THE DEVELOPMENT OF FITNESS FACILITIES GRADING SCALE AND RISK MANAGEMENT IN MALAYSIA

ELLAIL AIN BINTI MOHD AZNAN

SULTAN IDRIS EDUCATION UNIVERSITY

2022

THE DEVELOPMENT OF FITNESS FACILITIES GRADING SCALE AND RISK MANAGEMENT IN MALAYSIA

ELLAIL AIN MOHD AZNAN

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

THESIS PRESENTED TO QUALIFY FOR A DOCTOR OF PHILOSOPHY

FACULTY OF SPORT SCIENCES AND COACHING
SULTAN IDRIS EDUCATION UNIVERSITY

2022

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

UNIVERSITI PENDIDIKAN SULTAN IDRIS
SULTAN IDRIS EDUCATION UNIVERSITY

Sila tanda (√)

Kertas Projek	
Sarjana Penyelidikan	
Sarjana Penyelidikan dan Kerja Kursus	
Doktor Falsafah	/

INSTITUT PENGAJIAN SISWAZAH

PERAKUAN KEASLIAN PENULISAN

Perakuan ini telah dibuat pada 13 (hari bulan) DISEMBER (bulan) 20 22

i. Perakuan pelajar :

Saya, ELLAIL AIN MOHD AZNAN, P20172001845, FAC. OF SPORTS SCIENCE AND COACHING (SILA NYATAKAN NAMA PELAJAR, NO. MATRIK DAN FAKULTI) dengan ini mengaku bahawa disertasi/tesis yang bertajuk THE DEVELOPMENT OF FITNESS FACILITIES GRADING SCALE AND RISK MANAGEMENT IN MALAYSIA.

adalah hasil kerja saya sendiri. Saya tidak memplagiat dan apa-apa penggunaan mana-mana hasil kerja yang mengandungi hak cipta telah dilakukan secara urusan yang wajar dan bagi maksud yang dibenarkan dan apa-apa petikan, ekstrak, rujukan atau pengeluaran semula daripada atau kepada mana-mana hasil kerja yang mengandungi hak cipta telah dinyatakan dengan sejelasnya dan secukupnya

Tandatangan pelajar

ii. Perakuan Penyelia:

Saya, JAFFRY BIN ZAKARIA (NAMA PENYELIA) dengan ini mengesahkan bahawa hasil kerja pelajar yang bertajuk THE DEVELOPMENT OF FITNESS FACILITIES GRADING SCALE AND RISK MANAGEMENT IN MALAYSIA

(TAJUK) dihasilkan oleh pelajar seperti nama di atas, dan telah diserahkan kepada Institut Pengajian Siswazah bagi memenuhi sebahagian/sepenuhnya syarat untuk memperoleh Ijazah DOCTOR OF PHILOSOPHY (SLA NYATAKAN NAMA IJAZAH).

13.12.2022
Tarikh

Dr. Jaffry Zakaria,
Pensyarah
Jabatan Sains Kejurulatihan
Fakulti Sains Sukan & Kejurulatihan,
Universiti Pendidikan Sultan Idris
35900 Tanjong Malim, Perak.

Tandatangan Penyelia

UNIVERSITI PENDIDIKAN SULTAN IDRIS
SULTAN IDRIS EDUCATION UNIVERSITY

INSTITUT PENGAJIAN SISWAZAH /
INSTITUTE OF GRADUATE STUDIES

BORANG PENGESAHAN PENYERAHAN TESIS/DISERTASI/LAPORAN KERTAS PROJEK
DECLARATION OF THESIS/DISSERTATION/PROJECT PAPER FORM

Tajuk / *Title*: THE DEVELOPMENT OF FITNESS FACILITIES GRADING SCALE AND RISK MANAGEMENT IN MALAYSIA

No. Matrik /*Matric's No.*: P20172001845

Saya / *I* : ELLAIL AIN MOHD AZNAN

(Nama pelajar / *Student's Name*)

mengaku membenarkan Tesis/Disertasi/Laporan Kertas Projek (Kedoktoran/Sarjana)* ini disimpan di Universiti Pendidikan Sultan Idris (Perpustakaan Tuanku Bainun) dengan syarat-syarat kegunaan seperti berikut:-
acknowledged that Universiti Pendidikan Sultan Idris (Tuanku Bainun Library) reserves the right as follows:-

1. Tesis/Disertasi/Laporan Kertas Projek ini adalah hak milik UPSI.
   The thesis is the property of Universiti Pendidikan Sultan Idris
2. Perpustakaan Tuanku Bainun dibenarkan membuat salinan untuk tujuan rujukan dan penyelidikan.
   Tuanku Bainun Library has the right to make copies for the purpose of reference and research.
3. Perpustakaan dibenarkan membuat salinan Tesis/Disertasi ini sebagai bahan pertukaran antara Institusi Pengajian Tinggi.
   The Library has the right to make copies of the thesis for academic exchange.
4. Sila tandakan (√) bagi pilihan kategori di bawah */ Please tick (√) for category below:-*

☐	**SULIT/*CONFIDENTIAL***	Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub dalam Akta Rahsia Rasmi 1972. / *Contains confidential information under the Official Secret Act 1972*
☐	**TERHAD/*RESTRICTED***	Mengandungi maklumat terhad yang telah ditentukan oleh organisasi/badan di mana penyelidikan ini dijalankan. / *Contains restircted information as specified by the organization where research was done.*
/	**TIDAK TERHAD / *OPEN ACCESS***	

(Tandatangan Pelajar/ Signature)

Tarikh: 15.12.2022

(Tandatangan Penyelia / *Signature of Supervisor*)
& (Nama & Cop Rasmi / *Name & Official Stamp*)

Dr. Jaffry Zakaria,
Pensyarah
Fakulti Sains Kesihatan
Universiti Pendidikan Sultan Idris
35900 Tanjong Malim, Perak.

Catatan: Jika Tesis/Disertasi ini **SULIT** @ **TERHAD**, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan ini perlu dikelaskan sebagai **SULIT** dan **TERHAD**.

Notes: If the thesis is CONFIDENTAL or RESTRICTED, please attach with the letter from the organization with period and reasons for confidentiality or restriction.

ACKNOWLEDGEMENT

Alhamdulillah, thanks to Allah with His grace and permission, this dissertation can be completed. My deepest gratitude to the supervisors Dr. Jaffry Zakaria and Professor Dr. Nur Ikhwan Mohamad who have provided guidance, encouragement, and guidance in completing the dissertation process. Furthermore, this appreciation is also extended to those who have assisted in the process of collecting data and study materials, developing instruments, and research documentation directly or indirectly. This dissertation is specially dedicated to my Mama Jamaliah Abdul Rahman and Abah, Mohd Aznan Abd Rahman, mother, and father-in-law, Rabinah and Baseri, my siblings Emilda, Ezil, Edri and Eqwa who never stopped praying for success from the early stage of the journey towards the end, and subsequently my beloved husband Muhamad Faidhi Baseri who has been very helpful in managing our little family during the dissertation writing process. Special thanks to my daughter Fadhwa Esshal who had been together with me during the preparation for my pre-Viva up to the final stage of writing, you are my motivation, and you are the reason I am moving forward. Not to be forgotten for the people who have always been supportive and together during the volatility of this journey, Dr. Nurul Aizan, Dr. Harris Kamal, Dr. Ahmad Dzulkarnain, Mrs Wan Nur Shalina, Ms Hajar Asmidar your dearest support, your sacrifices, your prayers, and your words of wisdoms had always been the most essential foundation of this dissertation completion. To my fellow friends from the faculty, Mrs Masshera, Mrs Norfaezah, Mrs Nurul Afiqah, Mrs Nurul Hidayah, Mrs Siti Jameelah Md Japilus, Ms Jamilah, Mrs Siti Hannariah, Dr Khor Poy Hua, Mr Tham Yin Choong, Tn. Syed Shahbudin, Ms. Nuraimi, Dr Ahmad Faridz, Dr Nurul Farha, Mr Azim, Mr. Khairulanwar, Mr. Mohd Syafiq, Mr. Mohd Firdaus, Mr. Al Hafiz, Mrs. Fatin Nazieffa thank you for always being helpful and understanding during the journey. My special gratitude for Ms Siti Syahirah Aqilah who had given her time and positive vibes and energy throughout the writing process. To Dr. Ahmad Fikri, who had always given me the morale support and wise advice since the very beginning of the journey, thank you is never enough as you do not know how much he support means to me and my fellow friends in enduring this journey, and of course to my dearest students from Faculty of Sports Science and Recreation Perlis Branch that always give encouragement and prayers, because without all this I would not be able to complete this dissertation. To the main character for this completion, dear self, thank you so much, for staying in, staying up more importantly thank you for not giving up nor losing hope, you had completed the challenged and unlocked another chapter of life. Thank you so much, Allah had blessed me in a very beautiful way, alhamdulillah.

ABSTRACT

Essentially grading system allows for the identification of safety and quality provided. Presently, no specific grading system for fitness facilities in Malaysia is available to be used. This study aims to develop and test a grading system for fitness facilities in Malaysia. Systematic review and meta-analysis were used to determine the criteria for the grading system instrument. Items developed were tested for validity using *Exploratory Factor Analysis (EFA)* and *Confirmatory Factor Analysis (CFA)*. *Test-retest* analyses were used to determine reliability. 174 fitness facilities in the central region of Malaysia, including Kuala Lumpur, Selangor, and Putrajaya, were approached to reveal the level and graded the fitness facilities accordingly using the newly developed grading scale, the *Malaysian Fitness Facilities Grading Scale (MFFGS)*. All items were validated with factor loading for *EFA* at >0.5, considered valid for newly developed items, and factor loading for *CFA* at >0.6, which is acceptable and significant for newly developed items. 30 derived from 5 main criteria have been identified and inserted in the newly developed fitness facility grading instrument. The reliability test results were indicated as follows; overall, items constructed had indicated a *Cronbach Alpha* of (*α= .977).* While for each of the reliability criteria, the results were as follows*, Human Resource Management* (*α= .891), Facility Development (α= .899), Facility Administration (α=935), Safety and Risk Management (α=.901), and Information, Communication, and Technology (α= .946).* All the results proved that the items were significantly reliable, with *Cronbach alpha* >0.80. The grading scale revealed that out of 174 fitness facilities, 54 were graded with A, 110 with B, and 10 with C. In conclusion, all the 30-items grading scales developed are significantly reliable and valid tools for evaluating fitness facilities and help in grading the fitness facilities in the central region of Malaysia. The findings also indicated that the fitness facilities grading scale could assist the fitness facilities operators, especially in Malaysia, in improving the services and safety and risk management.

Keywords: grading scale, fitness facilities, safety, and risk management

PEMBANGUNAN SISTEM PENGGREDAN DAN PENGURUSAN RISIKO BAGI FASILITI KECERGASAN DI MALAYSIA

ABSTRAK

Pada asasnya sistem penggredan dapat membentuk sebuah sistem yang selamat dan berkualiti. Sehingga kini tiada sistem penggredan khusus untuk kegunaan kemudahan kecergasan di Malaysia Kajian ini dijalankan bagi membangunkan dan menguji sistem penggredan bagi kemudahan kecergasan di Malaysia. Kajian sistematik dan meta-analisis digunakan untuk menentukan kriteria bagi item sistem penggredan yang dibina. Item yang dibangunkan telah diuji kesahan menggunakan *Exploratory Factor Analysis* (EFA) dan *Corfirmatory Factor Analysis* (CFA). Analisis *test-retest* digunakan dalam menentukan kebolehpercayaan. 174 fasiliti kecergasan di wilayah tengah Malaysia termasuk Kuala Lumpur, Selangor dan Putrajaya telah dilibatkan bagi mengukur aras dan digredkan menggunakan sistem gred yang telah dibina iaitu Malaysian Fitness Facilities Grading Scale (MFFGS). Semua item telah disahkan dengan pemuatan faktor >0.5 bagi analisis EFA yang dianggap sah untuk item yang baru dibangunkan, dan pemuatan faktor >0.6 untuk CFA bagi memastikan kesahan untuk item yang baru dibangunkan. Tiga puluh item yang diperoleh daripada 5 kriteria utama telah dikenal pasti dan dimasukkan ke dalam instrumen penggredan kemudahan kecergasan yang baru dibangunkan. Keputusan ujian kebolehpercayaan ditunjukkan seperti berikut; item keseluruhan yang dibina telah menunjukkan *Cronbach Alpha* sebanyak (α= .977) manakala bagi setiap kriteria, keputusan kebolehpercayaan adalah seperti berikut, *Human Resource Management* (α= .891) , *Facility Development* (α= .899), *Facility Administration* (α=935), *Safety and Risk Management* (α=.901) dan *Information, Communication and Technology* (α= .946). Kesemua keputusan membuktikan bahawa item yang dibangunkan adalah boleh dipercaya dengan *Cronbach Alpha* >0.80. Selain itu menggunakan sistem gred yang telah dibina daripada 174 fasiliti kecergasan yang terlibat, 54 telah dinilaikan dengan Gred A, 110 dengan gred B dan 10 dengan Gred C. Sebagai kesimpulannya, skala penggredan 30 item yang dibangunkan adalah alat yang boleh dipercayai dan sah untuk penilaian kemudahan kecergasan. Hasil dapatan juga mendapati bahawa sistem gred yang telah dibina, disahkan dan digunakan mampu untuk memberikan panduan kepada pemilik fasiliti kecergasan dalam meningkatkan tahap perkhidmatan, keselamatan dan pengurusan risiko.

Kata kunci: skala gred, fasiliti kecergasan, pengurusan keselamatan dan risiko

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ACSM	America College of Sports Medicine
AFIRM	The Australian Fitness Industry Risk Management
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis
FA	Facility Administration
FD	Facility Development
FGD	Focus Group Discussion
HRM	Human Resource Management
ICT	Information, Communication and Technology
IPTA	Institut Pengajian Tinggi Awam
KPM	Kementerian Pengajian Tinggi
MFFGS	Malaysian Fitness Facility Grading Scale
SEM	Structural Equation model
SPSS	Statistical Package for Social Sciences
SRM	Safety and Risk Management

APPENDIX LIST

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter summarized the background of study of each sub-theme including the fitness activity, fitness trends, facility management, theory of risk management and grading system. This chapter also include the problem statement, research objectives and questions, significance of stud, delimitation and as well as the operational definition. The chapter aimed to explain in general the subtopic in relation to the study conducted.

1.1.1 Fitness Activity

Life is meaningful by having a physically and mentally healthy and fit body. Through the statement, it was proven that nowadays people are engaging in physical and fitness activity. The public are becoming aware upon the effect and the benefits of engaging in fitness activities (Feito, Heinrich, Butcher & Poston, 2018; Malm, Jakobsson, & Isaksson, 2019).

The most important note is that the public are also aware that by engaging in physical and fitness activity, they had minimized the chances in experiencing any serious diseases especially related to cardiovascular system (Piercy, Troiano, Ballard, Carlson, Fulton, Galuska, & Olson, 2018). The public had undergone the phenomenon scene by living a physically active and fit lifestyle (Jankowska,2021).

Being physically active may resulted in preventing serious diseases where it was proven that most of the inactive person are more likely exposed to hypokinetic diseases compared to the active person (Boguszewski, Ochal, Adamczyk, Jasiński, Obszyńska-Litwiniec, & Białoszewski, 2021; Peçanha, Goessler, Roschel & Gualano).

In addition, physical activity was also demonstrated a high correlation in controlling the hypokinetic disease where it has been effectively relieving hypokinetic conditions such as diabetes, heart-attack, backpain and many more (Bird, 2019).

Physical activity is defined as “bodily movement caused by skeletal muscle contractions that significantly increases the amount of energy expended” (Piggin,2020; Troosters, Blondeel, Rodrigues, Janssens, & Demeyer, 2019)

There are countless benefits by participating in a physical activity, for instance it may increase a person's health conditions, minimize the exposure towards chronic disease and increase a person's emotional intelligence level (Ali, 2018).

Jago, Salway, Emm-Collison, Sebire, Thompson, and Lawlor (2020) also points out that, the physical activity also varies and suitable to be participated by children, adolescents, and older adult, which means that there is no restriction in performing physical activity.

Commonly, there are two most reliable scene in defining and explaining the increment in physical and fitness activity which were the demand for fitness tracking applications and gears and as well as the numbers of fitness facilities built and developed. Alqhatani (2021) mention that the number of mobile applications, fitness tracker and wearable fitness gears were highly demanded, and this was significantly related towards the awareness upon the importance of physical and fitness activities.

Commercial fitness trackers such as Fitbit, Polar, Apple Watch, Samsung Gear Fit, and Jawbone are becoming more popular, with an estimated 19 million "connected wearables" purchased in 2014, up from 5.9 million in 2013 and a significant increase expected by 2019 (Asimakopoulos, Asimakopoulos, & Spillers, 2017).

Fitness trackers and wearable apps capture a wide range of information, including exercise levels and quality, sleep, steps taken, heartbeat, breath quality, water consumption, and even meditation and mood monitoring.

Users utilise them to gain feedback on movement, sleep, and eating in general (Asimakapoulos.et al, 2017; Lee, Han, Cho, Chung, Hong, Lee, & Carroll, 2019). The publics were excited to track their fitness performance by using the mobile applications and wearable gears (Bardus, Borgi, El-Harakeh, Gherbal, Kharroubi, & Fares, 2021).

A report by Thompson (2018), shown that, from the 20 top worldwide fitness trends in 2017, on the top is the wearable technology, which is align with a study conducted by Asimakapoulos.et al (2017) which mentioned that there was high demand for mobile applications and wearable gears.

1.1.2 Fitness Trends

Just like the demand for the mobile applications and wearable gear, the evolution of fitness facilities was also apparent to be high this can be demonstrated through the revenue report by the International Health, Racquet and Sportsclub Association (IHRSA) reports in 2016 to 2019.

The global health club sector generated $83.1 billion in sales in 2016, with 162.1 million members visiting 201,000 clubs (De Lyon, 2018). With a total revenue of 27.6 billion dollars, the United States of America (USA) leads the health and fitness business. (Yearby, 2018).

According to an IHRSA research from 2017, worldwide health club business sales was $87.2 billion US dollars, which was predicted in 2017. (IHRSA, 2019).

This is a year-on-year increase of 4.1 billion dollars. In 2018, it was estimated that around 40,000 fitness centres were visited by over 6 billion people. As a result, revenue increased to 32.3 billion US dollars in 2018, up from 30 billion US dollars in 2017, resulting in a 7.8% increase in the number of raises (IHRSA, 2019).

In 2018, it was also reported that more that 71 million people visited health club in the United States, which is a new record for IHRSA ever since the tracking of health club since 1987, the total number of the individual members were also increased by 2.6 % which make the total is 62.4 million U.S dollar compared to 60.9 million U.S dollar in 2017 (IHRSA, 2019). This phenomenon can also be seen in the Asian country, fourteen markets in the Asia-Pacific region combine to attract 22 million members at more than 25,000 health clubs. Total revenues in 2018 are an estimated 16.8 billion U.S dollar (IHRSA, 2019).

The report by IHRSA 2018 also shows signs of rapid growth and professionalization in Hong Kong (5.85%), Singapore (5.8%), and Japan (3.3%), opportunities for growth remain in the Philippines (0.53%), Thailand (0.5%), Indonesia (0.18%), and India (0.15%) (IHRSA, 2019).

Correspondingly, Malaysia was not excluded from this evolution of fitness industry. According to the Department of Statistic Malaysia, the total revenue the area of arts, entertainment, sports, and recreation for 2017 is RM 20 billion which had been increased from RM 15.8 billion in 2010.

Consistently, Teik (2015) stated that Malaysian are now aware of the need to stay healthy in a stressful environment which seemingly to be happening nowadays. Through the experience and in contrary to the issue, more Malaysian are involving and getting into the fitness industry, they are engaging in the physical and fitness activities specifically by the increment in the gym membership (Ong & Yap 2017). In addition, the fitness industry in Malaysia had becoming a battlefield with the evolution of fitness centres and fitness facilities (Teik, 2015).

Concerning to the previous statement, Yusof, Joseph and Shah (2017) mentioned that Malaysia health and fitness industry had a tremendous growth especially in interest and participation. In addition, report by Statista also shows that the revenue for 2018 in fitness industry for Malaysia is worth to 40 million U.S dollars and was expected to increase by 12.1% in 2022 which will be summed up to 63 million U.S dollars (Kinda, 2019).

1.1.3 Facility Management

Fitness centres can be defined as the central attention for the public that enables the usability of the facilities and equipment provided to improve one's health condition (Rimmer, Padalabalanarayanan, Malone & Mehta, 2016).

Fletcher, Landolfo, Niebauer, Ozemek, Arena, and Lavie (2018) also mentioned that fitness facilities may be beneficial to those with physically mobile and able to walk in fulfilling the basic requirement or standards for any regular activity held in each fitness center.

The fitness and sport facilities were also known as a complex and heterogeneous buildings which are unique in their kind, for energy consumption, used materials, comfort requirements (Fantozzi, & Lamberti, 2019).

By understanding the definition of fitness centers or fitness facilities it helps in understanding the criteria in developing a good fitness facility. Setting up a new facility would not be an easy task, as there are many criteria and requirements that need to be fulfilled.

There are five main attributes in developing a good fitness facility which include, human resource management, facility development, facility administration, safety and risk management and lastly the information, communication and technology (Potkany, Vetrakova & Babiakova, 2015; Isa, Kamaruzzaman & Mohamed, 2019; Atobrah, Frimpong-Asante & Attah, 2021). All these attributes must be understood and applied in developing a new fitness facility. Added to that, facility management service is also important for any new or existing fitness facility (Fried & Kastel, 2020). Facility Management service delivery seeks to provide the most cost-effective services possible in order to maximize asset usage and ensure their long-term durability for the benefit of the property owner (Atkin & Bildsten, 2017).

Furthermore, Atkin and Brooks (2021) stated that the facility management role is crucial because it may assist in seeing beyond the physical structure, which can help to improve the environment and productivity. Facility management is an interdisciplinary profession that focuses on the upkeep and care of structures such as hotels, resorts, schools, office buildings, sports arenas, and conference centres (Bagshaw, & Peters, 2015)

Wahed (2018) also listed the responsibilities in the facility management sector, which included air conditioning, electric power, plumbing, lighting, cleaning, décor, grounds maintaining, and security.

Because of the advent and evolution of the fitness industry, sports facility legislation is quite diverse and depends on a variety of criteria, including the state organization and the intended use of the facilities. Sports facilities, according to Yazawa (2021), are generally multifunctional buildings that may be utilized for a variety of sports while also being used for other reasons such as recreational or leisure activities.

Furthermore, according to Rozenberg and Fay (2019), different countries have diverse ways to operating and maintaining infrastructure. Local governments, schools (both public and private), and private sector business entities, which include sporting groups or various commercial operators, operate and maintain the majority of sporting facilities (Jakar, Razin, Rosentraub, & Rosen, 2018). This issue was also linked to the newly created workout facilities.

The facilities must be maintained in accordance with the legal requirements. Without a doubt, the most important aspects of sport surroundings are safety and quality, which should not be overlooked. Regulations and monitoring systems should be in place to ensure safety and quality in sporting situations (Boustras & Waring, 2020). The topic of facility management was not a major concern in Malaysia because society's understanding was minimal (Kamaruzzaman, Myeda, Zawawi, & Ramli, 2018).

In response to the preceding statement, a series of damages to the building have occurred as a result of a lack of facility management knowledge, including water pipe leaks, sewage blockage, and limited air ventilation. This is a critical circumstance since it can lead to sliding, falling, injuries from accidental items, sore throats, flu, and pain (Donaldson, Callaghan, Bizzini, Jowett, Keyzer, & Nicholson, 2019).

As a result, a standard grading or classification system is required to ensure that the danger is reduced and that the facilities maintain a high quality for a positive image and reputation (Mmutle, & Shonhe, 2017; Tran, 2015). Various means to investigating individual wellbeing have been created over time, such as data collection via questionnaires or monitoring techniques, in order to analyze the reciprocal impact of microclimate, environmental conditions, and clothing on physical activity (Clarsen, Bahr, Myklebust, Andersson, Docking, Drew, & Verhagen, 2020; Zhou, Bao, Watzlaf, & Parmanto, 2019).

Interviews, the use of maps, and blog focus groups were used to assess the perception of indoor building quality, such as schools or sports facilities (Sant'Anna, Dos Santos, Vianna, & Romero, 2018). Several states in the United States of America (USA) have rules on non-industrial areas' exposure to indoor pollutants.

The Centers for Disease Control and Prevention (CDC), the Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency have all released recommendations for prevention and treatment (EPA) (Parr, Whitney & Barkelman, 2015).

In addition to the pertaining issue, China's Ministry of Construction and the China State Quality Supervision, Inspection, and Quarantine Administration (SQSIQA) issued the "Code for Indoor Environmental Pollution Control of Civil Building Engineering" (GB 50325-2001), which lays out comprehensive IAQ standards (Parr et.al, 2015).

Furthermore, China had also issued a new national design code for indoor air environment of sports buildings, which established guidelines for indoor airflow in sports buildings in China, including parameters such as air velocity, temperature, humidity, and fresh air volume replenishment in gyms and pools (Cianfanelli, Valeriani, Santucci & Giampaoli, 2016).

Consequently, various aspects to ensure a high level of security, including the characteristics of the emergency space, exits, seating, changing rooms, electrical system, structures and furniture, fire regulations, and other standards (Kelly, Bailey, Aldrige, Brennan, Hardy, Henrys & Taft, 2021).

As a result of this, it is critical to have a standard operating system in place to ensure that the constructed facility can be categorized as a safe and secure facility for public use (Rozo, Arellana, Santander-Mercado & Jubiz-Diaz, 2019).

1.1.4 The Theory of Risk Management

To reduce or minimize the risk, a proper fitness facility is required. Previously, risk was separated into two diverse facades which are chance and danger (Carretero-Ayuso, & Sáez-Pérez, 2021).

Chance is focusing more on the probability and danger is related to the severity of the harmful consequences (Carretero-Ayuso et.al, 2021). This statement was supported by Tong, Zhai, Jia, Wu, Liu and Xue (2018) which stated that risk was characterized by the uncertainty and unpredictability. Consequently, risk may occur during the physical activity performed at any sport or fitness facility which requires the process of identifying the risk factor (Tong et al, 2018).

However, not all risk factors can be quantified or measured hence, a good preparation and management is needed in handling and mitigating the risk. Accordingly, there are several theories of risk management that can applied in determining and understanding the risk and the risk factors.

Rendering to the Heinrich's Domino Theory (1931), this theory suggest that accidents or injury befall due to five main interdependent factors which include, social environment, the fault of a person, hazard, accident and injury.

The theory explained by sequence on how the injury will occur through the concept of domino fall. In this theory as well, Heinrich (1931) also mentioned that the accident and injury can be stop or minimized by excluding one or two of the main factors.

Other than the Domino Theory, another theory that can be use in understanding and managing risk is the Farrell's Human Factor Theory (1977), compared to Heinrich's theory, this theory suggest that the accident or injury were directly caused by human factor.

Farrell (1977) then classifies the causes of accidents into 3 category which are, overload, incompatibility, and improper activities. Each of the categories were explained specifically.

Improper activity was the simplest concept of injury or accidents occurrence which explained by two sources of accidents (DeCamp, 2016). First, the responsible person might not know the consequence of the particular action and second, they had already known the consequences, yet they choose to take the risk. Next is the incompatibility which incorporates the inappropriate response towards a situation by an individual and the environmental characteristic (DeCamp, 2016).

The last cause which is the overload is the most complex cause in Farrell's theory. It can be separated into three subcategories which include the emotions of the responsible individual, the physical and educational background of the individual and lastly the capability of the individual especially in completing assigned task (DeCamp, 2016).

An extended study was developed by Heinrich, Petersen and Roos (1980) had developed another theory describing risk which is the Petersen's Accident Theory. In this theory, Petersen had suggested another three main causes of risk and accidents.

The first cause is related to the incompatibility of the environment which include the workstation design, display and control he named the first cause as the ergonomic traps.

The second factors are the logical decision by the individual which can be affected by the current situation faced by the individual, unconscious feelings, or any psychological faults. The last factors are the system failure where Petersen mentioned that the incapability of the management to fix the error may lead to the accidents.

The shocking news upon 2020 is definitely the outbreak of pandemic COVID 19. Without warning, the outbreak of a new SARS-CoV-2 known as COVID 19 astounds the whole world (Clarke, 2021). SARS-CoV-2 is a highly contagious novel coronavirus disease that produce an acute respiratory syndrome epidemic (Bchetnia, Girad, Duchaine & Laprise, 2020).

Between January and April 2020, the epidemic morphed into a global pandemic, spreading from its beginning in Wuhan, China to almost every country on the planet. COVID-19 has killed over 126,000 individuals worldwide as of April 14th, 2020. The World Health Organization designated the epidemic a "public health emergency of worldwide significance" on January 30th, 2020 (Howard & Utton, 2020).

As the number of people dying from the disease climbs around the world, it's more crucial than ever to understand how people think about it, the government reactions currently range from social separation and hygiene guidance to complete community lockdowns (Kareem, 2020). These safeguards are designed to keep national health systems from being overwhelmed by an unexpected influx of cases (Stephens, 2021).

However, we know from previous pandemics that public perceptions of personal and societal risk factors are critical to the success of programs aimed at slowing the spread of a highly contagious disease and most of the economy sectors were affected including the sports and fitness industry (Kareem, 2020). On top of this, adapting to the current situation all new or the existing fitness facilities developers and owners should take this issue into consideration.

1.1.5 Grading System

Subsequently ranking or grading can be very essential, especially when it comes to the public's life and safety.

Grading schemes have become a popular way to convey the quality of public services accessibly and concisely (Meltzer, Rothbart, Schwartz, Calabrese, Silver, Mijanovich and Weinstein, 2015).

According to Walker, Yeung, Lee and Lee (2020), the grading system is an example of a good information-based policy targeted at influencing and persuading a user's specific behaviour or direction, either directly or indirectly. According to Meltzer et. al. (2015), grading also conveys information about the quality of services or goods, such as policies, public education, and public health.

Furthermore, this grading system will aid in the improvement of service and product quality, as an example, many school districts assess public schools on their efficacy particularly, gains in test scores and other metrics and make these marks public (Baharun, Mundiri, Zamroni & Jannah, 2021). Most of the research focuses on the differences in grades and how this differentiated information influences educational outcomes (Aziz, Mahmood & Rehman, 2018).

Likewise, past research has indicated that the grades that are made public generate an increase in the student's achievement (Fitzpatrick, Berends, Ferrare, & Waddington, 2020). As a result, grading methods are frequently used in agricultural markets to classify mixed-products simply and disseminate information to clients (Liu, Zhou, Chang & Lin, 2020). Despite this, communities all around the United States employed the grading system for nearly everything, including public schools, street cleaning, and even subway train lines (Bonny, O'Reilly, Pethick, Gardner. Hpcquette & Pannier, 2018).

The grading system was documented on a report card, and each town was given a ranking. As time passed, the significance of the grading system was recognized and applied to a broader range of issues, including service quality and public safety (Sepula, Kieti, Korir, Isabella & Bello, 2018).

As a result, it's possible that the identical procedures were used. As the fitness sector evolves, the requirement for a consistent grading system becomes increasingly important. It is critical to have specialists in each area, including facility or building contractors, risk management specialists, the governing body for buildings and facilities, and stakeholders, while designing the standard grading system for fitness facilities in Malaysia.

Aside from that, the results of the previous study will be used to determine the most critical factors in grading or designating fitness facilities as standard and safe public facilities. As a result of governments' preventative health programs, fitness facilities can now be considered as an essential contributor to economies on a global scale.

Importantly, the Medical Fitness Association (MFA), a nonprofit professional membership organization whose mission is to ascertain and respond to the needs of medically integrated centres around the world, publishes medical fitness standards and guidelines for medical fitness centre facilities (MFCF) that can be purchased, as well as a Medical Fitness certification for facilities that follow these standards and guidelines (De La Torre, Spruijt-Metz, & Farias, 2021)

As a result, it is critical that they can protect their users' health and safety in the event of an emergency under appropriate work health and safety (WHS) regulations (Norton, Dietrich, Coyle, Gray, & Finch, 2018). As a result, there are a variety of risk management approaches, standards, guidelines, and specifications that can be used in risk assessment and management (Shamala, Ahmad, Zolait & Sedek, 2017).

Most techniques, according to Shamala et al., (2017), will prescribe a similar process that includes creating a scope of assessment, gathering information, producing intermediary information, and measuring and classifying items such as hazards and risk according to the set-up criteria. These features were crucial since they might serve as recommendations for all fitness facilities in terms of creating a safe atmosphere for the public or clients (Shamala et.al, 2017).

In relation to risk management, risk analysis will be necessary, which can include the consumer, equipment, and facilities, and risk analysis will also be essential in developing a better solution for a risk occurrence (Lathrop & Ezell, 2017). On the other hand, despite having a risk management strategy and a risk analysis, it is still critical to establish an evacuation plan.

While an evacuation plan is typically used in the event of a natural catastrophe, it should also be included in the emergency plan for fitness facilities. Amideo, Scaparra and Koiadis (2019) suggested an interdisciplinary strategy for evacuation modelling that included input from social scientists, transportation planners, and engineers in discussing the need of evacuation planning.

The above statement was backed up by Åman, Forssblad, and Henriksson-Larsén (2014), who stated that a solid surveillance system is needed to examine the risk factors and mechanisms, as well as that sport injury prevention guidelines must be followed. When it comes to dealing with or managing risk, we should also be prepared to face the consequences of being a part of it.

As a result, it was suggested that each and every fitness facility, as well as the individual themselves, should be prepared by having their own medical care, medical expenses, and insurance (Kumar, Krishnamrthi, Nayyar, Sharma, Grover & Hossain, 2020). To examine the risk variables and mechanisms, a robust surveillance system is essential; however, most nations lack a standard sport injury surveillance system for medical coverage or injury treatment (Kerr, Comstock, Dompier & Marshall, 2018).

According to Gamage, Kountouris, Finch and Fortington (2020), due to the variety of injuries, each fitness facility should have at least one medical officer to diagnose the injury, as all of this information is required if the client wishes to file an insurance claim. Aside from that, the customer should be able to determine their amount of injury (Gamage et.al, 2020).

Aside from that, comprehensive medical team and medical coverage planning should be done. Injury inspection accessibility, as well as appropriate inspection areas, should be incorporated in the medical coverage plan, particularly in fitness facilities, relatively, emergency transportation, such as an ambulance, should also be available because the injury is particularly unpredictable (Sanders & American College of Sports Medicine, 2018).

To summarize, this study aims to develop and test the grading system for fitness facilities in Malaysia due to the evolution of fitness facilities in Malaysia and the growth in the number of Malaysian engaged in fitness activity. Undoubtedly, this study aided in standardizing the minimal safety regulations that each fitness facility must adhere to. Most importantly, it will help educate the fitness facility operators in providing a safe and excellent quality facility for the user's use.

1.2 Problem Statement

Escalante and Gentry (2020) in a survey proved that shoulder and knee injuries were the most common suffered injuries among the beginner participating in the physical activity at the fitness facility. In the survey, the rate of injury shows and increment with 56.1% which is higher thana survey did in 2018 and 2019 with rate of 38.8% and 43.1% respectively (Escalante & Gentry, 2020).

Additionally, Gray and Finch (2015) stated that, very few study had been conducted in determining the compliance of a fitness facility especially on the investigation of injuries suffered from the use of fitness facility and equipment.

Moreover, even fewer studies had given attention to the unreliable and poor quality of a fitness facility in term of the causes of the injuries at fitness facility (Gray & Finch, 2015; Ekstrand, Lundqvist, Davidson, D'Hoghe & Pensgaard, 2019; Warren, Lininger, Chimera & Smith, 2018).

Grading and rating system had been proven to be a helpful system for a facility user in determining a good quality and excellent services provided (Wong, McKelvey, Ito, Schiff, Jacobson & Kass, 2015; Moore, Potter, Blankshain, Kaplan, O'Dwyer & Sullivan, 2018). Rating or grading system had impacted the industry positively in terms of maintenance of the minimum standards especially in the hospitality industry (Xia, Vu, Law & Li, 2020)

However, in the fitness industry, there has yet to be a specific measuring tool for fitness facility quality assurance has been developed (Moran, 2014). Consequently, equipment maintenance and monitoring assessment tools are also limited, which somewhat leads to a high risk of injury among the facility user in the sports and fitness industry (Cianfanelli, Valeriani, Santucci, Giampaoli, Gianfranceshi, Nicastro & Spica, 2016). Additionally, there need to be more existing tools to determine the risk and management, especially towards fitness facilities. Moreover, the tools and instrumentation developed needed to be more specific and focused on assessing risk.

Therefore, this study significantly focused on risk management in a fitness facility. This study was conducted to develop a specific measuring and grading system assessing the risk and management at the fitness facility. Moreover, this study also helps shape a standard grading system in determining the level of quality compliance in providing a safe and conducive environment for fitness facility users in Malaysia.

1.3 Objectives of Study

The purpose of this study to develop and evaluate the grading system for the fitness facilities here in Malaysia as it will surely help in standardizing the minimum or the safety requirements that need to be followed and applied by each of the fitness facilities. Hence, to attain the purposes there are four objectives developed which are:

RO1: The study to determine the current available literature of overall criteria of a good fitness facility

RO2: The study to determine the items needed in a holistic fitness facility grading system, based on needs, requirements and wants of related by-laws and clients.

RO3: The study to develop and assess reliability and validity of newly developed grading system for fitness facilities.

RO4: To evaluate Malaysian Fitness Facilities using newly developed fitness facilities grading system.

1.4 Research Questions

Keeping in view the above objectives, there are four research questions that have been raised which are:

RQ 1. For study one, the research question is, what is the current available literature on the overall criteria of a good fitness facility?

RQ 2. For study two, the research question is, what items are needed in a holistic fitness facility grading system based on the needs, requirements, and wants of related by-laws and clients?

RQ 3. For study three, the research question is, what will be the reliability and validity of the newly developed grading system for fitness facilities?

RQ 4. For study four, the research question is, what will be the level of Malaysia's fitness facility based on the developed fitness facilities grading system?

1.5 Significance of Study

This study aimed to develop and test the grading scale, the Malaysian Fitness Facilities Grading Scale (MFFGS), and assess the level of fitness facilities focusing on the central region of Malaysia.

This study benefits the fitness facility user who aims for a safer and more comfortable environment during activity engagement. This study also provides guidelines and standard requirements that need to be fulfilled by the fitness facilities operators in delivering their services.

Additionally, this study also helped improve the current fitness facilities operators involved in the study to understand and identify their grades based on the assessment using the MFFGS and improve the services provided to achieve the minimum requirement.

1.6 Delimitations of the Study

Like any other study, this study also has delimitation in the completion process. This study focuses on Malaysian fitness facilities.

In completing the study (4), the items needed to develop a good fitness facility were derived from the ministry representative, fitness industry representatives, academicians in fitness facilities, and stakeholders.

Thus, the resources were based in Putrajaya, Selangor, and Wilayah Persekutuan, as all the ministry and most fitness facilities were based in Putrajaya, Selangor, and Wilayah Persekutuan. The focus of the fitness facilities grading scale developed is the fitness facilities in Malaysia. This study focuses on the central region. Based on the Companies Commission of Malaysia report in 2019, 750 fitness facilities were registered in the central region of Malaysia, and it was the highest number compared to the other region in Malaysia.

This study uses a mixed methodology consisting of quantitative and qualitative methodology due to the compatibility of assessing and quantifying the data.

1.7 Operational Definition

1.7.1 Malaysia Fitness Facilities Grading Scale (MFFGS): Research-based grading scale or instruments to assess quality and safety level of fitness facilities in Malaysia with 30-items constructed including 5 main constructs which are human resource management (5-items), facility development (6-items), facility administration (7-items), safety and risk management (7-items) and information, communication and technology (5-items) which were developed by the researcher throughout the study.

1.7.2 Fitness Facility: Facility built with the proper space and equipment for physical and fitness activities (Hasson, Sallis, Coleman, Kaushal, Nocera & Keith, 2020)

1.7.3 Human Resource Management: Management personnel for employees' welfare and recruitment (Meijerink & Keegan, 2019)

1.7.4 Facility Development: The facility interior and exterior design and equipment arrangement (Heragu, 2018).

1.7.5 Facility Administration: Management personnel for customers service quality (Heragu, 2018)

1.7.6 Information, Communication and Technology: The ability and usability of technology in reaching for the customers (Russ & Salem, 2018).

1.7.8 Risk: The unpredict and uncertain errors that lead to injury or harm (Kasapoğlu, 2018)

1.7.9 Risk management: coordinated activity to direct and control an organization with regards to the risk (Kasapoğlu, 2018)

1.7.10 Emergency policy: capacity to respond to and recover from any emergency situations despite health and safety also include the broader health system and community (Peters, Hanssen, Gutierrez, Abrahams & Nyenswah, 2019)

1.7.11 Fitness Industry: operators that manage fitness and recreational sports facilities, as well as produce and provide programs, services, and fitness equipment (Pradeep, Vadakepat & Rajasenan, 2020)

1.7.12 Facility Management: management concept aimed at getting a building, structure or facility to serve effectively the purpose for which it is intended (Sacks, Eatman, Lee & Teicholz, 2018).

1.7.13 COVID-19: Novel coronavirus disease that produce an acute respiratory syndrome (Acter, Uddin, Das, Akhter, Choudhury & Kim, 2020).

1.8 Summary

This chapter explained upon the background of this study while stating the importance in developing it. This study has it owns specialty where it was focusing on the most evolved industry world widely and now expanding to the Asians country specifically Malaysia. Nevertheless, this study has a purpose in developing a standard procedure in grading the fitness facilities in Malaysia as an alternative platform to provide a safety environment to the public and the users of the facilities.