be very rewarding for a prison officer. As mentioned in the previous section, according to Correction Victoria report, there is average one incident reported in every three days because of lack of performing their duties or not enough training how to handle the inmates, Then LMS comes into play of how to train the prison officer to tackle the violent prisoners. This single case study help to find that gap which is focused only on one prison due to ethical approval from the prison. The next chapter, Chapter 3, will discuss the research methodology that was used during the different iterations of the study.

Chapter 3. Research Methodology

3.1 Introduction

This current chapter aims to provide an overview of research methodology and research design which have been used in the current research. The research methodology assists the research to provide the conclusion and inferences which has been evident through the research done by Benbasat and Weber (1996), *"research methods shape the language we use to describe the world, and language shapes how we think about the world"* (1996, p. 392). Therefore, the research methodology must include suitable research methods to explicit the investigation. Whereas, the research design must observe the type and form of data constrained to present the answers of research questions, data collection methods and data analysis process, which has been very well evident through the research. Mouton (2011) defined the research design, *"architectural design or blueprint" and the accompanying execution of the design whereas the research process or methodology was the "construction process using methods and tools"* (2011, p. 56). Likewise, McMillan & Schumacher (1993), discovered that research design of a study is an approach to accumulate and examine data in order to permit the researcher to answer the research questions proposed by the research.

There are many research methods which can be linked to education and training technology. There are normally three main research strategies in the academic world and these are - Qualitative research which is a means for exploring and understanding the meaning individuals or groups describe to a social or human problem. The second is Quantitative research which means for testing the objective theories by analysing the connections amongst the variables. And the last one is the mixed-method approach which is a combination of Qualitative and Quantitative research.

The framework plays a crucial role to build any research. According to Crotty 1998, developing research, first, these two questions should be answered by the researcher (Crotty 1998, p. 2):

- What methods and methodologies will the research plan undertake and use?
- How do we justify this choice and use of methodologies and methods?

According to Kumar 2008, Research methodology is a systematic method which intends to address the research problem identified in the research endeavour. This current research is aimed at exploring the usability of LMS which might be addressed using particular option of research philosophy, data

collection methods and data analysis process. The below figure shows the current research methodology stages:

Figure 10: Research methodology stages

(Researcher's construction)

Design Science Research (DSR) used as a research paradigm in this research, which describes in detail in this chapter. This chapter analyses different DSR models and selecting the best- suited one for this research which can help to build the appropriate model for LMS in Victoria prison. This chapter outline as below:

- DSR Introduction
- The philosophical view of DSR
- An explanation of the design cycle in DSR
- Explanation of every step of three design cycles

3.2 Introduction to DSR

Design Science Research (DSR) is used as research Paradigm in this research and this chapter describes DSR in detail. This chapter explains the rationale of choosing DSR as a research methodology. This chapter discussed the comparison of different DSR models. This chapter provides

the justification of choosing the research design which contains: a) General description of DSR: b) The justification for the use of DSR: c) a description of specific research design used in this research.

DSR is a research process for generating progressive creation intended to resolve issues confronted in the real world and, by way of meaning, to make a contribution to the concept of the discipline in which it is implemented (Lukka 2003). March and Smith (1995) checked out it as a manner that seeks to discover new solution options to solve problems, to explain this exploratory method and to enhance the problem-solving method and serve human functions. The DSR approach has been chosen to ascertain and acknowledge opportunities and problems applicable to online training using LMS in Victorian Prison and contribute explicit approach to develop or design or enhanced conceptual measures to accord with those problems.

3.3 The philosophical worldview

This study is conducted at a real-life Prison where the researcher has experienced through the communications among the users, to gain more precious knowledge about LMS. Thus, Design science research used as a philosophical approach. Secondly, the design science research perspective approach from the epistemological position is concerned with the relationship between the participant and the researcher. According to Vaishnavi and Kuechler (2007*), "Design science research, by definition, changes the state-of-the-world through the introduction of novel artefacts. Thus, design science*

Research Philosophical Worldview			
Basic Belief	Positivist	Interpretivist	Design Science Research
Ontology	A single reality Knowable, Probabilistic	Multiple realities, socially constructed	Multiple, contextually situated alternative world-states Socio-technologically enabled
Epistemology	Objective; dispassionate, Detached observer of truth	Subjective (i.e., values and knowledge emerge from the researcher participant interaction)	Knowing through making: objectively constrained construction within a context Iterative circumscription reveals meaning
Methodology	Observation; quantitative, statistical	Participation; qualitative, Hermeneutical, dialectical	Developmental, Measure artefactual impacts on the composite system.
Axiology	Truth: universal and beautiful; prediction	Understanding: situated and description	Control; creation; progress (i.e., improvement); understanding

Table 1: Philosophical worldview

(Source adapted from Vaishnavi and Kuechler, 2007)

researchers are comfortable with alternative world-states. An obvious contrast is with positivist ontology in which a single, given composite socio-technical system is the typical unit of analysis" (2007, p. 25). The DSR philosophical approach is adopted in this qualitative research which is uncovering socially multiple constructed meanings and involving small samples and rich and subjective data. As shown in the above Table, this paradigm described Ontological, Epistemological, Methodological, and Axiological positions and due to that the fact Creswell 2013 defined, *"the individuals seek understanding of the world in which they live and work"* (2013, p. 8).

Design science research (DSR) was selected because the research paradigm for the current study. In brief, the use of DSR is within the design of artefacts or innovations to solve issues or modify the circumstance of the world (Vaishnavi & Kuechler, 2015). Ontologically, the researcher in DSR engages inside the studies through numerous related incidents, that is learning management system in organisations. Epistemologically, for the duration of the course of the research, the researcher practices the collection of knowledge by explaining, identifying and comprehending that the setting influences the process. within the current study, the developing of knowledge was to obtain a cognizance of online training using LMS in Victorian Prison. Moreover, the understanding obtained in a single phase gave rise to the attention of what became necessitated to commence the next phase. Methodologically, a conceptual approach to enhance the usability of LMS inside the context of the Prison.

From an axiological perspective, the researcher in DSR is familiar with that artefacts resource in the resolution of problems and constructive change in organisations. Moreover, apart from comprehending and controlling the essential sides of research, the research also is familiar with the whole setting of the study (Vaishnavi & Kuechler, 2015). The artefact, in the current research, signifies a conceptual technique to enhance the usability of LMS inside the context of the Prison environment.

Simon (1996) argues that design sciences can be relevant for the studies in Organisation and managements which supported by this statement- *"Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artefacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a new state"* (1996, p. 123).

3.4 Description of Design Science Research (DSR)

DSR was introduced in 1966 by Gregory SA, defined that *"Design science is concerned with the study, investigation and accumulation of knowledge about the design process and its constituent Operations. lt aims to collect, organize and improve those aspects of thought and information which are available concerning design and to specify and carry out research in those areas of design which are likely to be of value to practical designers and design organizations"* (1966, p. 323). Whereas, Simon (1981) described that *"Design science is concerned with "devising artefacts to attain goals"* (1981, p. 133).

There are so many research studies has been done on DSR which shows various DSR techniques that investigate both natural science and design science phenomena. According to March & Smith (1995), *"The creativity and studies activities underlie the dual nature of IT research. Rather than being in conflict, however, both activities can be encompassed under a broad notion of science that includes two distinct species, termed natural and design science"* (1995, p. 253). The natural science attempts to recognise the reality using two activities which are discovery and justification whereas design science seeks to create things using four types of products- Constructs; Models; methods and Instantiations. The below- proposed table by March & smith (1995) defined the research framework which has two dimensions. The First dimension is based upon the science design research artefacts: Constructs, Models, methods and instantiations. The second dimension is based on vast types of design science and natural science research activities: build, evaluate, theorize and justify. The researchers explained that *"IT research builds and evaluates constructs, models, methods, and instantiations. It also theorizes about these artefacts and attempts to justify these theories. Building and evaluating IT artefacts have design science intent. Theorizing and justifying have natural science intent"* (1995, p. 256); as depicted in the below Table.

The below Table 2 presented the difference between research outputs and research activities by producing sixteen cells describing defining feasible research attempts. The research can build, evaluate, theorise approximately, or justify theories about constructs, models, methods, or instantiations. The exclusive cells have different targets and distinct methods are suitable in specific cells. The research efforts often cover a couple of cells. Evaluation of research has to be primarily based on the cell or cells wherein the research lies.

Research Activities represent the current study.

Research Outputs	Build	Evaluate	Theorise	Justify
Constructs	X	X	X	
Model	X			
Method		X	X	
Instantiation				

Table 2: Research Framework

(Source adapted from March & Smith 1995)

Lukka (2003), advised that DSR is a constructive research approach which involves a method for generating revolutionary construction supposed to remedy problems confronted in the actual world which means it's implemented to make a contribution to the concept of the discipline. He advised the below core features of Constructive approach of DSR (p. 84):

- Focuses on real-world problems felt relevant to be solved in practice
- Produces an innovative construction meant to solve the initial real-world problem
- Includes an attempt for implementing the developed construction and thereby a test for its practical applicability
- Implies a very close involvement and co-operation between the researcher and practitioners in a team-like manner, in which experiential learning is expected to take place
- Is explicitly linked to prior theoretical knowledge, and
- Pays particular attention to reflecting the empirical findings back to theory.

There are many DSR research process models which the researcher has found in many kinds of literature (Jarvinen, 2004, Lukka, 2003, Peffers et al., 2007, Kasanen et al., 1993, March and Smith, 1995, Vaishnavi and Kuechler, 2007, Hevner, 2007). The DSR models have three processes which are – Establish awareness of the problem, design science evaluation and theory building. The below

comparison provides the details which model cover which DSR process. The below table is described in colours:

1) Establishing awareness of the problem- as highlighted in orange colour
2) Development of the artefacts and evaluation – as highlighted in blue colour
3) Theory Building – as highlighted in green colour

Kasanen (1993)	March &Smith (1995)	Lukka (2003)	Vaishanvi & Kuechler (2007)	Hevner (2007)
Find a problem with practical relevance and that also has research potential		Find a practically relevant problem with the potential for theoretical contribution	Awareness of the problem	Problem and opportunities
		Assess the likelihood for longstanding research collaboration with the target organizations		
Obtain an understanding of the topic		Obtain an understanding of the problem from a practical and theoretical perspective		
Innovate, namely construct a solution	Create things that serve human purposes	Innovate a solution idea and develop a solution that solves the problem at hand	Suggestion of a tentative design	Build, design artefacts and processes
			Further development of the tentative design and implementation	
Demonstrate that the solution works	Evaluate the performance of things in use	Implement the solution and test how it works	Evaluation of the design against a previously defined criterion	Evaluate
Present its connection to theory and the research contribution		Identify and analyse its theoretical contribution	Conclusion	Additions to the knowledge base
Assess the scope of application of the solution				

Table 3: DSR model comparison

(Source adapted by Rocha et al. 2012)

3.4.1 Establishing awareness of the problem – In this type of research, the study starts by analysing and describing possibilities and practical problems in the real-world environment. This kind of research examines the process involved in the domain of inspection. This research is creating the

research model and intended solutions from the existing knowledge under the direction of theory. According to Venable (2006), Theory can be used to formulate the artefact to reduce the identified problem and also understanding the core of the problem. The Relevance cycle helps to generate the artefact which needs to be tested and works as a bridge between the theory use and the building process. This step also called problem investigation process which has the aim to describe the problem, explain it and to predict the solution (Wieringa 2009). The problem investigation has divided into four categories which are described below (Wieringa 2009):

- Problem-driven investigation – This kind of problems need to be diagnosed before solving them. The important functions of this investigation are describing problematic phenomena, formulating and testing a hypothesis about their causes and identifying priorities for problems to be solved.
- Goal-driven investigation - This kind of investigation happens where there may be no problem and consider a situation. In this investigation, the important functions are describing stakeholder goals, defining and operationalising them, and identifying priorities of goals.
- Solution driven investigation – This type of investigation usually inspires with the solution. The important tasks here are making an inventory of goals and current technology, and in identifying functionality and performance requirements for new technology.
- Impact-driven investigation- in this kind of investigation, focus on the outcome of existing action. Important tasks in evaluation research are describing solutions implemented earlier, identifying their impacts and explaining these impacts in terms of properties of the implemented solutions, identifying relevant stakeholder goals, translating these into criteria and applying these to the impacts.

This research falls under the class of problem-driven investigation, which focus on identifying the problem within Prison context. According to Hevner 2007, DSR that not only provides the requirements for the research as inputs but also defines acceptance criteria for the ultimate evaluation of the research results which contains the below information:

- To define the existing problem
- Decide the requirements for developing the artefact

The above information used to help in creating Relevance cycle process because the results of the above steps will determine whether additional iterations of the relevance cycle are needed in this design science research project.

3.4.2 Design Science Evaluation – Design Science research includes the method of constructing the artefact as the solution to ease the existing problem, assess the artefact and consecutive assessment to facilitate the design. The design cycle used as a term to define this process which helps to generate the artefact and then evaluate them until a satisfactory design is achieved (Simon 1996).

Hevner (2007), to construct the research product, inputs for necessities and defining recognition standards for the ultimate evaluation of the research effects are explained in the relevance cycle. After building the artefact, will go through the design cycle, in which the evaluation process happens.

3.4.3 Theory Building – In this process, the performance of the artefact is evaluated and determined whether artefact worked or not worked if they worked, why and how the artefact worked which will be justified in rigor cycle section. Such research applies natural science methods to theorising and justifying and building and evaluating the artefacts that have the design science intent (March &Smith 1995). Theories amplify the aspects of the artefact and its interplay with the environment which concludes the noticed achievement. This process requires considerate knowledge of natural laws administrative the artefact and those governing the environment in which it acts. Moreover, the interplay of the artefact with its surroundings may lead to theorizing about the inner workings of the artefact itself or approximately the surroundings. March & Smith (1995) defined every aspect of the research output depicted as below:

Design Artefact	March & Smith (1995) Definition
Constructs	Constructs or concepts form the vocabulary of a domain. They constitute a conceptualization used to describe problems within the domain and to specify their solutions.
Model	A model is a set of propositions or statements expressing relationships among constructs. In design activities, models represent situations as problem and solution statements.
Method	A method is a set of steps (an algorithm or guideline) used to perform a task. Methods are based on a set of underlying constructs (language) and a representation (model) of the solution space

Instantiation	An instantiation is the realization of an artefact in its environment. IT research instantiates both specific information systems and tools that address various aspect of designing information systems.

Table 4: DSR Research Output

(Sources adapted from March & Smith 1995)

The above table explained four Research Outputs According to March and Smith (1995) checked out it as a manner that seeks to explore new answer alternatives to solve issues, to explain this exploratory method and to enhance the problem-solving system and serve human purposes.

3.4.4 Justification for the use of design science research used in this study

As this research seeks to explore the usability of Learning Management system in a Victorian prison and determine to design the principal that best promote the data collection in prison, DSR methodology is decisive to be the most appropriate option. A DSR is a scientific methodology of problem-solving that was developed specifically for the Information Systems domain. According to Vaishanvi & Kuechler (2007), DSR includes the introduction of latest knowledge through the design of latest or innovative artefacts, analysis of use and performance of these artefacts to enhance information systems. The researchers also defined that DSR is a well-suited approach because it embraces the artefact creation as well as research iteration. Whereas Action research (AR), a time period coined by Kurt Lewin, a professor at MIT (1944), is a method that establishes an iterative process of simultaneous incidence of "taking action" and doing "research". This methodology assumes the involvement of a client. Therefore, this process is context-dependent and is not restrained to the design and development of technology artefacts but can be utilized in social innovation, environmental policy change through participatory collaboration among researchers and clients systematically.

According to research conducted by Iivari & Venable (2009), explained the comparison between DSR and AR and advised that DSR methodology may result in improving artefact design practices and development without the existence of a client, the AR methodology is generally iterative within a client-researcher participatory investigation that may not result in a technology artefact.

3.4.5 Research Framework- There is various research framework used in past studies (Walls, Widmeyer, & El Sawy, 1992; Veneable, 2006; Vaishnavi & Kuechler, 2007; Pries-Heje, Baskerville, & Venable, 2008; Peffers, Tuunanen, Rothenberger & Chatterjee, 2007; Nunamaker, Chen & Purdin,

1991; March & Storey, 2008; March & Smith, 1995; Hevner, March, Park & Ram, 2004; Cole, Purao, Rossi & Sein, 2005; Baskerville, Pries-Heje & Veneable, 2009; Aken, 2004). This research follows the research framework designed by Hevner (2007).

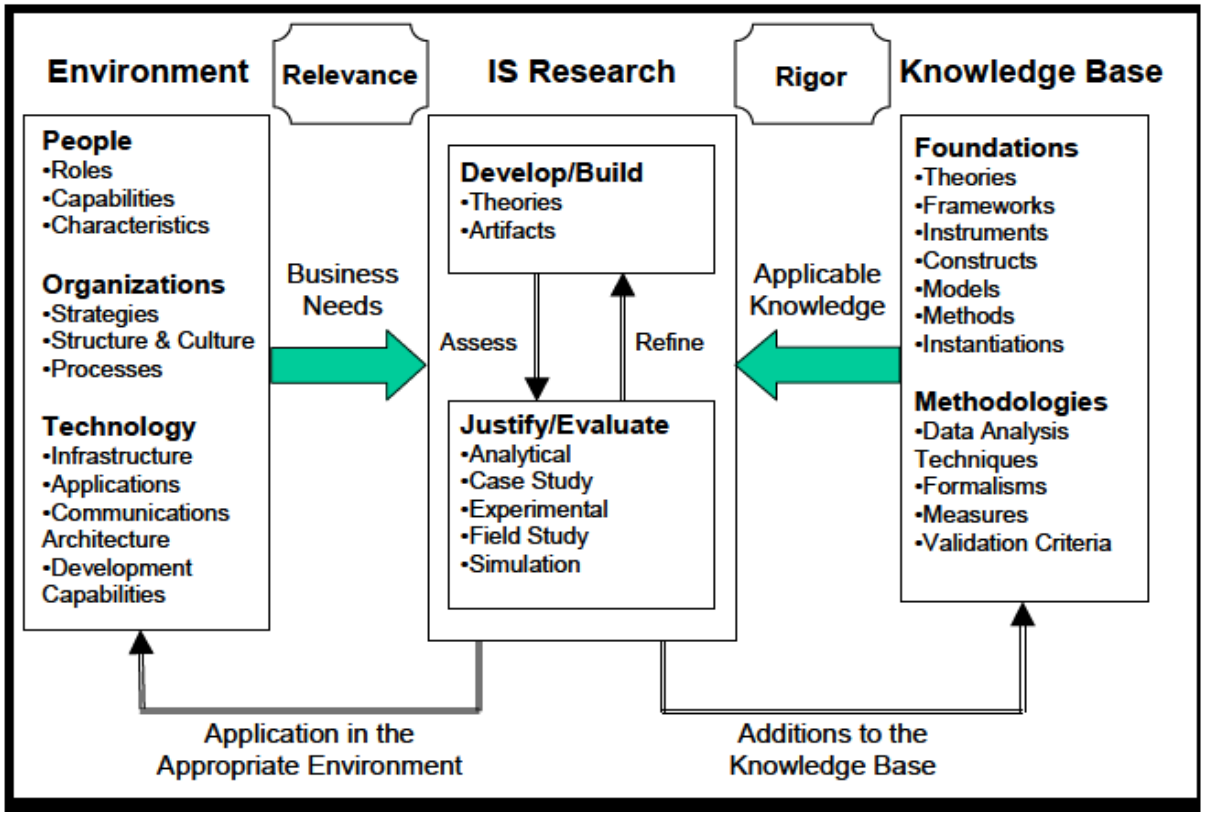

Figure 11: Research Framework

(Source adapted from Hevner et al. 2004)

According to Hevner et al. (2004), presented a conceptual framework for understanding, executing, and evaluating IS research combining behavioural-science and design-science paradigms for understanding, the authors stated that Design science is a natural way of solving the problems. The essential principle of design science studies from which seven guidelines are adopted is that understanding and knowledge of a design problem and its answer are received inside the building and application of an artefact.

Guidelines	Description
Guideline 1: Design as an Artefact	Design-science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.
Guideline 2: Problem Relevance	The objective of design-science research is to develop technology-based solutions to important and relevant business problems.
Guideline 3: Design Evaluation	The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.
Guideline 4: Research Contributions	Effective design-science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.
Guideline 5: Research Rigor	Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.
Guideline 6: Design as a Search Process	The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.
Guideline 7: Communication of Research	Design-science research must be presented effectively both to technology-oriented as well as management-oriented audiences.

Table 5: DSR Guidelines

(Source adapted from Hevner et al. 2004)

The researchers, reviewers, and editors must use their progressive capabilities and judgment to decide whilst, wherein, and the manner to exercise each of the guidelines in specific research (Klein and Myers, 1999).

The below model by Owen (1998), helped the research to understand the design science research and design principal process through the general model for generating and accumulating Knowledge model in which he advised knowledge used to create the works and works are evaluated to build the knowledge.

In this presented model, the author stated that "*Knowledge is generated and accumulated through action. Doing something and judging the results is the general model . . . the process is shown as a cycle in which knowledge is used [creatively] to construct (create) works, and works are evaluated to build knowledge"* (1998, p. 11). The author also explained the channel are in the above diagram, "*systems of conventions and rules under which the discipline operates. They embody the measures and values that have been empirically developed as 'ways of knowing' as the discipline has matured. They may borrow from or emulate aspects of other disciplines' channels, but, in the end, they are special to the discipline and are products of its evolution"* (1998, p. 11).

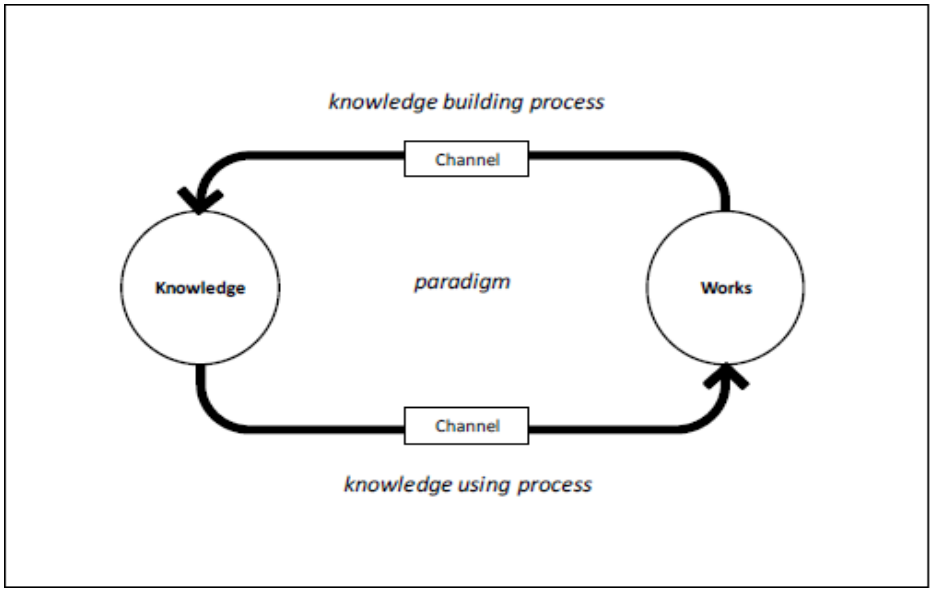

Figure 12: A general model for Generating and accumulating Knowledge

(Source adapted from Owen, 1998)

This research is followed by the Hevner 2007 framework which he borrowed from Hevner et al. 2004 and explained the three cycles in detail. According to Hevner 2007, *"The Relevance Cycle inputs requirements from the contextual environment into the research and introduces the research artefacts into environmental field testing"* (2007, p. 88). The author defined that *"The central Design Cycle supports a tighter loop of research activity for the construction and evaluation of design artefacts and processes"* (2007, p. 88).

And he stated, "The Rigor Cycle provides grounding theories and methods along with domain experience and expertise from the foundation's knowledge base into the research and adds the new knowledge generated by the research to the growing knowledge base and the author explained"

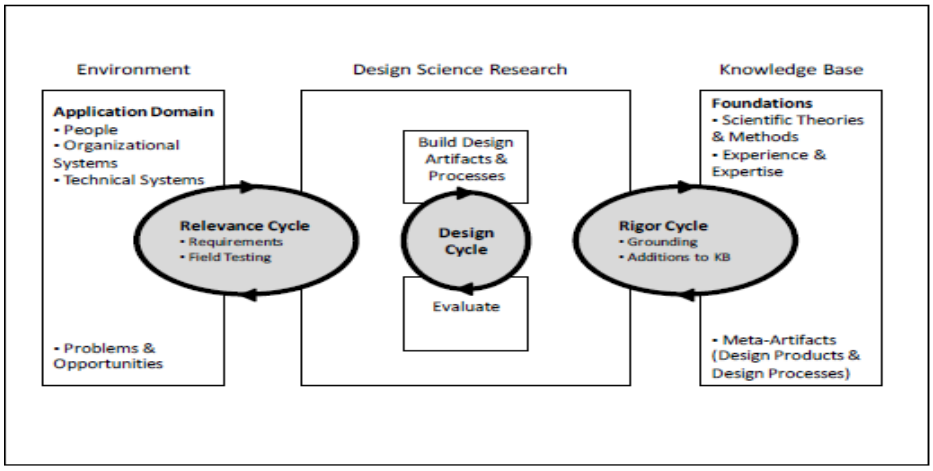

Figure 13: DSR Framework

(Source adapted from Hevner 2007)

The below Figure 13 has been created using Hevner's (2007) DSR model. The model divided into three sections: Environment; design science research and Knowledge-base and three cycles of activities are used to create the desired model of LMS. In the Environment, section-the application domains are- Prison, prison's employee and current training system and mentioned the problem and opportunities. In the second Phase, DSR- described the eleven steps process as building design artefacts and process and then evaluate, lastly, in the knowledge phase, explained the foundations and methodologies.

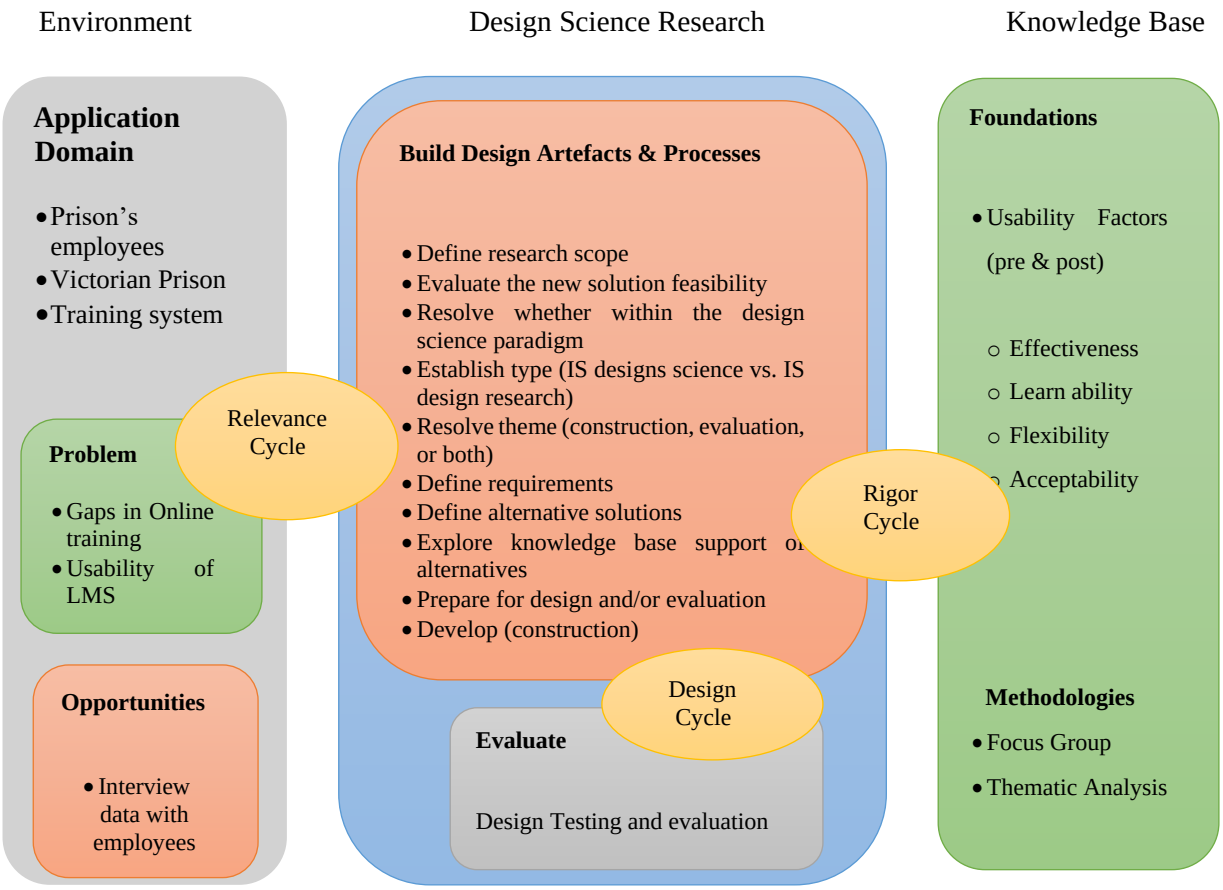

Figure 14: DSR Model

(Researcher's construction, Inspired by Hevner 2007)

According to Peffers, Tuunanen, Rothenberger & Chatterjee, (2007), many research have been conducted on the Design cycle in DSR. Alturki, Gable and Bandara (2011), have recommended an established set of iterative steps for the design cycle in DSR methodology. The authors stated that "*The Roadmap is a structured and detailed methodology for the conduct of DSR. It is a general guide for researchers to carry out DSR by proposing reasonably detailed activities. The Roadmap usefully inter-relates many otherwise seemingly disparate, overlapping or conflicting concepts. It covers the*

entire DSR lifecycle, from the early "spark" of a design idea, through to final publication" (2011, p. 5). The authors provided the roadmap into sixteen steps to build the Design Science research which are shown below in the table.

	Step	**Description**
1	Document the Spark of an Idea/Problem	DSR is informed either by practitioners in an environment, where the needs come from; or by researchers based on the knowledge base, where possible new solutions or extensions are suggested. Researchers‟ creativity based on available resources is another possibility for a DSR starting point
2	Investigate and Evaluate the Importance of the Problem/Idea	Researchers must investigate pre-existing knowledge and solutions to ensure they do not simply replicate past work of others „routine design‟ or prior research (Hevner, et al., 2004; Venable, 2006b) to ensure DSR produces new knowledge. This step could involve consideration of the type of problem and may involve searching the existing knowledge-base, or collecting primary data through empirical work. Research should stop if the problem has already been solved, or if it is found to be unimportant for the targeted environment.
3	Evaluate the New Solution Feasibility	A critical question to ask here is "*Is it possible to produce a new solution*?" Feasibility is thus a critical early consideration, in order to increase the likelihood of success.
4	Define Research Scope	The initial research scope and ultimate objectives are defined in this step. Since knowledge from DS research is generated through the design process (Owen, 1998; Vaishnavi & Kuechler, 2004), the scope and ultimate objective are revisited frequently for refinement, as the research evolves.
5	Resolve Whether within the Design Science Paradigm	Researchers judge whether the research falls under the DS paradigm or not. Researchers must understand their objective precisely, and compare it to the DS paradigm; on the one hand, to ensure they intend doing DS research and on the other hand to discover the value of their design.
6	Establish Type (IS Design Science vs IS Design Research)	DSR in IS can be seen as one or both of two types: (1) IS Design Science and (2) IS Design Research1. Based on this distinction, researchers judge their research. This distinction is important for researchers to consider when planning and scoping their work and intended contributions.
7	Resolve Theme (Construction, Evaluation, or Both)	Deciding on construction, evaluation, or both, is a key decision, having substantive implications for planning and related activities.
8	Define Requirements	This step specifies necessary skills, knowledge, tools and experience required for the project, or hardware/software resources. These requirements may be obvious, maybe identified through empirical work, or may necessarily become apparent with the passage of time and design iteration.
9	Define Alternative Solutions	This step is creative because a new solution is imagined. The defined solution is tentative and needs to be built, instantiated, and evaluated. It defines the candidates‟ solutions and then investigates the optimization of this solution.
10	Explore Knowledge The Base for Support for Alternatives	This step entails exploring the knowledge-base in order to discover a „kernel theory‟ (Walls, et al., 1992) that supports the defined alternative solution (from the previous step) if such theory exists. The kernel theory as justificatory knowledge which is "explanatory knowledge that links goals, shape, processes, and materials".

11	Prepare for Design and/or Evaluation.	This step encompasses planning for solution construction and evaluation activities. Methods for constructing the defined alternative solution are selected at this step. The step also includes preparation of functional specifications and metrics or criteria, to evaluate the significance and performance of a solution or an artefact.
12	Develop (Construction)	This step includes the design and development of a solution for an existing problem/foreseen need, and/or a novel artefact is constructed. This step also includes the determination of the artefact's functionality, architecture and properties, then building an instantiation which is the physical artefact.
13	Evaluate	Once the artefact is built, it becomes the object of the evaluation activity. The evaluation activity compares the performance of a solution to criteria or metrics, or functional specifications (Cole, Purao, Rossi, & Sein, 2005; Vaishnavi & Kuechler, 2004) in the targeted environment defined before. The aim of the evaluation is to decide not „why" or „how", but „how well" the artefact works (March & Smith, 1995). The new the system must be verified as (1) working correctly without shortcomings, and (2) performing required functions according to the defined requirements.
14	"Artificial" Evaluation	The designed solution or artefact is tested in a limited way where it may pass on to external evaluation or return to the design step for refinement before entering the same loop again (Venable, 2006a).
15	"Naturalistic" Evaluation.	This is the „real" test where the invented designed solution or artefact is tested in a real-life setting to check its validity (Venable, 2006a), based on metrics defined in step eleven.
16	Communicate Findings	Reaching this step means the design solution/artefact has passed the tests in the evaluation activity and can be published and communicated. Researchers must effectively report/communicate results, contributions, limitations, and new knowledge gained during the construction and design of the DS artefact, to communities of both researchers and practitioners. Establishing a contribution to knowledge, over what was known previously, is important

Table 6: DSR Roadmap

(Source adapted from Alturki, Gable and Bandara (2011)

This research contains eleven steps which explain the formalised steps of design cycle in DSR. Out of the researcher used 14 steps which are mentioned in the below table:

	Cycle	**Design Steps**
1	Relevance	Document the spark of an idea/problem
2	Relevance	Investigate and evaluate the importance of the problem idea
3	Design	Define research scope
4	Design	Evaluate the new solution feasibility
5	Design	Resolve whether within the design science paradigm
6	Design	Establish type (IS designs science vs. IS design research)

7	Design	Resolve theme (construction, evaluation, or both)
8	Design	Define requirements
9	Design	Define alternative solutions
10	Design	Explore knowledge base support of alternatives
11	Design	Prepare for design and/or evaluation
12	Design	Develop (construction).
13(a)	Design	Evaluate: 'artificial' evaluation
13(b)	Rigor	Evaluate: 'naturalistic' evaluation
14	Rigor	Communicate findings

Table 7: DSR Roadmap developed for this research

(Source adapted from Alturki, Gable and Bandara (2011)

For the aim of this research, step 1 and step 2 of DSR methodology are included in the relevance cycle, while step 13(b) and step 14 are included in a rigor cycle process.

The design cycle which is used in this research are: i) define research scope; ii) evaluate the new solution feasibility; iii) resolve whether within the design science paradigm; iv) establish type (IS design science vs. IS design research); v) resolve the theme of the research; vi) define DSR requirements; vii) define alternative solutions; viii) explore the knowledge base of alternatives; ix) prepare resources for the alternative design; x) develop (construct) the abstract design; xi) evaluate the abstract design: 'naturalistic' evaluation; xii) prepare resources for the solutions instantiation; xiii) develop the instantiation; and xiv) evaluate the instantiation: 'artificial evaluation'.

3.5 Relevance Cycle

The motive of Relevance cycle in design science research is to outline the problem, determine the necessities for artefact development and to decide the dimensions of the instruments so that it will define how effective the artefact is in addressing the said wicked trouble (Hevner et al. 2004).

This relevance cycle described the current state and the desired state of learning management system in Victorian Prison.

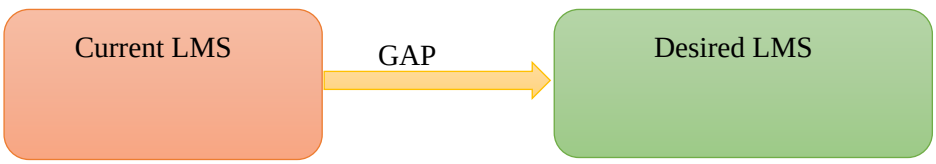

Figure 15: LMS Gap

(Source adapted from Alturki, Gable and Bandara (2011)

According to Alturki, Gable, and Bandara (2011), defined the relevance cycle as "discovering the needs" and "determining important unsolved problems".

The discovering needs in this research mentioned as "Document the spark of an idea/problem", and those problems found through previous research and the researcher observed it during their on-boarding process. The researchers found the Gap in organisation online training process and document the factors which play a crucial role in online training in Prison context. In this research, "To determine the important unsolved problems" means to Investigate and evaluate the importance of the problem idea, which observed through the employees' feedback and past literature.

3.6 Design Cycle

The Design cycle is the second stage of DSR, which plays the main part of the methodology. According to Simon (1996), "the design cycle as generating design alternatives and evaluating them against the requirements of the artefact". There are many studies published on Design cycle process in DSR. This research opted below steps to design the desired LMS model.

a) Defining the research scope – The problem already encountered by the researcher in Relevance cycle. In this section, as the research expands, the artefact is in developing status and the research scope and objectives are revisited. Every iteration of design and performance were recorded as a process of creating the model of desired LMS.
b) Evaluate the new solution feasibility – The early consideration is evaluated as a part of creating the successful LMS model. As mentioned in the previous section, the result of this research is documented.
c) Resolve whether within the design science paradigm – The researcher assesses whether this research falls under the Design Science Paradigm or not.
d) Establish type (IS design science vs IS design research) - There are two types in Design Science Research- design science and design research. This research falls under design science research which can be found below in the same section.

e) Resolve theme (construction, evaluation, or both) – According to Hevner (2007), there are two elements of the design cycle- Construction and evaluation. Both elements are used in this research.

f) Define requirements- Once the layout targets for the artefact were decided, a requirements time table became developed that specify the technical capabilities and physical resources required to complete the artefact's improvement. These necessities varied at every stage of its improvement. The diverse versions of the requirements time table are documented inside the desired model and can be view in Table.

g) Define alternative solutions- in the beginning, many viable solutions were made, through the identification process, all those solutions were tested and gap evaluation was carried out for every possible feasible solution.

h) Explorer knowledge base support of alternatives- This step follows the Kernel theory (Walls, Widmeyer, & El Sawy, 1992) which involved the investigation that supports and inform artefact design.

i) Prepare for design and/or evaluation- This step encloses the planning for construction and evaluation activities. This part consisted of documenting of artefact's illustration, design standards, improvement method, construction technique, functional specs, metrics, and standards.

j) Develop (construction) – The artefact is developed at this stage, when the artefact's structure, functionalities and residences are determined.

k) Evaluation of artefact – Once the artefact development process is completed, it goes under the evaluation process which determined whether the artefact is working without issues or need more testing. The evaluation process compares the solution's performance to criteria or metrics or functional specifications to the desired model (Cole, Purao, Rossi, & Sein, 2005; Vaishnavi & Kuechler, 2007).

3.7 Rigor Cycle

Evaluate: 'naturalistic' evaluation – In this section, the various data collection method is used and tested. This is the real test which invented the desired LMS. The data collection technique is discussed in Chapter 4 which contains instruments and data collection questions. The 'action research approach is used in this research which involved the quality testing of a developed artefact using Interviews and focus groups. In this cycle of DSR model, three measurement techniques are applied: TAM, semi-structured interviews and Focus groups which helped to evaluate the effectiveness of artefact.

The next chapter described the data collection which included- data collection methods- Semi-structured interview and Focus groups and technique samples

3.8 Data collection instruments and methods

The below table presented the various data collection methods used in this study. The below table shows two sources of data collected in the Relevance Cycle which defined the i) past research literature of LMS in the organisation context. The next section is design cycle, which has two sources of data collection i) Semi-structured Interviews and ii) Focus groups which are helped to test the quality of the developed artefacts through an 'action approach'. In the Rigor Cycle, desired LMS model and Focus groups used to evaluate the effectiveness of the artefact.

Summary of data collection methods/instruments

Relevance Cycle	Design Cycle	Rigor Cycle
Past Systematic literature	Semi-structured Interviews	LMS Model
		Focus groups

Table 8: Data collection technique

(Researcher's construction)

3.9 Research Approach

The current study used a qualitative research approach and the rationale behind choosing the qualitative research method is to have experience and inclusion of human aspects in the investigated results. According to Stuckey (2013), qualitative research has all the abilities to organise and interpret the data, which has the strength of retaining the original richness and the individuality of the responses, therefore, the qualitative research design will be the best fit for this study to be able to retain the original value of the data. Hevner & Chatterjee (2010) have advised that the emphasis in qualitative approaches is discovering by personally hearing, observing, or living through the existence of study participants.

Creswell (2013), explained that qualitative research is a means for exploring and understanding the meaning individuals or groups describe to a social or human problem. This qualitative approach will provide a realistic approach and framework that enables the researcher to understand any social phenomenon and answer the research questions. Iacono, Brown, and Holtham (2009) have rejected

the analyses through quantitative phenomenon on the ground of losing realistic, textual and conceptual data, which is another factor of the selection of qualitative approach. The research questions on effectiveness, learnability, and flexibility and user acceptance of LMS can be theoretical, hence requiring exploration of the usability of an LMS in real-world practice. The study will also be concerned about the inherent disadvantages of any qualitative research design. According to Atieno (2009), there are chances that the validity and reliability of the qualitative data may be questioned later on and to avoid that situation, the researcher will have to be ensured that the unfairness in the research program to be negligible.

3.10 The Case of Prison

This Victorian Prison established in late 2017. The organisation's primary role is to deliver better corrections, and in doing so, help create a safer community. The organisation is insured through the external insurance company and follows safety guidelines and aims to maintain a healthy work environment for employees, contractors and visitors alike and to ensure that the organisation has used online training to deliver programs to those who work the organisation's premises and have implemented a safe working culture through the anonymous program. This research will be a mostly exploratory case study, investigating the usability of LMS of Victorian Prison and goal is to create the new methodology by designing the desired LMS model. Albert, Gabrielle, and Elden (2010) defined *"the exploratory case studies as a means to define the necessary questions and hypotheses for developing consecutive studies"* (2010, p. 372). In other words, when there are single or multiple case studies, which has not been studied more clearly and rely upon to predict an outcome and usually used to generate theory for further research, Exploratory research draws actual conclusions with acute attention and helps to decide the best research design and data collection methods.

This study will explore a single case to investigate the LMS of Victorian Prison. Yin (2014), defined a case study as an *"empirical inquiry that investigates contemporary phenomenon with its real-life context, especially when the boundaries between phenomenon and context are not clearly evident"* (2014, p. 16). The advantage of single case study research is that it permits the researcher to accumulate an in-intensity appreciation of an event. This chapter starts with a discussion on the theoretical foundations of the research and then explain research design along with the method selected for data collection.

Stake (2008), discussed the prospective insights from the case study approach and identified three types: intrinsic, instrumental and collective. The instrumental case study will be the best fit for this

research where the problem could be on the unique group of users who are recognised to have the minimum expertise in technology and language problems. While Yin (2014), listed three case studies: explanatory, exploratory and descriptive and this case study will be exploratory in nature which will direct the investigation to gain the advanced knowledge of other influencing factors, which describe the impressions of the usability of LMS.

3.11 Data Collection Methods

There were three sources of data collection method used in this study- Systematic review literature, Semi-structured Interviews and Focus groups.

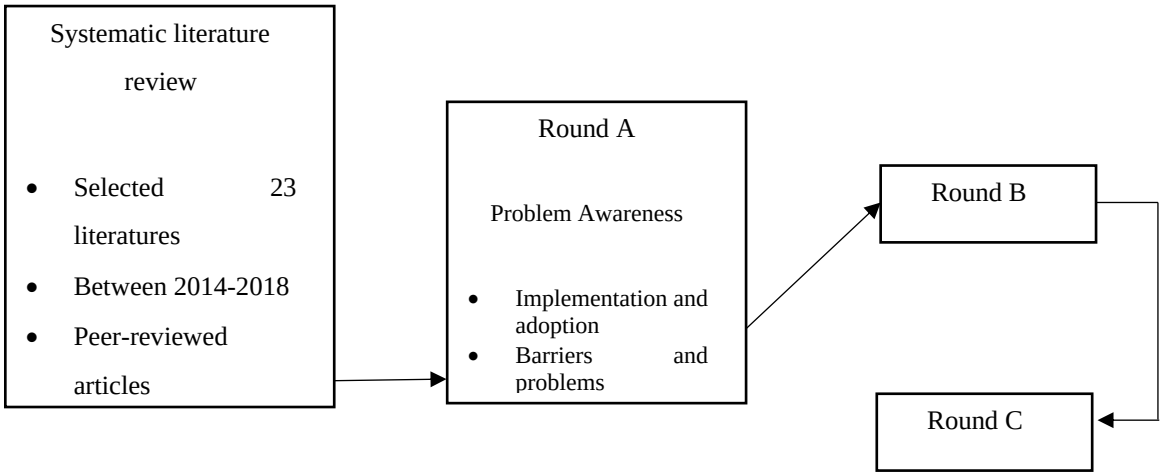

Figure 16: Data collection Process

(Researcher's construction)

The below figure explained the process for creating the artefact in the form of an interview question and then develop the model using employees' feedback to the interview questions and assess the model.

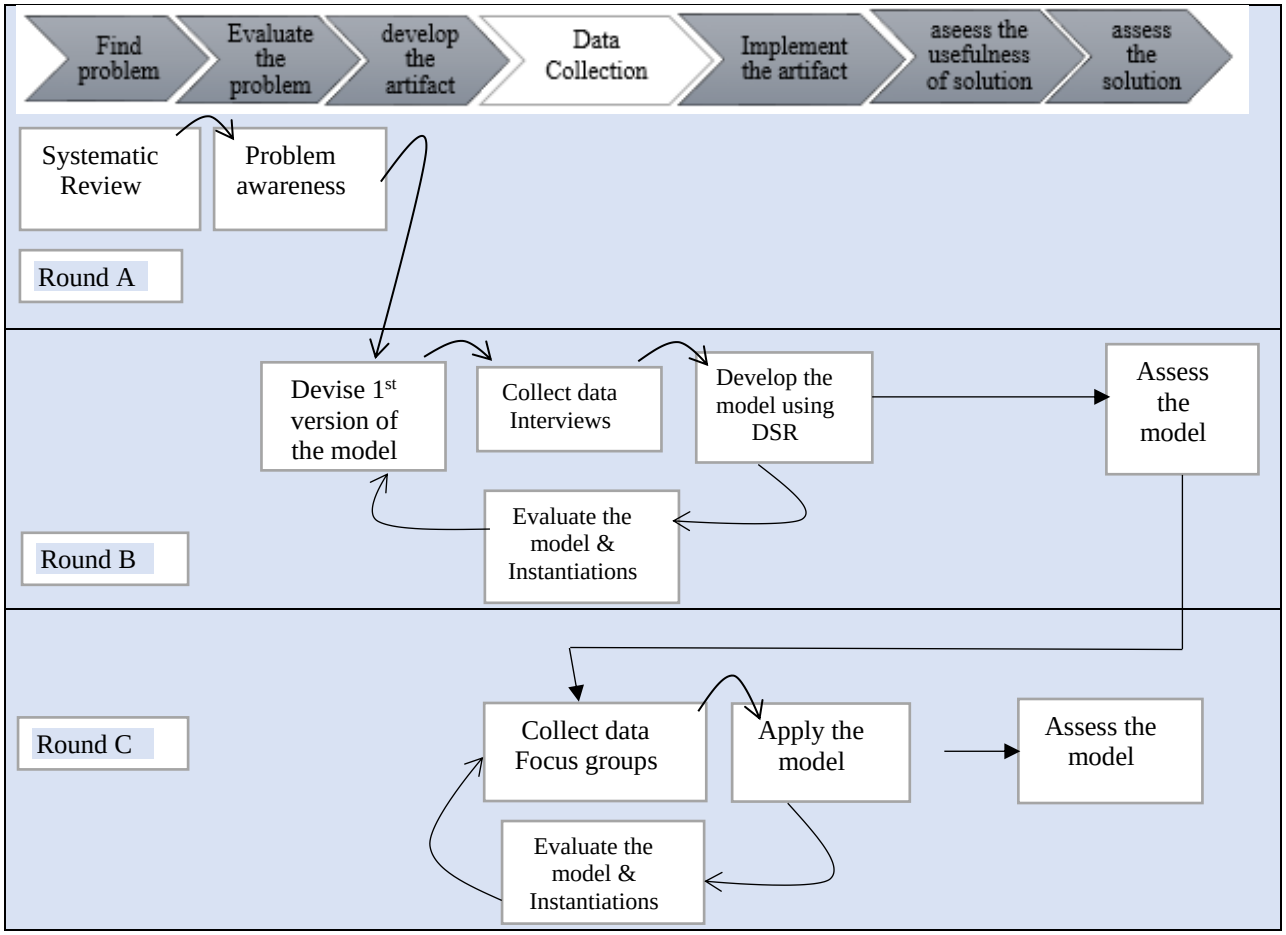

Figure 17: Data Collection and Analysis process

(Source adapted from Rocha et al., 2012)

It was decided to use Primary data and secondary data in the current study. Therefore, the approach to data collection promoted involved the analysis of the literature as secondary data by using a systematic review of the existing literature to resolve the usability of LMS in a Victoria prison.

This process was divided into seven steps and three rounds: Round A, Round B and Round C. The seven steps are- Find the problem, evaluate the problem, develop the artefact, collect the data, implement the artefact, assess the usefulness of the solution and assess the solution. Round A is involved in finding and evaluating the problem while as Round B involved in developing and implementing the artefacts using the interview as data collection. Round C followed the same cycle using focus groups as data collection. Several cycles of development, testing and refining of the solution were carried out until a suitable version of the model was produced, and then presented the model to the organisation.

3.11.1 Systematic Review

A systematic review (SR) of literature pertaining to usability, in the context of Prison was performed to thoroughly examine existing literature and research. A systematic review is an approach to methodically recognize, evaluate, and integrate all the applicable studies on a specified matter (Petticrew & Roberts, 2008).

Littell, Corcoran & Pillai (2008) defined that Systematic reviews can be used to resolve many kinds of research questions, and meta-analysis can combine different forms of studies. The generic plan which is appropriate for the identification of the literature for Systematic review as follows. To retain the nuances of a systematic method, essential keywords and phrases were used - learning management system, organisation, usability, online training, e-learning, corporate. Truncation and wildcarding along with appropriate Boolean operators were used while searching. The databases used to search for the literature were: Science Direct Elsevier, IEEE Xplore, Springer Link, PubMed, Taylor and Francis, Emerald, Bio Med Central and EBSCOhost. Only peer-reviewed publications from 2014-2018 were selected. After screening, only 23 publications were found to be useful, and these have been presented in Table.

The table in next chapter illustrates those 23 articles in chronological order; 1 related article was published in 2014, 9 articles in 2015, and 8 articles in 2016, 3 articles in 2017 and 2 articles in 2018. Key features from each study are outlined in the last column of Table In next chapter. A narrative review of the literature was performed due to diversification of practice playing an appearance in Learning management system in Organisational context and a few observational studies exploring explicit aspects of Workplace LMS such as Usability and LMS, implementation and adoption of LMS, barriers and problems of LMS which have been discussed in detail below. Narrative studies, as a methodology, are generally based on the availability of literature or the author's selection. Narrative reviews are used to express a focus on clearly identified issues, appraise published literature and conduct a general debate around a topic (Ferrari, 2015).

Data collection for this research were the Semi-Structured Interviews and Focus groups. The rationale of choosing multiple sources ensures that the usability is explored correctly through users' perspective and the issue is not explored through one lens but rather through multiple lenses which allows for various facets of the phenomenon to be revealed and understood (Baxter & Jack, 2008, p. 544).

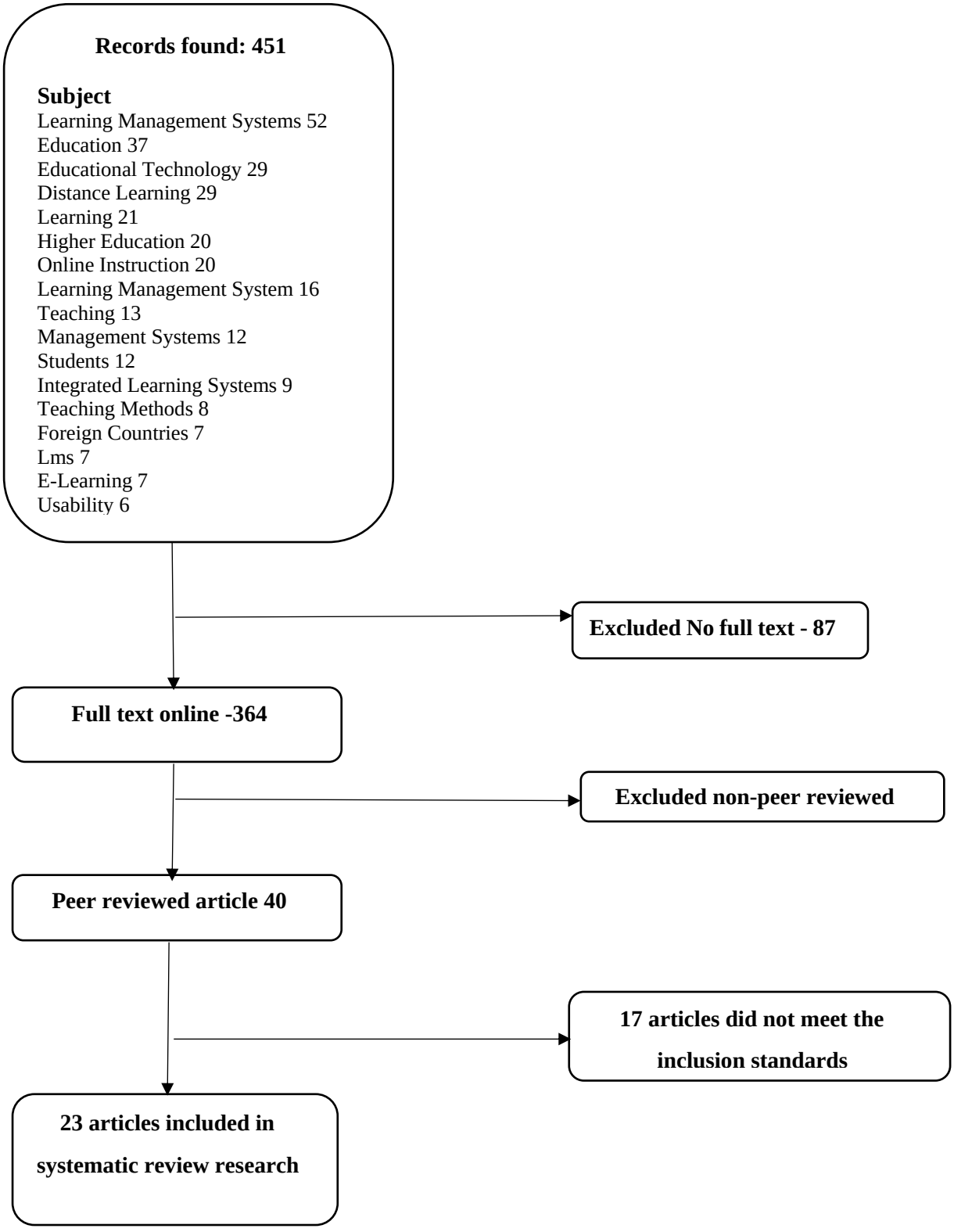

Figure 18: Selection Activities of Articles for the Systematic Review

(Researcher's construction)

3.11.2 Semi-Structured Interview

The starting point of the data collection was Semi-Structured Interview, which was held in March 2020, subject to the availability of the participants. Currently, the researcher is an ICT employee of the organisation and the participants have not been chosen from the same department where the researcher works to avoid the bias in the research.

The questionnaire design is justified by its suitableness to determine the four factors of Usability-effectiveness, learnability, and flexibility and user acceptance of LMS. Galletta (2013), described that the interview has an important feature that it is not rigid at all during the investigation process. Instead, it offers a suitable framework, flexibility in diverting the discussion, dexterity in asking questions, focused attention, two-way communication and dynamism in changing scenario while interviewing the respondents. Zorn (2008), has advocated the semi-structured interview method as very flexible, not highly structured, consisting of close-ended question and giving license to the respondents to speak freely. It is not very difficult for the interviewer to go away from the set of the guided composition of questions. However, the divergence should be as per the changing needs and within the scope of the study. All the contents will be recorded by the interviewer in diary or recorder so that necessary information is not lost. It helps those maintaining up-to-date records without missing any crucial information related to the study.

3.11.3 Semi-Structured Interview Sample

The 9 participants who attended the Interview (early, 2020), were invited by the researcher to participate in the interview process. Setting clear boundaries at the beginning of the interview and having a clear set of Interview question that needs to be answered by the participants will help the researcher to stay on the track. The researcher user purposive sampling which helps the researcher to select the set of Interview participants and researcher set criteria that would fit for the selection process of the participants including Participant's knowledge about online training, Usability view of the participants and the Prison's employee where the research has been held. Saunders et al. (2007) emphasise that the purposely approaches the target participants bringing the above criteria.

3.11.4 Focus Groups

A focus group is a qualitative data collection method that usually involves 10 or fewer participants, is moderated by a group leader where the researcher initiates a discussion but does not participate (Gibbs (1997). This discussion may be a question, problem or statement where the group is free to share their opinions and feelings. Participants' views will be recorded and studied for further research. Sometimes

groups are also appealed to conclude the discussion with relevant conclusion or solution. This method can generate feeling, opinion, perception, attitude, and experience of the individual or a group, time and cost-effective, helpful in obtaining information, face to face interaction provides an in-depth and clear answer to critical problems (Krueger & Casey, 2002). However, relevant information may be lost when two or more speakers argue or speak collectively while disagreement and irrelevant discussion, non-participant volunteers, dominant viewers, the personal bias of the moderator and observer into the participant's ideas may render the study inaccurate. This method can be used to study a large number of respondents in a short span of time. Personal interview with a large group may not be feasible in some instances as it is time-consuming.

3.11.5 Focus Group Samples

The 12 participants who attended the focus groups were invited by the researcher to attend the focus group. According to Kidd & Parshall (2000), in the preparation of the focus group, it is crucial to design a manual. In other words, without having a manual, the studies do no longer accommodate to a simple requirement for reliability. So, created the manual by setting up the boundaries at the beginning of the session and created the set of the questions which need to be answered by the group.

3.12 Data Reliability and Validity

The data is understood to be present as it was real-life research involving the prison's staff. As the data has been collected within Victorian prison as a single case, this can guarantee a level of data validity. The express dialogue of high-quality originated from social research, especially on issues relating to the concepts of validity and reliability, which initially developed in the scientific tradition, and which moved to qualitative studies (Seale, 1999).

The triangulation of methods that existed in the collection of Semi-Structured Interview and Focus groups, allowed trustworthiness of the data. In regard to the data collection, triangulation deliver to justify the data accumulated from many resources (Creswell & Creswell, 2017)

Lincoln and Guba (1985) argue that sustaining the trustworthiness of a research report depends on the issues, quantitatively, discussed as validity and reliability. The idea of discovering truth through measures of reliability and validity is replaced by the idea of trustworthiness, which is "defensible" and establishing confidence in the findings (Lincoln & Guba, 1985).

3.13 Ethical Consideration

Some Ethics was reviewed and considered by the Victoria University prior to the data collection. The participants' details including name kept anonymous and the confidentiality of data also kept ensured as an ethical consideration but data can be retrieved anytime upon participants' request. The researcher followed the guidelines from Saunders, B., Kitzinger, J., & Kitzinger, C. (2015), "'confidentiality' is a generic term that refers to all information that is kept hidden from everyone except the primary research team. Anonymity is one form of confidentiality – that of keeping participants' identities secret. However, confidentiality also includes keeping private what is said by the participants, something only achievable through researchers choosing not to share parts of the data."

The consent form was handed over before proceeding the data collection, which provides full knowledge about the research as well as obtains their consent as a part of Ethical consideration.

3.13 Chapter summary

This chapter clearly stated of a selection of a single case study. The researcher provided the justification of adopting each factor of the research framework whether its methodology, methods, sampling techniques and consideration. The study adopts Design Science research philosophy, the qualitative research design, Semi-structured Interview and focus groups data collection methods, purposive sampling techniques, thematic analysis method, single case study and ethical consideration are used as parts of this research methodology.

The Design Science research philosophy is adopted to design and investigate artefacts in context. This design science research methodology helps to create the model in order to improve the usability of Learning Management system in a Victorian Prison which was actioned in three levels which are- Awareness of the problem, then evaluate the problem and the last find the conclusion of the problem.

Choosing the Qualitative approach enables the user to make sense of reality, to describe and explain the social world and to develop the models and theories. The selection of single case study has demonstrated that the statement of stability regarding the manner in which the research itself stepped forward and also used as a path to discuss in-depth the underlying usability issues within Victorian prison.

The purposive sampling technique was chosen as the appropriate sampling technique to select the sample for Semi-Structured Interviews and Focus groups. Thematic analysis method has been selected

to enable the result analysis at which point frequent themes appearing inside the proof evaluate are recognized and analysed.

Chapter 4. Problem Awareness

4.1 Introduction

This chapter provides the findings from the systematic literature review which was described in the previous chapter. From the perspective of learning, the existing literature reviewed and provided a deep knowledge of LMS, LMS in the workplace, adoption and implementation issues, barriers and problems and discussed those facts and provided the conclusion, which developed as an artefact for DSR model. The first part of this research chapter briefly reviews the approach applied in the systematic review. This review discovered the essential usability factors, implementation and adoption issues and the barriers and enablers within the LMS domain, primarily in workplace settings. A review of the literature has been carried out by considering 23 research articles published between 2014 to 2018. The discussion highlighted current issues in the field, as well as gaps and possibilities for further research.

4.2 Round A

The data analysis process is divided into three rounds which involved seven steps process: Find the problem, evaluate the problem, develop the artefact, collect the data, implement the artefact, assess the usefulness of the solution and assess the solution. In the below figure, the first and second steps of the research process have been carried out which involved Round A involved the definition and understanding of the research problem based on systematic Literature review and problem awareness. The next round is discussed in the next section Round B.

4.2.1 Approach to Systematic Review

As explained in the previous chapter, Systemic review searches were conducted and the databases used to search for the literature were: Science Direct Elsevier, IEEE Xplore, Springer Link, PubMed, Taylor and Francis, Emerald, Bio Med Central and EBSCOhost.

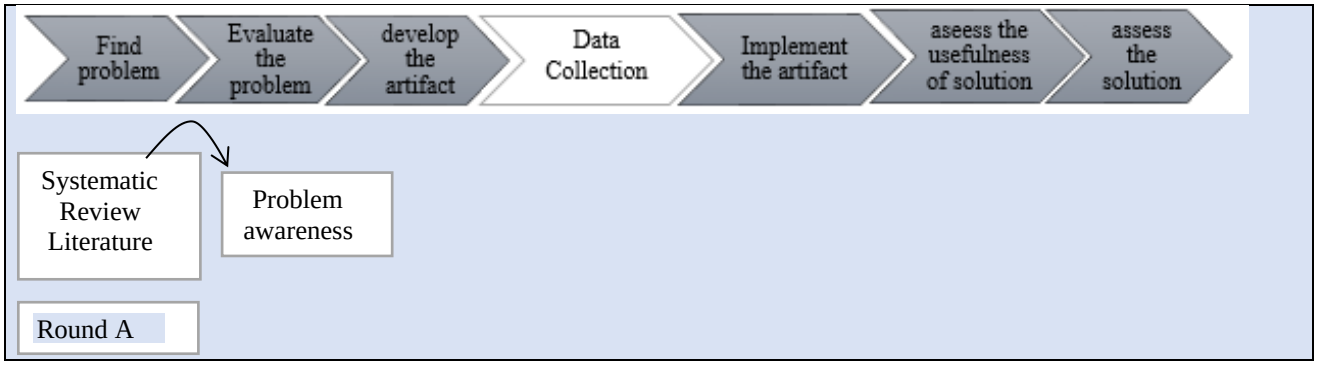

Figure 19: Data Collection and Analysis process (Round A)

(Researcher's construction)

4.2.2 Inclusion and Excursion standards

This study had to keep the inclusion and excursion criteria maintained in order to find the literature. The searches were limited to only English language and focused only on specific terms: learning management systems, organisation, usability, online training, e-learning, corporate learning. Only peer-review articles were chosen between 2014 to 2018. The study drew attention to Usability, LMS, adoption, implementation, barriers and problems. This search found only 23 articles which match the criteria.

4.2.3 Data Extraction

There were a very limited number of papers that focus directly on LMS in the organisation, the usability of LMS, Organisational learning while even as there are numerous within the information systems literature that deals with the concern in an oblique way. Eventually, the findings from the studies protected in the review have been enclosed in terms of Key features: Use of learning management systems at the user end; Factors influencing faculty members' acceptance of LMS; Uses of MOOCs in the corporate world; Attitude towards usability; Investigate users' preferential factors of ease of workplace learning in Korean WLS business organizations; LMS features and characteristics; Evaluates the usability of locally built LMS; Students' acceptance of mobile learning and its influence on learning achievement using an information system; An online training model for blended learning in the traditional classroom and on the job training for students; Identify challenges to open E-Learning in public administration; Acceptance of LMS; Measures instructors' satisfaction; Factors affecting perceived usefulness of e-learning; Implementation of LMS; Investigation of different E-LMS; Evaluates the effect of e-training towards the performance of employees; Instructor's perception of LMS usage; Engagement with work-based learning; Examines the attitudes of corporations regarding the usage of e-learning for corporate training; Evaluates the activation pattern of LMS; Students' perception of learning styles; Usability evaluation of mobile learning applications; Students' attitude toward online education.

The database has been selected by the solo researcher and also responsible for screening the resulting articles. A total of 23 articles were selected for use in the literature review. The findings from this systematic review were utilised in this study as a suggestion of a solution which helped to develop an

artefact as a model. The finding from this systematic review of literature turned into separate awareness of the problem from recommendations for its potential resolution.

4.2.4 Systematic Review Results

The below table presented 23 articles which were selected for the systematic review search.

Publication Year and Author Details	Study title	Research Method Used	The Key Feature (s) of the Study
Shahid and Abbasi 2014	Usability testing of an E-Learning System: A comparative study of two evaluation techniques	Survey	Use of learning management systems at the user end
Bousbahi and Alrazgan 2015	Investigating IT faculty resistance to learning management system adoption using latent variables in an acceptance technology model	Survey	Factors influencing faculty members' acceptance of LMS
Dodson et al. 2015	Possibilities for MOOCs in corporate training and development	Case study	Uses of MOOCs in the corporate world
van Kuijk et al. 2015	Usability in product development practice; an exploratory case study comparing four markets	Interview	Attitude towards usability
Lee and Kim 2015	Users' preferential factors in Web-based e-learning systems for ease of workplace learning in Korea	Survey	Investigate users' preferential factors of ease of workplace learning in Korean WLS business organizations
Little 2015	The purchasing and practical benefits of a learning management system	Case study	LMS features and characteristics
Medina and Gamboa 2015	Usability evaluation by experts of a Learning Management System	Questionnaire	Evaluates the usability of locally built LMS
Shin and Kang 2015	The use of a mobile Learning Management System at an online university and its effect on learning satisfaction and achievement	Questionnaire	Students' acceptance of mobile learning and its influence on learning achievement using an information system
Sriprasertpapa 2015	The development of online training model for Srinakharinwirot University in Thailand	Mix-method (group discussion, questionnaire, in-depth interview)	An online training model for blended learning in the traditional classroom and on the job training for students

Stoffregen et al. 2015	A barrier framework for open E-Learning in public administrations	Systematic literature review	Identify challenges to open E-Learning in public administration
Al-Gahtani, 2016	Empirical investigation of e-learning acceptance and assimilation: A structural equation model	Survey	Acceptance of LMS
Almarashdeh 2016	Sharing instructors experience of learning management system: A technology perspective of user satisfaction in distance learning course	Questionnaire	Measures instructors' satisfaction
Alsabawy et al. 2016	Determinants of perceived usefulness of e-learning systems	Survey	Factors affecting perceived usefulness of e-learning
De Smet et al. 2016	The design and implementation of learning paths in a Learning Management System	Quasi-experimental study	Implementation of LMS
Mahoney et al. 2016	Implementing an electronic learning management system for an Ophthalmology residency program	Interview	Investigation of different E-LMS
Saidin and Iskandar 2016	Proposed model to evaluate the impact of e-training on work performance among IT employees in Malaysia	Survey	Evaluates the effect of e-training towards the performance of employees
Walker et al. 2016	Learning Management System usage: Perspectives from university instructors	Survey	Instructor's perception of LMS usage
Zhang et al. 2016	Facilitating professionals' work-based learning with context-aware mobile system	Survey	Engagement with work-based learning
Kimiloglu et al. 2017	Perceptions about and attitude toward the usage of e-learning in corporate training	Questionnaire	Examines the attitudes of corporations regarding the usage of e-learning for corporate training
Park and Jo 2017	Using log variables in a learning management system to evaluate learning activity using the lens of activity theory	Questionnaire	Evaluates the activation pattern of LMS
Ramirez et al. 2017	Moderating effect of learning styles on a learning management system's success	Survey	Students' perception of learning styles
Kumar and Mohite 2018	Usability of mobile learning applications: a systematic literature review	Systematic literature review	Usability evaluation of mobile learning applications

Nurakun et al. 2018	Learning management system implementation: a case study in the Kyrgyz Republic	Mix-method (Survey, questionnaire , interview)	Students' attitude toward online education

Table 9: Systematic review

(Researcher's construction)

4.2.5 Usability and LMS

The key focus of usability is for users to be able to use a product or system with effectiveness, efficiency and satisfaction. A usable interface indicates how easily employees are able to use a system, whether for training or skill development. If users spend more time learning to use an LMS rather than the training content, it is not user-friendly and does not help in meeting objectives. According to research on the usability of e-learning at the University of Sargodha Women Campus Pakistan, a right user interface always leads to excellent user fulfilment levels (Shahid and Abbasi 2014). Shahid and Abbasi (2014) compared Nielsen's ten heuristics technique, from which it was concluded that e-learning success has three primary features: efficiency, effectiveness, and user satisfaction.

Usability is a comparative but independent approach that describes the nature of the interaction between people and systems (Van Kuijk et al. 2015). Van Kuijk et al. (2015) compared four multi-national markets and concluded that usability and user-centred design influence a company's product-market combination target. Moreover, usability helps to integrate various aspects of digital systems and allows the quality of a design to be characterised from the perspective of users' experience (Medina-Flores and Morales-Gamboa. 2015). Medina-Flores and Morales-Gamboa (2015) designed an instrument to evaluate usability factors and also carried out a usability test on the development of an in-house built LMS called Metacampus. In other words, usability testing is a technique used in user-centred interactive design to evaluate a product by testing it on users; this helps to identify problems before and after implementing LMS.

Businesses need a useable LMS, which is why an exploratory study examined the attitude of 106 corporations towards the usability of online training (Kimiloglu et al. 2017). Kimiloglu et al. (2017) explained that LMS adoption consists of many elements such as cost-effectiveness, functionality, customisability and maintainability. These authors found that online training is a flexible and efficient way to develop employees' skills and knowledge.

Usability is a primary factor for successfully adopting the technology. Mobile learning is an extension of e-learning that allows users to accomplish learning using small and portable wireless devices (Kumar and Mohite 2018). The researchers used 23 publications and a systematic review to measure the research activity, attributes, research methodologies, and limitations. Mobile learning has a wide

range of benefits such as flexibility, cost-effectiveness, location-based services, and it reduces the distance of learning. Mobile learning can be used as a formal or informal tool for online-training. Shin and Kang (2015) determined the acceptance of mobile learning and its effect on learning satisfaction and achievement using the Technology Acceptance Model (TAM) and Information System Success (ISS) model. Shin and Kang (2015) found from 1117 survey responses that learners began to accept mobile LMS as a new learning tool which influenced their learning acceptance.

Another study by Zhang et al. (2016) examined how context-aware mobile system is used in professional work-based learning. This research presented a work-based learning activity design, system technical implementation, structure design, functionalities and evaluation of learning achievements, as well as user attitudes and acceptance towards the learning system. Zhang et al. (2016) highlighted that professionals could use their mobile devices to get adaptive, personalised and just-in-time learning support.

According to Dodson et al. (2015) corporate LMS is different from educational LMS; a study about MOOC (massive open online course), which is off-the-shelf LMS for online and distance education, revealed that LMS can be customised according to audience requirements. The corporate LMS's primary role is to ensure that employee has skills and knowledge to assist an organisation to develop and expand, while an education LMS's primary focus is only on knowledge transfer.

4.2.6 LMS adoption

LMS is a means to provide high-quality training for employees and also make them aware of compliance and skill development via an online medium. To adopt LMS, an organisation requires planning and preparation, as indicated by this medical college research, conducted in the United States for an Ophthalmology residency program that explored faculty members' experience towards electronic learning, by encouraging staff to implement electronic LMS (e-LMS) (Mahoney et al. 2016). Mahoney et al. (2016) have found it necessary to implement an e-LMS to consolidate external electronic educational resources, host internal electronic education resources, and provide a space for developing new online learning contents (Mahoney et al. 2016). With help from 12 interviews to determine the features, the authors also examined 4 LMSs and found a cost-effective solution for curriculum management, which has all the functions needed to complement current teaching methods.

Research by Al-Gahtani (2016) highlighted that implementation failure of e-learning systems costs millions of dollars and low adoption and acceptance could be the reasons of underutilisation. Al-Gahtani (2016) primarily focused on individual behaviour towards acceptance and assimilation of e-learning in Saudi Arabia (King Khalid University) with the help of 286 participants' survey; the

research based on TAM3 determined factors that influence the users' intention to use e-learning, with a key focus on managerial interventions for increased acceptance (Al-Gahtani 2016).

Nurakun Kyzy et al (2018) investigated the adoption factors such as users' preferences and attitude towards LMS and concluded that four factors: technical characteristics of LMS, ease of use, feedback options of LMS and advantages of use influenced the students' perception of LMS.

A study by Almarashdeh (2016) examined the factors that influence instructor satisfaction and found that service quality, perceived usefulness, system quality and information quality has a significant effect on user satisfaction and also proved with 110 survey responses that perceived ease of use have no impact on instructor satisfaction. An Australian institution (University of Southern Queensland) focused on the impact of IT infrastructure services and IT quality on perceptions of the usefulness of e-learning systems and created a model with 720 students' response; which proved that IT infrastructure services substantially impacted system quality, information quality, SDQ, and perceived usefulness (Alsabawy et al. 2016).

On a similar note, instructors (faculty members) should understand the concept of the usability of LMS. A study conducted at King Saud University investigated the personal factors influencing faculty member's acceptance of LMS (Bousbahi and Alrazgan 2015). Bousbahi and Alrazgan (2015) found that the perception of the usefulness of LMS depended upon personal factors; motivation, load anxiety, and organisational support; and the ease of use of LMS has no impact on the usefulness of LMS. Lee and Kim (2015)'s study in Korea which focused only on employer's preferences towards web-based e-learning found six preferential factors for ease of workplace learning - content selection and clarity, feedback of learning, control the process, motivational possibilities, and information sharing which can help design successful Web-based learning systems.

De Smet (2016) stated that the design of learning path and group setting (collaborative versus individual) have an impact on learning outcomes; this quasi-experimental study involved 360 students and found the importance of the design of learning path and effect of an individual versus a collaborative setting. Another study by Little (2015) discussed that LMS adoption could import tangible benefits such as improve efficiency and business goals for the organisation. Little (2015) revealed selection factors such as the user interface, support and service, features, unique selling propositions, the speed of innovation, and adaptability and consumer feedback.

Whereas a study by Park and Jo (2017) evaluated the activation levels and usage patterns of LMS using activity theory through online activity information from 7940 courses which result in different activity patterns within different courses colleges as well as the low use of virtual campus with minimal changes. Another study by Ramírez-Correa et al. (2017) assessed Delone and McLean (D&M) model of Information system and effect of learning styles on the success of LMS from

students' perspective with the help of 258 survey responses and justified the D&M model to explain user satisfaction and perceived benefits of a learning management system.

The adoption of online-training within corporate organisations has a positive impact on both employees as well as organisations. The employees can access the online training at any time and from anywhere because of its remote nature, which improves employees' skills and knowledge. Research of Malaysian organisations by Saidin and Iskandar (2016) focused on evaluating the effectiveness of e-training towards work performance within the ICT sector. Saidin and Iskandar (2016) proposed a research model to evaluate the employee's performance as well as the impact on the utilisation of e-training using task-technology and social cognitive theory.

Walker et al. (2016) focused on determining LMS features to benefit online learning and teaching and secondly, focused on the impact of LMS's quality which can help to accomplish instructor's requirements. Walker et al. (2016) found the positive and negative attitude towards seven features of LMS: grade book, assessment tools, course materials, communication tools, interface, administration of classes, and student engagement. Walker et al. (2016) advised that a positive attitude towards LMS features confirmed the LMS selection whereas negative attitude focuses on threats that ought to be addressed in the future for LMS adoption.

Additionally, Sriprasertpap (2015) aimed to design and develop an online training model for blended learning in the conventional classroom and on the job training for students and teachers. Sriprasertpap (2015) designed an online training model which has five elements: creativity, LMS, instruction media, interaction, and evaluation. The author outlined the interaction between the teacher and the students and advised that this is two-way communication through online learning and evaluation plays an important role in usability assessment.

4.2.7 Barriers and problems of LMS

This research also explored the obstacles and the difficulty of using LMS which included face-to-face interaction, technical knowledge, cost, individual adoption behaviour and content of LMS. This part of the paper reveals the barriers and limitations of LMS by investigating the relevant literature.

A Saudi Arabian study found that distance learning has some limitations such as technology dependence, individual experience, motivation and time management (Almarashdeh 2016) and secondly, the study was only limited to higher education's instructors.

Alsabawy et al. (2016) explained the impact of IT infrastructure services but only limited to the education sector. The research did not include e-learning systems in organisations which can be a hurdle to generalising the findings of this student group to organisations adopting e-learning systems due to the differences surrounding universities and organisations and the purpose of using e-LMS.

The lack of motivation is the most significant barrier to LMS usefulness. Bousbahi and Alrazgan (2015) explained the impact of using TAM; the instructors are not motivated enough to engage in the new method of teaching and the study only limited to IT, faculty members. The adoption of LMS can be vital for early adopters or non-adopters as explained in a Turkish organisational study (Kimiloglu et al., 2017). Kimiloglu et al. (2017) explained two types of disadvantages of e-learning; personal disadvantages which included lack of acquaintance, concentration and communication of the employees and organisational disadvantage which included necessary infrastructure, qualified team, supportive management and competent employees to benefit from e-learning. The attitude towards LMS is another factor, which varies through human interaction and experience (van Kuijk et al. 2015) Despite all other factors, language is another limitation; the users do not feel supportive if the training module is not in the shared language. Little (2015) assessed two case studies and described that users feel comfortable if LMS content is designed in their language. Little (2015) advised that due to a large number of LMS currently available in the market which makes it difficult to acquire the appropriate one for the organisation. Inactive user-interface is another barrier which stops users to access the learning material via portable devices such as mobile phones and tablets. Kumar and Mohite (2018) advised in this research conducted in Fiji that mobile learning has some limitations due to mobile small screen size, limited input capability, and changing user context which make it difficult to abide by the traditional methods of usability.

Another research by Medina-Flores and Morales-Gamboa (2015) identified eight attributes: searchability, communicability, reliability, configurability, design, comprehensibility, ease of use, and navigability to measure the usability of an in-house built LMS. With the help of the above mentioned eight attributes, Medina-Flores and Morales-Gamboa (2015)found that in-house built LMS has usability problems: low reliability, lack of flexibility to meet the varying user demands, and missing search facilities. Research by Stoffregen et al. (2015) was aimed to identify the challenges to open e-learning in public administrations and developed a contextual framework that covers more than 40 obstacles in organisational, social and technical dimensions.

4.2.8 Discussion

From the review, it is evident that many of the shortlisted articles are geared towards academic applications of LMSs. The scope of this study though aims at figuring out usability in a workplace setting. Although the common denominator is still education and training, it is important to distinguish between the two settings – academic and workplaces. What works for one population may not necessarily work for others. The role of LMS in workplaces is to ensure staff can be trained with the relevant knowledge, skills and behaviours expected within a workplace, with an aim to efficiently enable staff to complete job-related tasks. In contrast, an academic LMS may have functionality

similar to workplace LMS but the goals and user base are different. In academia, LMS primarily focusses on imparting subject knowledge, the ubiquity of learning content and course administration. In both contexts, the overlap is on virtually managing learning and development to create an effective learning environment.

To develop employees' skills and knowledge, online training is a flexible and efficient way (Kimiloglu et al. 2017). The selection of a suitable LMS within an organisation depends upon many factors: user interface, support and service, features, unique selling propositions, the speed of innovation, and adaptability and consumer feedback(Little 2015). Implementation and adoption issues should not be an after-thought and should be considered early in the planning stages. However, before adopting any e-learning tool, it is important to ensure that the intended outcomes are clarified and aligned with learner needs (Chugh 2010)

Since organisations utilise a lot of resources to train their employees, having a balanced combination of usability factors in LMS helps make training easily accessible and will improve user satisfaction. This review has evaluated some usability factors of LMS and places the concept into practicality. LMS is a combination of tools that deliver online training in an efficient and timely manner. Workplace learning that occurs on a day-to-day basis at work when employees obtain skills and knowledge for the problem-solving and decision making can be delivered through LMS. LMS can help to save costs, enhance organisational performance and provide ubiquitous content. In this regard, an ideal LMS should make education and training activities streamlined, efficient and effective. From usability factors' perspective, an LMS should be intuitive, easy to learn and reduce ambiguity. In order to provide value, an LMS should enable administrators or managers to have easy access to reporting capabilities, have a low learning curve and offer functionality and features that can be used to engage learners in any educational setting.

4.2.9 Conclusion

It appears that most LMSs are seamless for managing to learn, but not for delivering learning. The navigation is often tedious, the analysis and analytics capabilities are basic and lack customisation features. It is vital that future iterations and advancements in the LMS arena prominently focus on the learners, providing them engaging learning experiences through the use of newer technologies such as artificial intelligence and virtual reality.

This research makes contributions to the literature on LMS with a focus on understanding usability, implementation and adoption issues and challenges of LMS usage. Nevertheless, this research paper may have some boundaries regardless of the truth; the study was planned with the purpose of accomplishing the maximum achievable certainty. Some relevant research may have been overlooked, and therefore might provide incomplete observation into the usability of LMS. The research has been

constrained based upon the selection of literature in the usability domain of LMS and stuck to peer-reviewed journal articles and omitted reports, grey reports and web articles. The quest string can be questioned as the search has filtered using some keywords. To alleviate that risk, some database filters were applied resulting in the effective search string.

Future research can be based upon finding empirical issues towards LMS adoption and implementation to enhance the usability of LMS. This study has practical significance as it provides a better understanding of LMS, in particular, to guide practitioners, managers and developers with an aim to improve LMS adoption in workplaces. Employee satisfaction with LMS usage and its role within different domains can also be investigated. More theory is required to understand the users, managers and administrative staff perception towards LMS which can help to guide the design, adoption and implementation of LMS in diverse settings.

4.3 Round B

This part is a continuation of Round A. The problems has been defined as part of Round A which contains: adoption and implementation issues, barriers and problems, the data collection has been performed using semi-structured Interview. The third step involved the development of artefact, in which preliminary version of model devised. This 1st version of the model based on understanding the problem which proposed the overcome of issues found in problem awareness. The data collection – semi-structured interviews are used to corroborate and refine the 1st version of the originally developed model. The third, fourth and fifth step involved the development and implementation of artefact which is cycle process to devise the preliminary version of the proposed model, then data collection and then analyse the findings of data collection and add new features on the proposed model which developed 2nd model and then evaluate the process and created an instantiation of the model. The initial model of the version is refined, considering a reflection based on the instantiations, and initiating a new cycle of solution development. The last step enclosed an assessment of the model. Round C has been invented using Round B process which is described in the next section.

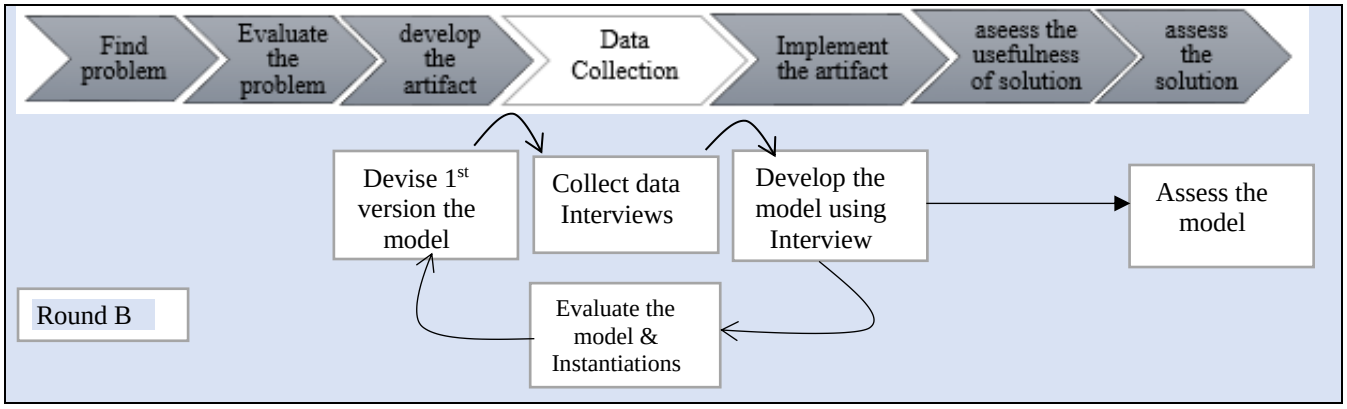

Figure 20: Data Collection and Analysis process (Round B)

(Researcher's construction)

Primary data collection for this research were the Semi-Structured Interviews and Focus groups. The rationale of choosing multiple sources ensures that the usability is explored correctly through users' perspective and the issue is not explored through one lens but rather through multiple lenses which allows for various facets of the phenomenon to be revealed and understood (Baxter & Jack, 2008, p.544). The question has been divided into 8 main questions which are described along with Interviewer response.

4.4 Round C

Round C is created using the Round B model and followed the process of the same steps which involved data collection and implementation of the artefact. The assessed proposed model is analysed based on secondary data collection method- Focus groups. Therefore, many cycles of development, testing and implementation are carried out until a suitable version of the model is produced.

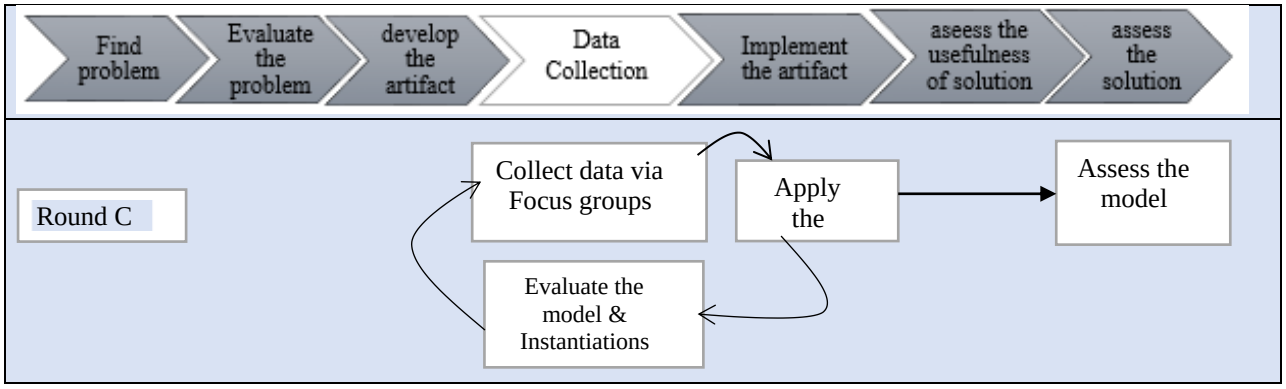

Figure 21: Data Collection and Analysis process (Round C)

(Researcher's construction)

4.5 Chapter summary

This chapter explained Data collection and analysis process which has been divided in Round A, B and C as a continuation of chapter 3, 2 and 1. The research issues that were discussed in chapter 1, have been rigorously explored and have shown that there is a gap in the usability of LMS in the workplace which leads to the current research. The chapter 2 provided the review of the literature

followed by chapter 3, Research methodology which included DSR and DSR process in this current research.

This present chapter explained systematic review literature process as Round A which included an approach to a systematic review, inclusion and extraction literature standards, data extraction, systematic review results, usability and LMS, LMS adoption, barriers and problems of LMS, discussion and conclusion of a systematic review. Then Round B has been explained which included the development of artefact using semi-structured interview data collection. The last part is described as Part C which is a repetition process of Round B but used Focus Group as a data collection process. The model has been developed and evaluated and assessed. The next chapter will evaluate the data using PDCA testing process and then analyse the data using NVIVO which has been collected through a semi-structured interview and focus groups.

Chapter 5. Field Study and Data Analysis

5.1 Introduction

In the background chapter, the researcher explains how this research evolved in the prison context. The online training is a part of training in Prison where the employees find the information before performing their duties. The training system should not be complicated otherwise it's quite challenging to train the new employees and share product knowledge. The online training should be user friendly to navigate the content and easy to use.

Currently, the researcher is an employee of the organisation where the study has been held. The researcher found the big gap in training platform and decided to do the investigation so that the employees can get proper training before going on the actual job. In Victoria Prisons, the primary goal of correctional officers not to just keeping the prisoners inside the jail but also create the plan for the prisoners to follow as a part of rehabilitation care so that they don't re-offend the crime. The correctional officers are responsible for care, custody, and control of inmates (Corrections Victoria 2019).

5.2 Methodology

After studying the feedback from previous years (2014 – 2018), It appears that most LMSs are seamless for managing to learn, but not for delivering learning. The navigation is often tedious, the analysis and analytics capabilities are basic and lack customisation features. It is vital that future iterations and advancements in the LMS arena prominently focus on the learners, providing them engaging learning experiences through the use of newer technologies such as artificial intelligence and virtual reality.

5.3 The research location

There were 9 Semi-Structured interviews conducted which included Correction officers, Admin staff and manager. The different data was collected due to different sort of roles of employees within the prison. There were 7 male interviewee and 2 female because there are less female staff as compared to male staff due to fact that the prison system is complex and at times prisons can be a very dangerous workplace with fatal consequences if necessary, precautions are not taken (Smith and Palin 2019).

5.4 Analysis and discussion of Interview Data

This section provides a discussion on the PDCA cycle (Plan, do, change and act). The proposed model for this research presents a smooth transition to this new system and to ensure that it works the PDCA implementation cycle can be used. The details of the cycle are as follows.

5.4.1 PDCA or the Shewhart Cycle

The PDCA is a method of pilot testing a change that is going to be implemented in an organisation or a department (Vyt 2019). The chief aim of pilot testing new technology or in this case the LMS is to be aware of the change and how it works and are there any issues. For example, in the given case the LMS can be initially applied to only 1 of many prisons in Victoria State to test its application, its benefits and any issues that arise from its implementation. For example, instead of applying LMS once it is approved in all prisons in Victoria simultaneously, it will be wise to implement it in one prison so that it can be tested. This testing will not only allow the user or the prison offices to be aware of the LMS and its various variables but also regarding ways to refine it further. The PDCA cycle can be used for pilot testing and it is as follows.

Plan: the first stage is called the planning stage (Maruyama and Inoue 2016). In this stage of the pilot implementation of the LMS, it is necessary to prepare one prison for application, it will involve updating the IT equipment, developing lesson plans to testing the system, imparting training to the employees to test the system and much more. The complete emphasis will be on making the testing phase a realistic as possible. For people, the planning stage will last for around 30 to 60 days and it will as realistic as possible involving daily updates for the officers, the task they need to complete as a way of training and feedback from them in regard to the complete LMS, its operations and any other issues that the officers find. This phase will also involve the significant amount of training to the officers too. It must be kept in mind that the Australian prisons have a very diverse workforce, their cam is individuals in the second decade of life to the mature employees who are in their 5th or even 6th the decade of life, these officers may have some training or next to none training in using IT/IS equipment that forms the core of the LMS. Therefore, before the testing stage can be completed there will be a need to train all employees regarding the LMS and its use.

Do: is the second stage (Dimitrescu et al. 2018). In this stage, the training of the officers must be completed and they must use the LMS in the way is designed to be used. For example, the offices should use the LMS for case management, prisoners' details, policy updates, their training and much more. It will be shifting from the current paper-based system to the new LMS which will automate

most functions but it will require a significant amount of adjusted as well as training to get functional fluency in regard to the LMS.

Change: this is a stage of the pilot testing where the users will get a chance to give their feedback in regard to the program and check if it requires any changes (Vargas et al. 2018). For example, after testing the LMS for a period of 60 or more days all the officers in the centre selected for the LMS will be requested to give their feedback. In case the feedback states that the LMS is working as is expected and is helping the prison officers in their day to day work and is also useful in keeping them updated then the implementation plan will move on to the next stage. However, in case there is negative feedback regarding the LMS or in regard to its ability to help the officers then the LMS implementation will be suspended and the LMS will be updated to remove any issues faced by the officers. The above stages will be repeated until there are no more errors evident in the LMS and all the users are fully satisfied with the LMS and its operations. Once there is all clear from all users, then the implementation will move on to the final stage.

Act: this is the final stage (Gemechu et al. 2018) in the complete implementation process of the LMS and it involves terming the LMS testing at the pilot level as a success and this will also give the green light for the LMS to be implemented in all other Victorian prisons after the pilot testing is successful.

5.4.2 Data Collection

Introduction – The data is collected via Semi-structured interview process and randomly selected the participants from different departments. The gathered data was in qualitative in nature-based upon the participants' answers. Having such data available, enabled the researcher to consider the question that was stated in Chapter 1:

- What does the LMS in a Victorian prison provide to facilitate more effective online training for users?

- What features of the LMS assist users to improve learnability?

- What are the factors that would provide flexibility to the LMS at Victorian prison?

- What promotes the acceptability of the LMS?

5.5 Analysis Process

As mentioned in the previous chapter, the participants' details kept anonymous, thus the actual name of the semi-structured interview participants was changed to fake due to ethical consideration which has been already described in the previous section. There had been 9 interview participants in the Interview process – six were correctional officers, one facility maintenance, one admin staff and one manager. The participants have been identified as Correctional officer 1, Correctional officer 2, Correctional officer 3, Correctional officer 4, Correctional officer 5, Correctional officer 6 and the facility maintenance officer, the admin staff and the manager.

Interviewees	Male	Female	Total
Correctional Officers	4	2	6
Facility Maintenance officer	1	0	1
Administration Personnel	0	1	1
Manager	1	0	1
Total Respond	6	3	9

Table 10: Interviewees' Job positions and gender

(Researcher's construction)

According to Deakin et al. (2012) *"NVivo is one form of CAQDAS (computer-assisted qualitative data analysis software) available to students to facilitate the storing, organizing, analysing and presenting of qualitative data. NVivo facilitated analysis of qualitative data including documents, surveys, audio files, video and pictures"* (2012, p. 604).

5.5.1 Employees' experience with online training

The interview participants were asked about the experience, they have encountered while using online training. Correction officer 1 stated that the training provided detailed irrelevant information about processes and operations. He also advised that it was good at some extent but did not cover everything that a correctional officer has to do on daily routines such as case management and dealing with the prisoners.

The Correctional officer 2 identified that it was overloaded with too much information such as policy, procedures, field training, scenarios etc.

The Correctional Officer 3 mentioned that it was long and time-consuming which has only repetitive stuff which does not connect to your daily tasks. He also advised that he needed support to complete the training because he has very little technical knowledge about technology.

The correctional officer 4 has identified that it was not helpful at all, the information was too much which included-policies, procedures. The other problem was a lack of communication between the trainer and the staff and the training provided online training material which created the gap between the staff.

The Correctional officer 5 response was that the training did not provide the values what he has expected, in other words, it was lack of support, lack of flexibility and overloaded information with irrelevant stuff.

The correctional officer 6 advised that the training was much helpful if you learn on the computer, and by the time you apply it's very difficult to retain and it's in short and precise.

Facility Maintenance personnel mentioned that the training was effective if you take it seriously but it does not teach your job what you do on-field.

On the point of view of Administration Personnel, the training was good in some respects but it was not detailed and did not get much information about the world inside the four walls. The problem the administration staff has encountered is a lack of technology and lack of communication.

On the other hand, the manager said that he did not get a chance to do the training as a correctional officer because he has appointed as correctional manager last year. The manager has done some modules prion to join the prison but it does not provide the knowledge as it supposed to do.

The diagram below summarises the participants' response to Question One:

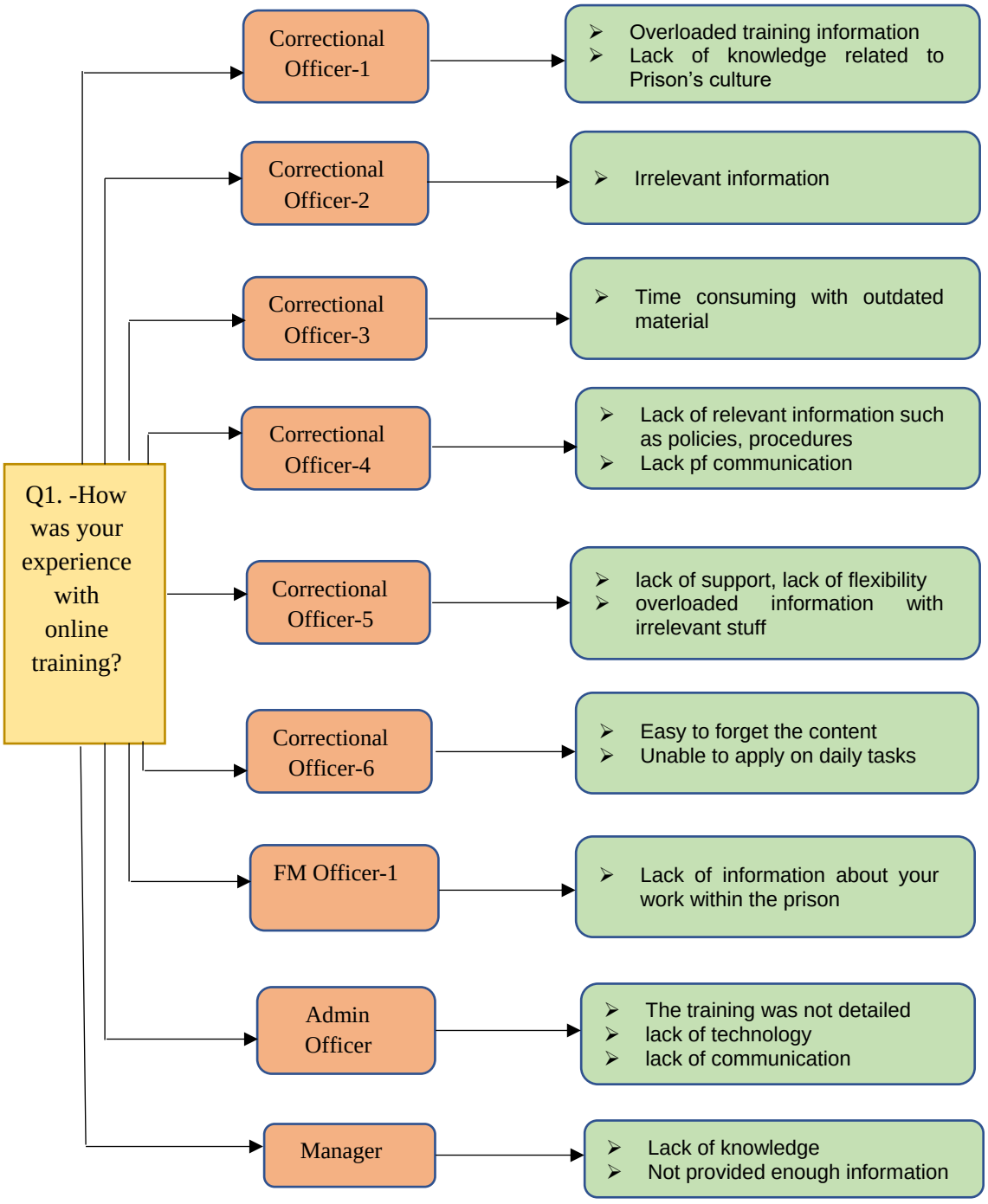

Figure 22: Users' experience with online training

(Researcher's construction)

5.5.2 Main barriers with the use of current online training

The interview participants were asked about the main barriers, they have faced using online training. Correction officer 1 stated that there was a lack of interest, lack of training information among the staff and lack of online support.

The Correctional officer 2 advised that there was no pre-planning of the training program.

The Correctional Officer 3 mentioned that there was a lack of adequate technical knowledge for using the computers for non-technical staff.

The correctional officer 4 stated that the training classroom was unprepared and communication gap.

The Correctional officer 5 response was that the training was overloaded with irrelevant information, which made him no interest in the training

The correctional officer 6 advised that the training was not effective at all in terms of the content and the way of delivery.

Facility Maintenance personnel mentioned that the main barrier was that the training was too long with irrelevant information, the staff was not skilful to do the online training and no support provided to the staff.

Administration Personnel advised that the main barrier was the communication gap and the trainees did not have enough skills to teach themselves how to use the system.

On the other hand, the manager said that the training does not cover all the aspects of the job and does not provide the full scenario about inside the prison.

The diagram below summarises the participants' response to question two:

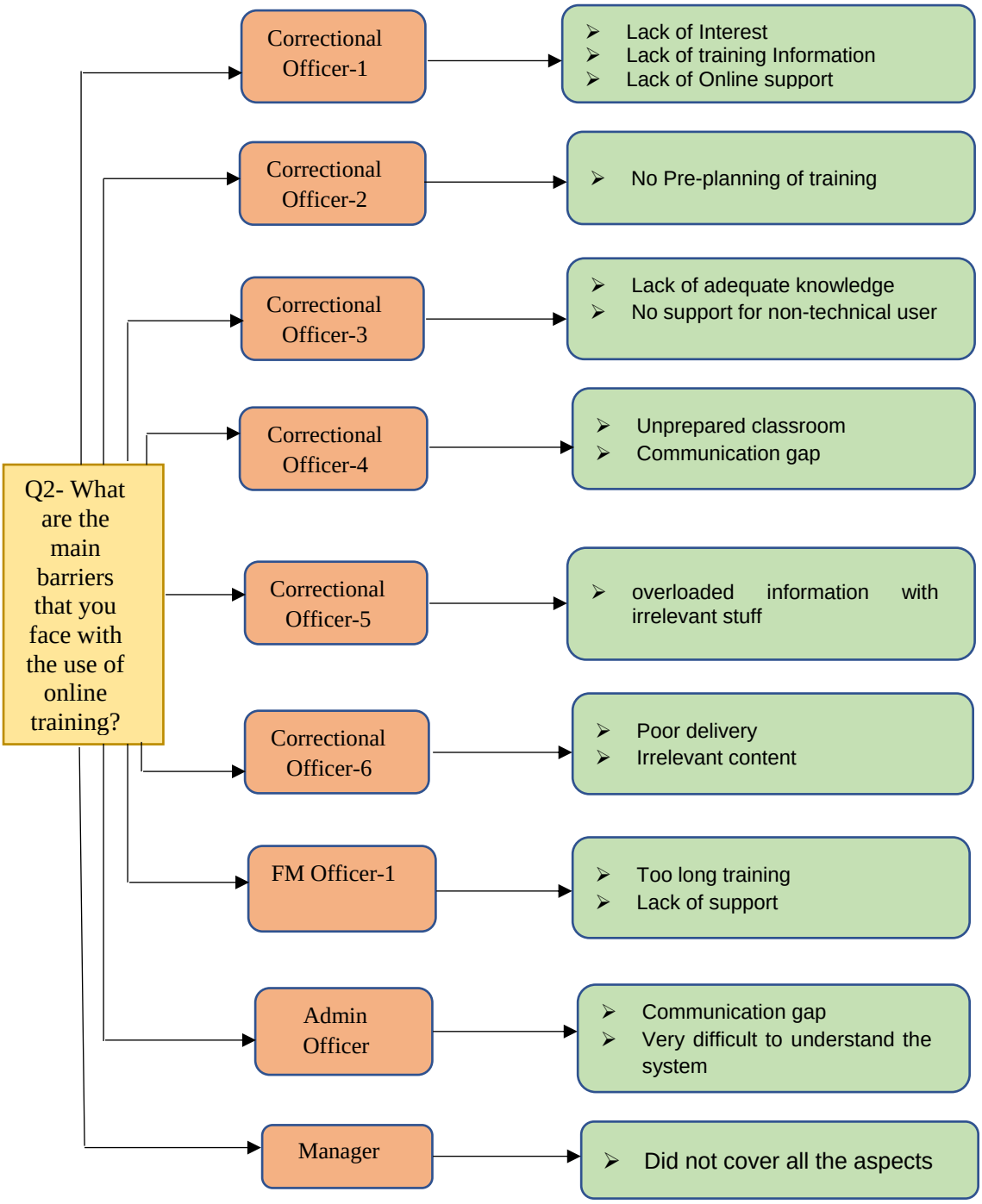

Figure 23: Main barriers using current online training

(Researcher's construction)

5.5.3 Recent Use of online training

The interview participants were asked when did they do the training recently (refresher training).

The Correction officer 1 advised that he did refresher training about 6 months ago.

The Correctional officer 2 advised, about 3 months ago.

The Correctional Officer 3 mentioned that he completed refresher training almost 4 months ago.

The correctional officer 4 stated that the refresher training was completed about 3-4 months ago.

The Correctional officer 5 response was that the training was done 5 months ago.

The correctional officer 6 advised that the refresher training was not done recently, about 6-7 months ago.

Facility Maintenance personnel mentioned that there is no refresher training for him as it's not required for his role.

Administration Personnel advised that she did not do any refresher training since the day she has joined.

On the other hand, the manager said that he did not complete any refresher training because it's not a requirement for his role.

The diagram below summarises the participants' response to question three:

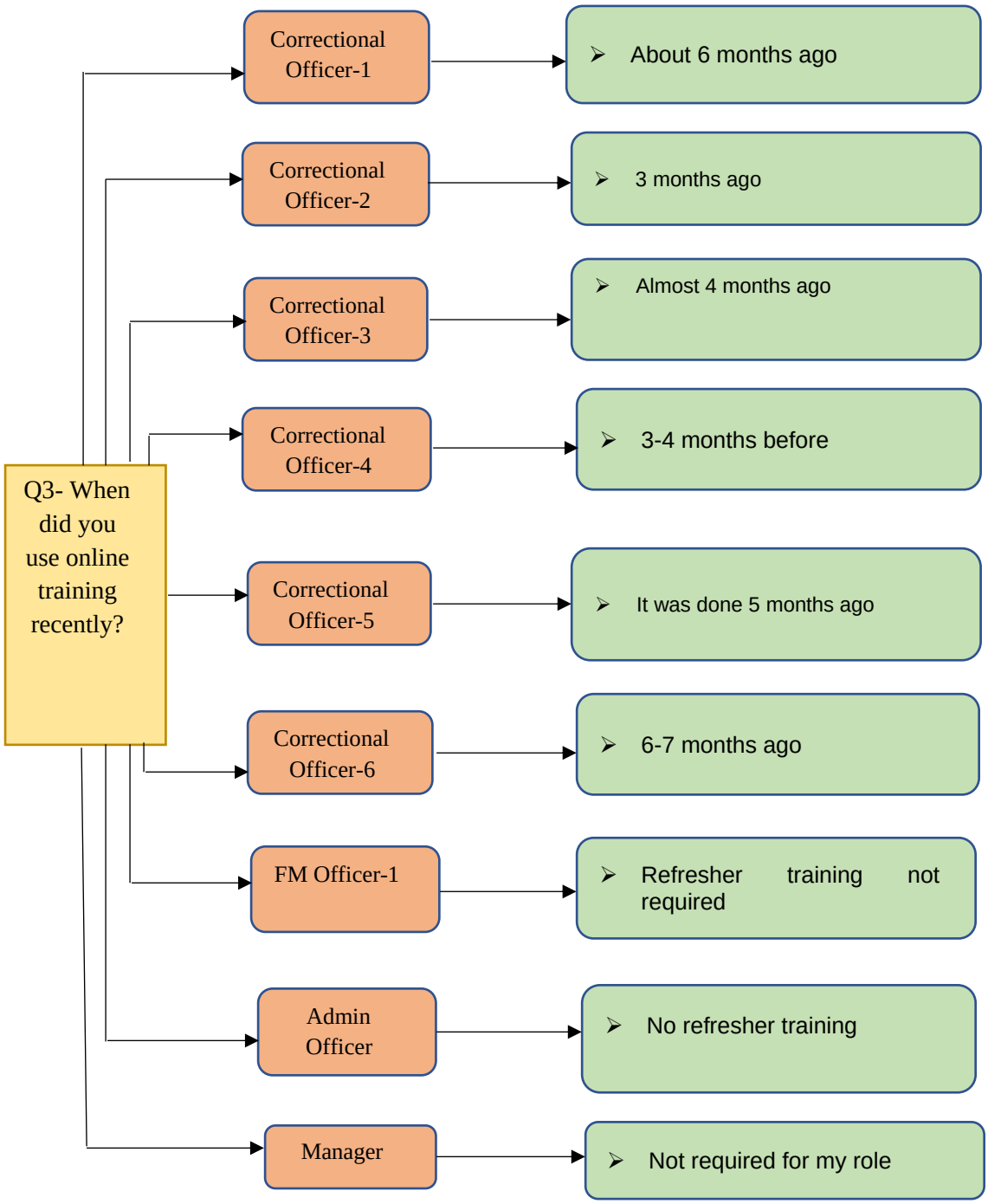

Figure 24: Recent use of online training

(Researcher's construction)

5.5.4 Effectiveness of online training

The interview participants were asked how effective the training was. The Correction officer 1 advised that the Training modules were very good but it was then very boring to read through the subject online without much practical exposure, so when we did our practice session, then we understand why these rules apply and where to apply.

In terms of productiveness, he advised that he cannot say just doing online training but doing a practical session, it does make a sense and made him more productive, more efficient, more knowledgeable, and more aware of the policies and the laws. Just provided the fictional perspective about being a correction officer without much practical knowledge. He said that just online sessions are not enough, with a practical session, would be great.

The Correctional officer 2 advised that it was good which was included with so much information such as policy, procedures, field training, scenarios etc. and he has encountered lack of knowledge about technology and the training information. In terms of productiveness, the class session was boring but on-field training was quite interesting, up to some extent, made him ready to do his job.

The Correctional Officer 3 mentioned that it can be short rather than been long training. It's very long and time-consuming. In terms of productiveness, No, don't think that he becomes more productive because he did not gain many skills.

The correctional officer 4 stated that the training was not effective at all. The information is overloaded which included policies and procedures. There is a search function available but it does not provide the actual value what you are looking for. In terms of productiveness, not at all, it does not provide much information about how the world within the prison.

The Correctional officer 5 response was that the training was alright as far as the company's rules and regulations were concerned but overall, the training was in regard to legislation, systems, work safety, health etc. The training basically covered code of conduct etc.

The correctional officer 6 advised that the training was not as effective as he thought. In terms of productiveness, he did not find this training made him more productive, it's just that some information they come across and then later forgot by the time they reach to the floor.

Facility Maintenance personnel mentioned that it's not that effective for him, its best practice and is not related to his day to day tasks The job he is doing, it's about inductions included safety, security etc. It was not theoretical but it pretty good knowledge but when it comes to practice.

Administration Personnel advised that the training modules were very good but it was short and did not provide much information about procedures of day to day tasks. It was pretty much about the laws, company policies and procedures. In terms of productiveness, she said NO, it was not connected at all with her daily tasks and did not provide her information on how life within the prison. Admin training is not like the correctional staff training and even admin staff also located within the prison and not ready if something bad happens inside the prison.

On the other hand, the manager said that this training program was helpful at little extent but does not cover everything what do you do inside the prison. It was quite effective but could not learn much. In terms of productiveness, He said he felt a little bit productive, whatever he has learned, he was quite ready to use and it does not cover all the aspects of the job and does not provide the full scenario about inside the prison.

The diagram below summarises the participants' response to question four:

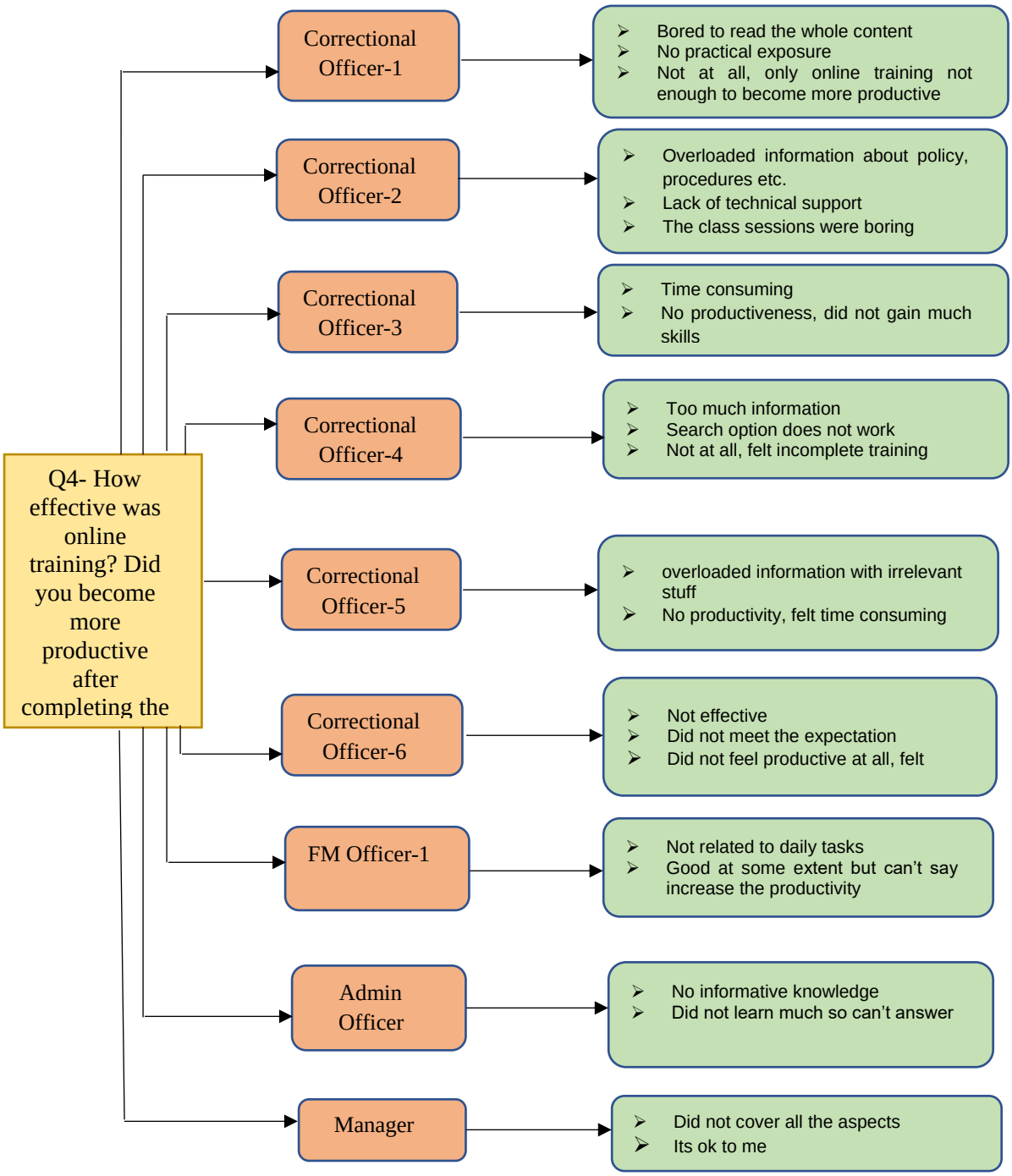

Figure 25: Recent use of online training

(Researcher's construction)

5.5.5 Improve Learnability

The interview participants were asked about their views on Learn-ability:

The Correction officer 1 advised that LMS provide Clarity of induction whatever they do on the floor. It was pretty much in detail and these modules for meaningful. He also advised that it could have been better if they include some video demonstration as to how would you apply whatever you are learning as theoretical in training.

The Correctional officer 2 advised, that there was no clarity of induction for him, it was quite structured but quite confusing, so not satisfied at all.

The Correctional Officer 3 mentioned that Learnability was poor as there no clarity of content.

The correctional officer 4 stated that the clarity of content was ok but delivery was poor.

The Correctional officer 5 response was that it was too much of reading and it was lots of modules, which was time-consuming. It was all about statutory and manual handling, job safety and all those things. There is nothing much about what to do on the scenario. It was not related to do day to day jobs.

The correctional officer 6 advised that the whole training was pretty much online which did not help for non-technical users.

Facility Maintenance personnel mentioned that could not learn much as the user is not tech-savvy and lack of support from the training team.

Administration officer advised that it was poorly delivered and she could not make interest to learn.

On the other hand, the manager said that the induction was quite cleared.

The diagram below summarises the participants' response to question five:

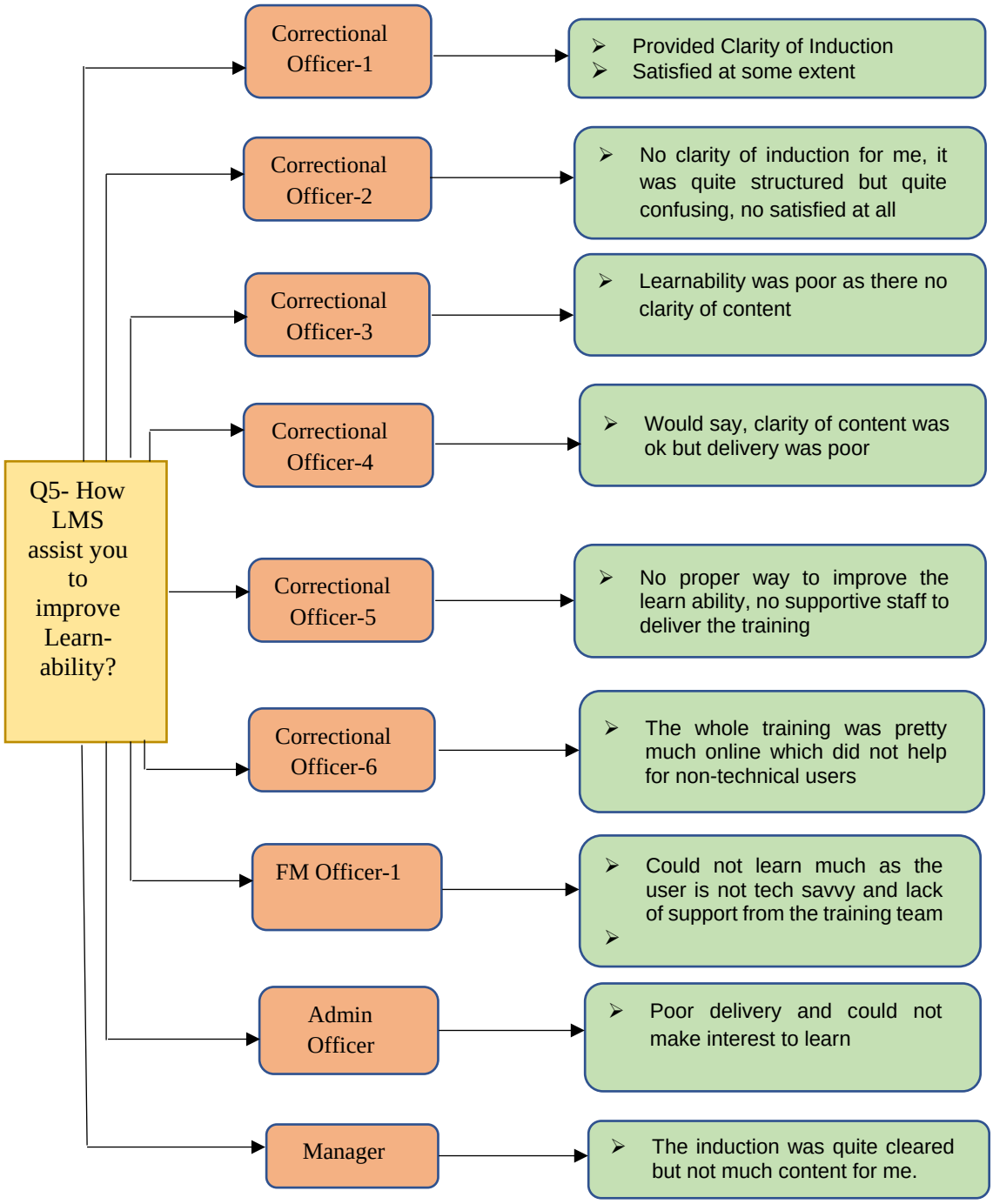

Figure 26: Learnability Improvements

(Researcher's construction)

5.5.6 Flexibility of online training

The interview participants were asked about the flexibility of online training:

The Correction officer 1 advised that the user interface was made very well, because every information you need, was provided on the table of content. Secondly, the user can't complete online training at home and there is no app available, only accessible onsite.

The Correctional officer 2 advised, that it was not flexible at all because of the security reason, no one can access online training from home. There was no such function available for self-support or any FAQ. The training User interface was quite good, but as I have mentioned earlier, it was overloaded information.

The Correctional Officer 3 mentioned that the training was not flexible, the user has to make an effort to do this online training because the user has to read all the contents and modules.

The correctional officer 4 stated that the training program mixture of online training and on-field training. The user has to be on-site to access the training due to security reasons.

The Correctional officer 5 response was that the training was not related to the job, it was just a requirement of the correction officer's role.

The correctional officer 6 advised that the user have to be on-site to access the online training.

Facility Maintenance personnel mentioned that the user has to be on-site to do online training.

Administration Personnel advised that she was not allowed to access the training from home but can accessible form onsite due to security reasons. There was no self-support or any FAQ available. The user interface was made very well, because every information you need, was provided on the table of content.

On the other hand, the manager said that he was not able to do this training off-site. The user has to be on-site due to security reasons. There was no online chat or FAQ to have self-support.

The diagram below summarises the participants' response to question Six:

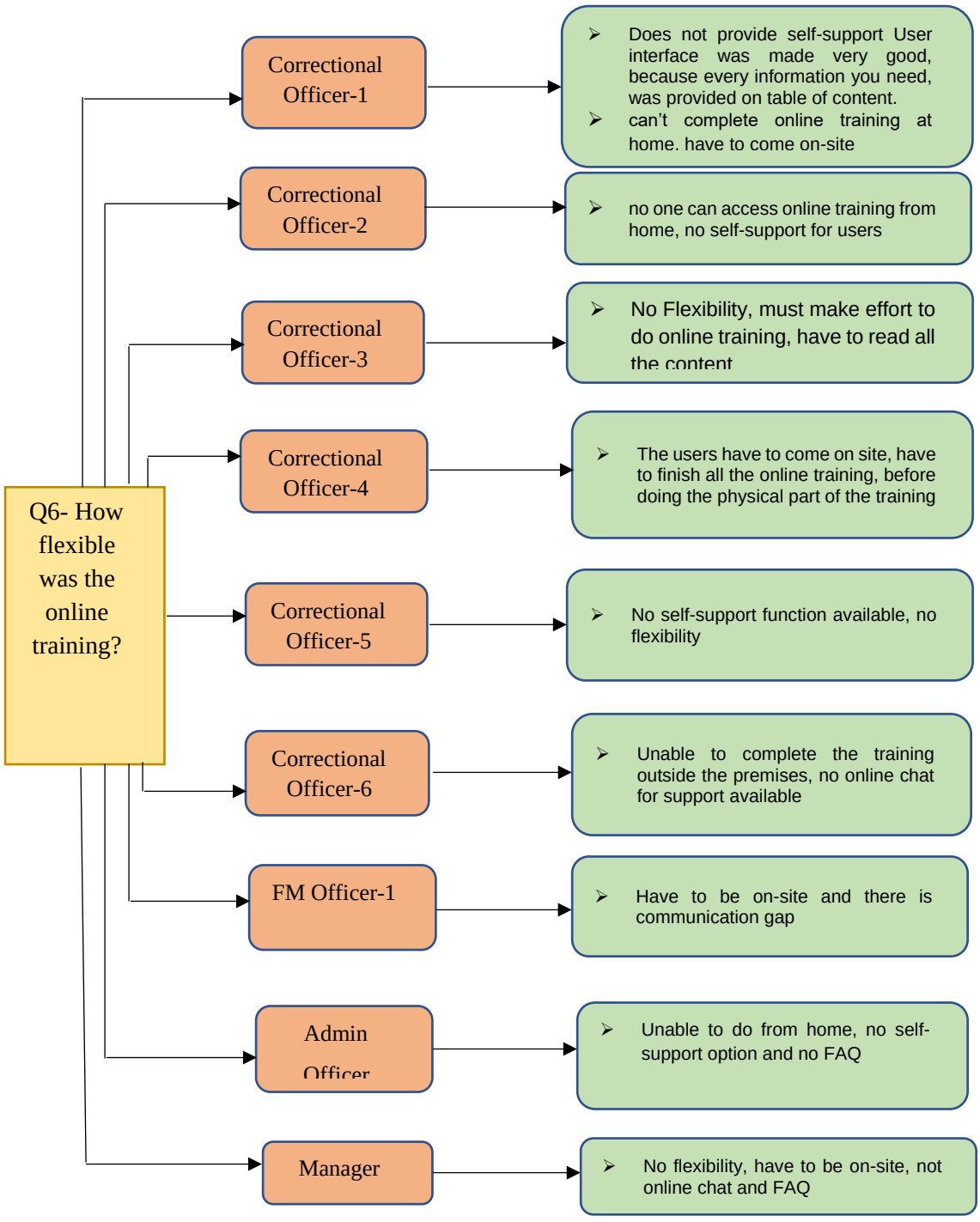

Figure 27: Flexibility of online training

(Researcher's construction)

5.5.7 Acceptability of online training

The Correction officer 1 advised that he rate 7 to acceptability out of 10. And he mentioned that the system was bored to use because it was all theory. There was no practical session. But when he started the practical session, it was alright.

The Correctional officer 2 advised that he rates 6 out of 10, it can be more effective if they will make efficient changes according to employees' needs.

The Correctional Officer 3 mentioned that he rates 4 to acceptability. He advised that the training is not related to skills and knowledge, you learn on-the-job. If it is simplified, would be very nice. It should require some changes as its too lengthy and time-consuming.

The correctional officer 4 stated that it was not that great, the training should help the correctional staff to deal with the prisoner and the issues within the prison. The user-interface was good but the information was too long and could not relate to a daily task.

The Correctional officer 5 response was that the training was too long and time-consuming and he could not accept it as there is no support available to non-technical users like him.

The correctional officer 6 advised that the training was below average because it's not user-friendly, due to the way it is developed as there is lengthy information which is hard to digest. It could be more effective if it has Audio Visual Slides.

Facility Maintenance personnel mentioned that he will rate 7 to acceptability. The training just made him to know about it but the application might be different in terms of a real job.

Administration Personnel advised that she rate it 3 and it did not cover every aspect of being within the prison. The training does not teach the user how to handle the angry prisoner. So, whatever the user learns from online training, not good enough to do the job inside the prison. For example. If there are big incidents happens inside the prison, it does not provide anything in regard to riots or how to deal with the prisoner.

On the other hand, the manager said that he rates 5 out of 10 as I have learned about policies and procedures but does not relate to the life within the prison, he did not get much to learn about the prison's life and about prisoners.

The diagram below summarises the participants' response to question Seven:

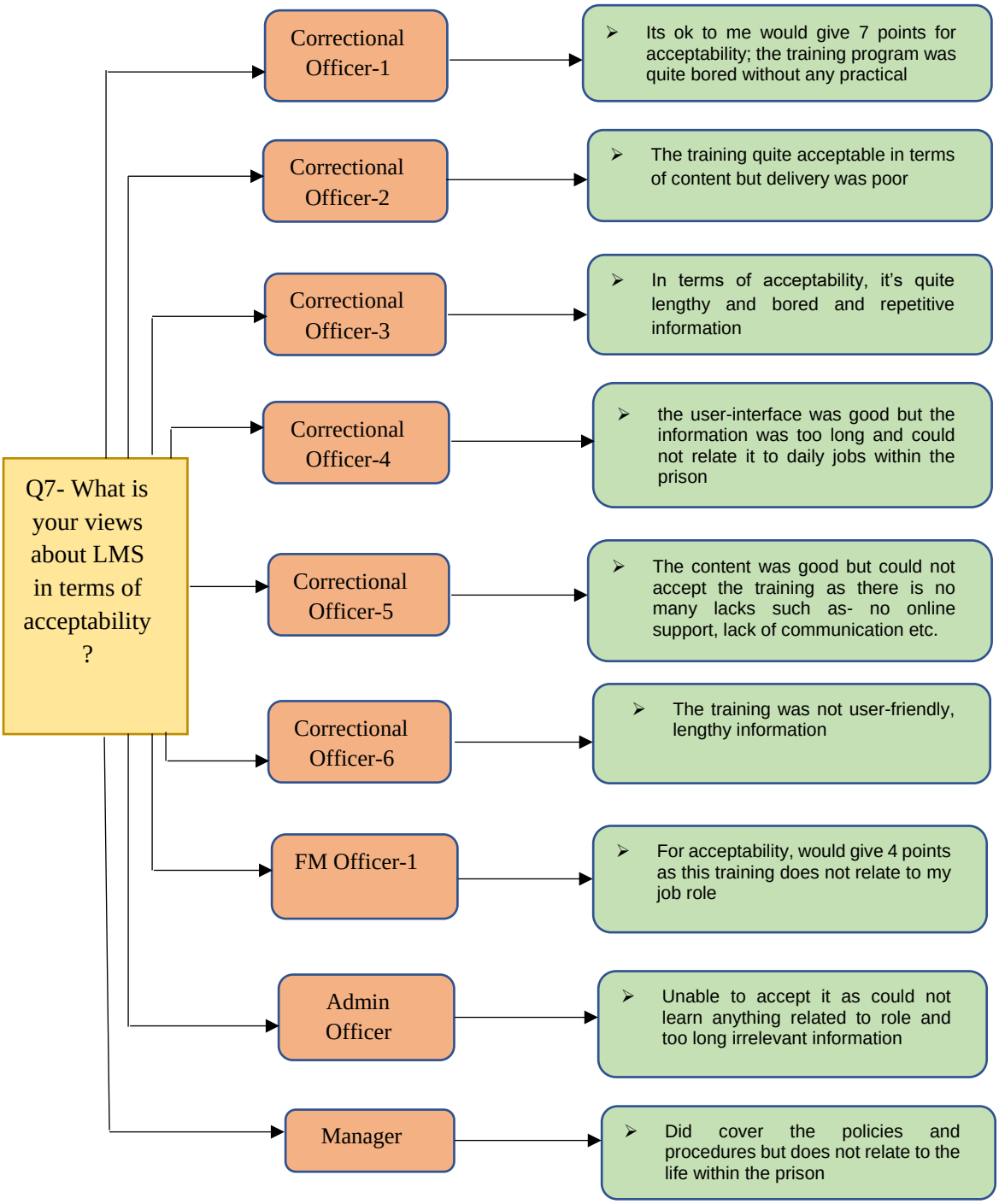

Figure 28: Online training acceptability

(Researcher's construction)

5.5.8 Suggestions for enhancing the usability of online training system in the Victorian prison

The Correction officer 1 suggested providing more video material or interactive learning material online.

The Correctional officer 2 suggested to add more video which should be connected to day to day jobs within the prison, can get new staff ready to face the prisoner in an efficient manner.

The Correctional Officer 3 mentioned that the training team should work on the way it is delivered.

The correctional officer 4 stated that there should be a video which can help the employees to have a feel how the life inside the prison.

The Correctional officer 5 response was it can be shortened and training should be more related and relevant tasks to the practical job and should add more videos which give more knowledge about the prison.

The correctional officer 6 advised that if there is more audio-visuals and demonstrations and some small exercises to do, it will be helpful.

Facility Maintenance personnel mentioned the online training should be a mixture of practical and theoretical training. For example, whatever you learn the whole day, should practice on the floor for some time every-day.

Administration Personnel advised that online training should train each and every employee like they train the correctional officer because all the staff works within the prison and have to deal with the prisoners on a daily basis.

On the other hand, the manager said that it can be more detailed and train the staff to become ready to deal with the prisoners and the issues within the prison and training should be more related and relevant tasks to the practical job.

The diagram below summarises the participants' response to question Eight:

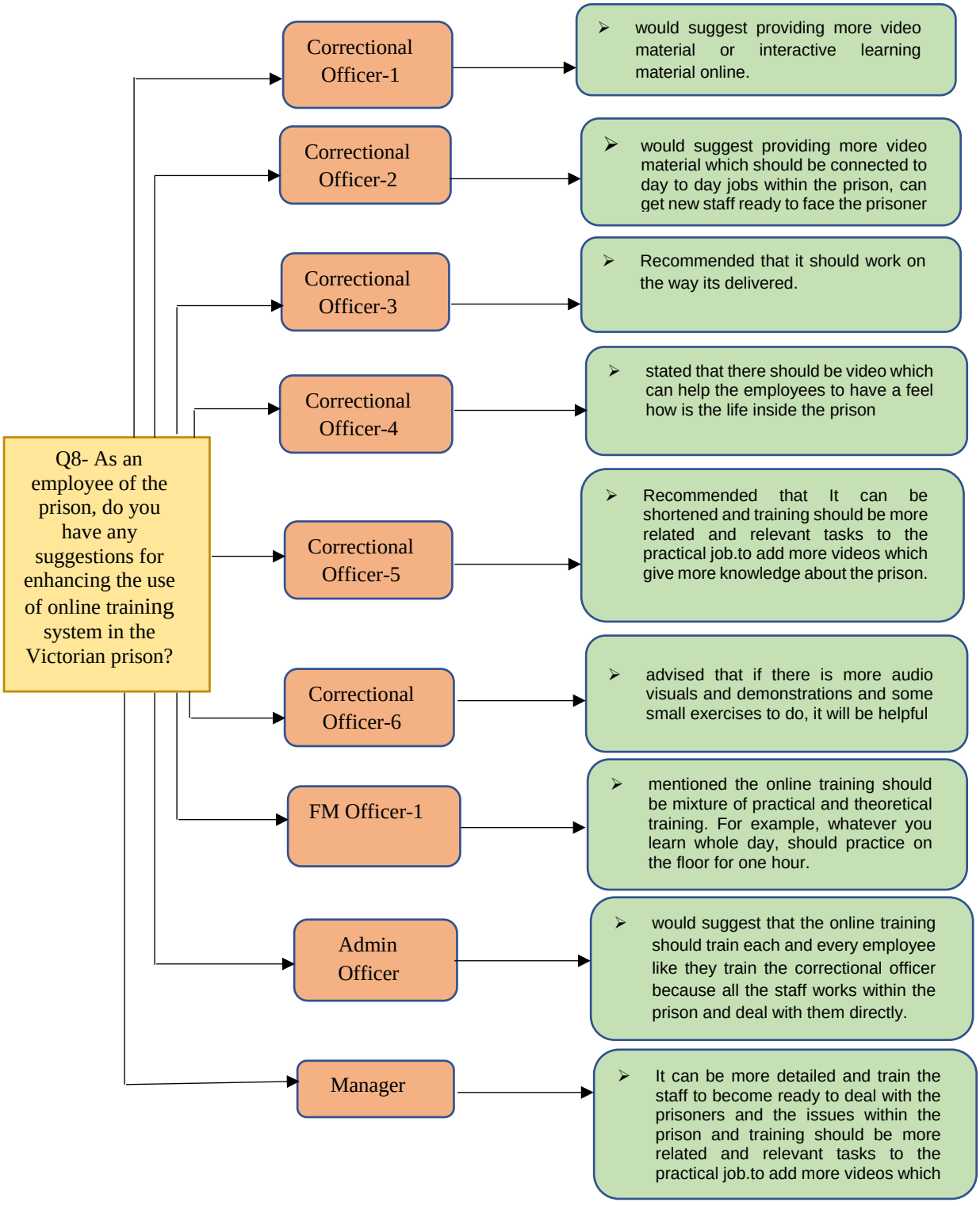

Figure 29: Suggestion for improving the usability of online training

(Researcher's construction)

5.6 Thematic Analysis

According to Gorman et al. (2005), *"Data analysis is an important part of any study and involves multiple processes on the data, including organisation, interpretation, and reporting"* (2005, p. 205). Thematic Analysis method with the assistance of NVIVO 11 has been used to analyse the themes using focus group and semi-structured data. A six-phase analysis process was used for identifying, analysing and reporting themes within data in the step by step manner. Braun and Clarke (2006) described thematic analysis is a method used for *"identifying, analysing, and reporting patterns (themes) within the data"* (2006, p. 79). Generally, thematic analysis is the most commonly used method to analyse qualitative interview data. According to Braun & Clarke (2006), *"rigorous thematic approach can produce an insightful analysis that answers particular research questions"* (2006, p. 97). Using this thematic source analysis method provides a rich, detailed and elaborate description of the data. Additionally, this approach helped to find accurate information using two perspectives- a data-driven perspective which is based on coding and research question perspective for the consistency of data. The applied thematic analysis method has been used in six phases. In the first phase, the focus groups and interviews data has been read and re-read and prepared a list of the reoccurring pattern. During the second phase, the initial coding was generated using meaningful parts of the data which was related to the research questions. The third phase was combining those codes and generating a list of primary themes. The fourth phase, the researcher put the themes in that manner so that it answered the research questions, otherwise need to go back to phase two, to creates more codes to generate more themes. The fifth phase, the themes have been analysed and defined to support the research data. The final phase, a list of the master theme is created and categorised to produce the results, and the irrelevant themes have been discarded.

The below figure represented the themes which have been considered to draw the subthemes and then main themes.

Figure 30: Themes generated using NVIVO software

(Researcher's construction)

Thematic analysis is widely used in qualitative research to identify, analyse and creating themes within data and also interprets various aspects of the research (Braun & Clarke, 2006). According to Braun & Clarke (2006), the themes are not necessarily dependent on quantifiable measures, such as the prevalence within the data but rather on the ability to demonstrate something significant related to the research question.

5.6.1 Overview of Main Themes

Participants described being lured and attracted by getting of voucher in participant's advertisements. This appears to have created a thrill that tempted the individuals to participate in the data collection. The two main themes derived from the data analysis are – 'Technology' and 'Learning Management System' (Figure 25).

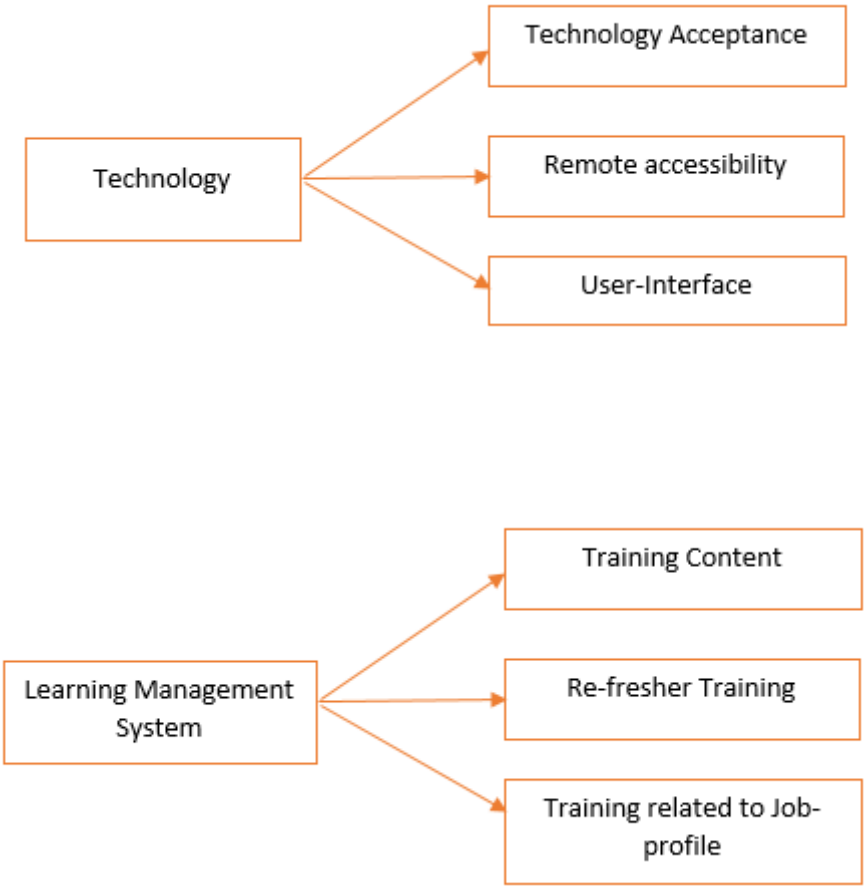

Figure 31: Overview of main Themes

(Researcher's construction)

Theme 1: Technology

Participants discussed the Technology is the main feature which has to be addressed to make online training more effective. For example, in the extract below, Correction officer answered about the experience with online training.

> Correction officer 2 advised: *He needed support to complete the training because he has very little technology knowledge*

Correction officer 2 extract identifies lack of technology in online training and the non-technology users are struggling to complete the training as they are not getting adequate support.

> Whereas Correction officer 3 has answered that *there was a lack of adequate technical knowledge for using the computers for non-technical staff.*

Online training uses a lot of technologies. Lots of them are created especially for it and others just complimented the learning process. Correction officer 3 response is quite clear that some users have no knowledge of how to use the technology.

> Correction officer 6 *advised that whole training was pretty much online which did not help for non-technical users.*

Learners respond better when receiving any type of training in familiar environments. The above statement provided by Ms Kaur which explained that if the user is not a tech-savvy which makes a bit difficult to perform the training.

Technology Acceptance: it is the adaptation procedure and a system that is claimed to be due to different variables by the user of new technology. When the question been asked about the main barriers that the employees face with the use of online training, most of the employees answered about the issue of technology acceptance. For example-

> Correction officer 1 advised that *there was a lack of interest, lack of training information among the staff and lack of online support.*

> *Whereas* Correction officer 4 *answered that has identified that it was not helpful at all, the information was too much which included-policies, procedures. The other problem was a lack of communication between the trainer and the staff and the training provided online training material which created the gap between the staff.*

> *The administration staff responded that the training was good in some respects but it was not detailed and did not get much information about the world inside the four walls. The problem the administration staff has*

> *encountered is a lack of technology and lack of communication.*

Remote Accessibility: remote access is the potential for an authorized person to access a computer or a network from a geographical distance through a network connection. Remote access allows users to connect to the systems they need when they're physically far away.

> Correction officer 1 *mentioned that you can't complete online training at home and come to work and apply on your daily schedule. No there is no such app facility available, only accessible onsite.*
>
> Correction officer 2 *advised that because of the security reason, no one can access online training from home and no self-support available.*
>
> Correction officer 4 *answered that the staff must be on-site to do online training due to security reason.*
>
> The Manager *has also advised that the user has to be on-site due to security reasons.*

User-Interface: User-Interface (UI) is very important for an effective and positive learning experience. Generally, a good website is one that's easy to use. The following extract by some prison's employees highlight user-interface.

> Correction officer 1: *there was a lack of interest, lack of training information among the staff and lack of online support.*
>
> Correction officer 3: *the training classroom was unprepared and communication gap.*

> Correction officer 6*: the training was not effective at all in terms of the content and the way of delivery.*

> Correction officer 2*: It was good which was included with so much information such as policy, procedures, field training, scenarios etc. and I have encountered lack of knowledge about technology and the training information, the class session was boring.*

> Correction officer 4*: that the clarity of content was ok but delivery was poor.*

Theme 2: Learning Management System

This main theme derived from subthemes- Training Content, Refresher training and training related to job-Profile. Learning management system is required in Victorian Prison as and it is evident that the current staff of corrections facilitates has limited training in this regard and such a lack of training again raises the need to have a learning management system in place that can help improve the outcomes for all concerned (Minton 2018 pp 5-6). The below extract is evident that the users want to make efficient changes to online training which can be done by implementing new LMS.

Training Content: The below extract from the participants identify that the training content is not user-friendly and required changes.

> Correction officer 3*: that Learnability was poor as there no clarity of content.*

> Correction officer 4*: the clarity of content was ok but delivery was poor.*

> Correction officer 2*: The training content is overloaded with irrelevant information.*

> Correction officer 5*: the users have to make an effort to do this online training because you have to read all the*

contents and modules whatever you learn from online training

Refresher training. According to the below extract, it appears that there is no time-frame for refresher training which is the main issue in this unsecured work environment. Refresher training main aim at recall and reinforcement of previously acquired knowledge and skills.

Correction officer 1*: I did refresher training about 6 months ago.*

Correction officer 2*: about 3 months ago.*

Correction officer 3*: I have completed refresher training almost 4 months ago.*

Correction officer 4*: the refresher training was completed about 3-4 months ago.*

Correction officer 5*: the training was done 5 months ago.*

Correction officer 6*: the refresher training was not done recently, about 6-7 months ago.*

The facility maintenance officer*: there is no refresher training for him as it's not required for his role.*

The admin staff*: I did not any refresher training since the day she has joined.*

The manager: *I did not complete any refresher training because it's not a requirement for his role.*

Training related to job-Profile: Training is the main component to enhance the competencies of individual employees. By delivering the correct training programs, can help boost employees'

workplace performance in alliance with the company's core values. The below extract from non-correctional staff represents that the training is not required if you are not part of the operations team.

> The admin staff*: The training modules were very good but it was short and did not provide much information about procedures my day to day tasks.it was pretty much about the laws, company policies and procedures. Admin training is not like the correctional staff training and even admin staff also located within the prison and not ready if something bad happens within the prison.*

> The manager*: The training program was helpful at little extent but does not cover everything what do you do inside the prison. It was quite effective but could not learn much. The training does not cover all the aspects of the job and does not provide the full scenario about inside the prison. Mr Reis: it's not that effective for him, its best practice and is not related to his day to day tasks the job I am doing, it's about inductions included safety, security etc. It was not theoretical but it pretty good knowledge but when it comes to practice.*

5.7 Chapter summary

This current study aimed to explore the usability of Learning Management System in a Victorian Prison. It endeavoured to gain an understanding of how the prison's employees perceive and understand online training. The present research focused on four factors of usability which has been described below and has been discussed in chapter 1:

- What does the LMS in a Victorian prison provide to facilitate more effective online training for users?
- What features of the LMS assist users to improve learnability?
- What are the factors that would provide flexibility to the LMS at Victorian prison?
- What promotes the acceptability of the LMS?

The above mentioned questioned has been divided into Semi-structured interview and focus groups question which have been explained in Appendix F and Appendix G.

The current chapter explained the field study and analysis process which included the research location and analyse the data collection. The data analysis indicated that online training is perceived as a required factor of the job, however, the employees are not quite impressed with the usability elements of online training. On the other hand, the employees provided some recommendation which can help them to learn the training faster and can make them more skill full and knowledgeable at their respective jobs. The employees' feedback has been counted and has been described as the intended outcome in the next chapter. This chapter used thematic analysis method and created two main themes which will achieve the intended outcomes of the research, will be explained in the next chapter. The next chapter will develop the learning model using Learning Grid architecture.

Chapter 6 - Development and Evaluation

6.1 Introduction

The preceding chapter described “the problem awareness” and drew interest to the regions of emphasis in research with reference to the usability of LMS within Victorian Prison. The goal of the current chapter is to unite the numerous principles to derive a conceptual model to enhance usability at the workplace. As a result, an attempt is made to research the manner through which people can learn through online training and the way this learning can be useful for prison’s employees.

The previous chapter “Field study and Data analysis” described the data analysis process and created the themes which assist the researcher to create a model for enhancing knowledge about LMS in this present chapter. In this current chapter, Findings from Systematic Review and data analysis is presented, which will be meeting with the intended outcomes and prepare the Learning model using Learning Grid architecture.

6.2 Findings from Systematic Review

The process of systematic research and inclusion criteria for selecting the research articles has been discussed in Chapter - 4. The systematic review was concluded - To develop personnel’ abilities and knowledge online education is a flexible and efficient way. The selection of an appropriate LMS within an agency depends upon many factors: consumer interface, support and provider, capabilities, specific promoting propositions, the rate of innovation, and flexibility and patron feedback. Implementation and adoption troubles should no longer be an after-thought and must be considered early inside the planning stages. However, earlier than adopting any e-learning tool, it's far essential to make certain that the intended consequences are clarified and aligned with learner desires.

Considering the fact that organisations utilise a variety of resources to educate their employees, with the help of LMS, which facilitates to make training easily accessible and will enhance user satisfaction. This systematic review has examined some usability factors of LMS and places the approach into practicality. LMS is a mixture of tools that supply online training in an efficient and timely manner. workplace learning can be delivered using LMS which can help them to save cost and enhance

organisational performance and the employees can obtain skills and knowledge. As explained in brief in Chapter- 1, LMS can be used in many ways, such as content module, content development tool, management tool, distribution tool, collaboration tool and delivery tool.

6.3 Findings from the data analysis process

Participants talked about Technology which has been created as the main theme, especially in connection to Technology acceptance, Remote accessibility and User-Interface of online training. The previous literature has ascertained that technology acceptance is one of the common reasons for what affects the implementation and adoption of the Learning Management system (Sabharwal et al. 2018). *"The adoption of online-training within corporate organisations has a positive impact on both employees as well as organisations. The employees can access the online training at any time and from anywhere because of its remote nature, which improves employees' skills and knowledge"* (2018, p. 4). As the COVID-19 pandemic spreads around the world, organisations are scrambling to shield their people and their operations. The remote option is the favourable way whether its normal work, training or education. During the data collection, remote accessibility was the main concern as the prison's employees are not able to complete the training modules from off-site. The remote option is not available due to security reason but the prison can work to develop the remote training align with Information Security Manual. The attractive interface is extremely important for properly engaging the user and correctly conveying important information in the case of employee training programs. The proper user experience layout can engage the learner and help them understand the subject material easily and right lesson layout will make it less difficult to understand and provide the learner with the information they want to develop behaviours and complete objectives.

A quality learning management system works to offer your workplace with the proper system designed for optimal transfer of information. This permits for improvements inside the overall leaning within the organisation. The best online training for employees fits the content to the learning objectives and not the alternative way around, which means most courses require a variety of written notes, graphics, slides, templates and employee training videos. The participants were asked about the refresher training as employee refresher training has the same values as the new employee training and refresher training aims at the retention and reinforcement of formerly acquired skills and knowledge as well as workplace refresher training results in improved client services and increased employee satisfaction. The last subtheme was discussed by the participants- training related to job-profile. This section can be divided into two categories of LMS- product training and technical training which has been explained more in intended outcomes in the next section.

6.4 Intended Outcomes

As briefly explained in chapter 1, the suggested modules in LMS which included flexible modules system, content module, content development, content management, content distribution and content collaboration, content delivery and learning module. The below- intended outcomes have been prepared using above mentioned suggested modules and two main themes – Technology and LMS which has been derived from thematic analysis process using employees' feedback in data collection, explained in chapter 5. The below four intended outcomes helped to create a conceptual DSR model which can improve the usability of LMS in prison.

6.4.1 Outcome 1: Improved the quality of Online training using LMS implementation

Victorian Prison will improve the quality of Online training by implementing the learning management system. The research will help in establishing the new LMS Model which coordinates the correction Victoria policy guidelines as well as employees feedback. The new LMS will serve as the implementing attribute of Online training within this prison which will be utilised by the prison's staff. This new LMS model will have two-sided of the training, one will be new recruit training and the second will be refresher training. This desired outcome is a response to the need for improving online training.

6.4.2 Outcome 2: Improved the LMS Usability using four attributes

The LMS usability four attributes-effectiveness, learnability, flexibility and acceptability- The new DSR Model will be focused upon the usability factors of LMS which are- effectiveness, learnability, flexibility and acceptability. The new model will address the problem of the staff using Online training such as lack of effectiveness, no flexibility, not having any interest to accept this current training program.

6.4.3 Outcome 3: ICT infrastructure and Technological Support

The new LMS implementation will be involved in many elements such as Information technology, Interface design, network and other hidden attributes. The 24*7 online chat option will be the main factor of LMS DSR Model. The other ICT infrastructure such as online libraries, FAQ, search options, online discussions, video conferencing and online consultations will be introduced in the DSR Model. This desired outcome is also to the need identified in the data analysis chapter.

6.4.4 Outcome 4: Employee skill development program

The new LMS will address the problem of lack of training, lack of support, lack of adequate knowledge and lack of interest. The new model will be created which will be focused upon the employees' skills. This outcome is desired which identified as required in the previous chapter.

6.5 Learning Model

The researcher's experience with LMS and Usability in organisational context inspired the suggestion of using Learning Grid architecture to develop the DSR model which is proposed outcome of the present research project.

My Learnings is the proposed model which has a mission to help organisations like Victorian Prison to improve staff performance and business outcomes through better learning, training and development programs. This model can manage all aspects of your online training including hosting, support, training, consulting, customisation, system integration and content design.

6.5.1 Learning Grid

According to Capuano, Gaeta, and Ritrovato (2008a) Learning Grid is, "*A Learning Grid is an enabling architecture based on three pillars: Grid, Semantics and Educational Modelling allowing the definition and the execution of learning experiences obtained as cooperation and composition of distributed heterogeneous actors, resources and services"* (2008a, p. 6).

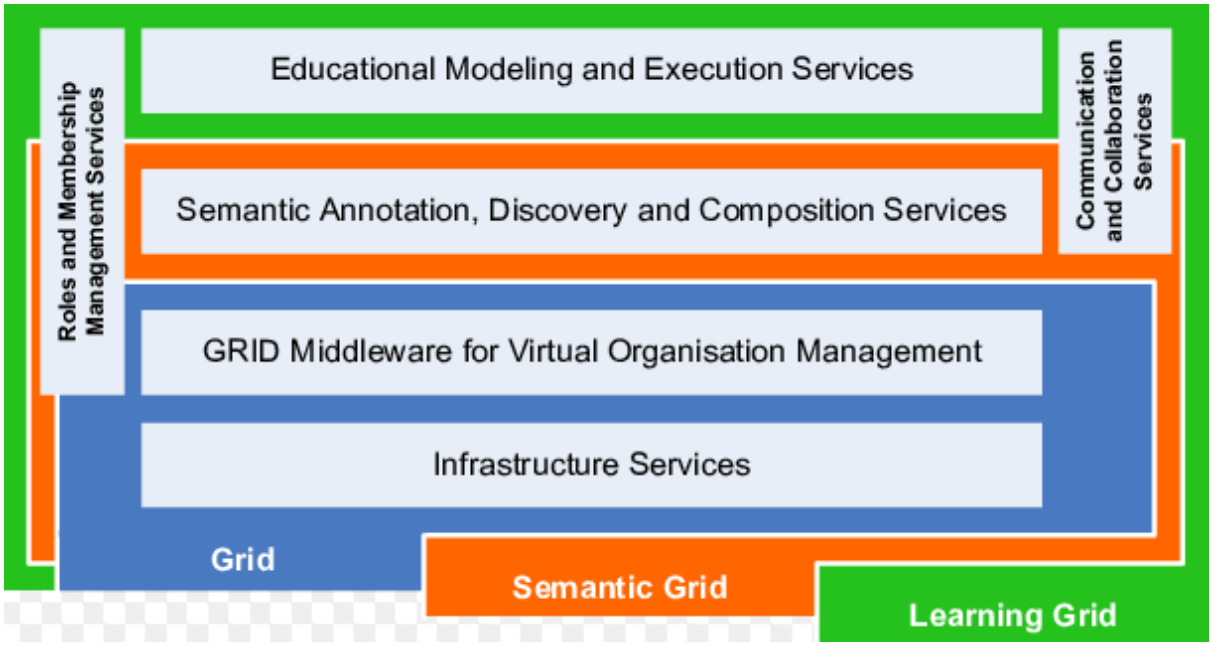

Figure 32: Learning Grid Architecture

(Source adapted from Capuano et al. 2008a)

The above figure explained Learning Grid architecture which is divided into three layers: Grid, Semantic Grid & Learning Grid

Grid is composed of two services:

Infrastructure services – provide an implementation of the Web Service Resource Framework specifications with the reason for describing the service model.

GRID Middleware for Virtual Organisation Management – provides an implementation of the services detected by using the Open Grid services architecture (OGSA) permitting the advent and management of a distributed VO and to combine, virtualize, and administer offerings and resources on it.

Semantic Grid

Semantic Annotation, Discovery and Composition Services – provide learning independent functionalities based on necessities and languages utilised for the semantic description of Web services (e.g., OWL-S) to permit automatic negotiation, detection and composition of Grid Services.

Learning Grid

Educational Modelling and Execution Services – offer contextualised capabilities associated with the prescribed narrative of learning reviews based on Education Modelling Languages ((e.g. IMS-LD) and the automatic discovery, composition and execution of learning resources and offerings to be had on the Grid basing on such descriptions (Capuano et al., 2008a).

In the above figure, Capuano et al., (2008a) explained that *"a Learning Grid is composed by a Semantic Grid Plus Educational Modelling and Execution Services plus a set of "environment" services described below to support the creation, the operation, the evolution and the maintenance of a learning community"* (2008a, p. 8). Within the context of the prevailing study, the DSR model for Learning management system can be implemented via a learning Grid because it facilitates the online training community.

However, it must be stated that Victorian prison might require acknowledging the users' perspectives of adaptation factors of implementing Learning Grids within Correction Corporation. The basic technology of the Learning Grid can be decisive based on the sources available to the prison. Considering that technologies are a reasonably general aspect of an organisation's technology infrastructure within the modern-day constructing an online training platform based on cloud computing can be an apparent end.

The figure explains that final anticipated of DSR model for Learning Management system. Hence the workplace must consume considerable resources in preparing learning management system through usability factors. This learning management system structure can be supported by the manner of custom-designed Learning Grid Infrastructure.

The DSR model has been designed in the form of website which has accommodated the Learning Grid architecture and employees' feedback collected via data collection. The learning model screenshot has been captured which is presented in the Appendix.

6.6 Evaluation

It is well evident through the research that there are multiple facets of evaluation of DSR model for LMS in the workplace. The first model has been prepared using Systematic analysis research and semi-structured interview process. The prepared model has been assessed via Focus groups in line with learning Grid. The final model has accommodated the four desired outcomes which have been explained earlier in the current chapter.

6.7 Chapter summary

This chapter provided an overview of the development and evaluation part of the desired DSR model for LMS. The model has been prepared in line with Learning Grid architecture which has been explained in this chapter. The model has been evaluated using focus groups which have been discussed. The next chapter provided a conclusion to the dissertation.

Chapter 7 – Conclusion

7.1 Summary of the research

The research study investigated the usability of learning management system. The research was conducted as a single case study in Victorian prison as one of the key aspects of the research questions related to the role of context in the use of online training within the Workplace. Through the use of Systematic analysis research, Semi-structured Interviews and Focus groups as data collection methods, this research set out to understand the relationship between the prison's staff and the use of online training used in the prison. This was achieved by exploring the following:

- What does the LMS in a Victorian prison provide to facilitate more effective online training for users?
- What features of the LMS assist users to improve learnability?
- What are the factors that would provide flexibility to the LMS at Victorian prison?
- What promotes the acceptability of the LMS?

The key outcomes of this research were:

- Improved the usability adaptation of the prison's employees through a combination of-
  - Technology
  - Learning Management System
- Developed the DSR model to accommodate the users' feedback.
- DSR model has been presented to Victorian Prison which will be assessed by senior management and executives' team.

7.2 Contribution to the study

The development and the implementation of DSR model within Victorian prison have been documented through the research which is highlighted the following:

7.2.1 Theoretical Contributions

One of the fundamental aberrations come across was that there must be past research on learning management system in the Workplace. Through the systematic analysis research process, found that most of the articles are geared towards academic applications of LMSs. The scope of this study though aims at figuring out usability in a workplace setting. Although the common denominator is still education and training, it is important to distinguish between the two settings – academic and workplaces. What works for one population may not necessarily work for others. The role of LMS in workplaces is to ensure staff can be trained with the relevant knowledge, skills and behaviours expected within a workplace, with an aim to efficiently enable staff to complete job-related tasks. In contrast, an academic LMS may have functionality similar to workplace LMS but the goals and user base are different. In academia, LMS primarily focusses on imparting subject knowledge, the ubiquity of learning content and course administration. In both contexts, the overlap is on virtually managing learning and development to create an effective learning environment.

Having a more focused clear and direction provided on how the desired LMS model should look like. If this does not occur, then workplace training and employees will again arise against the battle described in this research, the staff will not know which LMS can help them to train them effectively. Using the proposed DSR model in Prison has shown the easy user-interface, online support, and online videos and so on. This new model has accommodated the employees' feedback and desired outcomes. The investigation of the usability of learning management system of prison's employees, taking into account by the senior staff and DSR model can be used by the Victorian prison to implement an effective LMS for online training.

7.3 Implication of the study

This study displays the relevance of research placed in a single case methodology, inside a prison. Firstly, this research contributed to the existing literature regarding facets knowledge of LMS in a corporate setting. Secondly, insights were offered to developers, managers and facilitators of LMS regarding the features of online training and the different aspects of usability of LMS. Thirdly, new facts become provided to organizational managers and executives who are inquisitive about improving, maintaining and preserving the knowledge resources of the corporation regardless of the location of the staff.

The recommended factors and approach for the evaluation of the recommended conceptual model might be utilised for different models of LMS in the context of a corporate setting. Furthermore, it is

hoping that this research will inspire the initiation of further and comprehensive research on models for LMS in the context of the workplace.

7.4 Limitation of the study

As with any research, this study also has some limitations which are outlined below:

- The research covers the only prison in the corporate sector excluding other organisations in diverse domains.
- The analysis of the usability of LMS is focused only on a single organisation. Therefore the results may be difficult to conclude.
- This study will revolve around the LMS usability problems encountered by users, identify the usability barriers and analyse the current usability factors. However, this research will undoubtedly provide a more in-depth and more productive understanding of the LMS which will cover only four factors of usability.
- Availability of the respondents may be the most significant constraint as they may not be ready always to give time during working hours. It is also possible that they may not be available after working hours as they have their commitments.
- Trainers may not be ready to share all the information with the researcher keeping in mind the confidentiality of the system or lack of adequate power to share such information.

The above- mentioned limitation was faced during the research. Once the conceptual model is ready, there was another limitation which has been listed below:

- Limited trail of the conceptual DSR model.
- The conceptual model is still being fully developed.

7.5 Further research opportunities

There are further research opportunities that could be investigated from this research:

- The conceptual model has been proposed as a new practical solution within Victorian Prison. This model has been focused on only four factors of Usability- Effectiveness, learn-ability, flexibility and acceptability and was not combined the rest. This provides the possibility to focus on other factors which have not been covered in this present research.

- A further area of research, not to just overcome the above-listed limitation, but to enhance the usability of LMS in diverse settings. This study has practical significance as it provides a better understanding of LMS, in particular, to guide practitioners, managers and developers with an aim to improve LMS adoption in workplaces. Employee satisfaction with LMS usage and its role within different domains can also be investigated.

7.6 Concluding remarks

Previous research on Learning Management system has contributed to focus on managing learning, but not for delivering learning. The navigation is often tedious, the analysis and analytics capabilities are basic and lack customisation features. It is vital that future iterations and advancements in the LMS arena prominently focus on the learners, providing them engaging learning experiences using newer technologies such as artificial intelligence and virtual reality. This study has inadequately provided contributions towards enhancing the usability of LMS in the context of the workplace.

Adverse to the previous research within the education sector, this study has provided insight into the use of LMS in a cooperate environment. It has provided the conceptual model for improving usability factors. This research has also provided a deep understanding of how the ideal online training can help the employees to boost their skills and knowledge.

Consistent with Corrections Victoria, the primary purpose of Corrections Centres not just holding the prisoners for public safety, even get the prisoners ready for not re-offending the crimes. Therefore, this Victorian prison where the study being held has contributed to Continuum of Care model which provides a wide variety of guide and learning possibilities to prisoners to assist them to grow for the duration of their sentence and provide them with the tools to allow them to be triumphant after they re-input their societies but they are failing to keep the Prison's staff safe and secure. There are standard guidelines for Correction in Australia, which must be followed by all the correction facilities. According to the guidelines, the prison officers must maintain order and daily operations of the facility and are accountable for the care, custody, and control of inmates. The officers have obligations to shield themselves, other officers, inmates, and the public from assault by other inmates. The Correctional officers should additionally guard inmates against harming themselves or committing suicide. The correctional officer should be alert and aware of any and all movement taking place inside the facility. Prevention is one of the key components of an officer's obligations. The officers can utilise prevention by routinely searching inmates and their residing cells for potential threats which include weapons, drugs, or other contraband. These above duties can place an extra burden on the corrections

officers and as there is limited training for correctional officers, which is not helpful in ensuring their safety and perform above-listed duties. However, if the current conceptual Model implement, can help the staff to overcome the issues as well as the organisation with their shrinking budgets and staff shortage.

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Appendices

Appendix A – Published Paper

Sabharwal, R, Hossain, MR, Chugh, R & Wells, M 2018, December. Learning Management Systems in the Workplace: A Literature Review. In *2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE)* (pp. 387-393). IEEE.

Learning Management Systems in the Workplace: A Literature Review

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Abstract—Learning Management Systems (LMSs) are a vital software platform to deliver education and training courses online. They enable the creation, management and delivery of educational content making it easier for businesses of all sizes and types to administer educational content. Like any system, LMS also needs to be user-friendly and easily usable. Usability is a measure of the degree to which users can use a product or system to effectively, efficiently, and satisfactorily achieve their objectives; this means that users will be trained quickly and efficiently if the degree of usability of LMS is high. This paper attempts to discover the essential usability factors, implementation and adoption issues and the barriers and enablers within the LMS domain, primarily in workplace settings. To achieve these aims, a review of the literature has been carried out by considering 23 research articles published between 2014 to 2018. The discussion highlighted current issues in the field, as well as gaps and possibilities for further research.

Keywords—learning management system, usability, training, e-learning, organisations.

INTRODUCTION

According to Pankaja [1], Learning Management Systems (LMSs) began to evolve in the 1960s after the first system was developed at the University of Illinois, Urbana Champaign; new features were developed that enabled different users to interact with each other, so students could complete course materials, and assessors could mark them online. In 1983, the Massachusetts Institute of Technology (MIT) announced Project Athena, a five-year initiative to explore the innovative use of computers for teaching. In 2002 an open source Internet network called LMS Moodle was released; in 2008, Eucalyptus was released as the first opensource, AWS API-compatible platform for deploying private clouds, and in 2012, a modern LMS system was hosted in the cloud, freeing companies from the burden of installing and maintaining 'in-house systems'.

LMS has a well-defined way to plan, implement, and assess specific training packages. In recent years, online training is becoming more important, whether for education or workplace skill-based learning. This contemporary

way of delivering training not only eliminates having to access learning material physically, but it also increases interaction between trainer and trainee.

LMS enables training material to be delivered via the internet and intranet, so employees can gain the knowledge and skills needed to perform their work tasks from anywhere and at any time. To enhance the usage of LMS for employee training, usability must be explored, but this aspect is generally ignored. Usability is the extent to which a system can be used by specified users to achieve specified goals effectively, efficiently, and satisfactorily in a specified context [2], and if the e-learning systems have poor usability, users can spend more time learning the system itself rather than learning the content it delivers [3].

Job satisfaction can be determined by increasing employee's level of motivation, and while there are numerous ways, efficient and effective training programs are vital because they increase skills and help them acquire new knowledge. Employee training can be carried out off site or on site, which is why LMS technologies are useful. For example, Hewlett-Packard allows regional trainers in different countries around the world to select the best delivery modes for training while emphasising its motto "one size does not fit all" [4]. Corporate sector managers visualise LMS as an essential way to deliver the training needs of their employees, which is why various organisations around the world are looking to embrace LMS to provide training.

Within the structure of online training, this paper aims at studying the usability factors of LMS, its implementation and adoption, as well as its limitations and barriers, with a specific emphasis on LMS in workplaces. Many literature reviews have described LMS, but little attention has been given to such a holistic perspective; this literature review paper aims to fill that gap. The unique contribution of this paper lies towards a theoretical analysis that provides a complete perspective of LMS in workplaces, considering a range of diverse issues that can ultimately improve LMS adoption. The analysis contributes to a better understanding of LMS, in particular to guide practitioners, managers and developers. The next section outlines the research method and then a review of literature which covers usability and LMS. This is followed by the implementation and adoption of LMS, and then its barriers and problems. A brief discussion and conclusion is then presented with limitations and recommendations for future research.

RESEARCH METHOD

This research paper provides a narrative literature review. Narrative studies are generally based on the availability of literature or the author's selection. Narrative reviews are used to express a focus on clearly identified issues, appraise published literature and conduct a general debate around a

topic [5].

In order to also retain the nuances of a systematic method, essential keywords and phrases were used - learning management systems, organisation, usability, online training, e-learning, workplace/corporate. Truncation and wildcarding along with appropriate Boolean operators were used while searching. The databases used to search for the literature were: Science Direct Elsevier, IEEE Xplore, Springer Link, PubMed, Taylor and Francis, Emerald, Bio Med Central and EBSCOhost. Only peer-reviewed publications in English language from 2014-2018 were selected. Firstly, the titles and abstracts of articles yielded by the databases were screened, followed by an evaluation of the full text. Any article that was not relevant to the usage of LMS in workplaces was disqualified. After further screening, based on the identified inclusion and exclusion criteria, only 23 publications were found to be relevant to LMS usage in workplaces, and these have been presented in Table 1.

Table 1 illustrates those 23 articles in chronological order; 1 related article was published in 2014, 9 articles in 2015, and 8 articles in 2016, 3 articles in 2017 and 2 articles in 2018. A decline in learning management studies was evident although the whole of 2018 was not captured. It was also identified that there are a few articles that focus on usability in the traditional sense but other articles are more about acceptance rather than usability. However, implementation, adoption and challenges are closely linked to acceptance. Key features from each study are outlined in the last column of Table1.

Publication Year and Author Details	***Study Titles***	***The Key Feature (s) of the Study***
Shahid and Abbasi 2014	Usability testing of an E-Learning System: A comparative study of two evaluation techniques	Use of learning management systems at the user end

Boubahi and Alrazgan 2015	Investigating IT faculty resistance to learning management system adoption using latent variables in an acceptance technology model	Factors influencing faculty members' acceptance of LMS
Dodson, Kitburi and Berge 2015	Possibilities for MOOCs in corporate training and development	Uses of MOOCs in the corporate world
van Kuijk, van Driel, and van Eijk 2015	Usability in product development practice; an exploratory case study comparing four markets Interview	Attitude towards usability
Lee and Kim 2015	Users' preferential factors in Web-based e-learning systems for ease of workplace learning in Korea	Investigate users' preferential factors of ease of workplace learning in Korean WLS business organizations
Little 2015	The purchasing and practical benefits of a learning management system	LMS features and characteristics
Medina and Gamboa 2015	Usability evaluation by experts of a Learning Management System	Evaluates the usability of locally built LMS
Shin and Kang 2015	The use of a mobile Learning Management System at an online university and its effect on learning satisfaction and achievement	Students' acceptance of mobile learning and its influence on learning achievement using an information system
Sriprasertpapa 2015	The development of online training model for Srinakharinwirot University in Thailand	An online training model for blended learning in the traditional classroom and on the job training for students
Stoffregen, Pawlowskia and Pirkkalainen 2015	A barrier framework for open E-Learning in public administrations	Identify challenges to open E-Learning in public administration
Al-Gahtani 2016	Empirical investigation of e-learning acceptance and assimilation: A structural equation model	Acceptance of LMS
Almarashdeh 2016	Sharing instructors experience of learning management system: A technology perspective of user satisfaction in the distance learning course	Measures instructors' satisfaction
Alsabawy, Cater-Steel and Soar. 2016	Determinants of perceived usefulness of e-learning systems	Factors affecting perceived usefulness of e-learning
De Smet, Schellens, De Wever, Brandt-Pomares and Valcke 2016	The design and implementation of learning paths in a Learning Management System	Implementation of LMS
Hameed and Swar 2016	Information systems acquisition decisions: learning management system of SolBridge	Acquisition of LMS
Mahoney, Boland, Ramulu and Srikumaran 2016	Implementing an electronic learning management system for an Ophthalmology residency program	Investigation of different E-LMS
Saidin and Iskandar 2016	Proposed model to evaluate the impact of e-training on work performance among IT employees in Malaysia	Evaluates the effect of e-training on the performance of employees
Walker, Lindner, Murphrey and Dooley 2016	Learning Management System usage: Perspectives from university instructors	Instructor's perception of LMS usage
Zhang, Yin, David, Xiong and Niu 2016	Facilitating professionals' work-based learning with a context-aware mobile system	Engagement with work-based learning
Ban, Che'Pa, Din, and Yaa'cob 2017	Integrating Social Collaborative Features in Learning Management System: A Case Study	Evaluates LMS model in terms of usefulness, ease of use and user's satisfaction

Ippakayala and El-Ocla 2017	OLMS: Online learning management system for e-learning	Introduction of OLMS to provide new course content
Kimiloglu, Ozturan and Kutlu 2017	Perceptions about and attitude toward the usage of e-learning in corporate training	Examines the attitudes of corporations regarding the usage of e-learning for corporate training
Park and Jo 2017	Using log variables in a learning management system to evaluate learning activity using the lens of activity theory	Evaluates the activation pattern of LMS
Ramirez-Correa, Rondan-Cataluña, Arenas-Gaitán and Alfaro-Perez 2017	Moderating effect of learning styles on a learning management system's success	Students' perception of learning styles
Kumar and Mohite 2018	Usability of mobile learning applications: a systematic literature review	Usability evaluation of mobile learning applications
Noval and Johnson 2018	A Qualitative Study on the Usage of e-Learning Management System by Allied Health Faculty	Explored faculty's experiences in LMS usage and factors that affected faculty's use of LMS to facilitate classroom learning
Nurakun Kyzy, Ismailova and Dündar 2018	Learning management system implementation: a case study in the Kyrgyz Republic	Students' attitude toward online education

TABLE I. SHORTLISTED ARTICLES

USABILITY AND LMS

The key focus of usability is for users to be able to use a product or system with effectiveness, efficiency and satisfaction. A usable interface indicates how easily employees are able to use a system, whether for training or skill development. If users spend more time learning to use a LMS rather than the training content, it is not user-friendly and does not help in meeting objectives. According to a

research on the usability of e-learning at University of Sargodha Women Campus Pakistan, a right user interface always leads to excellent user fulfilment levels [6]. Shahid and Abbasi [6] compared Nielsen's ten heuristics technique, from which it was concluded that e-learning success has three primary features: efficiency, effectiveness, and user satisfaction.

Usability is a comparative but independent approach that describes the nature of the interaction between people and systems [7]. Kuijk et al. [7] compared four multi-national markets and concluded that usability and user-centred design influence a company's product-market combination target. Moreover, usability helps to integrate various aspects of digital systems and allows the quality of a design to be characterised from the perspective of users' experience [8]. Medina-Flores and Morales-Gamboa[8] designed an instrument to evaluate usability factors and also carried out a usability test on the development of an in-house built LMS called Metacampus. In other words, usability testing is a technique used in user-centred interactive design to evaluate a product by testing it on users; this helps to identify problems before and after implementing LMS.

Businesses need a useable LMS, which is why an exploratory study examined the attitude of 106 corporations towards the usability of online training [9]. Kimiloglu et al. [9] explained that LMS adoption consists of many elements such as cost-effectiveness, functionality, customisability and maintainability. This authors found that online training is a flexible and efficient way to develop employees' skills and knowledge.

Usability is a primary factor for successfully adopting the technology. Mobile learning is an extension of e-learning that allows users to accomplish learning using small and portable wireless devices [10]. The researchers used 23 publications and a systematic review to measure the research activity, attributes, research methodologies, and limitations. Mobile learning has a wide range of benefits such as flexibility, cost-effectiveness, location-based services, and it reduces the distance of learning. Mobile learning can be used as a formal or informal tool for online-training. Shin and Kang [11] determined the acceptance of mobile learning and its effect on learning satisfaction and achievement using Technology Acceptance model (TAM) and Information System Success (ISS)

model. Shin and Kang [11] found from 1117 survey responses that learners began to accept mobile LMS as a new learning tool which influenced their learning acceptance.

Another study by Zhang et al. [12] examined how context-aware mobile system is used in professional workbased learning. This research presented a work-based learning activity design, system technical implementation, structure design, functionalities and evaluation of learning achievements, as well as user attitudes and acceptance towards the learning system. Zhang et al. [12] highlighted that professionals could use their mobile devices to get adaptive, personalised and just-in-time learning support.

According to Dodson et al. [13] corporate LMS is different from educational LMS; a study about MOOC (massive open online course), which is off-the-shelf LMS for online and distance education, revealed that LMS can be customised according to audience requirements. The corporate LMS's primary role is to ensure that employee has skills and knowledge to assist an organisation to develop and expand, while an education LMS's primary focus is only on knowledge transfer.

IMPLEMENTATION AND ADOPTION OF LMS

LMS is a means to provide high-quality training for employees and also make them aware of compliance and skill development via an online medium. To implement and adopt LMS, an organisation requires planning and preparation, as indicated by this medical college research, conducted in the United States for an Ophthalmology residency program that explored faculty members' experience towards electronic learning, by encouraging staff to implement electronic LMS (e-LMS) [14]. Mahoney et al.[14] have found it necessary to implement an e-LMS to consolidate external electronic educational resources, host internal electronic education resources, and provide a space for developing new online learning contents [14]. With help from 12 interviews to determine the features, the authors also examined 4 LMSs and found a cost-effective solution for curriculum management, which has all the functions needed to complement current teaching methods.

A research by Al-Gahtani [15] highlighted that implementation failure of e-learning systems costs millions of dollars and low adoption and acceptance could be the reasons of underutilisation. Al-Gahtani [15] primarily focused on individual behaviour towards acceptance and assimilation of e-learning in Saudi Arabia (King Khalid University) with the help of 286 participants' survey; the research based on TAM3 determined factors that influence the users' intention to use e-learning, with a key focus on managerial interventions for increased acceptance [15].

Nurakun Kyzy et al. [16] investigated the adoption factors such as users' preferences and attitude towards LMS and concluded that four factors: technical characteristics of LMS, ease of use, feedback options of LMS and advantages of use influenced the students' perception of LMS.

A study by Almarashdeh [17] examined the factors that influence instructor satisfaction and found that service quality, perceived usefulness, system quality and information quality has a significant effect on user satisfaction and also proved with 110 survey responses that perceived ease of use have no impact on instructor satisfaction. An Australian institution (University of Southern Queensland) focused on the impact of IT infrastructure services and IT quality on perceptions of the usefulness of e-learning systems and created a model with 720 students' response; which proved that IT infrastructure services substantially impacted system quality, information quality, SDQ, and perceived usefulness [18].

On a similar note, instructors (faculty members) should understand the concept of the usability of LMS. A study conducted at King Saud University investigated the personal factors influencing faculty member's acceptance of LMS [19]. Bousbahi and Alrazgan [19] found that the perception of the usefulness of LMS depended upon personal factors; motivation, load anxiety, and organisational support; and the ease of use of LMS has no impact on the usefulness of LMS. Lee and Kim [20]'s study in Korea which focused only on employer's preferences towards web-based e-learning found six preferential factors for ease of workplace learning - content selection and clarity, feedback of learning, controls the process, motivational possibilities, and information sharing which can help design successful Web-based learning systems.

De Smet [21] stated that the design of learning path and group setting (collaborative versus individual) have an impact on learning outcomes; this quasi-experimental study involved 360 students and found the importance of the design of learning path and effect of an individual versus a collaborative setting. Another study by Little [22] discussed that LMS adoption could import tangible benefits such as improve efficiency and business goals for the organisation. Little [22] revealed selection factors such as the user interface, support and service, features, unique selling propositions, the speed of innovation, and adaptability and consumer feedback.

Whereas a study by Park and Jo [23] evaluated the activation levels and usage patterns of LMS using activity theory through online activity information from 7940 courses which result in different activity patterns within different courses colleges as well as the low use of virtual campus with minimal changes. Another study by Ramírez-Correa et al. [24] assessed Delone and McLean (D&M) model of Information system and effect of learning styles on the success of LMS from students' perspective with the help of 258 survey responses and justified the D&M model to explain user satisfaction, and perceived benefits of a learning management system.

The adoption of online-training within corporate organisations has a positive impact on both employees as well as organisations. The employees can access online training at any time and from anywhere because of its remote nature, which improves employees' skills and knowledge. Research of Malaysian organisations by Saidin and Iskandar [25] focused on evaluating the effectiveness of e-training towards work performance within the ICT sector. Saidin and Iskandar [25] proposed a research model to evaluate the employee's performance as well as the impact on the utilisation of e-training using task-technology and social cognitive theory.

Walker et al. [26] focused on determining LMS features to benefit online learning and teaching and secondly, focused on the impact of LMS's quality which can help to accomplish instructor's requirements. Walker et al. [26] found the positive and negative attitude towards seven features of LMS: grade book, assessment tools, course materials, communication tools, interface, administration of classes, and student engagement. Walker et al. [26] advised that positive attitude towards LMS features confirmed the LMS selection whereas negative attitude focuses on threats that ought to be addressed in the future for LMS adoption.

Additionally, Sriprasertpap [27] aimed to design and develop an online training model for blended learning in the conventional classroom and on the job training for students and teachers. Sriprasertpap [27] designed an online training model which has five elements: creativity, LMS, instruction media, interaction, and evaluation. The author outlined the interaction between the teacher and the students and advised that this is two-way communication through online learning and evaluation plays an important role in usability assessment.

BARRIERS AND PROBLEMS OF LMS

This research also explored the obstacles and the difficulty of using LMS which included face-to-face interaction, technical knowledge, cost, individual adoption behaviour and content of LMS. This part of the paper reveals the barriers and limitations of LMS by investigating the relevant literature.

A Saudi Arabian study found that distance learning has some limitations such as technology dependence, individual experience, motivation and time management [17] and secondly, the study was only limited to higher education's instructors.

Alsabawy et al. [18] explained the impact of IT infrastructure services but only limited to the education sector. The research did not include e-learning systems in organisations which can be a hurdle to generalising the findings of this student group to organisations adopting elearning systems due to the differences surrounding universities and organisations and the purpose of using eLMS.

The lack of motivation is the most significant barrier to LMS usefulness. Bousbahi and Alrazgan [19] explained the impact using TAM; the instructors are not motivated enough to engage in the new method of teaching and the study only limited to IT faculty members. The adoption of LMS can be vital for early adopters or non-adopters as explained in a Turkish organisational study [9]. Kimiloglu et al.[9] explained two types of disadvantages of e-learning; personal disadvantages which included lack of acquaintance, concentration and communication of the employees and organisational disadvantage which included necessary infrastructure, qualified team, supportive management and competent employees to benefit from e-learning. The attitude towards LMS is another factor, which varies through human interaction and experience [7].

Despite all other factors, language is another limitation; the users do not feel supportive if the training module is not in the shared language. Little [22] assessed two case studies and described that users feel comfortable if LMS content is designed in their language. Little [22] advised that due to a large number of LMS currently available in the market which makes it difficult to acquire the appropriate one for the organisation. Inactive user-interface is another barrier which stops users to access the learning material via portable devices such as mobile phones and tablets. Kumar and Mohite [10] advised in this research conducted in Fiji that mobile learning has some limitations due to mobile small screen size, limited input capability, and changing user context which make it difficult to abide to the traditional methods of usability.

Another research by Medina-Flores and MoralesGamboa [8] identified eight attributes: searchability, communicability, reliability, configurability, design, comprehensibility, ease of use, and navigability to measure the usability of an in-house built LMS. With the help of the above mentioned eight attributes, Medina-Flores and Morales-Gamboa [8] found that in-house built LMS has usability problems: low reliability, lack of flexibility to

meet the varying user demands, and missing search facilities. Research by Stoffregen et al. [28] was aimed to identify the challenges to open e-learning in public administrations and developed a contextual framework that covers more than 40 obstacles in organisational, social and technical dimensions.

DISCUSSION

From the review, it is evident that many of the shortlisted articles are geared towards academic applications of LMSs. The scope of this study though aims at figuring out usability in a workplace setting. Although the common denominator is still education and training, it is important to distinguish between the two settings – academic and workplaces. What works for one population may not necessarily work for others. The role of LMS in workplaces is to ensure staff can be trained with the relevant knowledge, skills and behaviours expected within a workplace, with an aim to efficiently enable staff to complete job-related tasks. In contrast, an academic LMS may have functionality similar to workplace LMS but the goals and user base are different. In academia, LMS primarily focusses on imparting subject knowledge, ubiquity of learning content and course administration. In both contexts, the overlap is on virtually managing learning and development to create an effective learning environment.

To develop employees' skills and knowledge, online training is a flexible and efficient way [9]. The selection of a suitable LMS within an organisation depends upon many factors: user interface, support and service, features, unique selling propositions, the speed of innovation, and adaptability and consumer feedback [22]. Implementation and adoption issues should not be an after-thought and should be considered early in the planning stages. However, before adopting any e-learning tool, it is important to ensure that the intended outcomes are clarified and aligned with learner needs [29].

Since organisations utilise a lot of resources to train their employees, having a balanced combination of usability factors in LMS helps make training easily accessible and will improve user satisfaction. This review has evaluated some usability factors of LMS and places the concept into practicality. LMS is a combination of tools that deliver online training in an efficient and timely manner. Workplace learning that occurs on a day-to-day basis at work when employees obtain skills and knowledge for the problemsolving and decision making can be delivered through LMS. LMS can help to save costs, enhance organisational performance and provide ubiquitous content. In this regard, an ideal LMS should make education and training activities streamlined, efficient and effective. From usability factors' perspective, a LMS should be intuitive, easy to learn and reduce ambiguity. In order to provide value, a LMS should enable administrators or managers to have easy access to reporting capabilities, have a low learning curve and offer functionality and features that can be used to engage learners in any educational setting.

CONCLUSION

It appears that most LMSs are seamless for managing learning, but not for delivering learning. The navigation is often tedious, the analysis and analytics capabilities are basic and lack customisation features. It is vital that future iterations and advancements in the LMS arena prominently focus on the learners, providing them engaging learning experiences through the use of newer technologies such as artificial intelligence and virtual reality.

This research makes contributions to the literature on LMS with a focus on understanding usability, implementation and adoption issues and challenges of LMS usage. Nevertheless, this research paper may have some boundaries regardless of the truth; the study was planned with the purpose of accomplishing the maximum achievable certainty. Some relevant research may have been overlooked, and therefore might provide incomplete observation into the usability of LMS. The research has been constrained based upon the selection of literature in the usability domain of LMS and stuck to peer-reviewed journal articles and omitted reports, grey reports and web articles. The quest string can be questioned as the search has filtered using some keywords. To alleviate that risk, some database filters were applied resulting in the effective search string.

Future research can be based upon finding empirical issues towards LMS adoption and implementation to enhance the usability of LMS. This study has practical significance as it provides a better understanding of LMS,

in particular to guide practitioners, managers and developers with an aim to improve LMS adoption in workplaces. Employee satisfaction with LMS usage and its role within different domains can also be investigated. More theory is required to understand the users, managers and administrative staff perception towards LMS which can help to guide the design, adoption and implementation of LMS in diverse settings.

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An Exploration of the Usability of a Learning Management System: A Case Study of a Victorian Prison

Introduction

Updating knowledge and learning a new skill is part of the cycle of training and it is crucial too as it allows for the learners to be aware of the recent developments and to also use evidence-based practice (Back et al. 2016). In practice, all employees must be regularly trained in regard to the new updates, evidence and other important information that can help then discharge their duties adequately. Therefore, to streamline learning amongst employees the LMS or the learning management system is being implemented by organisations across the globe. The LMS originated from the eLearning system that was in use in the past. However today LMS has already been deployed in colleges and universities and many organisations also use LMS to train their employees and even help them be updated in regards to the latest requirements, policies, and procedures (Kasim and Khalid 2016).

For example, there are organisations in Australia which are using LMS and they have gained benefits from the use of this system. However, at the same time, there are other organisations which are still deliberating and at times not using the LMS to the full potential as they are not sure of its usefulness (Mtebe 2015). For instance, in the literature review that was conducted in another paper, it became evident that managers and management of most organisations are aware of the benefits of LMS and they are using it too (Sabharwal 2018). However, it also became evident that not all organisations feel confident in using LMS as they are unsure of the possible gains (Algahtani 2017).

For example, the Victorian corrections department has a sizeable strength and it is required to have the best employees and managers who are aware of the latest policies, procedures, and updates that apply to them (CV 2019). For instance, in Victorian prisons, there are at present around 7666 inmates and this is around 80 % more than comparative figures from a decade ago. The staff and other correctional officers who are in charge of these prisons are required to be aware of the latest updates in regards to ways to manage inmates (CV 2019). Furthermore, there are reports that in Victoria one prison officer is assaulted every three days (McGhee 2015) and this is the reason Victorian prisons are considered as the most violent in Australia and feared due to sheer size and scale of assaults that place

in them. Likewise, as the Victorian prisons are getting overcrowded there will be more chances for such incidents that can physically as well as psychologically harm the corrections officers (McGhee 2015).

Therefore, it is evident that there is a lack of training of the current and new staff of the Victorian prison facilities to deal with the inmate's and it is at this point that LMS can be of help.

Need for Learning Management System in Victorian Prisons

According to the corrections Victoria, the main aim of corrections facilities to not just ensure public safety by holding prisoners but it also has the duty to ensure humane treatment of prisoners (Corrections Victoria 2019). Likewise, it is also stated that the corrections facility officers are also entrusted with the task of developing strategies to rehabilitate prisoners in their custody. Moreover, it is also part of the corrections offices role to tackle the underlying causes of crime so that it can lead to a reduced chance of reoffending of the inmates. Likewise, there are other requirements too like the need to manage prison facilities so that they are operated in the most efficient manner possible and much more. Furthermore, there is also a need for prison officers to be well versed in case management so that they can manage inmates better and also ensure that they do not get violent and hurt themselves to be a threat to others (Corrections Victoria 2019).

However, it is evident that the current increase in violence in the Victorian prisons hint at a lack of training and updating of the corrections officers in regard to the ways to manage inmates and to ensure that there is no threat to the staff or to the inmates too. For example, in the recent report published by Corrections industry standards Australia (Minton 2018), it was stated that there are multiple threats faced by the staff members of the correctional facilities and the most serious one of them is staff shortage. Victorian prisons and prisons across the nation face a staff crunch that is leading to overwork, staff stress and errors. Furthermore, staff members face serious issues in regards to training too (Minton 2018).

For instance, according to Minton (2018) around 61.23 % of all staff members are having a certificate 3 or 4 while around 18.9 % have a diploma or an advanced diploma. However, none of them is trained in all aspects of prison operations and such as lack of training affects their ability to discharge their duties adequately (Minton 2018 pp 5-6). Corrections staff need training in regards to rehabilitation services, relationship management skills and constant monitoring of prison and its inmates. The current training system is unable to help the corrections officers in this regard and therefore there is a need to have a better training system in place. Similarly, it is also evident that modern prisons are

using technologies that are designed to track inmates and to carry out general duties related to security, inmate rehabilitation and more. These new technologies that are in use require more training and it is evident that the current staff of corrections facilitates has limited training in this regard and such a lack of training again raises the need to have a learning management system in place that can help improve the outcomes for all concerned (Minton 2018 pp 5-6).

How an LMS can improve the current toxic culture in Victorian prisons for women corrections officers

It is very well evident from research that the prison system is complex and at times prisons can be a very dangerous workplace with fatal consequences if necessary, precautions are not taken (Smith and Palin 2019). However, when it comes to female corrections officers, the potential for harassment, physical harm, sexual harassment and injuries increases manifolds (Boseley 2019). Women corrections officers are part of the Victorian prisons corrections teams but they are more at risk as compared to male officers and they indeed suffer the most too. For example, there are around 943 female correctional officers in Victoria which account for around 31 % of the total correctional officer's workforce (Boseley 2019). However, as the number of female prisoners is on the rise and they are increasingly getting violent and more aggressive, the female corrections officers are increasingly facing issues they are not trained for. For instance, female prisoners may be in prison because of many reasons and they may seek help from corrections officers in regard to coping with the stress of the prison confinement. Likewise, female corrections officers may be required to develop plans to help the prisoners sort out their issues and be ready for their release. These tasks can place an extra burden on the corrections officers and as there is limited training, and female officers may feel extra stress. At the same time, women officers when deputed in male prisons face the threats of not only physical injuries but there is also evidence of sexual harassment and much more. The training imparted to these female officers is not helpful in ensuring their safety and the increase in incidents of abuse of female corrections officers is proof that the current training mechanism is not adequate. However, if an LMS is in place it can be used to impart the required training to the officers so that they can adjust to the changing as well as the stressful requirement of the prisons (Cluff 2019a).

Likewise, female corrections officers are more prone to leaving their jobs in the prison system as they may not get the required emotional support and counselling (Cluff 2019). Indeed, there is a significant amount of evidence that states that female corrections officers are more inclined to leave their jobs because they may be unable to manage the stress they face in their jobs. Likewise, the current system that is in place to help support female prison officers in regards to their mental health and wellbeing are not effective (Cluff 2019). Therefore, if an LMS is implemented it can not only help update the

training provided to the staff but it can be updated to provide counselling and emotional support to the corrections officers too and this can help reduce the current number of burnouts and stress faced by the female corrections officers.

LMS can be also used in special case management and to even help prisoners rehabilitate

Furthermore, it is also evident that there is serious issue evident in relation to the Aboriginal prisoners and others with special needs like those with underlying drug and alcohol issues, mental health issues, acquired brain injuries and cognitive disabilities (Glass 2015). These issues are quite serious ones with many repercussions. For example, Aboriginal prisoners (COAG 2016) and others with mental health issues and more upon entering jails in Victoria require special care and it is necessary for staff to be aware of the ways to manage such issues. However, as is evident there is hardly any ongoing training given to corrections officers in this regard and such scenarios increase the workload and stress level of the corrections officers. It must be stated here that most accidents and incidents in prisons take place when the corrections officers are overworked and stressed and they let their guard down (Safe Work Australia 2018). However, LMS can be used to update the corrections officers regarding the special prisoners needs and how to manage them. Likewise, it is also evident that the special needs prisoners like the ones stated above will have diverse requirements for rehabilitation and case management and the current training is not sufficient in this regard. Therefore, LMS can be successfully applied in this area too to gain positive outcomes.

Therefore, it is evident that the LMS can be successfully used to provide training and support to the corrections staff in a lot of many areas. The next area of discussion is the research method and samples.

Type of research

The main aim of this research is to collect statements from the prison staff in regards to their current training issues and providing them information regarding the ways in which the LMS can be useful. Thus, the process will involve seeking information from the staff and then analysing the statements to understand the requirements and how can the LMS be used to manage these requirements.

To gain statements from the officers the qualitative research method will be used as this type of research allows for data to be collected in the form of statements and then they can be assessed to arrive at the conclusion (Jamshed 2014).

For example, to conduct this research permission will have to be sought from the department to interview prison officers in regard to their training and the areas that are leading to the issues and injuries amongst the staff. Once the permission is attained, an online request will be forwarded to all prison officers in Victoria state to participate in this research. From the pool of office who will be willing to participate In this research a random sample of around 10 officers will be selected to be interviewed (Robinson 2014). The interview will be a one to one interview as it will be designed to get detailed information from the officers regarding the areas that are leading to the most number of incidents or accidents involving prisoners in the system. The interview will use open-ended questions so that detailed answers can be sought (Singer and Couper 2017).

Likewise, once the data is collected, it will be coded using the coding process (Elliott 2018) to find out the themes that may emerge from the statements of the officers. The process of thematic analysis and coding is integral to qualitative research as they can help in understanding the issues and the themes that may present (Vaismoradi and Snelgrove 2019). For example, in this case, it is very well evident from research that the current training of the corrections staff is lagging in many areas. The evidence that supports this assertion is the increase in the number of incidents and accidents involving prisoners in the Victorian prison system. The number of injuries, assaults and harassments suffered by poison staff at the hand of the prisoners is increasing and this is a sign that the current training is lagging. Likewise, it has also been discussed that the women or female staff, members are more likely to be the victims of abuse, sexual harassment and they are more like to leave their jobs because they are at times unable to cope with the stress. Likewise, there is hardly any robust mechanism in place in regards to stress management and training for the staff. The current training is inadequate and there is, therefore, a need to find out from the prison officers the state of affairs and how can this scenario be improved.

Lastly, it is also evident from the above research that there are special needs prisoners in the prisons like the Aboriginals, past drug users, clients with mental health issues and at times cognitive impairment. These prisoners are special needs prisoners because they may have requirements that are different from other prisoners. However, managing such prisoners by developing management plans for them and taking care of them can be a stressful task for the prison staffers who may not be fully trained in this regard. However, as a result, of such stress, the prison staffers may suffer from anxiety and they may make mistakes due to stress and such mistakes can cost dear. Therefore, it is necessary to find out from the prison staffers the issues they are facing in managing prisoners and how can they be regularly trained to manage the prisoners and even provide help and counselling for them to manage the stresses and strains they may face.

Therefore, it is necessary to conduct interviews with the staff members to understand the areas that need improvements and how can efforts be in place to improve the outcomes for all concerned.

Open-ended questions

To conduct interviews and collect first-hand data from the participants the open-ended questions will be used. The chief reason for selecting these is the fact that they can help in detailed data collection from the participants and this data can be then used to develop themes to arrive at results (Singer and Couper 2017).

The sample

It is expected that around 500 to 1000 participants will be willing to participate in this research and to complete the required number of interviews to collect data it will be wise to randomly select around 10 such participants. A random selection will be used as the basis to select participants as it can help in improving the validity as well as reliability of the research. Moreover, by using random sampling it will be possible to increase the generalisability of the research too (Robinson 2014).

How the LMS will be implemented and tested

LMS or the learning management system is a revolutionary step that is going to change the way the current training and policy updating of the employees and officers takes place. For example, the current education and training plan that is in place in Victorian prisons is a simple paper-based and it will be correct to state that it is an old School training method. The training is provided manually with some minor components delivery using IT-based devices. Moreover, most discussions take place in the discussion rooms or at official meetings to update the staff regarding the new updates in law and policies. Apart from these updates, there is other minor year to year programs that are used to help the staff be aware of the changes. However, these methods are not as effective as they should be and most of the time, they are considered outdated and slow. On the contrary, the LMS is going to be a 24 *7 service that allows the users to learn about the policy changes instantly and be trained in regards to the new ways of managing the prisons and the individuals that are there. Moreover, LMS can allow training, updates and even complete information to be delivered to the staff at a moment’s notice and hence it will be a far superior method of ensuring well trained and fully updated staff that is managing the Victorian prisons. Moreover, if the LMS is successfully implemented it will directly reduce the incident rates at prisons by helping in training offices in a better manner and with reducing their

workload. However, the single most important and crucial question that arises at this point is, how to implement the LMS in Victorian prisons.

The main reason this question is gaining significance is because LMS is a revolution that is a clear deviation from the current methods and it may lead to some resistance to change along with the fears that it may not work at all. Therefore, to ensure a smooth transition to this new system and to ensure that it works the PDCA implementation cycle can be used. The details of the cycle are as follows.

PDCA or the Shewhart Cycle

The PDCA is a method of pilot testing a change that is going to be implemented in an organisation or a department (Vyt 2019). The chief aim of pilot testing new technology or in this case the LMS is to be aware of the change and how it works and are there any issues. For example, in the given case the LMS can be initially applied to only 1 of many prisons in Victoria state to test its application, its benefits and any issues that arise from its implementation. For example, instead of applying LMS once it is approved in all prisons in Victoria simultaneously it will be wise to implement it in one prison so that it can be tested. This testing will not only allow the user or the prison offices to be aware of the LMS and its various variables but also regarding ways to refine it further. The PDCA cycle can be used for pilot testing and it is as follows.

Plan: the first stage is called the plan stage (Maruyama and Inoue 2016). In this stage of the pilot implementation of the LMS, it is necessary to prepare one prison for application, it will involve updating the IT equipment, developing lesson plans to test the system, imparting training to the employees to test the system and much more. The complete emphasis will be on making the testing phase a realistic as possible. For people, the planning stage will last for around 30 to 60 days and it will as realistic as possible involving daily updates for the officers, the task they need to complete as a way of training and feedback from them in regards to the complete LMS, its operations and any other issues that the officers find. This phase will also involve the significant amount of training to the officers too. It must be kept in mind that the Australian prisons have a very diverse workforce, their cam be individuals in the second decade of life to the mature employees who are in their 5^{th} or even 6^{th} the decade of life, these officers may have some training or next to none training in using IT/IS equipment that forms the core of the LMS. Therefore, before the testing stage can be completed there will be a need to train all employees regarding the LMS and its use.

Do: is the second stage (Dimitrescu et al. 2018). In this stage, the training of the officers must be completed and they must use the LMS in the way is designed to be used. For example, the offices

should use the LMS for case management, prisoners' details, policy updates, their own training and much more. It will be shifting from the current paper-based system to the new LMS which will automate most functions but it will require a significant amount of adjusted as well as training to get functional fluency in regards to the LMS.

Change: this is a stage of the pilot testing where the users will get a chance to give their feedback in regards to the program and check if it requires any changes (Realyvásquez-Vargas et al. 2018). For example, after testing the LMS for a period of 60 or more days all the officers in the centre selected for the LMS will be requested to give their feedback. In case the feedback states that the LMS is working as is expected and is helping the prison officers in their day to day work and is also useful in keeping them updated then the implementation plan will move on to the next stage. However, in case there is negative feedback regarding the LMS or in regards to its ability to help the officers then the LMS implementation will be suspended and the LMS will be updated to remove any issues faced by the officers. The above stages will be repeated until there are no more errors evident in the LMS and all the users are fully satisfied with the LMS and its operations. Once there is all clear from all users, then the implementation will move on to the final stage.

Act: this is the final stage (Gemechu et al. 2018) in the complete implementation process of the LMS and it involves terming the LMS testing at the pilot level as a success and this will also give the green light for the LMS to be implemented in all other Victorian prisons after the pilot testing is successful.

Issues with LMS implementation and how to overcome them

The plan to implement LMS in Victorian prisons is a fairly big undertaking and its success is going to be contingent on the ways in which the training and other updates regarding policies are provided to the officers. However, it must be kept in mind that the officers are using the current methods since a long time and if they are prompted to shift suddenly to the new LMS it might lead to a resistance to change.

Resistance to change: resistance to change is one of the most serious issues that a revolutionary change like the LMS implementation can face. The resistance to change is a natural response of employees and others who are going to be part of the change (Serban and Iorga 2016). For example, all humans have a natural tendency to resist change if it deviates from the old ways and if it requires training and updating operations. In the case of LMS these all attributes are there because it is a revolutionary change that will alter the ways in which current training and policy updates are provided

to the employees. Therefore, the employee can resist change and in case they do so implementation of the LMS can be affected.

For example, resistance can be in the form of not taking interest in the LMS or not learning how to use it purposefully (Zhang 2019). Likewise, it may also be evident in the form of negative feedback regarding the LMS and so on. On the other hand, overt resistance can be in the form of open disapproval, refusal to use the LMS, not showing up for training and all other ways in which employees can convey to the managers that they are not interested in the LMS. These signs should not be ignored as ignoring them can lead to far bigger issues. However, there are ways to manage the issue of resistance to change and it is a follow.

Overcoming resistance to change: it is natural for employees to resist change but there are ways in which the issue can be reduced and eliminated. The First method is by informing the employees about the change, its importance, its benefits and how it will benefit the employees (Ragab 2018). For example, in this case, the LMS can be projected as a way to reduce injuries and accidents that take place in prisons by regularly updating officers in regards to ways to reduce accidents. Likewise, LMS can reduce workload and errors associated with overwork. Likewise, it can update officers regarding new policies and procedures very easily and this can transform the whole system.

Likewise, apart from informing employees, they must be given a chance to give feedback and seek more information. For example, employees may have questions and these questions must be answered respectfully (UWA 2017). In case these questions or queries go on unanswered it can lead to negative outcomes and it may contribute to employee resistance. Therefore, managers must be diligent and devoted towards employee requirements and all queries regarding the change must be answered in as detail a possible and as many time as required. Patience is the key to success and any signs of impatience in mangers or supervisors regarding employee queries will be recipe for disaster and attempts must be there to be as patient as possible in answering queries (UWA 2017). Therefore, these are the ways in which the employee resistance to change can be managed. However, there can be one more issue and that is related to the IT/IS literacy and ability to learn.

Age and learning diversity amongst the prison officers:

Likewise, implementation, of the LMS as well as training of employees in the Victorian prisons can face one more issue and that is related to the age as well as existing training of the employees. For example, it is expected that Victorian prisons will have officers ranging from quite young to mature ones and there is a high probability that some of them may have never used LMS or any similar

software and, it may be difficult to train these employees (Guiney 2015). Likewise, with age the ability of the learners to learn decrease and the mature as well as aged officers may require extra time to be aware of the LMS, its uses and how can it be used in day to day operation. Such diversity in learning time may require the managers to be extra patient and be aware of the diverse needs of the staff. Moreover, to overcome this issue it may be necessary to extend training time, change the training plan and so on (Guiney 2015). Therefore, there can be a need to change the way the training is planned and implemented in accordance with the needs of the users.

Conclusion

To conclude the above discussion, it is evident that the Victorian prisons seen will benefit dramatically by implementing LMS in the prisons as it will help impart better and updated training to the employees. Likewise, there is also a chance that the number of incidents, injuries and accidents that are increasing in the Victorian prisons may reduce as the officers will be updated in regard to training and most of the tasks like prisoner management plan development and more will be automated. Furthermore, it is evident that there will be many other benefits too and these will ensure a balanced workload, better information access and more. Therefore, implementing LMS in the Victorian prison system will benefit all concerned.

Consequently, interviews will be used to seek direct feedback from the law enforcing offices to be sure about the requirements of the Victorian prison officers and to update the LMS so that the requirements of the users can be met. Therefore, qualitative interviews with officers will help collect the required data and thorough coding and thematic analysis the underlying requirements can be ascertained. Furthermore, there are apprehensions that the LMS being a new and refined system, it may lead to some issues with implementation. Therefore, it will be wise to pilot test the LMS to be aware of the usefulness of the system for the prisons and to update it if required. Lastly, there can be issues related to the learning ability of employees and a need to personalise training so that all employees across different age groups can learn about LMS and use it successfully. Such a personalised training plan can help implement the LMS in Victorian prisons with positive outcomes.

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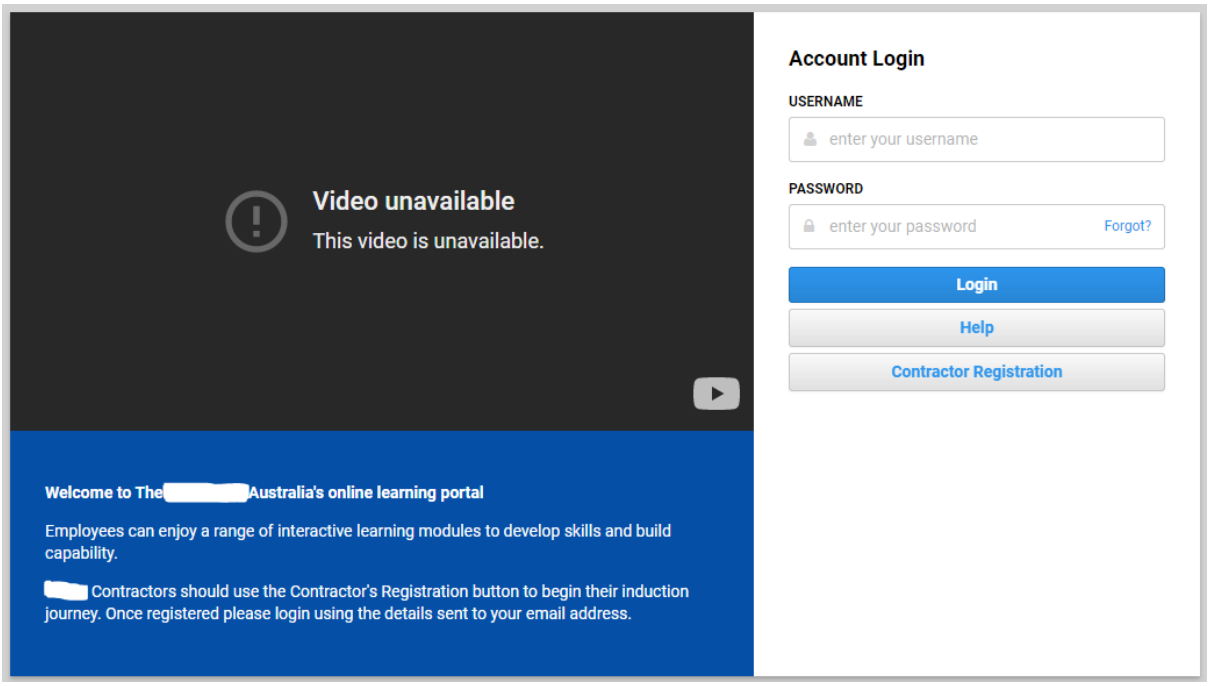
Appendix B - Recruitment email to Prison's Employees

Dear <name >

Would you like to take part in learning management system research which will help to better inform quality training in this organisation?



This research project aims to investigate the usability of LMS. Effectiveness, learnability, flexibility and acceptability are of specific interest as these provide insight into the usability of LMS.

Your participation in this project would be appreciated and the researchers hope you are willing to partake. You are invited to participate in an interview in which you would be given the opportunity to discuss your perceptions regarding the learning management system. Your involvement is voluntary. Should you choose to participate your confidentiality and anonymity are ensured.

You can find further information about this research project in the attached information sheet attached.

You have the freedom to withdraw from this research project at any time without explanation up until December 2019 by which time data will have been included in a research dissertation which will not be feasible to remove.

Kind regards,

Renu Sabharwal

Appendix C- Participant Information Sheet

Information sheet for Participants

An Exploration of the Usability of a Learning Management System: A Case Study of a Victorian Prison

This information sheet is for users of the learning management system who are employees of Prison.

1. Invitation:

You are invited to take part in a research study that is examining the usability of learning management system with a specific focus on effectiveness, learnability, flexibility and acceptability.

2. What is the purpose of the study?

The primary aim of this study is to investigate the usability of LMS. This research will inform users and trainers using a Prison as a case study where the main aim is to:

Explore the usability of an LMS.

Specifically, this research will examine the following questions:

- **What does the LMS in Victoria Prison provide to facilitate more effective online training for users?**
- **What features of the LMS assist users to improve learnability?**
- **What are the factors that would provide flexibility to the LMS at Victoria Prison?**
- **What promotes the acceptability of the LMS?**

3. Why have I been asked to participate in this study?

This study requires the participation of a select number of Employees from Victorian Prison. It is intended that by selecting employees from various branches the data collected for analysis will be coming from a more representative sample. Your participation is voluntary and there is no consequence for declining this invitation.

4. What will I be asked to do?

This research requires a one-on-one face-to-face interview and focus groups between you and the researcher at company premises. The interview will be a semi-structured formal process with the inclusion of open-ended questions. The interview will last approximately 30-45 minutes, will be audio recorded on a handheld recording device and will later be transcribed. The interviews will be conducted in July 2019. The focus groups will be open-ended structured as well which will last approximately 60-90 minutes, included of 8-10 participants.

5. Are there any possible benefits from participating in this study?

Participation in this study may increase your awareness about your personal perceptions regarding online training using LMS and how this is reflected in your work practices. In the broader context, it is hoped that this research may instigate a greater interest from employees from Prison and from other corporate areas into the benefits of including a well-executed online training program in the corporate.

6. Are there any possible risks from participation in this study?

We do not foresee any risks from participation in this study, but please let us know if you have any concerns.

7. What if I change my mind during or after the study?

You are free to withdraw your consent to participate at any time and can do so without providing an explanation. All data relevant to your participation will be destroyed. Specifically, electronic files will be deleted from computer hard-drives and servers, and electronic "rubbish bins" emptied and paper documented will be securely shredded.
You can choose to withdraw from the study until December 2019. After this point in time, it is expected that analysis and publication will have been developed which would make it no longer practicable to isolate and remove your data.

8. What happens at the conclusion of the study?

This study will conclude by December 2020.
All raw data will be held by the Victoria University, for a period of five (5) years from the publication of the study results and will then be securely destroyed.
Interview and Focus groups transcriptions will be stored within electronic files accessed via, Victoria University. Paper copies used for the qualitative analysis of interviews and Focus groups will be kept in a locked filing cabinet accessible only to the researchers. All data will be accessed only by the researchers.
The data will be treated in a confidential manner.

9. How will the results of this study be published?

This research will be published in the form of a Masters by Research dissertation. It is also our intention to provide a brief report of findings to Prison and to write and publish the articles in various journals.

10. How will my confidentiality and anonymity be maintained?

The researchers will assign pseudonyms and/or research codes to data from these interviews to ensure the confidentiality and anonymity of individual participants in the publication or dissemination of any findings from this research. No detailed demographic or information that might be able to identify schools will be used in the publication.

11. Who do I contact if I have questions about this study?

Our contact details are:
Renu Sabharwal
Email: renu.sabharwal@live.vu.edu.au

This study has been approved by the Victoria University Human Research Ethics Committee. If you have concerns or complaints about the conduct of this study, please contact the Human Research Ethics Committee (VU).
This information sheet is for you to keep.
You will need to provide your consent to be involved.

Kind regards,
Renu Sabharwal

Appendix D- Approval email from the organisation

Renu Sabharwal <renusabharwal3@gmail.com> | Shah Miah

Fwd: Data collection

Hi Sir

Please find the email below.

From: David Pettit<dpettit@geogroup.com.au>
Date: 16 March 2020 at 4:52:17 pm AEST
To: Renu Sabharwal <renusabharwal3@gmail.com>
Subject: RE: Data Collection

Hi Renu,

Thanks for the email.
I am giving you permission to collect data outside the premises.
If you need anything, let me know ...

David Pettit
Finance & ICT Manager

Site Address:
Ravenhall Correctional Centre
97 Riding Boundary Rd Ravenhall VIC 3023

Mailing Address:
Ravenhall Correctional Centre
PO Box 490 St Albans VIC 3021
DX211603

DPettit@geogroup.com.au
Ph: (03) 8363 2662

www.geogroup.com.au

This email and any files transmitted with it are intended solely for the use of the individual or entity to which they are addressed. If you are not the intended recipient or the person responsible for delivering the email to the intended recipient, be advised that you have received this email in error, and that any use, dissemination, forwarding, printing or copying of this email is strictly prohibited. If you have received this email in error, please immediately notify by replying to this email.

-----Original Message-----
From: Renu Sabharwal <renusabharwal3@gmail.com>
Sent: Friday, 16 March 2020 2:16 PM
To: David Pettit <dpettit@geogroup.com.au>
Subject: Data Collection

Hi David

As we have discussed this afternoon, Can I get your permission to collect the data outside the premises?
Please reply me via email or call me on 0430 132 213 if you require further information.

Thanks

Regards
Renu sabharwal

Appendix E- Ethics Approval

quest.noreply@vu.edu.au
Wed 3/07/2019 11:27 AM
To: Renu Sabharwal

Ethics Application.pdf 495 KB | Semi-Structured Interview q1.... 14 KB | Focus Groups questions q2.d... 13 KB | Appendix 2 Information Shee... 17 KB

Show all 5 attachments (554 KB) Download all Save all to OneDrive - Victoria University

Dear Researcher,

Please find attached a copy of your application for ethical review of research involving human participants at Victoria University.

NOTE: This email contains a copy of the application only and is NOT confirmation of submission. Please check the 'Process Status' below to determine the current status of this application.

» Application ID: HRE19-083
» Chief Investigator: ASPR SHAH JAHAN MIAH
» Other Investigators: DR HIMANSHU SHEE, MS Renu SABHARWAL
» Application Title: An investigation of the usability factors of online-based learning management system in a Victorian organisation
» Process Status: Finalised - Approved
» Form Version: 13-07

To access the application online, go to http://quest.vu.edu.au/

For help and information regarding ethical conduct or applications for ethical review at Victoria University, refer to the Human Research Ethics website or contact the Secretary for the Human Research Ethics Committee, Office for Research.
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

Ethics application approval:

Application ID - *Assign HRE # using "Manage Applications"*

HRE19-083

Clearance Purpose

Research

For Review:

Assigned Ethics Committee

Low Risk Human Research Ethics Committee

Risk Level *(Enter 'High' or 'Low' or 'Neg')*

Low

Students involved in conduct of project? *(Enter 'Yes' or 'No')*

Yes

Date Accepted by Ethics Secretary

19/06/2019

For Finalisation:

Date Approved

03/07/2019

Approved Start Date for Project

03/07/2019

Approved End Date for Project

03/07/2021

Date Rejected

This question is not answered.

Date Withdrawn

Application for Ethical Review of Research Involving Human Participants

Application ID : HRE19083
Application Title : An investigation of the usability factors of online based

learning management system in a Victorian
organisation
Date of Submission: 18/06/2019
Primary Investigator: ASPR SHAH JAHAN MIAH
Other Investigators: DR HIMANSHU SHEEMS Renu SABHARWAL
3/07/2019 Page 1 / 21

Introduction

Important Information

Form Version: V.1602.
Last Updated: 6.7.2016.

IMPORTANT INFORMATION FOR ALL APPLICANTS:

Applicants are advised to follow the guidelines provided on the **Human Research Ethics website** prior to submitting this
application.
Ensure all questions are appropriately answered in plain language with correct spelling and grammar.
All applications must be sighted and approved by all members of the research team and any relevant parties. Applications will
not be reviewed without appropriate authorisation.
To avoid unnecessary delays, please ensure application is submitted in full by the submission deadline for the relevant HREC.

**You are reminded that your project may not commence without formal written approval from the appropriate Human
Research Ethics Committee.**

Contact:

Ethics Secretary

For help and further information regarding ethical conduct, refer to the Human Research Ethics website: *http://research.vu.edu.au/hrec.php* or contact the Secretary for the Human Research Ethics Committee, Office for Research.
Phone: 9919 4781 or 9919 4461
Email: researchethics@vu.edu.au

Quest Service Desk

For technical help, refer to the Quest website: *http://research.vu.edu.au/quest.php* or contact a member of the Quest team.
Phone: 9919 4278
Email: quest.servicedesk@vu.edu.au

External Resources

NHMRC: National Statement on Ethical Conduct in Human Research
NHMRC: Human Research Ethics Handbook
NHMRC: Australian Code for the Responsible Conduct of Research

Appendix F- Consent Letter

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We invite you to be a part of a study into Acceptance of – An Exploration of the usability of a Learning Management System: A Case study of a Victorian Prison by participating in the interview

The main purpose of this research is to investigate the usability of LMS in Victorian Prison in order to determine the four factors that affect online training adoption in Prison. The research includes the interview the general staff in Victorian prison for generating new understanding and knowledge in order to address challenges to using online training. This is particularly important in contributing to improving and developing online training through providing consistent, high-quality research and understanding for the employees' development.

There is no potential risk to participants in this study, which aims only to gather information and experience about the use of online training by the general staff. The researcher will not request any participant's information in this study. In addition, you will not be affected by participating in the research.

CERTIFICATION BY PARTICIPANT

I,

Certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study: An Exploration of the usability of a Learning Management System: A Case study of a Victorian Prison for assessing LMS in a Victorian Prison. This research is being conducted at Victoria University, Masters of Research Candidate Renu Sabharwal.

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by Renu Sabharwal.

AND that I freely consent to participation involving the following procedures.

- participating in the interview.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the researcher

The researcher: Renu Sabharwal

Phone: 0061 430 132 213

Email: renu.sabharwal@live.vu.edu.au

Chief Investigator: Associate Professor Shah Jahan Miah

Phone: 0061399199835

Email: shah.miah@vu.edu.au

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email Researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Appendix G - Interview

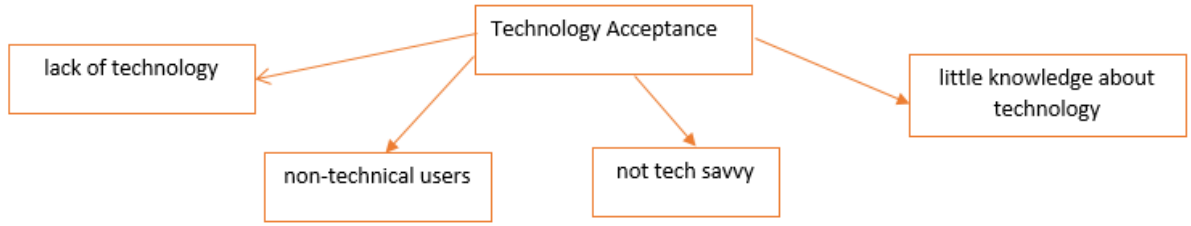
Interview Information		
Interviewer Name:	Interview Number:	
Date & Time:	Gender:	
Role:	Department:	
Duration of the Interview:		
Introduction		
Introduce yourself to the interviewee.		
Ask permission for the recording.		
Ask the interviewee about their confidentiality.		
Explain the aim of the research and explain the interview.		
Start the interview.		
Questions		
Themes	Questions	Notes
Opening Questions	How often do you use LMS?	
	What training module normally you perform through the training system?	
	Tell me about your experience with the online training program?	
	Do you think this training program is helpful?	
Effectiveness	How effective is this training program was?	
	Does this LMS do everything you would expect it to do?	
	Do you become more productive after finishing training?	
	Is this LMS easy to operate?	
Learning Ability	Does this LMS provide clarity of induction?	
	Is the location of the modules logical?	
	Is the content of the modules meaningful?	
	Is your interaction with LMS clear and understandable?	
Flexibility	Is this LMS training flexible to use?	
	Does this LMS provide good self-support for the different user?	
	Does this LMS provide flexible user guidance?	
	Can you use this LMS effortless?	
Acceptability	What acceptability rate will you give this LMS between 1-10	
	Is this system fun or bored to use?	
	How quickly you become skilful by using this LMS?	
	Will you accept the LMS in terms of the usefulness of the content it has?	

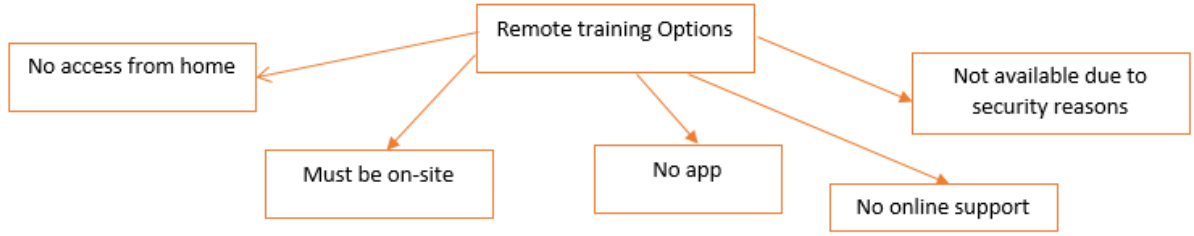
Closing Questions	What do you think about the influence of LMS on your training process?	
	Are you satisfied with using online training?	
	Do you have any suggestions for enhancing the use of LMS?	

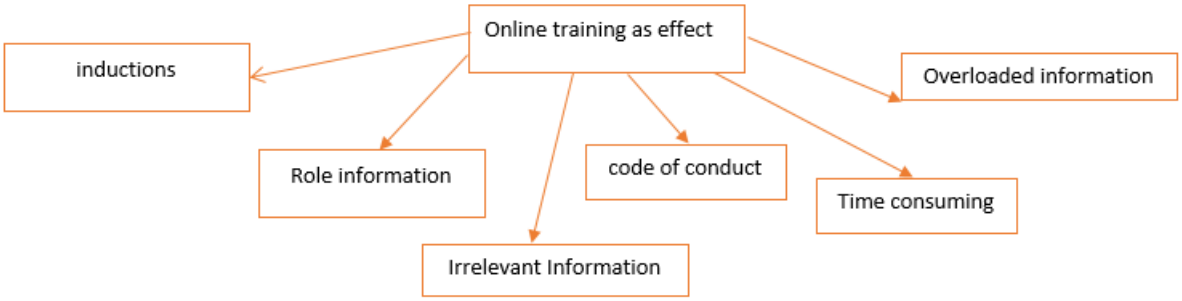
Appendix H – Focus Group

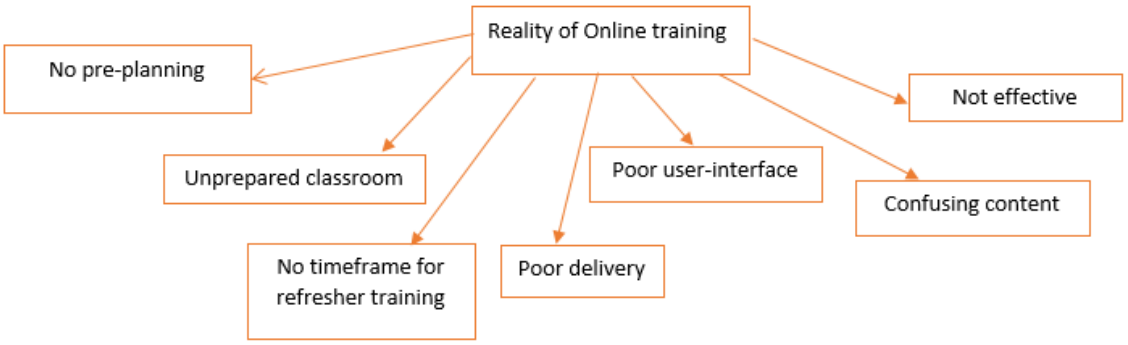
Effectiveness	Is this LMS effective enough to make you productive?
	Does this LMS make the things you want to accomplish easier to get done?
	Is it time-consuming or saves your time?
	Would you expect more from the LMS system?
Learnability	Is this LMS system easy to use?
	Is this LMS training system User-friendly?
	How effortless is this system in terms of the location of the modules and content?
	Can you use this LMS without written instructions?
Flexibility	Is this LMS flexible enough?
	Can you successfully use it at any time?
	Have you noticed any inconsistency in the system while using it?
Acceptability	How satisfied you are with this LMS training system?
	Do You get any benefits from this LMS training system?
	Is it worth to accept the data and knowledge about this LMS training system?

Appendix I - Thematic Analysis

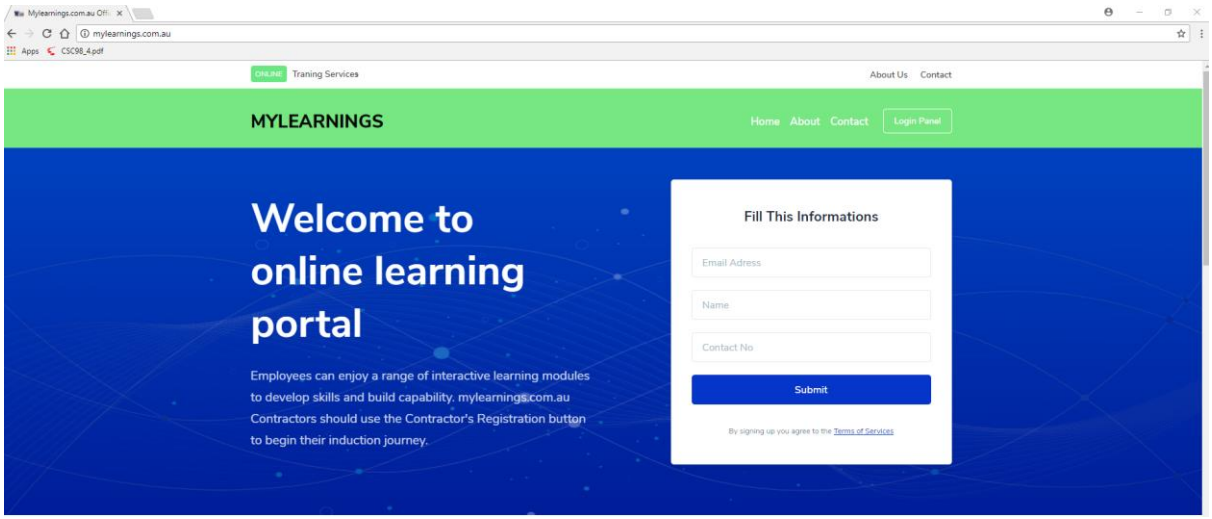


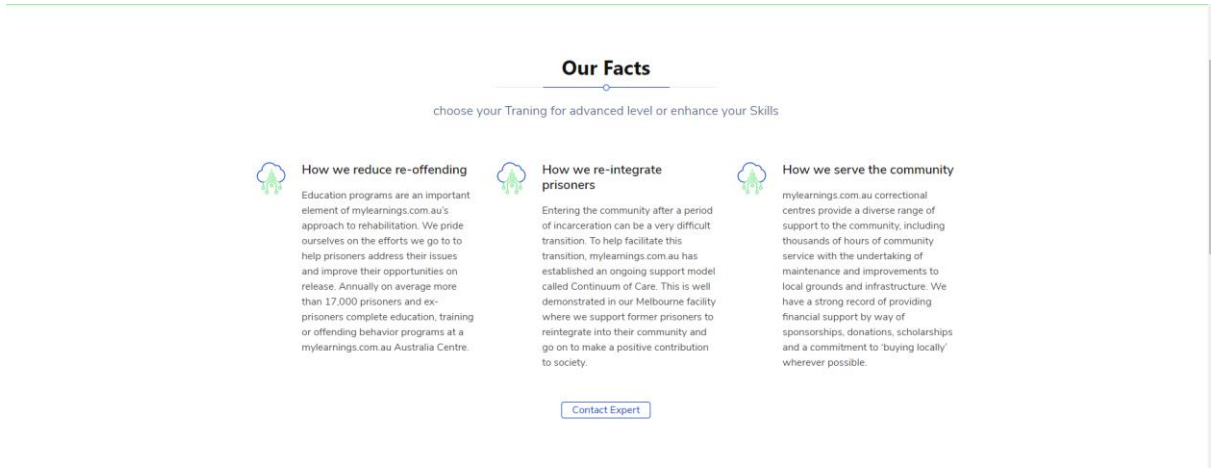


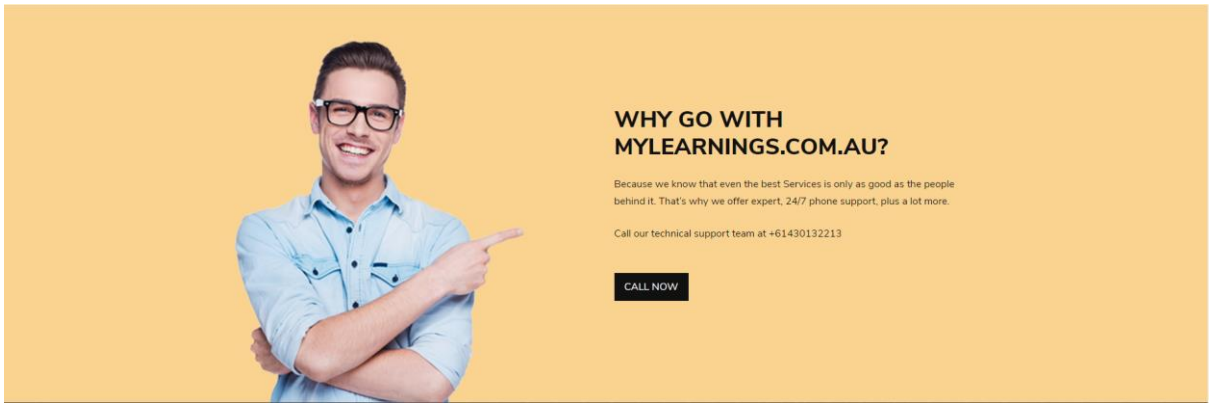




Appendix J – Learning model







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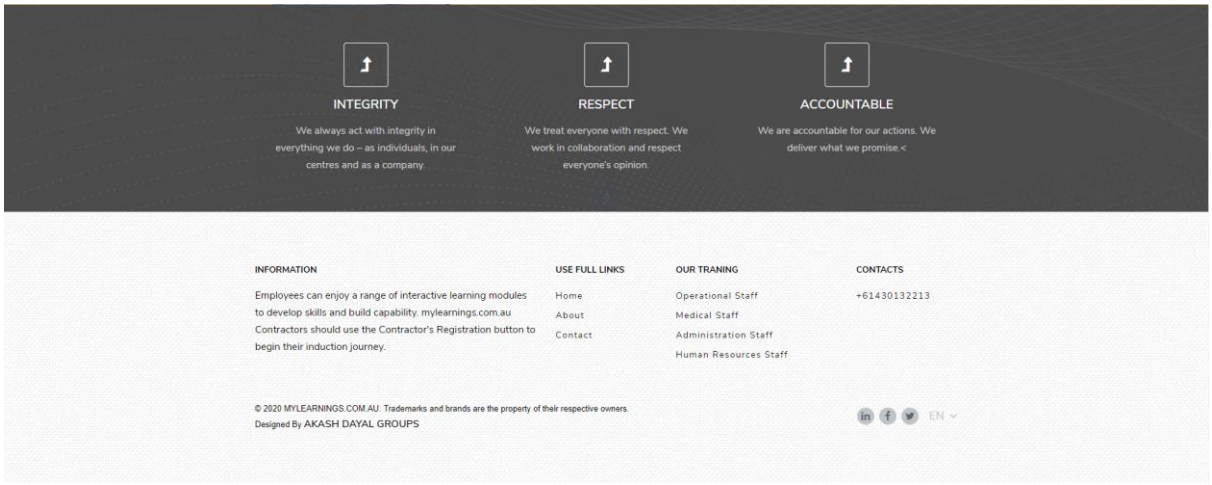

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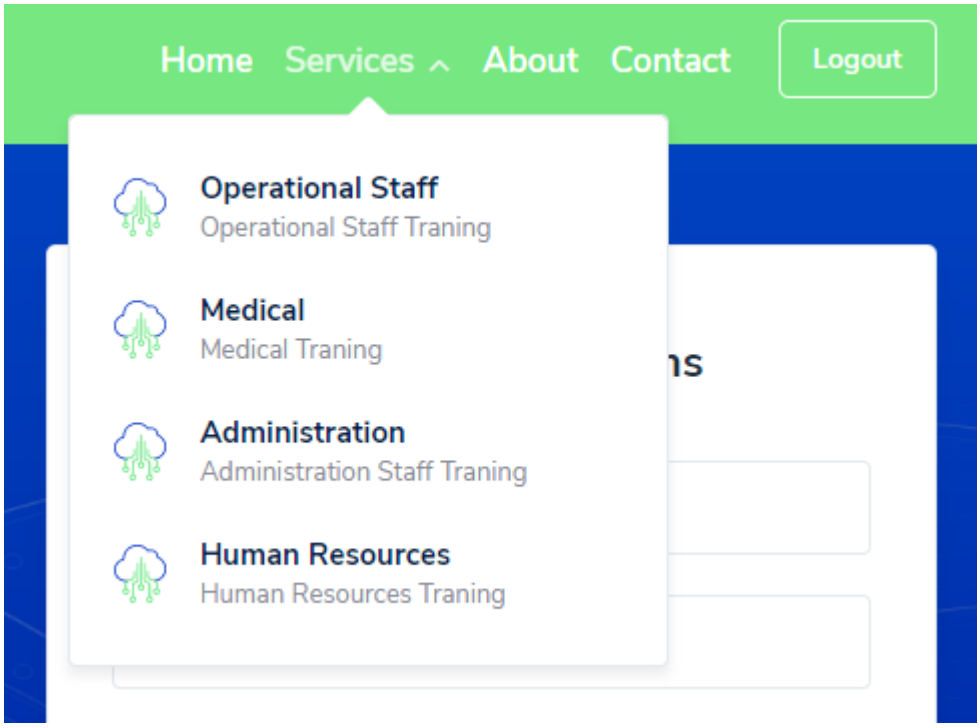

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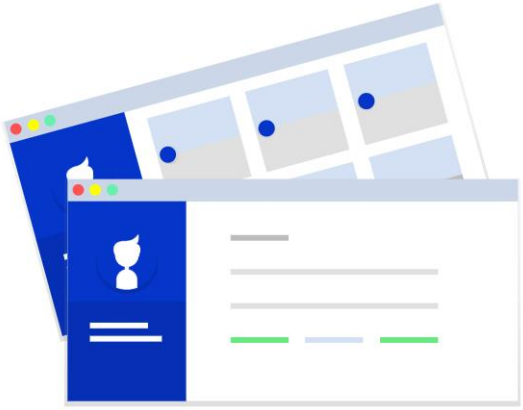

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