CHAPTER 1

INTRODUCTION

The education stages implemented in Malaysia is based on lower and higher education. Lower education consists of two-level which are primary and secondary. The primary level is for children aged seven to 12 years old and secondary is for students aged 13 to 17 years old. A typical school building in Malaysia consists of classrooms with windows and openings on both sides of the classroom. The common facilities within the classrooms are 900mm height table and small chairs arranged in rows facing the whiteboard area of the classroom. There are various types of educational systems available in Malaysia for secondary level such as religious schools, boarding schools, public schools and private schools in Malaysia.

In recent years between 2011 to 2017, new religious schools in Malaysia increased more than 900 in numbers. This shows that Islamic education *Ulul albab* has increased in demands since 2011.*Ulul albab* is derived from the Arabic Word *Ulu* (have) and *albab* (clear mind and heart). *Ulul albab* is also referred to as gifted people in the Quran (Arshad, 2015). Arshad also mentioned that implementing *Ulul albab* in the education system is a transformation that should be emphasized. Some of these private and public religious schools own a school building that follows the Malaysian Public Works Department (JKR) and Regulations for Building Planning (GRBP) standard layout design. However, whether the design is suitable for the traditional *Ulul albab* education system remains unstudied.

This chapter provides an overview of the research problem statement, research questions, aim, and objectives. Included in this chapter is the background study of the

importance of daylighting in Islam and learning spaces. This chapter also explains the issues on the current daylighting application in classrooms for Arabic handwriting tasks in memorization (*hafazan*) of the Quran. The issues discussed lead to the problem statement and research questions of the study. The summary of previous researches identifies the research gap to be further studied in this thesis. The thesis structure and conceptual framework are included in this chapter.

1.1 Background Study

Daylight as a renewable natural resource is a major element in photobiology studies. Photobiology is a scientific scope that studies the effects of light on living organisms such as a human. This shows that humans rely on light for daily activities. The importance of daylight is also emphasized in learning spaces design such as classrooms. Efficient daylight in the classroom proved to have positive effects on students' task performance in various research. The task performance evaluated is Arabic handwriting tasks. As translated by Hamka (2015), reading is important in understanding the Islamic religion, where "Read!" is the first word of the first revelation in *surah* Al-Alaq.

The positive effect of daylight on students' task performance is related to the students' visual comfort and circadian rhythm. Circadian rhythm is related to the biological process and changes of a living organism within a 24-hour interval. The circadian system is the physiology that controls the sleeping rhythm, where it is influenced by the gradual changes of light and dark ratio in the environment (Boyce, et al., 2003). Providing efficient daylighting in classrooms decreases the students' sleepiness and fatigue thus increase their alertness and cognitive skills (Heschong et al., 2002; Mirrahimi et al., 2012; Shishegar & Boubekri, 2016).

The daylight quantity, quality and distribution are the factor that influences the daylight environment of the space (Johnsen & Watkins, 1990; Gupta et al., 2015; Sun et al., 2017). Daylight quantity refers to sufficient daylight measured at working plane height, while daylight quality refers to good uniformity ratios with minimal visual discomfort due to glare (Antoniou & Meresi, 2003; Wu & Ng, 2003; Antoniou & Meresi, 2005; Axarli & Meresi, 2008). Daylight quantity is considered as the basis oy daylight quality evaluation (Jovanovic et al., 2014), where illuminance level is one of the measurement used to evaluate the daylight quality (Hourani & Hammad, 2012).

Various studies show that Malaysia has an intermediate sky condition, where it is 83 per cent intermediate with sun and clear sky (CIE, 1996; Lim, 2014; Yeop, 2014; Yunus, et al., 2019). The tropical climate of Malaysia consists of abundance of daylight, where the global illuminance during a clear sky can reach until 120,000 lx (Roshan, 2014). The global illuminance in Malaysia during March have a minimum of 80,000 lx and 60,000 lx in December (Zein-Ahmed, et al., 2002), where the lowest recorded average global illuminance is 19,000 lx (Al-Obaidi, et al., 2015).

Ministry of Education Malaysia (MoEM) released a General Circular in 2016 stating that *Ulul albab* education model shall be implemented in public secondary schools in Malaysia (MoEM, 2016). The Malaysia Deputy Prime Minister stated that religious (*Tahfiz*) education should be streamlined into public schools (TN50 Premier Dialogue, 2016; TN50 Lahir Profesional, 2016). Establishment of a religious (*Tahfiz*) school by the First Prime Minister of Malaysia, Tunku Abdul Rahman Putra Al-Haj in 1966 was coined by Sheikh al-Azhar Sheikh Mahmud Syaltut (Hassan, et al., 2015; Ismail, 2016). This model is based on reading, writing and memorizing (*hafazan*) the Al-Quran.

Various methods to memorize the Quran was developed by scholars and recommended by researchers. The basic and common methods of *hafazan* are writing, reading, reciting and listening to the *surah*, where one of the most preferred methods is through writing using the Arabic language. (Ikhwanuddin & Hashim, 2014; Mustafa & Basri, 2014; Ariffin, et al., 2014). Prophet Muhammad emphasized that preservation of the Quran should be through memorisation or *hafazan* and written method, which is also the basic Quran learning method (Jamaluddin, et al., 2018). *Tasmi'* is a method that requires the teacher to evaluate the students' *hafazan* performance (Abdullah, et al., 2003), which a part of it involves rewriting the verses shows efficient *hafazan* performance among the students (Abdullah et al., 2016). A study also shows that method of rewriting the Quran verses strengthen the students' memory retention (Abdullah & Maksom, 2016).

New religious schools have increased in recent year, where more than 900 new institutions were established (The Strait Times, 2017). The demand proven to increase, where public and boarding schools in Malaysia had also integrated *Ulul Albab* education in the curriculum (Ghani, 2016). The *Ulul Albab* education in Malaysia typically requires the students to do *hafazan* one hour to four and a half hours every day. The students are also required to memorize the whole Quran between two to five years (Bakar & Yusoff, 2016; Hadi & Latif, 2016; Mohamad, 2016), which proven that the daily *hafazan* learning schedules was adequate and sufficient (Abdullah et al., 2005).

Traditional religious schools in Malaysia typically teach *hafazan* using a book rest known as *rehal* or Quran stand instead of a table commonly used now. In 2014, The Metropolitan Museum of Art in New York exhibited a Quran stand dated back to the 14th Century. The use of Quran stand was earlier, as cited by Fuady (2015), Michael Stanton mentioned that small and short tables were used for *hafazan* during the Seljuq

Dynasty in the 10th Century. The students will sit in classrooms while listening to the teacher in front recite the Quran verses to them (Fuady, 2015). The typical height of a *rehal* is 220mm to 300 mm, whereas the recommended clearance for a cross-legged task is 300mm high (Adler, 2007; Neufert, et al., 2012).

The evolution of school design is initially based on space requirements. The typical layout design of a classroom changes over the years due to various reasons such as education system development and government's policies. In 1904, a new movement for classroom design started in Europe called 'open-air design' that emphasizes the improvement of the classroom's natural ventilation and daylighting (Châtelet, et al., 2003). The 'open-air design' changed the focus of classroom design on daylighting due to the high amount of daylight received that causes glare and eyesore in its design. Due to these factors, the respective governments started to establish standards and guidelines (Wu & Ng, 2003).

The classroom's layout and window configuration such as low ceiling and deep plan influences the daylight performance (Barret & Zhang, 2009; Ahmad & Razon, 2017). Studies shows that the recommended window sill height is between 600mm to 762mm, meanwhile the practiced window sill height by architects and designers in Malaysia is between 800mm to 900mm (Baker, 2012; VDE, 2013; Subramaniam, 2013; Mousavi, et al., 2016; IRC, 2016). Daylight thumb rule (DTR) for space with windows on both side that is commonly referred in daylighting studies is the window head height (Reinhart & Weissman, 2012). Various studies on DRT stated that the window head height depends on the depth of the room, where the depth should be 1.5 to 2.5 times more than the window head height (O'Conner et al., 1997; Cofaigh et al., 1999; Reinhart, 2005; Reinhart & LoVerso, 2010; Bian & Ma, 2017).

Other guidelines are related to daylighting based on Window-to-Floor Ratio (WFR) or Window-to-Wall Ratio (WWR). Uniform Building by-Laws (UBBL) in Malaysia stated that the Window-to-Floor Ratio (WFR) for a learning space is 20 per cent. The height of the window sill recommended follows the height of the table or working plane of 800mm to 900mm (UBBL, 2013). Other than WFR or WWR, the recommendation of the illuminance level in learning spaces also included in various guidelines and standards.

Illuminance level is the light intensity from sources that are reflected on a working plane and received through the eye. The recommended illuminance level by standards and guidelines are between 300 lx to 500 lx for educational spaces (Rea, 2000; ASHRAE, 2013; MS1525, 2014). The illuminance level is commonly measured at the height of 800mm to 900mm working plane of a table (GBI, 2009), where the method is not suitable to measure illuminance level for Islamic religious schools that uses *rehal* at 300mm working plane height in the classroom for *hafazan* education.

Therefore, a part of this study is to measure the difference of illuminance level at 300mm and 900mm working plane height through illuminance grid points measurement method. The acceptability of the measured average illuminance level by the students was based on other two methods, which were Arabic handwriting performance test and questionnaire based on the students' perceptions on daylight condition and task performance. The identified acceptable illuminance level will be used to set a benchmark to evaluate various window sill height that can achieve acceptable illuminance levels using daylight simulation. Simulation modelling is a basic classroom design based on Malaysian standards and guidelines. The orientation of the classroom

during the simulation process will be south and/or north for efficient daylighting (Al-Mohaisen & Khattab, 2006; Hyde, 2008).

1.2 Problem Statement

In Malaysia, the most referred standards and guidelines for designing classroom windows and openings is Uniform Building by Law (UBBL), where the Window-to-Floor Ratio (WFR) for a learning space is 20 per cent. Daylight evaluation in Malaysia's public schools shows that 75 per cent of the classrooms had insufficient or high intensity of daylight (Samad, et al., 2017; Mathalamuthu, et al., 2018). Classrooms that achieved acceptable illuminance level recommended at 300 lx for reading and writing task had 20 per cent WFR, while the window sill and working plane height were both at 800mm to 900mm as recommended in Malaysian Public Works Department (JKR). This shows that 20 per cent WFR with a similar height of window sill and working plane received acceptable illuminance levels for reading and writing tasks. Similar daylight research conducted across the world were in classrooms with window sill and working plane height ranged between 800mm to 900mm (Winterbottom & Wilkins, 2009; Al-Sallal et al., 2010; Mirrahimi et al., 2013; Sojoudi, 2014; Yacan, 2014; Barret, et al., 2015; Vi Le et al., 2016; Shishegar & Boubekri, 2016; Al-Ashwal & Hassan 2018).

Ulul albab education also includes similar reading and writing tasks that require adequate illuminance level for students' optimal performance for *hafazan*. However, due to the subject integration for both academic and religious subject, current practice of window design in Islamic religious schools follows the standardised 800mm to 900mm window sill height with similar table working plane height. Since that the *hafazan* education in Islamic religious schools uses *rehal* with 300mm working plane height, the current standardised classroom and window design influences the

illuminance level. Thus, the window sill height of the classroom will be evaluated for efficient daylighting performance. The problem statements for this study are:

i. Illuminance level measurement method at 800mm to 900mm working plane height is not suitable for measuring illuminance level at *rehal* lower working plane height.

ii. Recommended illuminance level measured at 800mm to 900mm working plane height is not suitable for Arabic handwriting task for memorizing (*hafazan*) the Quran that uses *rehal* in Islamic religious schools.

iii. There is a lack of reference for acceptable illuminance level measured at 300mm working plane height for Arabic handwriting task for memorizing (*hafazan*) the Quran in Islamic religious schools.

iv. There is a lack of reference regarding the height of window sill from floor level suitable for memorizing (*hafazan*) the Quran classrooms that uses *rehal* in Islamic religious schools.

1.3 Research Gap

Studies on daylighting performance in classrooms can be dated back as early as the 1950s. The focus of the researches was on students' visual comfort. Recent studies on daylighting in classrooms started to focuses not only on visual comforts but on students' learning performances as well. A study on the effect of daylighting on student's performance showed that there is a statistic significant between daylight and human behaviour through test scores analysis (Heshong, et al., 2002).

Since daylighting influences the students' performance in class, most of the government's public-school buildings follows the UBBL standardised Window-to-Floor Ratio (WFR) for educational space at not less than 20 per cent. Window-to-Wall Ratio (WWR) is not considered or used in the UBBL standards. The illuminance level recommended is measured at a height of 800mm to 900mm working plane or table (GBI, 2009).

Following the standards, the height of the window sill for classrooms is between 800mm to 900mm, where the height of the working plane and window sill are similar. A few research shows that JKR and UBBL recommended 20 per cent WFR were able to provide efficient illuminance level of 300 lx to 500 lx in public-school classroom (Mathalamuthu & Ibrahim, 2014; Husini, 2017). Therefore, this study follows the recommended WFR of 20 per cent by various standards and guidelines.

However, *Ulul albab* education is more related to religious curricular activities and tasks such as *hafazan* that uses *rehal* with 300mm working plane height. Although the working plane height required is different, the learning tasks involved are still the same such as reading and writing. Most public schools follow the JKR standards and Guidelines and Regulations for Building Planning (GRBP) classroom layout design, which also follows the same standard window sill height for *Ulul albab* education instead of for specific tasks and activity required in the curricular. Thus, this thesis focuses on the height of the window sill that is suitable to achieve acceptable illuminance level at 300mm working plane in classrooms for *hafazan* learning task performance such as Arabic handwriting.

Table 1.1: Summary of previous daylighting and student's performance studies

No		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Author		Edwards & Torcellini	Erwine & Heschong	Heschong et al.	Wu & Ng	Theodorson	de Bruin-Hordjik et al.	Al-Sallal	Mirrahimi, et al.	Samani & Samani	Ibrahim & Ahmad	Mirrahimi et al.	Lim	Mathalamuthu & Ibrahim	Megri et al.	Louis et al.	Alireza et al.	Christoffersen et al.	Shishegar & Boubekri	Vi Le et al.	Zomorodian et al.
Year		2002	2002	2002	2003	2005	2009	2010	2012	2012	2013	2013	2014	2014	2014	2016	2016	2016	2016	2016	2016
Literature review																					
Lighting	Artificial		√			√	√				√				√	√	√	√		√	
	Natural	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√
	Sun orientation				√		√						√	√							√
	Daylight Factor				√	√							√	√				√			√
	Sky condition					√	√	√				√	√	√		√		√			
	Climate condition			√		√										√					√
	Visual comfort						√														
	Illuminance level				√	√	√					√	√			√	√			√	
	Daylight metrics																				√
Design	windows & openings		√	√	√	√		√			√	√	√	√	√			√			√
	height/depth ratio			√				√				√	√					√			
	layout/orientation			√	√	√	√	√		√	√	√	√	√				√		√	√
	design configuration			√		√	√	√		√	√	√		√	√						
	WFR			√				√				√					√				
	WWR							√													√
	desk arrangement					√	√	√						√						√	√
	Blinds/shading device												√	√	√						
	light shelves																				
	standards/guidelines				√			√				√		√			√				√
	classroom zone					√	√														
Performance	Reading	√	√	√					√												√
	Writing								√												√
	Memorizing			√																	
	Behaviour	√		√										√					√		√
	Visual			√		√				√		√									√
	Communication									√											
	Test score (subject)	√	√	√					√										√		
School	Kindergarten		√														√				
	Primary	√	√	√		√	√		√	√						√			√		
	Secondary		√							√											
	Public							√					√								
	Tahfiz																				

1.4 Research Aim and Objectives

The aim of this study is improving the Islamic religious schools' classroom design for better daylighting condition and students' visual performance. Referring to the aim stated, the objectives are:

i. To identify the acceptable illuminance level for students' optimum Arabic handwriting performance for learning *hafazan* in Islamic religious school.

ii. To investigate the influence of window design on illuminance level measured at working plane of 300mm height in Islamic religious school.

iii. To recommended window sill height for students' optimum Arabic handwriting performance for learning *hafazan* at the working plane of 300mm height.

1.5 Research Questions

The research questions for this study are related to the research objectives as shown in table 1.2.

Table 1.2: Research questions

Research Objectives	Research Questions
To identify the acceptable illuminance level for students' optimum Arabic handwriting performance for learning *hafazan* in Islamic religious school.	What is the acceptable illuminance level for students' Arabic handwriting performance?
	How do the students perceive the daylight conditions and their task performance in the current classrooms?
	How does the performance of the illuminance level at working plane 300mm height affects students' Arabic handwriting performance?
To investigate the influence of window design on illuminance level measured at working plane of 300mm height in Islamic religious school.	What is the range of illuminance level measured at 300mm height working plane from floor level in the classroom with different window sill height?
	Why does the window sill height difference influence the illuminance level measured at 300mm height working plane in the classroom?
To recommended window sill height for students' optimum Arabic handwriting performance for learning *hafazan* at the working plane of 300mm height.	What is the suitable window sill height from the floor level that achieves acceptable illuminance level at a 300mm working plane?

1.6 Scope of Study

i. The selected school is Islamic religious school that implements *Ulul Albab* education, where it is commonly a secondary school.

ii. The age of the students selected will be 13 to 17 years old, where the students have the intellect to provide feedback based on their perceptions and experience.

iii. The Regulations for Building Planning (GRBP) standard layout requirement of 2.5m^2 per student in a classroom is referred in this study, where each selected classroom floor area are suitable for 24 students.

iv. The study focuses on the windows and openings, where the colour and reflectance of loose furniture is not considered.

v. The windows and openings are on both side of the classroom with WFR that follows the recommended 20 per cent by standards and guidelines, where it is suitable to achieved the recommended 300 lx to 500 lx of illuminance level in classrooms.

vi. The classrooms selected as experimental study are located on the second floor of the building to avoid nearby structures or natural environment such as trees to disrupt the daylight in the classroom.

vii. This study focuses on the daylight quality and quantity in Islamic religious school for students' visual performance, based on illuminance level field measurement and survey on the students' daylight conditions.

viii. This study looks into only the daylighting performance of the classrooms, where the illuminance level (lx) unit in used to identify the daylight quality and quantity for the selected Islamic religious school.

ix. The method for illuminance level field measurement is illuminance grid points measurement, where the calibrated lux meter was placed in a 1m x 1m grid layout of the classroom.

x. The most optimum daylight retrieved during the day is between 9.00 am to 11.00 am. Therefore, the time selected for the study is between 10.00 am to 11.00 am.

xi. Since Malaysia is located near to the Equatorial, the suitable month to evaluate the illuminance level is between February to March and August to October, based on the sun path diagram.

xii. The referred outdoor global illuminance level is between 60,000 lx to 80,000 lx, where the sky condition is intermediate for Malaysia.

xiii. This study uses a small table or *rehal* of 300mm height, which is suitable for cross-legged tasks. Therefore, the working plane height to measure the illuminance level will be at 300mm height.

xiv. The handwriting performance test will be based on the modified Balsam Alabdulkader-Leat (BAL) eye chart for Arabic language, where the survey also identifies their perceptions on the task performance given.

xv. The daylight simulation components other than the window sill height will be kept constants. The range of window sill height that will be evaluated in the simulation is from 300mm to 900mm height.

xvi. The orientation of the classroom during the simulation process will be south and/or north for efficient daylighting.

xvii. The daylight simulation follows the classroom's standard surface reflectance value, where the floor reflection at 0.3 (30%), walls reflection at 0.5 (50%) and ceiling reflection at 0.7 (70%). The transmittance in the simulation is at 0.81 (81%).

1.7 Limitations

i. The students were randomly selected by the administrative of Kolej Genius Insan due to the students' class schedule. Limited to students from form one and two, aged 13 to 14-year-old.

ii. The students selected as respondents were limited, where only a total of approximately 200 students from form one and two were available. Form three students were excluded and currently there were no form four and five students in the school.

iii. The selected *Tasmi'* classrooms were the specifically designed as *hafazan* learning space in Kolej Genius Insan that had 300mm window sill height. However, the classrooms were 85 per cent smaller in comparison with the other classrooms selected for the study.

iv. There was only one school selected for this study due to the strict bureaucracy and protocol of local education administrative and ministry at various levels of authorities.

v. The window head height simulated varied due to the different window sill height simulated with fixed dimensions and WFR percentage.

1.8 Thesis Structure

This thesis is structured as follows:

Chapter One: Introduction – This chapter also included with background study, problem statements, research gap, research questions, aim and objectives, the scope of the study, limitations, and significance of the study.

Chapter Two: Literature Review – Chapter Two briefly explains the theoretical relationship with the study by referring to previous studies by other researchers, not limited to biological and religious studies. Related variables and parameters identified through a desk study will be summarized in a theoretical framework. Includes literature reviews and discussion on related subjects of the study such as daylighting, illuminance level and student's performance. This chapter also explains about the education in Malaysia as well as schools and classrooms typology. The historical background of school design is also included.

Chapter Three: Research Methodology – Methodology used in this study will be explained and elaborated in this chapter. There are three phases in this research based on the objectives of the study. The first phase is to identify the range of acceptable illuminance level for students in a classroom through literature review, then finds out

the acceptable illuminance level for students' learning performance measured at 900mm and 300mm height working plane. The data collected are based on an experimental study consist of field measurements, questionnaires, and visual eye tests. SPSS Statistics software will be used for the statistical analysis. The second phase includes a Radiance-based simulation to identify window sill height required to achieve acceptable illuminance level measured at a 300mm height working plane.

Chapter Four: Results and Analysis – In this chapter, the data collected in the previous chapter will be discussed and analysed to provide results regarding the acceptable illuminance level, student performance and window sill height for working plane at 300mm height from floor level. The results will answer the research questions of the study. The relationship between these results will complement the aim and objectives mentioned in the previous chapter.

Chapter Five: Conclusion and Recommendation – Conclude the research by recommending the window sill height that achieves acceptable illuminance level for student's optimum Arabic handwriting performance for the Quran memorization (*hafazan*) at 300mm height working plane. This chapter provides suggestions regarding future research to compliment the results of this study.

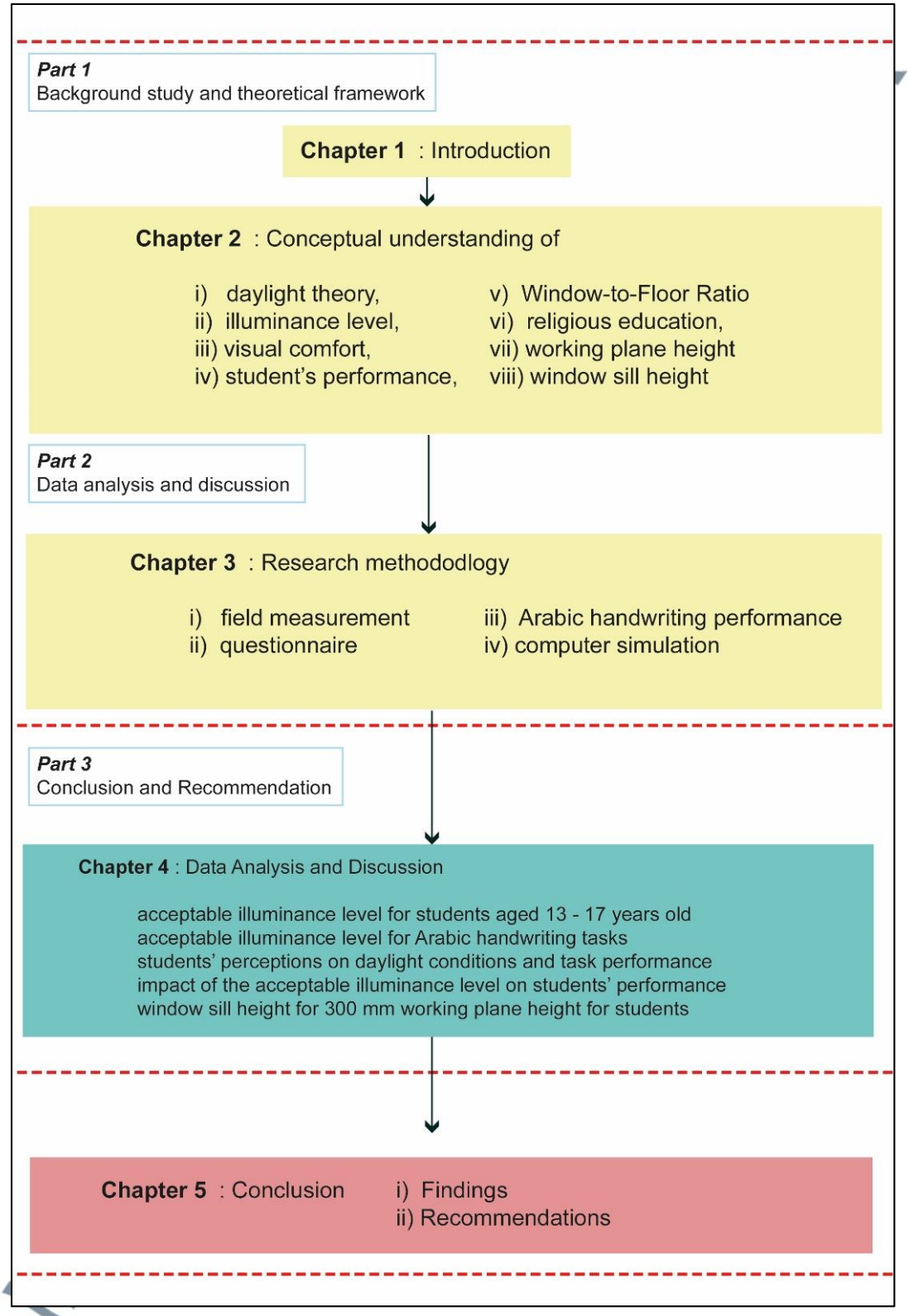

Figure 1.1: Thesis Structure

Figure 1.1 shows that the Thesis Structure consists of five chapters that relate progressively along with the research flow. Research on daylighting and students' performance requires confronting issues both in quantitative and qualitative spheres such as the external environment and the students' decision alteration, which is a challenge for mixed-method research. The research should be able to shift and operate between both research method (Drosou, et al., 2015). This research adopts the Design Science Research (DSR) concept (Venable, 2006b; Hevner, et al., 2004) to be able to shift between quantitative and qualitative methods, as shown in figure 1.2. Theory Building requires the research to establish a problem theory based on daylighting and students' performance for Arabic handwriting tasks. The research does not require a hypothesis due to the research method closely similar to the exploratory science research method, where quantitative results generalizes the qualitative findings (Creswell & Poth, 2016). Therefore, the DSR of this research is inductive research due to its' exploratory nature as explained by Trochim (2006).

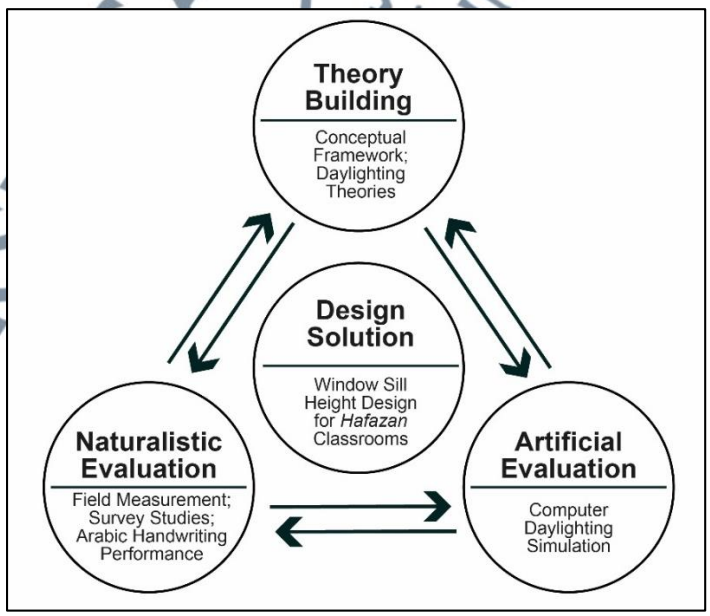

Figure 1.2: Design Science Research Concept for the research

The tools used are field measurement, questionnaires, visual eye acuity tests, and computer simulations. The methods selected are used based on daylighting measurements and aspects of the research. This research includes identifying and understanding the daylighting and students' Arabic handwriting task performance in multiple classroom layout.

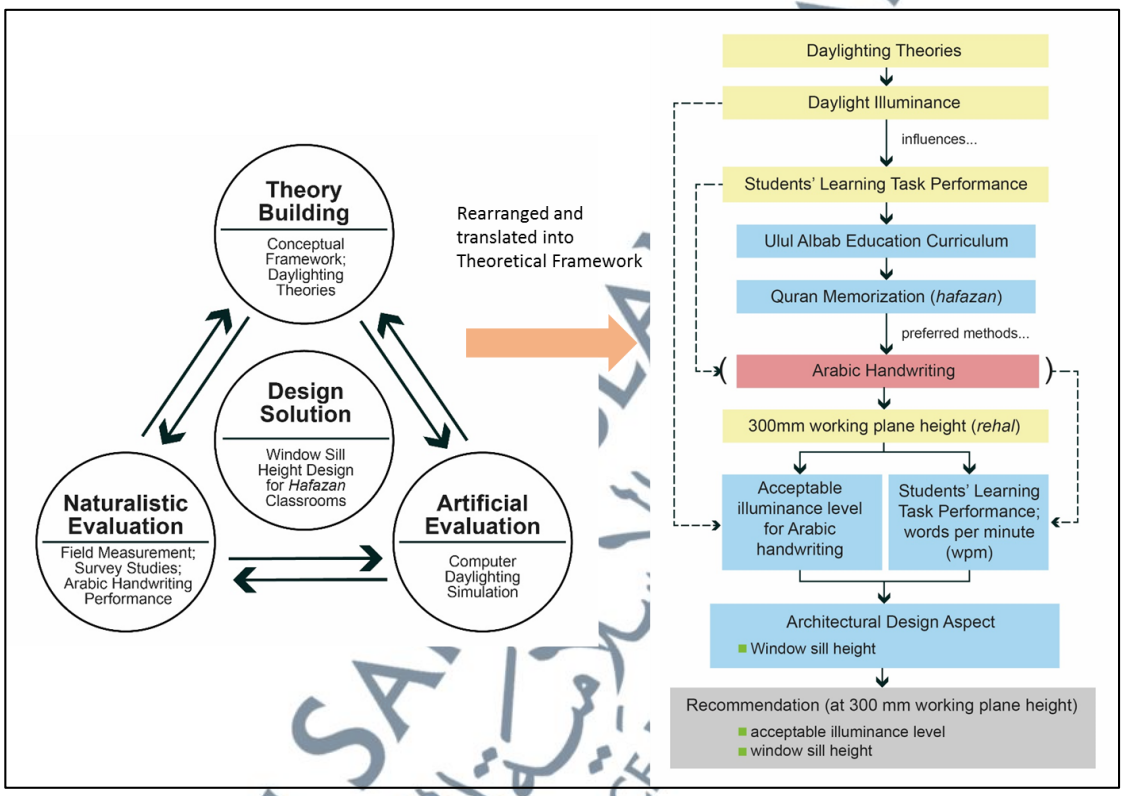

Figure 1.3: Theoretical Framework

Theoretical Framework as shown in figure 1.3 show that the data and results are collected through field measurement, survey and visual test conducted in this study. The contribution of this research includes the enhancement of the product or artefact which is the window sill height in classrooms. The DSR concept can be structured to the research as:

i. Theory Building – daylighting theories and students' learning task performance

ii. Naturalistic Evaluation - daylighting and students' Arabic handwriting task performance

iii. Artificial Evaluation – daylight simulation

iv. Design Solution – recommendation of window sill height for Islamic religious schools

1.9 Significant of Study

Various studies on daylighting effects on student's performance that were conducted focus on writing performance, where most of the studies reported that adequate illuminance level in the classroom can improve the student's performance. Identifying the acceptable illuminance level requires a method of measurement that can be applied at different working plane height, primarily due to the height difference of working plane height required for Arabic handwriting tasks for *hafazan* that uses *rehal*.

Therefore, this study can provide an acceptable illuminance level for Arabic handwriting tasks for *hafazan* learning measured at 300mm height of *rehal* working plane. The acceptable illuminance level will be evaluated with a constant Window-to-Floor Ratio (WFR) of 20 per cent at different working plane height following the height of a table and *rehal*. The method and findings can be adapted to other countries that have religious schools with *Ulul albab* education that requires the usage of *rehal* for *hafazan* learning or any other education that uses a low table. In general, the findings of this study are significant for architects and designers to design a proper classroom for schools that have *Ulul albab* curricular tasks such as reading and writing Arabic language at 300mm working plane height of a *rehal*.

1.10 Summary

The module *Ulul albab* education has certain curricular tasks required by the students to accomplish memorisation (*hafazan*) of the Quran such as reading and writing tasks. The educational spaces required for *Ulul albab* education model must be studied, especially regarding daylighting due to its effect on the student's Arabic handwriting task performance for *hafazan*. The research focuses on the acceptable illuminance level at *rehal* working plane height of 300mm from floor level, where it is influenced by the window sill height of the classroom. The literature includes the required acceptable illuminance level for student's performance. These literature reviews will be explained in the next chapter where the discussion will be based on daylighting, illuminance level, learning spaces, student's performance, classroom layout design, and other related subjects.