

**A FRAMEWORK OF SCHOOL CLASSROOM FACILITIES FOR
IMPROVING STUDENTS' ATTENDANCE AND ACADEMIC
ACHIEVEMENT**

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STUDENTS' ATTENDANCE AND ACADEMIC ACHIEVEMENT

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To my beloved Aryan Hakimi

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ABSTRACT

Facility management has become a major issue in any organisation as it affects the organisation's performance. The aim of this study is to develop a framework of school classroom facilities and how it influence students' attendance and academic achievement. The research objectives are to identify the key performance indicators for school classroom facilities, to determine the relationships between school classroom facilities performance and students' attendance and academic achievement, to determine the components of indicators for school classroom facilities and to develop a framework of school classroom facility for improving students' attendance and academic achievement. A mixed method approach was adopted in the research. A questionnaire survey was distributed to 200 students in secondary school around Johor which is to achieve the first objective of the research. Using the results from first survey, a second questionnaire survey was conducted to achieve the second objective of the research. The questionnaire survey was distributed to 405 students in secondary schools around Johor. Interviews were conducted to 22 respondents consisting of school teachers, officers in the Education Department and staff and engineers in the Public Works Department to determine the third objective of the research. The contents of the interviews were analysed using content analysis through Nvivo software. The results from the analysis contributed to the development of a framework of school classroom facilities for improving students' attendance and academic achievement. The proposed framework consists of three levels of performance indicators, including key performance indicators, their indicators and their components. The key performance indicators that have the most influence of the students' attendance and academic achievement are ventilation, temperature and classroom design.

ABSTRAK

Pengurusan fasiliti merupakan isu utama bagi setiap organisasi kerana ianya mempengaruhi prestasi organisasi. Tujuan kajian ini dijalankan adalah untuk membangunkan rangka kerja bagi fasiliti bilik darjah yang mana mempengaruhi prestasi kedatangan dan pencapaian akademik pelajar. Oleh itu, objektif kajian adalah untuk mengenalpasti indikator petunjuk prestasi untuk fasiliti bilik darjah, untuk menentukan perhubungan antara prestasi fasiliti bilik darjah dan kedatangan dan pencapaian akademik pelajar, untuk menentukan komponen bagi indikator fasiliti bilik darjah dan untuk membangunkan rangka kerja bagi mengukur prestasi fasiliti bilik darjah yang mana mempengaruhi kedatangan dan pencapaian akademik pelajar. Pendekatan kaedah campuran digunakan bagi kajian ini. Kajian soal selidik telah diedarkan kepada 200 orang pelajar sekolah menengah di sekitar Johor bagi mencapai objektif pertama kajian. Dengan menggunakan keputusan soal selidik pertama, kajian soal selidik yang kedua dijalankan bagi mencapai objektif kedua kajian. Kajian soal selidik telah diedarkan kepada 405 orang pelajar sekolah menengah di sekitar Johor. Temubual juga telah dijalankan kepada 22 orang responden iaitu terdiri daripada guru sekolah, pegawai di Pejabat Pendidikan dan kakitangan dan jurutera di Jabatan Kerja Raya untuk menentukan objektif ketiga kajian. Kandungan temuramah dianalisis menggunakan 'content analysis' melalui perisian Nvivo. Hasil analisis menyumbang dalam membangunkan rangka kerja bagi fasiliti bilik darjah yang mana mempengaruhi prestasi kedatangan dan pencapaian akademik pelaja. Rangka kerja yang dibangunkan dalam penyelidikan ini menerangkan tiga peringkat petunjuk prestasi iaitu petunjuk prestasi utama, petunjuk dan komponen mereka. Petunjuk prestasi utama yang paling mempengaruhi kedatangan dan pencapaian akademik pelajar adalah pengudaraan, suhu dan reka bentuk bilik darjah.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Research in environmental psychology has proved that the physical environment has an effect on people's productivity. This theory also applies to the school classroom environment. A number of researchers have postulated that the physical environment affects students' learning performance. The literature indicates that the students' learning performance is influenced by the physical and social environment. The physical environment of a school includes all the facilities such as classrooms, laboratory, canteen, toilets and so on that support the learning activities which are the school core business. Therefore, the identification of classroom facility performance is fundamental to providing a quality teaching and learning environment in schools and supporting student attendance and academic achievement in school. This research explains the relationships between school classroom facilities performance and student attendance and academic achievement by developing a framework of school classroom facilities. It also discusses the key performance indicators (KPIs) for measuring school classroom facilities that may help in the evaluation of school classroom facilities performance.

This chapter presents the background and overall content of the research approach. Therefore, this chapter contains the statement of research problem, need

for investigation, research questions, research objectives, scope and methodology. An outline of the thesis structure is also provided.

1.2 Research Background

Facilities management (FM) is becoming more widely recognised as a component in the business value chain and ultimately in the function of corporate strategies (Sapri *et al.*, 2005). As FM continuously develops into a mainstream management discipline, rather than being approached at a technical/operational level, the physical and non-physical elements in the workplace (those that have direct relevance to management at the organisational level) become an important issue (Sapri *et al.*, 2008). In this context, it is important to undertake research on physical elements especially in schools. According to Cairns (2003), the research community has so far failed to integrate the major theoretical and empirical stances of organisation theory, organisational behaviour, architecture and design. Therefore, the present study is related to the performance of the physical environment and student performance in school.

The classroom is an essential place which needs to be a high-quality physical and social environment. Conducive physical and social environments can have a positive impact to students' performance in education. The physical environment consists of many interacting variables such as class size, spatial density, location, acoustics and noise, secluded study spaces, ambient temperatures and air quality (Lackney, 1999). The social environment is another complex set of variables including social policies, instructional strategies, peer tutoring and factors related to the school climate (Lackney, 1999).

Research on service environment that explains the soft elements in relation to the user experience are still relatively limited (Sapri *et al.*, 2008). According to Cairns (2003), this has resulted in a lack of understanding of the impact of decisions on the physical environments. Similarly in learning environment, Lyons (2001)

postulated that parents generally focus on their child's learning, achievement and progress but not on the condition of the school facilities and the performance of the physical environment. However, Lackney (1999) proved that the school environment has an impact on students' academic performance. Figure 1.1 illustrates the links between the two environmental variables, namely, the physical and social environments, which influence educational outcomes. These two variables are influenced by three intervening variables which are behavioural factors, attitudinal factors and physiological factors. In addition, the physical and social environment has an impact on teacher instructional performance and student pro-social development, that is, it leads to students' academic performance. The physical environment also refers to the school classroom environment, laboratory environment, library environment, sport field environment and much more. Student performance refers to student results, attending and learning, social development and so on (Castaldi, 1982; Mendell & Heath, 2005).

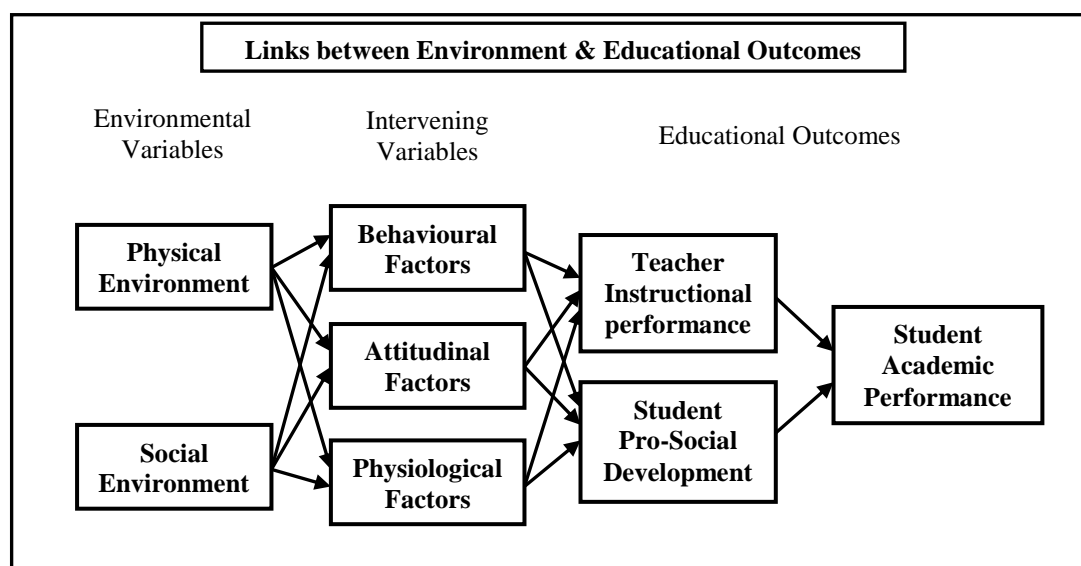


Figure 1.1: Links between environment and educational outcomes (Source: Lackney, 1999)

Other studies have also shown that student performance is influenced by the physical environment (Leung & Fung, 2005; Lyons, 2001; McGowen, 2007; Earthman, 2002; Stockard & Mayberry, 1992). Leung and Fung (2005) argued that the purpose of facility enhancement in schools should be to improve students' learning and claimed that changes in the FM components were significantly related

to changes in the learning behaviours of students. Lyons (2001) suggested that there is a direct relation between the condition and utility of school facilities and learning. Poor facilities negatively impact on teacher effectiveness and performance, and therefore have a negative impact on student performance (Earthman, 2002). On the other hand, Herzberg (cited in Cairns, 2003) placed the physical environment in the 'hygiene factor' theory within the dichotomous framework of motivators in an organisation. The generalised conclusion of the dominant organisation theory as postulated by Cairns (2003) is that a poor physical environment can have a negative impact on performance but if the appropriate motivators are in place, a good physical environment is then of little or no consequence to performance.

This research focuses on the relationship between classroom facilities performance and student performance. As learning activities are the core business of a school, the classroom environment is a vital element to support the student learning process. A review of the literature clearly shows that the classroom environment influences students' learning activities and their performance in school. Therefore, the students' opinions on classroom facilities should be taken into consideration when considering how to provide these facilities and ensure a positive effect on student performance. Overall, it can be concluded that the conditions of student performance depend on the conditions of classroom facilities performance.

1.3 Statement of the Research Problem

In Malaysia, the understanding of the quality of classroom facilities is still in its infancy as few studies related to this subject have been conducted. Research on school classroom facilities performance is also still limited. Previous studies about school classroom facilities performance have tended to be too general and not related to the core business. Hence, most researchers have only focused on the relationship between school classroom facilities performance and students' attendance and academic achievement in school but not on how to derive the KPIs in measuring the

performance of the school classroom facilities which influence students' attendance and academic achievement in school.

The Malaysian Government has invested a significant amount of funds in the construction of assets and infrastructure since 1976, although critics have pointed to high levels of negligence and incompetence in these efforts. In the Educational Development Master Plan 2006-2010, the Ministry of Education Malaysia allocated RM23, 198 billion to provide facilities and services in schools. This was a turning point to the government as concerns about maximising the efficiency of the investment motivated the government, through *Jabatan Kerja Raya* (the Malaysian Public Works Department), to develop an action plan for managing government assets known as *Dasar Aset Negara*. As part of the plan, the Malaysian Government established the National Asset & Facility Management (NAFAM) program and issued a manual of building guidelines and rules for planning in 2008. The manual includes guidelines for school buildings and lists the facilities to be provided in schools. Facilities provided at schools should now follow the guidelines issued by the government.

From this perspective, the FM function plays an important role in making sure the facilities provided can be used efficiently and can support learning activities in school. In other words, its objectives are parallel to the government's asset management objective. It is noted that the manual acts as a guideline for managing school assets but does not explain how to manage the assets. Performance measurement is one of the elements in FM; however, the government manual does not provide any procedure or method for measuring the school classroom facilities performance.

The literature also indicates that most of the derived methods for FM are too general and not related directly to schools' core business. According to Brackertz and Kenley (2002), most services are provided through facilities while Walters (1999) formed the view that facility performance measurements should relate to the main business indicators for the primary tasks such as customer satisfaction or service delivery. Therefore, the adoption of facility performance indicators that relate directly to the core business drivers is the key to the success of an organisation's

performance (Sapri *et al.*, 2008). However, a review of the literature reveals that itemised school classroom facilities performance indicators that relate directly to the core business of schools has not yet been established.

As discussed above in the research background, researchers have revealed that the physical environment of schools influences student performance (Leung & Fung, 2005; Lyons, 2001; McGowen, 2007; Earthman, 2002; Lackney, 1999; Stockard & Mayberry, 1992). Research on schools in Washington DC found that the classification of schools by physical condition was related directly to how students in those schools scored on achievement tests (Berner, 1993). The data in that study also revealed that, as a school moves from one category to the next (such as from poor to fair), the average achievement scores can be expected to increase by 5.455 points. If a school was to improve its conditions from poor to excellent, an increase of 10.9 points in the average achievement scores was predicted. Uline and Tschannen (2008) confirmed a link between the quality of school facilities and student achievement in English and Mathematics subjects in US schools. They concluded that there was a need to invest in replacing and/or renovating inadequate facilities.

Facility performance issues have also been highlighted in Malaysia, including a highly publicised case of student overcrowding at a school in Petaling Jaya. When there are too many students in one classroom, the learning session obviously can't run well. Therefore, when the facilities provided are inadequate and do not meet students' demands, then the students cannot learn well. In addition, the problem of students skipping school may be related to classroom facilities performance. Castaldi (1982), for example, reported that facilities influence students' attitudes and behaviours. Therefore, the school classroom facilities provided must be comfortable and enable students to improve their attendance and academic achievement. For this reason, it is necessary to identify the factors that contribute to facility performance. Some of these factors will be within the control of school management or may be beyond their control.

As discussed before, school classroom facilities performance has an effect on students' attendance and academic achievement. To achieve a good quality of students' attendance and academic achievement, classroom facilities in school should

be fit for their purpose and perform well. Therefore, classroom facility performance should be measured to determine the facilities' effectiveness. Leung and Fung (2005) stated that school facilities must be periodically evaluated in order to ensure quality student education. Performance measurement is an approach to identifying the quality of facility services. Appropriate methods are needed to implement the measurement process. In addition, to measure school classroom facilities performance, the development of indicators that reflect the core business is required. Based on these indicators, a facility manager can provide a conducive environment in schools and ensure that the environment has a positive impact on students' attendance and academic achievement.

Despite the clear need, there is a lack of information, knowledge and methods in measuring school classroom facilities performance. A study conducted by Sapri *et al.* (2008) particularly raised this issue. Their research generated the indicators of library servicescapes in measuring facilities performance for library facilities within higher education institutions. While their study identified performance measure attributes for library facilities within higher education institutions, the present study focuses on the development of a framework to measure the performance of school classroom facilities which influence students' attendance and academic achievement in school.

Therefore, research is needed to identify the framework of school classroom facilities for improving students' attendance and academic achievement. This research will contribute to the understanding of the fundamental issues in measuring facilities performance, particularly in the school setting. Research conducted by Sapri *et al.* (2008) postulated that identifying performance indicators is a prerequisite in measuring facilities performance. Hence, this research aims to identify the KPIs, their indicators and components in measuring school classroom facility performance which influence students' attendance and academic achievement.

1.4 Research Questions

In investigating the indicators to measure school classroom facilities performance and the relationship with students' attendance and academic achievement, the relevant research questions for this study are:

- a) What are the KPIs to measure school classroom facilities performance?
- b) How can the best indicators for measuring school classroom facilities performance be derived?
- c) How does school classroom facilities performance affect students' attendance and academic achievement?
- d) What is the relationship between school classroom facilities performance and students' attendance and academic achievement?
- e) What are the components of the KPIs to measure school classroom facilities performance?
- f) What are the most important KPIs to measure school classroom facilities performance?

1.5 Research Aims

The aim of this study is to develop a framework of school classroom facilities for improving students' attendance and academic achievement with a particular focus on the students' opinions of the facilities provided. The findings of this research provide a new approach to decision-making in measuring school classroom facilities performance and improving school FM performance.

The research statement and overarching aim of this study can be expressed as follows: "To develop a framework of school classroom facilities for improving students' attendance and academic achievement through an understanding of the students' opinions of the facilities provided".

1.6 Research Objectives

To achieve the research aim, this study embarks on the achievement of the following objectives:

- i. To identify the KPIs for school classroom facilities.
- ii. To identify the KPIs for school classroom facilities which influence students' attendance and academic achievement.
- iii. To determine the components of the performance indicators for school classroom facilities.
- iv. To develop a framework a framework of school classroom facilities for improving students' attendance and academic achievement.

1.7 The Significant of Research

The discussion presented above indicates a gap in the theory on facility performance management. In addition, the review of the literature reveals a potential research area in investigating student opinions as a tool in measuring school classroom facilities performance. Similar measurements have been developed in settings such as libraries, construction, and airport safety and security. Research in the literature has proved that the school classroom facilities performance influences the students' attendance and academic achievement and that, in the context of school organisations, facilities play a major role in achieving the organisational goals. Therefore, an investigation of student opinions is important in order to improve classroom facility performance. The developed framework can be used as a guideline to improve the school FM performance which has a strong relationship with the classroom facilities performance. In addition, it can open up new potential areas for research that will link FM functions and organisations goals.

1.8 Scope and Limitation

The scope and subsequent limitations of this research are this research takes into account Malaysian government secondary schools in Johor. The research respondents were government secondary school students, teachers and staff of the Malaysian Public Works Department. The research only focuses on the school facility that have the most effect on students' attendance and academic achievement, namely, the classroom facilities.

1.9 Research Methodology

In developing a framework of school classroom facilities for improving students' attendance and academic achievement, the research identified the KPIs for classroom facilities based on general indicators gathered from a review of the literature. Thus, the relationships between classroom facilities performance and students' attendance and academic achievement in school were evaluated in order to derive the performance indicators through student opinions of the facilities provided. From there, the framework of school classroom facilities for improving students' attendance and academic achievement was developed.

Given the nature of the proposed research, it was appropriate to conduct an exploratory study. According to Naoum (2007), exploratory research is used when one has a limited amount of knowledge about the topic. In addition, to elicit student opinions on classroom facilities, a mixed methodology approach was adopted, with both qualitative and quantitative data being gathered from the selected case study area.

As illustrated in Figure 1.2, the research methodology is divided into five (5) stages, namely, the literature review, development of the research proposal, identification of KPIs, indicators and components, development and validation of the

proposed framework, and conclusions and recommendations. The activities in each stage are discussed as follows.

The first stage is concerned with understanding performance measurement for classroom facilities. Thus, a review of the relevant theory on performance measurement within schools and in the FM context, FM performance, facility performance, methods to measure facility performance, student learning performance, facilities that affect student learning performance and key indicators to measure facility performance is performed to enhance the understanding of facility performance within classroom facilities.

Based on recent activities, the research framework is established in the second stage. It involves articulating the research background, problem statement, research aims, research questions, research objectives, significant of research, scope and limitations, research contribution and outcomes and the research method.

The third stage is the KPI identification, which involves collecting and analysing the data. As stated, the research used a mixed methodology approach which combines quantitative and qualitative techniques. The first round of data was collected using the quantitative technique. Hence, a questionnaire survey was conducted to identify the KPIs for classroom facilities which affect students' attendance and academic achievement in school. This was followed by the qualitative technique which used interviews to determine the components of the performance indicators for classroom facilities. The data were analysed based on the nature of the data. The survey data were analysed using Cronbach's alpha, frequency analysis, descriptive analysis, correlation, crosstabs analysis and chi-square analysis. The interview data were analysed using content analysis by Nvivo software.

The fourth stage is the framework development and validation. In this stage, when all the required data were collected and analysed, the framework of school classroom facilities for improving students' attendance and academic achievement was developed. This framework was tested to authenticate its accuracy and reliability by distributing a questionnaire to industry experts and conducting a field survey. Suggestions and recommendations are given in the last stage which is stage five.

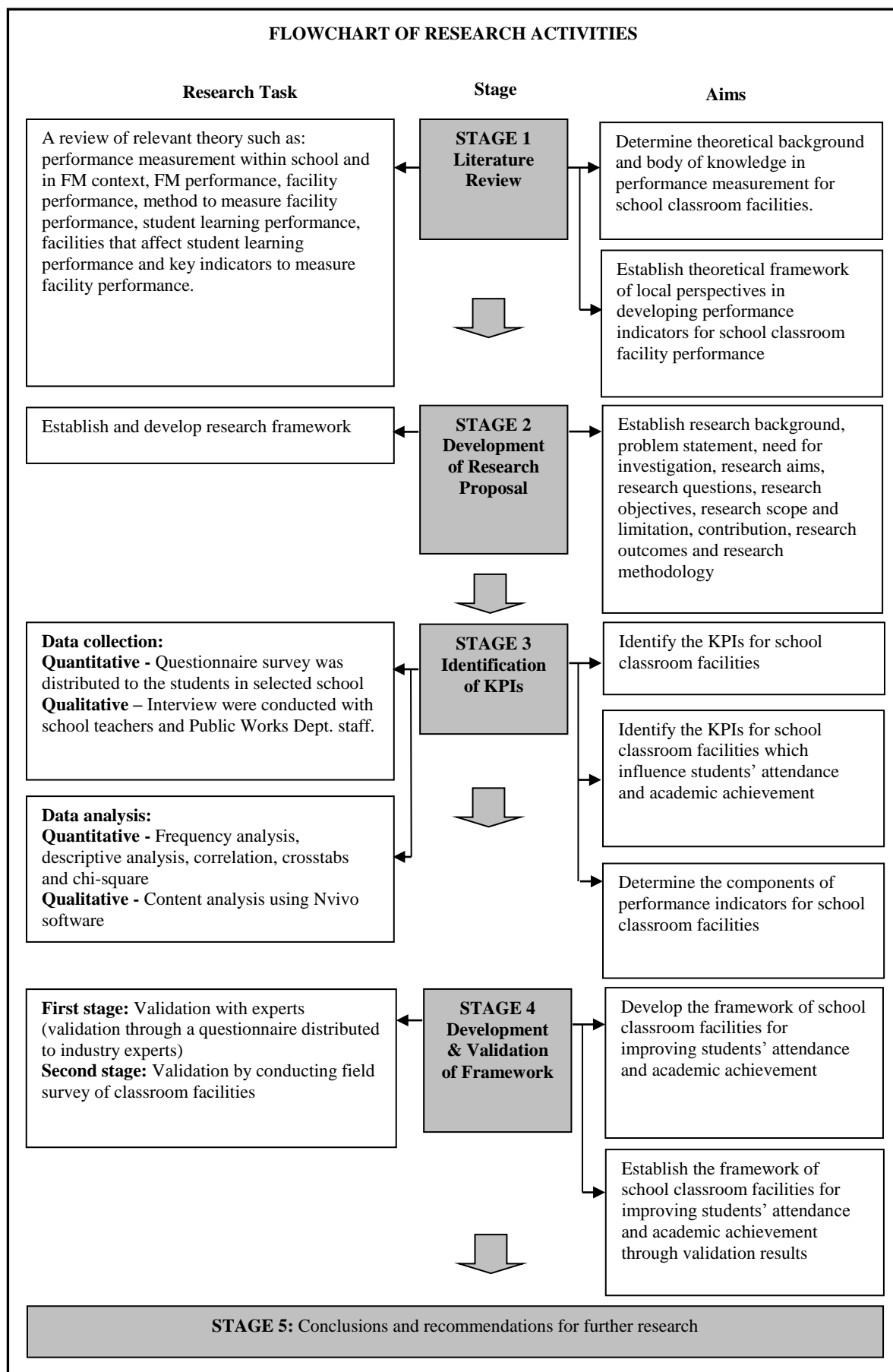


Figure 1.2: Flowchart of research activities

1.10 Chapter Layout

The research work is presented in ten chapters. The content of each chapter is outlined as follows:

Chapter 1 – Introduction

Chapter 1 introduced the research which included the research background, problem statement, research aims, research questions, objectives of the research, significant of research, research scope and limitation, research methodology, and the chapter layout. The research methodology was presented in a diagram.

Chapter 2 – Facilities Management and Performance Measurement

Chapter 2 presents the literature review. This chapter provides an understanding of FM practices and performance measurement. Thus, it involves a review of the literature on FM including its roles and its implementation in organisations. An overview of performance measurement is provided including a chronology of performance measurement.

Chapter 3 – School Classroom Facilities Performance

This chapter focuses on understanding facility performance for the school classroom. Therefore, it presents an overview of FM performance, facility performance, methods to measure classroom facility performance, student learning performance and the classroom facilities that affect students' attending and academic achievement. In addition, a chronology of approaches to the physical environment within schools and the key indicators to measure classroom facilities performance are discussed.

Chapter 4 – Research Methodology

Chapter 4 discusses the methodology used for the overall research work including collecting the data, analysing the data and developing the framework for measuring classroom facilities performance. It also deals with the process of designing the two questionnaires, the interview process for the case study area and the questionnaire for validation of the framework.

Chapter 5 – Key Performance Indicators for Classroom Facilities

Chapter 5 presents and discusses the results of the initial study. This chapter discusses the initial study analysis to fulfil the first objective of the research to identify the KPIs for school classroom facilities. Therefore, this chapter discusses the questionnaire development, Cronbach's alpha analysis, respondents' backgrounds, the descriptive analysis results regarding the students' opinions of classroom facilities, and the KPI ranking for classroom facilities.

Chapter 6 – Key Performance Indicators for School Classroom Facilities Which Influence Students' Attendance and Academic Achievement

Chapter 6 presents and discusses the results of the questionnaire survey to fulfil the second objective of the research to identify the key performance indicators for school classroom facilities which influence students' attendance and academic achievement. The questionnaire data were analysed using descriptive analysis, correlation, crosstabs and chi-square analysis. The topics discussed in this chapter are questionnaire development, data analysis, respondents' background, descriptive analysis, correlation analysis, crosstabs analysis and chi-square analysis.

Chapter 7 – The Components of Performance Indicators for School Classroom Facilities

Chapter 7 focuses on the third objective of the research which is to determine the components of performance indicators for school classroom facilities. Content analysis using Nvivo software was chosen as the technique for analysing the interview data. The topics discussed in this chapter are: interview development and process, Nvivo analysis procedure and the results of the components for each performance indicator.

Chapter 8 – Developing the Framework of School Classroom Facilities for Improving Students' Attendance and Academic Achievement

This chapter presents and discusses the results relevant to the fourth objective of the research which is to develop a framework of school classroom facilities for improving students' attendance and academic achievement.

Chapter 9 – Validation

Chapter 9 discusses the results of the validation. The validation process used a questionnaire and field survey. The questionnaire was distributed to industry experts and a field survey was conducted in a selected school in Malaysia.

Chapter 10 – Conclusion and Recommendations

Chapter 10 presents the research findings and conclusions and makes recommendations for further research based on the research findings.

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