IDENTIFICATION OF THE PHYSICAL FACTORS AND PRACTICES FOR IMPLEMENTING LOWER PRIMARY SCIENCE CURRICULUM

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ABSTRACT

The study identifies the physical factors and practices for the implementation of level one lower primary science curriculum. The purposes of this study were to assess the existing physical factors and practices for the implementation of primary science curriculum, to determine whether the schools have accommodated physical factors as in accordance to the Ministry of Education guidelines and to identify the relationship between the classroom physical factors and the teaching and learning (T&L) science practices. A survey design was adopted for this study. The study involved 146 primary science teachers from District of Larut, Matang and Selama, Perak. The research instruments employed were questionnaires, observation check list and interview protocol. Data were analyzed using descriptive statistics, which were frequency distribution and percentage, while correlation tested the hypothesis at 0.05 significant level. Data from the interviews were analyzed using Atlas.ti while the classroom observations were analyzed through the checklist. The key finding of the research identifies that the majority surveyed schools are adhered to the ministerial guidelines. However, the accommodation facilities in the classrooms are at moderate satisfaction level. The result reveals a low rating (mean = 2.47) for overall analysis of existing physical factors and a moderate level (mean = 2.74) for existing practices in the primary schools for implementing science curriculum. Furthermore, the result also indicates that the classroom physical factors have a significant relationship with the science T&L practices (r = 0.876, p < 0.05). In conclusion, by enhancing the accommodation of physical factors in the classroom, the quality of T&L could be improved. Its implication is that the integration of physical facilities in science curriculum could reduce frustration, improve positive behavioral, and could help in developing students' personality and self-confidence.

Keywords: Physical factors, lower primary, interconnected relationship in teaching and learning practices, good academic and quality behavior performance

PENGENALPASTIAN FAKTOR-FAKTOR FIZIKAL DAN AMALAN DALAM PELAKSANAAN KURIKULUM SAINS TAHAP SATU SEKOLAH RENDAH

ABSTRAK

Kajian ini mengenalpasti kemudahan fizikal dan penggunaannya dalam pelaksanaan kurikulum sains tahap satu di sekolah rendah. Matlamat kajian ini adalah untuk menilai kemudahan fizikal serta amalan sedia ada dalam pelaksanaan kurikulum sains, menentukan sama ada sekolah-sekolah menyediakan kemudahan prasarana mengikut garis panduan Kementerian Pendidikan serta mengenalpasti hubungan antara kemudahan fizikal dalam bilik darjah dengan amalan pengajaran dan pembelajaran (PdP) sains. Kajian ini adalah berlandaskan reka bentuk tinjauan. Sampel kajian ini merangkumi seramai 146 orang guru sains sekolah rendah di sekitar Daerah Larut, Matang dan Selama, Perak. Instrumen yang digunakan termasuk soal selidik, senarai semak pemerhatian dan protokol temu bual. Data penyelidikan ini dianalisis berdasarkan statistik diskriptif iaitu kekerapan dan peratus, serta korelasi dan diuji hipotesisnya pada tahap signifikan 0.05. Data temubual dianalisis menggunakan Atlas.ti manakala kaedah pemerhatian telah dianalisis melalui penggunaan senarai semak. Hasil kajian mendapati bahawa majoriti sekolah yang dikaji mematuhi garis panduan KPM. Namun, penyediaan kemudahan fizikal dalam bilik darjah adalah pada tahap sederhana memuaskan. Hasil kajian menunjukkan penyediaan kemudahan fizikal sedia ada berada di tahap rendah (min = 2.47), manakala amalan penggunaan kemudahan fizikal di tahap sederhana (min = 2.74) dalam pelaksanaan kurikulum sains. Hasil kajian juga menunjukkan bahawa kelengkapan kemudahan fizikal dalam bilik darjah mempunyai hubungan yang signifikan dengan amalan PdP sains (r = 0.876, p < 0.05). Kesimpulannya, peningkatan kelengkapan kemudahan dalam bilik darjah menambah baik kualiti PdP. Implikasinya, integrasi kemudahan fizikal dalam kurikulum sains dapat mengurangkan kekecewaan, meningkatkan tingkah laku yang positif, serta membantu perkembangan personaliti dan keyakinan diri pelajar.

Kata Kunci: Faktor-faktor fizikal, tahap satu sekolah rendah, hubungan kait rapat di antara amalan pengajaran dan pembelajaran, prestasi pencapaian akademik dan tingkah laku berkualiti

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LIST OF ABBREVIATIONS

FPK	Falsafah Pendidikan Kebangsaan
ICT	Information Communication Technology
KBSR	Kurikulum Bersepadu Sekolah Rendah
KSSR	Kurikulum Standard Sekolah Rendah
NEP	National Educational Philosophy

CHAPTER 1

INTRODUCTION

1.1 Introduction

Education is being a strong pillar and backbone in the chapters of life in individuals and national as well. It is the light of schools which awakes and digs out the intelligence among learners. Considering on this matter, educational zone in Malaysia has dashed out to meet 2020 visions and aspirations in facing lots of competitive challenges in parallel with the country's rapid development.

The headlines of newspapers, educational magazines are often yelling on "Our schools are failing," "Our students poorly perform compared to students from abroad countries," "Education management and styles need to revamping." To end this, government, education and private departments and organizations have revamped and

amended the national curriculum from time to time at all stages in schools on the purpose to fulfill the desires and expectations of the society and the educationa needs.

Aligned with our country's development and success in the challenges of globalization, Ministry of Education ensures the education system is transforming according to the demands of national development. Considering this, Malaysia primary curricular system is undergoing a tremendous change in order to be top priority for national transformation and development (Ghavifekr, Hoon, Ling & Ching, 2014).

In this 21st century, Malaysia science educators recognise the need for the science curriculum to keep in line with the international trends (Lee, 1992) if Malaysia were to achieve the vision of becoming a developed country by the year 2020. According to this objective, Primary Standard Science Curriculum aims to inculcate students' interests in science and technology. Besides, the curriculum also stressed more on developing the creativity of students through process of experience, experimental and research to master scientific knowledge, skills, attitudes and values.

In general, learning environment is a crucial role play in student's daily transition and transformation life. It helps in producing a well being, quality and successful students in terms of behavior, cultural practices, social and academic. It is defined as the social context, psychological and pedagogical which can affect learning, achievement and attitudes of the students. Moreover, learning environment and features are able to improve students learning in schools and are identified as major determinants of students learning. Learning environment is also capable in

stimulating students to engage in the learning process and being able to influence the behavior of students as well as to assist in the development of their skills or cognitive perception (Fraser, 1994).

It is also in relation with physical environment settings which help in shaping the students intellectual, social, friendship and cooperation apart from promoting students' developments in academic performance, growth and transmit their skills and knowledge in academic. Thus, the classroom is a suitable and appropriate place in promoting this socio-cultural setting among the students.

In Malaysia context, all educational processes including science curriculum at the national level are envisioned with the ultimate aim of building a united and progressive society (Ministry of Education Malaysia, 2001). In general, the Ministry of Education (2001) Malaysia has categorized the elements of the NEP into fifteen sub-groups as stated in the manual entitled, "National Education Philosophy, Goal and Mission" (*Falsafah Pendidikan Kebangsaan, Matlamat dan Misi*). One of these subgroups stressed on physical elements in schools which is playing a vital role in order to ensure the quality of delivering the education and academic achievements.

Students engage their huge amount of time in a school classroom. In general, classroom is being a place where they will learn various skills deemed necessary and proper for them to achieve success in the global society (Hannah, 2013). It is where the students thrive to develop and fulfill their needs to colour their beautiful futures as well as knowledge of the skills needed to reach that goal. As classroom plays a dynamic role in the process of teaching and learning and increase growth of students

as well, it is essential that each school needs to pay more attention on establishing suitable physical settings in the classroom based on the trends of century. This will help the teachers and students in creating a positive learning environment which consists approaches of teaching, learning, motivation, mood, healthy interaction and communication. Physical environment of a classroom is one of the first areas that make a noticeable impact on student success (Grubaugh and Richard, 2013). On the other hand, this also helps in promoting intellectual, cooperation and supportive activities which encourage students' process of learning and development (Fraser, 1998).

1.2 Research Background

Approaching towards Vision 2020 and facing the challenges of global education competitiveness, Malaysia education system has moving like a streak of lightning on the way of diversification process from non-formal system to a systematic unified formal and forward looking system.

In retrospect history of science education in Malaysia, the development of science curriculum has continued since pre-independence (Kamisah, 2006). However, science curriculum in Malaysia had been standardized and became official after the year 1956 when Razak Report 1956 was submitted by Cabinet Committee on Review of the Implementation of Education Policy 1979 (*Jawatankuasa Kabinet Mengkaji Pelaksanaan Dasar Pendidikan 1979*). This suggests that primary science curriculum was designed according to three segments namely the,"Communication", "Man and

Nature Around" and "Individual Personal Development" in accordance with the needs, interests, talents and mental ability and willingness of the disciples (Lay, 2010).

But before that, in year 1968, the schools and Ministry of Education initiated a project called Special Projects which targeting on students from year one until six on the purpose to improve the quality of science teaching, strengthen the knowledge of science and increase the students interests in investigating and understanding the world in primary schools. Following that, there had another amendment in primary science curriculum when "Nature and Mankind" was introduced with the aim to help the students to acquire knowledge and understanding of people and the environment. This curriculum is particularly targeting on students year four until six. Generally, the assessment is based on multiple choice which comprises aspects of knowledge, skills and values of learning (Pusat Perkembangan Kurikulum, 2003).

In year 1994, KBSR (*Kurikulum Bersepadu Sekolah Rendah*) was introduced due to improve the science education and achieve the target drew in National Education Philosophy. KBSR science was taught from year one to six focusing on knowledge and also diverges and covers nature of science process skills, manipulative skills, inculcation of scientific attitudes and noble in line with FPK which stressed on developing the potential of individuals in a holistic and integrated act to create a balance and harmonious in term of intellectual, spiritual, emotional and physical (Pusat Perkembangan Kurikulum, 2003).

The science curriculum again was changed when KSSR (*Kurikulum Standard Sekolah Rendah*) was introduced. This curriculum system is categorized as a modular standard based curriculum. This module encapsulates Basic Core Modules, Themes Core Modules and Elective Modules. Briefly, KSSR objectively conducted to cultivate students interests in science and technology besides develop their creativity through experience and investigation for master scientific knowledge, skills, attitudes and values (Bahagian Pembangunan Kurikulum, BPK, 2012a).

To date, tremendous changes in science curriculum is necessary to ensure the country's science education system is moving in tandem with changing time and in line with National Science Education Philosophy (BPK, 2012b). Align with this, students were exposed with different paradigm of learning approaches which satisfy the characteristics of cognitive science teaching and learning (Lee, 1992).

Currently, Malaysia science curriculum is in a state of flux to fulfill the demand of current science and technological advancement in schools. It is being one of the challenging subjects and present learning difficulties among the young learners. Therefore, numerous factors were concerned on upgrading the curriculum align with new technologies on the optimal way to teach the students. The importance of creating optimal conditions to enable and sustain learning has sometimes been overlooked as a 'peripheral' factor in the provision of quality education. Thus, a rapidly expanding body of research on the conditions of learning suggests that physical environments is being one of the central role in teaching and learning processes (UNESCO, 2012).

Students spent most of their time in the classroom environment, therefore quality of the classroom environment has highly focused (Noraini et al., 2013). The classroom is a place where the students develop what they want their future look like as well as knowledge of the skills needed to reach that goal. The quality of learning environment has strong influence on the academic standard which is an index of quality assurance in the school. Hence, a good quality learning environment in the classroom reinforces the efforts of the teacher by providing a good stimulus for effective teaching and learning to take place (Ayeni & Adelabu, 2012).

Based on study of Lemessa (2015), the classroom is being multidimensional environment where students with different goals, needs and abilities share the resources, materials and other infrastructures in the classroom. With the classroom being such an important place in the growth of a child, it is important to understand the ways in which to affect this environment in order to receive maximum quality and effectiveness in instruction and learning. Thus, one of the first areas that make a noticeable impact on student success is the physical environment of the classroom (Hannah, 2013).

Physical environment refers to physical characteristics of the room. Physical classroom environment is a combination of variety things such as lighting, temperature, ventilation system, space, size of the room, floor, wall, desks, chairs, rugs, whiteboards, computers and etc. Favorable physical environment has a significant positive effect on the efficiency of any organization and acts as catalyzing agent to provide a straight way for achieving predetermined objectives of an organization (Suleman & Hussain, 2014). According to Osman and Marimuthu

(2010), settings of physical elements in classroom is an important criteria of learning environment for the students' success in academic performance in the 21st century.

Arzi (2003) stated that physical aspects in the classroom able to influence the teaching and learning process and are usually regarded as second teacher due to the facilities able affects relationship between teacher and students. Moreover, the study also shows active learning in the classroom has a connection with the physical facilities provided (Arzi, 2003).

From the teaching and learning aspects, Abdul Hakim (2005) found that facilities play a significant role on teaching and learning process. Suitable and sufficient facilities will assist the students to be more focus on learning process and also to increase the quality as a student. In addition, educational equipment and materials have their own effects on the academic performance of the students. They are being channels through which contents stimuli are presented to the learner (Koroye, 2016).

Suitable and comfortable accommodation of physical facilities in the classroom stimulate intellectual activity, enhance social relationships and encourage student learning and development among students (Arzi, 2003). This is in turn will make teaching and learning happen in a comfortable and enjoyable situation. As a result, there is enhancement in term of students' knowledge and understanding (Che Ahmad et al., 2010).

Consider on this matter, to ensure a favorable classroom environment, it should be well facilitated and equipped. This provides enormous opportunity of effective instruction and promotes smooth teaching and learning process. Furthermore, physical facilities should be provided as they are helpful in improving the overall performance of the school (Suleman & Hussain, 2014).

On the basis, the current study was specially designed to identify the physical factors that help in contributing to the implementation of lower primary science curriculum in schools. This study will help in structuring a constructive reformation and revolution in the classroom arrangements and settings to assure potential and effective teaching and learning practices in the classroom (Fraser, 1998).

1.3 Problem Statement

In today's world, education systems must constantly evolve in order to respond to the rapid changing demands of the societies they serve. Innovations in curriculum, methodologies, materials and technologies may require major changes in the design of the learning environments (UNESCO, 2012). In same view of this, UNESCO (2008) points out that quality assurance oriented schools are characterized by core values and elements include quality learners, classroom facilities, curriculum content, teaching and learning processes and learning outcomes.

Learning is a unique process that is directly and indirectly influenced by variables such as teaching instruction, students' attitudes and the classroom learning environment (Odeh, 2015). Therefore, quality of science education is not only emphasized on the teachers' performance but also effective utilization of the facilities and infrastructures in the classroom. This was supported by study of Odeh (2015) that opined learning can occur via one's interaction with environment which refers to facilities that are available in the classroom to facilitate the students learning outcome.

Ajayi and Ayodele (2001) study emphasizes that availability of the resources are quite important to achieve effectiveness in instructional delivery and supervision in the classroom. Besides the study also indicates that by using facilities, teachers are seen as actively presenting the subject matter. Besides, Adesola (2005) found that the poor level of available resources is indeed a plus to the teachers and shows the level of ingenuity and commitment of the teachers toward effective delivery of lesson.

Education of the student and his achievement is determined to a large extent by varied and dynamic role of teachers and the facilities provided by them for the student's education (Miah, 2015). Explicitly, teaching and learning in most schools that took place in unconducive learning environments ended up performing dismally in national examinations in the country (Orodho et al., 2014). It was notable that inadequate provision of classroom resources has been a major factor of poor students' academic performance (Ademilua, 2002). In addition, Lemessa (2015) states that learning environment should have good infrastructural development, adequate trained teachers and adequate instructional materials among others which could have positive impact on academic achievement of students in primary schools. Availability,

adequacy and relevance of facilities in the classroom influence efficiency and high productivity. Significantly, there is no effective science education exists without the availability of necessary equipment because facilities enable the teachers and students to develop problem solving skills and scientific attitudes. This lead the students not only access to the reference materials mentioned by the teacher but individual student will also learn at their own pace. The net effect of this is increased overall academic performance of the entire students (Mfreke, 2016).

School age is an important stage in life that shapes each student over time into a unique adult. The majority of the school day is spent learning from a teacher and curriculum. School is a place where learning goes beyond the teacher at the front of the classroom which also shaped by physical environment that has a significant impact on the students and how they learn (Moehring, 2012). Essentially, the physical environment plays a vital role in determining on how students perform or respond to circumstances and situations around them (Tsavga, 2011). Hence, on purpose to nourish students' intellectual and to create enthusiastic pedagogical practices, there needs enhancement of classroom by accommodating of relevant and sufficient facilities that could highly benefit the teachers and students.

On the other hand, Adeyemo (2012) asserts that the quality of facilities in classroom has impacts not only on educational outcomes but on well-being of the students and teachers. Physical factors measure the conducive, successful, interesting and achievable teaching and learning practices as well as behavioral performance in the classroom. They have variety effects on teachers, students and teaching learning processes. Undoubtedly, these factors could adversely affect student behavior and

lead to higher levels of frustration among teachers and poor learning attitude among the students (Sabitu, Babatunde & Oluwole, 2012). This was corroborated by Suleman (2014) in his study that physical facilities is one of the stimulating factors that plays a fundamental role in improving academic achievement and behavioral performance in the school system.

If the teaching and learning environment is adequately enriched through high quality and interesting presentation, the probability that learning effectiveness results very high. Benjamin (2014) believes that the facilities and infrastructures in teaching and learning process stimulate to engage information and actively initiate to acquire knowledge skills and cognitive processes. This fully mobilize the enthusiasm of both teaching and learning, teaching information, improve information exchange between teachers and students, the efficiency and quality and the diversification of development of teaching style. Thus, lack of the physical resources could inevitably hampers the teaching; depress spirit of the students and enthusiasm of the teachers. Besides, direct effects of poor facilities create an uncomfortable and uninviting workplace for teachers combined with frustrating behavior by students include poor concentration, hyperactivity and also create stressful set of working conditions for teachers. Crucially, negative attitude include stress and job dissatisfaction are common pre-cursors to lowered teacher enthusiasm. Thus, teacher's unmotivated or negative characteristics and inadequate facilities in classroom are highly affect upon the academic performance of students (Hannah, 2013).

In addition, if the classroom size is large which means enroll between 30 to 45 students, they are unable to engage in the tasks actively and this also can increase disruptive behavior in the classroom. Moreover, teachers only had time to cover the basic lessons and less spend working with each individual student and also could not spend extra time with slow learners. This also reduce the facilities and materials the teacher can cover and also reduce the learning by reducing the kind of teaching methods that the teacher can employ in the classroom (Epri, 2016). In contrast, Yaman and Uygulamada (2009) found that small class size enhances students' effective learning and academic success. The quality and academic success are higher in class with less students compared with many students. Furthermore the study shows that small class size improves students' achievement, reduces discipline problems and provides quality benefits to teachers and students due to sufficient resources are available for the fewer students in small class size and also individual attention can be provided to the learners' particular needs (Epri, 2016).

Based from studies in Malaysia, to date most of the classroom physical factors are still not upgraded which lack of smooth, conducive teaching and learning process that lead to increase of fatigue, unconscious in studies and frustration among the students and teachers (Marzita et al., 2012). Previous studies also found that the students apparently still did not satisfy with the existing learning environment (Che Ahmad et al., 2010; Marzita et al., 2012; Mohd Hairy et al., 2012). On the other hand, lack of completeness of educational facilities in classroom and inconvenience of class size will lower motivation and creativity of teachers and students as well as limiting learning and teaching activities (Nurul Jannah Amirul, 2013). This cause the teachers and students are being under stress, depression, other negative emotional

expressions and also being demotivated as most of their time in school (Mohd Hairy et al., 2012).

Undoubtedly, inadequacy of physical factors is one of the crucial factors that could be impediment for effective of science teaching and learning. Apparently, the physical factors is being one of the crucial elements that help the teachers to be creative in meeting the needs of different levels of students in the classroom (Ehrenberg, Brewer, Gamoran & Willms, 2001). Basically, primary education is the platform of basic education of any educational system. If this basement is weak, then whole educational system could be highly weakened and distort. Concern on this matter, there were many studies conducted primarily on identifying the physical factors in secondary schools and higher institutions in Malaysia that contribute in implementing science curriculum as shown in Table 1.1. However, the researches based on classroom physical environment particularly at lower primary science curriculum were still at the preliminary stage. On the grounds, this study seeks to fill gap by using descriptive methods of research to study the identification of the physical factors that contribute in the implementation of lower primary science curriculum.

Table 1.1

Previous studies on physical infrastructures in the institutions in Malaysia

TITLE	AUTHOR	YEAR
Tahap Kepuasan Pelajar Terhadap Kemudahan Dan Perkhidmatan Yang Disediakan Di Politeknik Port Dickson (PPD) Bagi Sesi Disember 2010	Noremy Bt. Che Azemi Fadilah Bt Mat Assain	2010
Teacher's Perspective On Infrastructure Of Special Education's Classroom In Malaysia	Mohd Hanafi Mohd Yasin Hasnah Toran Mohd Mokhtar Tahar Safani Bari	2010
Tinjauan Terhadap Tahap Kesesuaian Infrastruktur Program Integrasi Pendidikan Khas Bermasalah Pembelajaran	Mohd Hanafi Mohd Yasin Hasnah Toran Mohd Mokhtar Tahar Noraini Mohd Salleh Rabaishah Azirun	2011
Penilaian Kemudahan Pembelajaran, Peruntukan Kewangan Dan Kursus Dalam Perkhidmatan Bagi Kursus Pendidikan Islam Di Politeknik Malaysia	Alias Mat Saad Nik Mohd. Rohimi Nik Yusoff Ruhizan Mohammad Yassin	2011
Pengaruh Persekitaran Fizikal Bilik Darjah Terhadap Tahap Keselesaan Pengajaran Dan Pembelajaran	Che Nidzam Che Ahmad Noraini Mohamed Noh Mazlini Adnan Marzita Putih Mohd Hairy Ibrahim	2013

(Continue)

Table 1.1 *(Continued)*

TITLE	AUTHOR	YEAR
Improving The Classroom Environment: Classroom Users' Perception	Nur Hidayahtuljamilah Ramli Shamsidar Ahmad Mawar Haji Masri	2013
Learning Outside Classrooms On Campus Ground: Malaysia	Norhayati Ibrahim Nur Hafisah Fadzil Masran Saruwono	2013
Principals' Perception On Classroom Physical Environment	Nur Hidayahtuljamilah Ramli Shamsidar Ahmad Mohd Zafrullah Mohd Taib Mawar Haji Masri	2014
Relationship Between Constructivist Learning Environments And Educational Facility In Science Classrooms	Che Nidzam Che Ahmad Wang Chiao Ching Asmayati Yahaya Mohd Faizal Nizam Lee Abdullah	2015

1.4 Research Objectives

The primary objectives for this research:

1. To assess the existing physical factors and practices for the implementation of science curriculum at the primary schools.
2. To determine whether the schools have accommodated the physical factors as in accordance to the Ministry of Education guideline.
3. To identify the relationship between the classroom physical factors and the teaching and learning science practices.

1.5 Research Questions

Specifically the study focused on the following questions:

1. What are the existing physical factors and practices in the primary schools for the implementation of science curriculum?
2. Do the schools have accommodated the physical factors as in accordance to the Ministry of Education guideline?
3. Is there any relationship between the classroom physical factors and the teaching and learning science practices?

1.6 Research Hypothesis

Based on the research questions above, the following hypothesis was generated.

Ho1 : There is no significant relationship between the classroom physical factors and the teaching and learning science practices.

1.7 Research Conceptual Framework

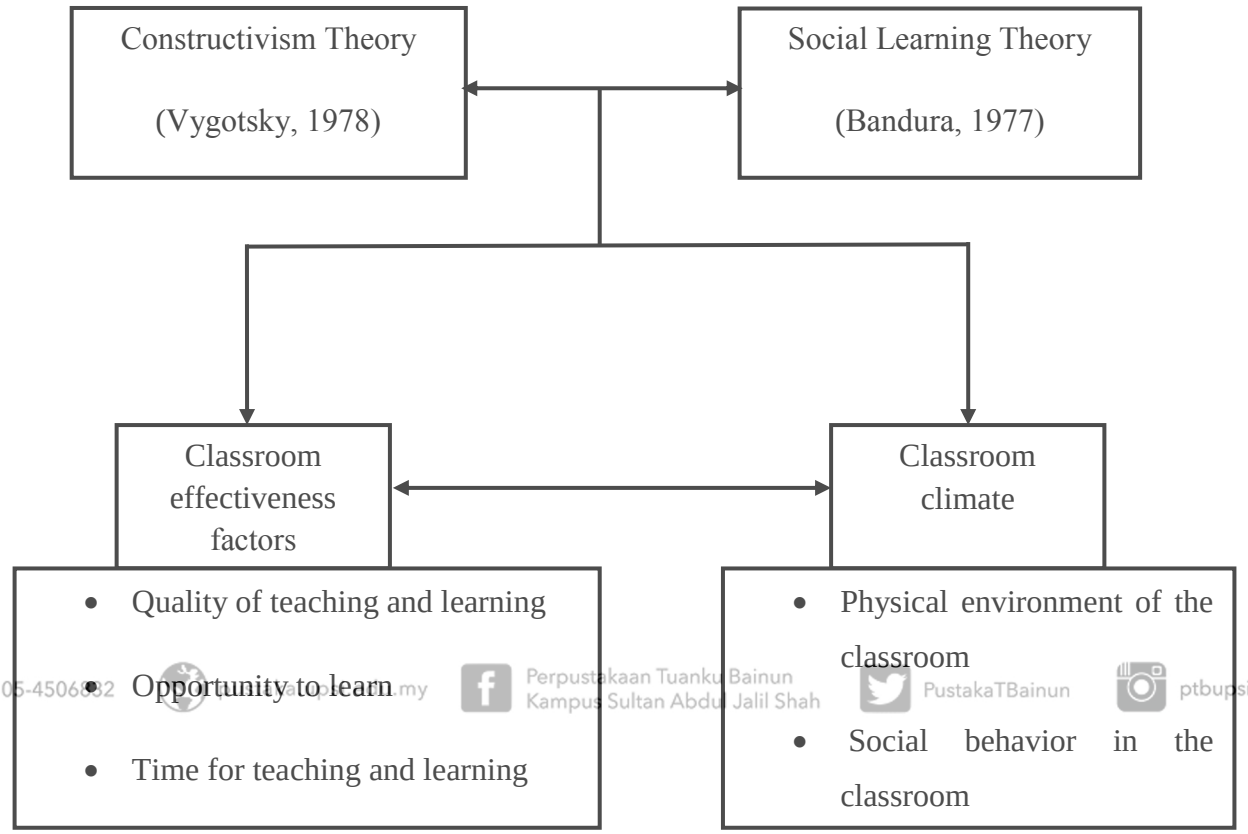

Figure 1.1. Conceptual Framework. Modified and adapted from Creemers and Reezigt, (1999).

Based on Figure 1.1, this study was guided by constructivism theory (Vygotsky, 1978) and social learning theory (Bandura, 1977). In this framework, Vygotsky and Bandura theories conceptualize on teaching and learning perspectives as well as emphasizes on physical environment and social system in the classroom. In particular, the conceptual framework comprises of optimal learning environment which filled with adequate facilities that foster students' interest; inspires and enhances social behavior among the teachers, students and with their shared learning environment. Overall, the theories guide in engaging the students and teachers in good

condition of teaching and learning practices within highly supportive and stimulating of quality of educational environments.

1.8 Significance of the Study

Science is being a core subject of the National Curriculum. Often it connects positively between students engagement with the science activities which provokes their interest, motivation, self efficacy, self belief, excitement, attainment and achievement. Teaching and learning science emphasize on most crucial concepts and skills. This encountered multiple contexts and facts which help imbedded in a student's cognitive and knowledge system, encourages their behavioral and attitude changes apart from stimulate the development of national socio economic (Werang, 2014). Along with, the excellent classroom facilities also is one of the basic ingredients for good education programmes and being imperative for good science education programmes besides attaining education goals (Khan & Iqbal, 2012). This was supported by (Werang, 2014) statement which reported an explicit relationship between the physical elements and educational outcomes.

Currently, execution of primary science education by using physical elements is being one of the power basements for the students' development in term of their knowledge, practices, skills, attitudes and behaviors. The existence of quality learning infrastructures and facilities in the classroom help to create a strong bond with the quality of teaching and learning practices. Comfortable classrooms and adequate provision of instructional resources facilitate teacher's instructional task performance

and students' learning outcomes. These facilities also boost the morale of teachers and students besides to ensure the realization of the set educational objectives in schools (Ayeni & Adelabu, 2012). Concisely, the quality infrastructures provide an impact on access and quality of science education besides improve the enrolment rates and learning outcomes.

Emphasize on the matter, this study will help the schools' organizations take initiative and proper actions to upsurge the academic achievements among primary school students. Besides, the findings of the study will be benefit various parties include education departments, school management, teachers, students and policy makers because it will discover about the contribution of physical factors to implement the teaching and learning practices at lower primary science curriculum in the schools.

Prioritize on this issue, there need more studies essentially on implementing the physical settings in lower primary science curriculum which is crucial in requiring much care and attention for the lower primary students but vice versa, up till now, most of the educational studies were focused immensely on secondary and higher of science education environment. The implementation of physical factors in science teaching and learning practices may create the framework of foundation for students' development of their future attributes, beliefs, positive relationships, motivation, and interests by experience and value them.

1.9 Limitation of the Study

There are several limitations to this study that must be acknowledged. The study scope is limited only for the primary schools around District Larut, Matang and Selama in Perak which covers urban and rural schools. Population of the study is imposed to 146 of primary school science teachers. Thus, the results of study can be generalized directly to all primary school science teachers around Larut, Matang and Selama district in Perak state. The preferable results provide to this study through questionnaires as a prime instrument and additional supportive instruments such as interviews and observation along with field notes, checklist, document analysis, documental evidence include photographs.

1.10 Operational Definition

In this study, there are several terms need to be understood by the readers. In order to ease the readers, researcher has listed some of the terms and definitions of concepts to understand every term. The research topic is titled, ‘Identification of the physical factors that contribute to the implementation of lower primary science curriculum.’ Definition of concepts that elaborated used by the researcher is to facilitate the review of problem statement on the research topic that has been chosen.

i) Physical factors

Knapp and Hall (1992) define physical factors as facilities that influence communication in number of ways. The physical factors establish a set of expectations and constraints that influence attitudes and communication. Akomolafe (2016) believes that physical facilities are germane to effective learning and academic performance of students. Meanwhile, Taylor (2009) in their theory mentioned that the physical factors in classroom being as the silent curriculum. This means that the environmental design of a classroom has the power to facilitate and enhance the learning process in ways similar to that of the overt curriculum.

Physical factors include spatial elements such as floor, windows, walls as well as other classroom equipments and tools include desks, rug, whiteboards, smartboards, tack boards, easels, counter, computer equipments, audio-visual equipments (Fisher, 2008). On the other part, the physical factors also encapsulates lighting, temperature, ventilation system and size of the room (Halstead, 1974). Besides the physical facilities also include books, audio-visual, software and hardware of educational technology, size of classroom, sitting postion and arrangement, availability of tables, desks, chairs, chalkboards, shelves on which instruments for practicals are arranged (Odeh, 2015).

In this study, physical factors refer to desks, chairs, table, white board, shelves, cupboard, notice board, fans, lamps, lighting and ventilation system, mini library, chatting corner, science gallery showcase, science bulletin board, classroom space, classroom wall, outdoor facilities, laboratory, instructional materials include

text book, exercise book, reference book, charts, teaching aids and ICT facilities such as LCD, projector, smart board, computer, television and radio. and ICT equipment include audio-visual tools, projector, LCD, computer and smartboard.

ii) Physical environment

Physical environment defined as the room arrangement, materials, facilities, equipment, space, display of students' works, elements of design (e.g. decoration, color, etc.) and physical design of the room (Hensley-Pipkin, 2015).

According to Suleman et al. (2014), physical environment refers to characteristics of the room. Physical classroom environment is a combination of different things include lighting, temperature, ventilation system, size of the room, floor, walls, desks, chairs, rugs, white boards, computers and etc. Teacher and students are considered the main elements of the classroom environment. In this study, physical environment refers to classroom arrangement and accommodation of necessary physical factors in the classroom as aforementioned in the physical factors.

iii) Lower primary

Primary relating to education for children between the ages about six to twelve. It is the initial stage of education and has its basic aim to create, establish and offer opportunities to all children regardless of age, gender or country of origin to achieve a balanced cognitive, emotional and psychomotor development standardisation of the

primary education was significant for enculutration and socialisation in term of education (UNESCO, 2015).

Lower primary education or known as Level 1 assumed as the first stage of primary or basic education and covers six years of full time schooling with the legal age of entrance normally being not younger than five years older than seven (UNESCO, 2015). In this study, lower primary covers students of year one until year three.

iv) Curriculum

A curriculum is broadly defined as a selected blueprint for learning that serves from content and performance standards (McTighe & Wiggins, 2012). This means the curriculum includes content and shapes it into a plan for effective teaching and learning. On the other hand, Finney (2002) refers curriculum to all aspects of the planning, implementation and evaluation of an educational programme, the why, how, and how well together with the what of the teaching-learning process. Thus, in this study the curriculum is defined as a specific plan with identified lessons in an appropriate form and sequence for directing teaching which is synonymous with a syllabus.

The curriculum is the overall plan or design for a course and how the content for a course is transformed into a blueprint for teaching and learning which enables the desired learning outcomes to be achieved Richards (2013). Werang (2014) defines curriculum as a set of plan and regulation about the objective, content and

teaching learning materials as well as method which is being used as the guideline of the implementation of learning activities. This study emphasizes curriculum as a set and guideline of education plan in implementing teaching and learning practices to achieve the specific educational goals and objectives.

v) Classroom

According to Weinstein (1979), classroom is the most pivotal supporting elements in teaching and learning processes. Traditionally, it is a space which is designed by the architect to accomodate various elements such as chair, desk, cupboard, white board and other equipments.

Meanwhile, Leonard and Karen (1996) in their study defined classroom as a place of conducting process of teaching and learning and it should be placed at school. In addition, classroom also being the main battle ground for teacher career.

On the other hand, in general the classroom is a room in the school that involves a group of pupils or students pursuing studies or learning any subject taught by the teacher. For a broad concept, the classroom is not simply a space only for teaching and learning process but accounts for students and teachers to learn and teach and also interacts with each other in it (Meng, 2000).

Zedan (2010) has defined the classroom as a place meant for the students to acquire knowledge and has been identified as a critical factor in a student achievement. It is also being significant in emotions and attitudes towards their

classmates, teachers, the subjects that they study and the entire education system. Moreover, the classroom attempts to provide a space where learning can take place uninterrupted by outside distractions. In this study, classroom is being a place that provides opportunity for smooth, meaningful and effective teaching and learning practices while creating healthy and comfort interaction environment between teacher-student, student-student and student- physical factors.

vi) Learning environment

Learning environment defined as the complete physical, social and pedagogical context in which learning is intended to occur. The term often refers to school classrooms but may include any designated place of learning such as science laboratories, libraries, tutoring centers, teachers' lounge and non-formal learning spaces and also refers to the natural environment surrounding school buildings when they are used as a learning space (UNESCO, 2012). In addition, based on study of Warger, Eduserve & Dobbin (2009), learning environment not only refers to physical location but it also encompasses learning resources and technology, means of teaching, modes of teaching and connections to societal and global contexts. In this study, learning environment addressed on classroom and outside classroom of resources and facilities.

vii) Physical infrastructures guideline

Physical infrastructures guideline is being as a planning guide for improving the facilities. It also intended in evaluating the existing facilities for functional adequacy and in determining the facility needs in order to ensure the school facilities support the principles of good teaching and learning, (McKoy et al., 2008). In this study, physical infrastructure guideline refers to a list of essential facilities drew by Ministry of Education Department that need to be equipped in the classroom which could contribute in enhancing and stimulating teaching and learning practices.

viii) Social behavior

Rummel (1976) defines social behaviors as acts, actions or practices that tries to affect or take account of each other's subjective experiences or intentions. On the other hand, Myers (2007) refers social behavior is the behavior of how people influence and react to one another; respond to various stimulus with their environment. Social behavior consists of conduct and actions exhibited by individuals within society. In this study, social behavior focuses on interaction, attention, communication and participation in the classroom activities.

ix) Classroom climate

Classroom climate defined as a comprehensive structure made up of culture, physical plant, organizational structure, social relationships and individual behaviors. The climate was fluctuating, influenced by changes in outside forces as well as by the emotions of the teachers and students (Dietrich & Bailey, 1996). Classroom climate is the perceived atmosphere, both positive and negative, resulting from the physical and social environment (Bennett, 2001). In this study, classroom climate refers to the contribution of physical environment to social behavior among the students and teachers in the classroom.

1.11 Summary

In conclusion, a positive classroom learning environment which encompasses physical factors is crucial for 21st century learners to succeed in academic performance and educational development as well. Many studies showed a significant relationship between better quality of physical infrastructure and students academic achievement. The purpose of this study is to identify the contribution of physical factors on lower primary science curriculum. The focus of this study is to assess, evaluate and determine the existing physical factors indoor and outdoor of the classroom in accordance to the guideline and also investigate whether or not the classroom physical factors appearance affects the teaching and learning practices, opportunity and time for learning as well as influence social behavior of teachers and students in the classroom.