THE DEVELOPMENT PATHWAY OF MALAYSIA YOUTH BASKETBALL PLAYERS

LEE ZHI HANG

SULTAN IDRIS EDUCATION UNIVERSITY

2022

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ABSTRACT

The study was aimed to understand the development pathways of Malaysia youth basketball players and examine the existence of relative age effect (RAE) in MSSM basketball tournament. Participants selected from the groups of top 3 successful performed (n=72) and bottom 3 unsuccessful performed (n=72) U18 boy and girl teams from the MSSM basketball tournaments and data collected through modified Participation History Questionnaire (PHQ). The milestones achieved, and types of activities engaged by all athletes were collected. ONE-WAY ANOVA used to analyze the milestone achieved, compared them within the successful and unsuccessful performed group. Factorial ANOVA were used to analyze type of activities involved according to their age and compared within the successful and unsuccessful performed group. Non-parametric *Kruskal-Wallis* test used to analyze their involvement in other sports. No significant different for milestones achieved for both groups. All successful groups accumulated significantly higher amount of time in basketball related activities, structured (i.e., deliberate practice, coach led practice session, individual practice, match) and unstructured (i.e., playing with friends). All groups accumulated higher amount of time in structured activities throughout the development process but not the U18 bottom 3 unsuccessful performed girl teams, collection the same amount of time in structured and unstructured activities while involved in more other sports. Early engagement development pathway were suggested for Malaysia youth basketball players. The date of birth of MSSM basketball athletes (n=636) were obtained from MSSM tournament database. Chi-squared test (χ^2) and standardized residuals reveal the existance of RAE for the U18 and U12 categories. Participants born in Q1 were overrepresented except U18 girl teams, but participants born in Q4 were underrepresented for all four categories. The RAE exists during selection for Malaysia youth basketball players.

POLA LALUAN PERKEMBANGAN PERMAIN BOLA KERANJANG REMAJA MALAYSIA

ABSTRAK

Tujuan kajian ini dijalankan adalah unutk mengenal pasti pola laluan perkembangan permain bolakeranjang dan juga mengenalpasti kewujudan kesan umur relative di kalangan permain bolakeranjang di peringkat MSSM. Data bagi kumpulan B18 pasukan lelaki dan perempuan yang telah berjaya mencapai kedudukan tiga teratas dan kumpulan yang mencapai kedudukan tiga terbawah dikumpul dengan instrumen soal selidik *Participation History Questionnaire* yang telah diubahsuai. Data tentang umur sasaran pencapaian permain disbanding antara kumpulan yang berjaya berprestasi dan yang tidak berjaya berprestasi dengan ANOVA sehala. Faktorial ANOVA diguna untuk menganalisis jenis aktiviti yang dilalui oleh permain (aktiviti struktur dan tidak berstruktur) mengikut julat umur diantara kumpulan. Ujian Kruskal-Wallis bukan parametrik diguna untuk menganalisis penglibatan atlet dalam sukan lain. Kumpulan yang berjaya berprestasi di peringkat MSSM mengumpul jumlah masa yang lebih tinggi dalam aktiviti berstruktur (latihan dengan jurulatih, latihan kendiri dan pertandingan) dan tidak berstruktur (bermain dengan kawan). Semua kumpulan menunjukkan pengumpulan masa yang lebih tinggi dalam aktivit berstruktur berbanding aktiviti tidak berstruktur selain kumpulan U18 pasukan perempuan yang tidak berjaya berprestasi yang tidak menunjukkan perbezaan. Kumpulan U18 pasukan perempuan yang tidak berjaya berprestasi menunjukkan lebih banyak penglibatan dalam sukan lain. Pola laluan perkembangan mengikut pengkhususan awal dicadangkan bagi pembangunan atlet bola keranjang Malaysia. Data tarikh lahir atlet (n = 636) didapatkan melalui pengakalan data MSSM dan kesan umur relatif dikesan bagi kumpulan B12 dan B18 lelaki dan perempuan.

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LIST OF ABBREVIATIONS

AFL	Australian Football League
CHL	Canada Hockey League
DMSP	Developmental Model of Sport Participation
FIBA	Federation International of Basketball Association
LTAD	Long-Term Athlete Development
MSSM	Majlis Sukan Sekolah Malaysia
NBA	National Basketball Association
PHQ	Participation History Questionnaire
RAE	Relative Age Effect
SUKMA	Sukan Malaysia
TID	Talent Identification and Development

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CHAPTER 1

INTRODUCTION

1.1 Preface

A successful profession in sports career has always been affected by not only natural factors but as well as the nurture factors. Years of repeated practices are the primary requirement for an athlete to attain an expert level in their own sport Ericsson, Krampe, and Tesch-Römer (1993). An expert is where they can reliably reproduce their performance anytime when required, during competition or training. In order to have a consistent performance as an expert elite athlete, every athlete undergoes

thousands and thousands of hours practicing their move before they can make it looks easy in their game.

As to develop technical skill, the theory of deliberate practice by Ericsson and colleagues (1993) has been proposed. Deliberate practice is a highly structured practice activity aimed to improve performance for the performer (Ericsson, Nandagopal, & Roring, 2009). The practice will cause positive adaptation to the performer in their mechanisms needed in their performance (Ericsson et al., 2009).

The idea of deliberate practice requires high concentration and feedback during the session and is arguably requires much effort and not gratifying(Ericsson et al., 1993). And as usual it may lead to burnt out for athletes and worst, quit. On the contrary, Côté and colleagues (Baker, Cote, & Abernethy, 2003; Côté & Hay, 2002) had identified that fun activities could be one of the many ways leads to expert performance in sport. The deliberate play was early discussed by Côté & Hay (2002) which athlete would involve in playing their game with rules and regulation set by coaches during their development stage. The deliberate play theory was then expanded into 3 stages: sampling years (5-12), specializing years (13-15) and investment years (16+) (Côté, 1999; Côté, Baker, & Abernethy, 2007; Côté & Hay, 2002). The idea of deliberate play is then lead to early diversification where at the early age athlete participating in a variety of sports before entering specializing years, which they focus on just a few and lastly investment years, where they focus on only one single sport and start accumulating heavy hours of deliberate practice.

But, how long should an athlete start accumulating the hours of deliberate practice until they can become an expert? To be an expert, the 10 years rule has been suggested and that the quality and quantity of time spent in training will affect the performance, as a study in chess had shown (Chase & Simon, 1973). This theory has been proven that the 10 years rule applied at most of the domain such as music (Ericsson et al., 1993) and mathematics (Gustin, 1985). The 10 years rules or the 10,000 hours rules is one of the main criteria in deliberate practice where the hours spent for an athlete or musician to practice will affect their performance. In a German Musical Institute study, a professional violinist spent around 7,400 hours undergoing solitary practice while a semi-professional violinist spent around 3,500 hours for their practice (Ericsson et al., 1993). Hodge and Starkes (1996) tested the deliberate practice theory on sports athletes, namely Olympic wrestlers. The skilled wrestlers and less skilled wrestlers can be categorized by the amount of time spent in sparring-with-others. The more time the wrestler spent in sparring-with-others that make them a better wrestler. As the international level wrestler spent about 5,800 hours in their sparring practice compared to a province or club wrestler, which spent only at an amount of 3,500 hours.

Therefore, the hours of sports athlete and players involved in deliberate practice decides which pathway the athlete will develop into, elite or sub-elite. The players for Belgium 1994 World Cup team is studied and discovered that they practiced about 14 hours per week during the study (Helsen, Hodges, Winckel, & Starkes, 2000). Helsen and colleagues (2000) found that the elite soccer players accumulated their practice

hours in teamwork at an earlier age (i.e., 16 years old). This may give a higher chance for players to attain a professional career in the sport.

But there were findings that showed some elite athletes that did not undergo early specialization in deliberate practice during their early age but still progressed to the professional and elite level. Ward, Hodges, Starkes, and Williams (2007) studied on 9-18 years old elite and sub-elite soccer players on their hours spent in practice and found that elite player participates in team training earlier in age (9 years old). Berry, Abernethy, and Côté (2008) reported that expert decision makers in Australia Football League (AFL) spent more hours in their development years in unstructured activities other than football activity. By undergoing deliberate play could be one of the ways for an athlete to develop their skills and their career into an elite performer. Deliberate-play training has shown a significant difference with a group of traditional playing style and deliberate play training in tactical intelligence after 18 session training (Greco, Memmert, & Morales, 2010).

A study on Portuguese and USA basketball players by Leite, Santos, Sampaio, and GÓmez (2013) found that elite basketball players from both countries engage sports at the age between 6 to10, which lie within the sampling years of athletes (Côté, 1999; Côté, Baker, & Abernethy, 2003; Côté & Hay, 2002). The USA basketball players (Coutinho, Mesquita, Fonseca, & De Martin-Silva, 2014) tend to participate in more sports compare to Portuguese players in their early age. The results supported the finding that early diversification can be one of the many ways to train and reach

for expertise. The form of training that athletes involved is the key to expanding their career into the elite in their main sport later. Güllich (2013) conducted a study on development pathway for Olympic gold men's field hockey and discovered the training for both Olympic and national men's field hockey players did not show differences but they involved in more other organized sports (deliberate play) and specialized later in their career in field hockey.

As researchers discovered, sequences of deliberate play during the development years of athlete might give them a different development pathway to an elite athlete at later years. Baker and Côté (2003) conducted research on hockey, basketball and netball players which these players develop throughout a high amount of deliberate play. Two groups of participants focusing on their main sport had been tracked since the age of 12. A group was discovered to have practiced at 4,885 hours or somehow 13 years experiences accumulated and the other group meanwhile, the not that potential group practiced as much as 3,223 hours only in their decision making in the team ball sports. Baker and Côté (2003) have suggested that participating in multi-sports will help an athlete to develop their decision-making skills and thus sharpen their skillset as well during their early stage. Children development throughout the deliberate play skill will build up a strong foundation of physical and cognitive development for their main sport when they come to their investment years (Abernethy, Baker, & Côté, 2005; Williams, Ward, Smeeton, & Allen, 2004)). The better decision makers in football players were found to have more hours involved in deliberate practices and deliberate play compare to others (Berry, Abernethy, & Côté, 2008).

1006 multi-sports athletes (individual and team sports) in the United Kingdom have been studied for their development pathways and was noticed that a significant amount of athlete which reached national levels (ages 16 – 18 years old) did not involve in early specialization on any sports during their age from 7 – 9 years old (Bridge & Toms, 2014). The result stated that it is not necessarily to develop an early sport specialization for an athlete to succeed to reach an expert performer pathway at the age of 18 and they still can make it there.

Bloom and Sosniak (1985) had studied the progressions on how a professional development. He studied the development of not only athletes but involve mathematicians and artists where how an individual develop through three different stages, the early age development phase, the middle age development phase, and the later years' development phase, throughout the alternate develop pathway which brings them to become a pro performer. In the early age development phase, children were exposed to their talent areas by their parents. Children will then start the learning process during the middle age development and then at the later years of the development phase, they will be focused on only one thing and they spent repeating hours to master it.

As Bloom stated that if an individual started something early and focus on them, eventually they will be successful in what they are paying attention to. As Côté and colleagues (2003) advanced the study from Bloom and Sosniak (1985), the researchers concluded that athlete have to go through 3 stages which are the sampling

years, specialization years and lastly the investment years before they could develop into elite athlete. The time spent in specialization training will significantly increase as they move on from sampling years towards investment years (Berry et al., 2008).

Côté and colleagues then developed an empirically based model, the Development Model of Sports Participation (DMSP) (Baker et al., 2003; Côté et al., 2007; Côté & Hay, 2002). The DMSP had been developed and refined in using more than 10 year time to build a collect all the variables that enable researchers to discover and test the development pathway of an athlete. The developed model will foresee if the young athlete will end up involved in sports for leisure purpose, or they can make it to the pro or perhaps they just quit doing sports. The DMSP model can help to track and explain in details about the development pathway of an athlete and it is used as a guideline for the athlete who wanted to develop themselves from novice to the elite level.

Time accumulation in practice activities have always been the direct factor that determined the achievement of an athlete. Therefore, to be able to accumulate such amount of hours in their practice activities before they reached their time for the professional level, it is best to believe that they start accumulating since young age with such development pathway for example early engagement, or long term athlete development, LTAD (Balyi & Hamilton, 1999).

The relative age effect (RAE) is referred to as the relative age difference among young athletes born in the same year (Barnsley & Thompson, 1988; Musch & Grondin, 2001). The RAE may result in a significant difference in their performance (Barnsley, Thompson, & Legault, 1992). According to Barnsley (1988), the concept of RAE is based on observation on the young athletes where they participated in the sports according to their age group. In sport, some specific events require a young athlete to play according to their age group. Young athletes grouped according to their age group during their new semester year for the school (Albuquerque et al., 2012). Some are categorized as the year of born (Barnsley, Thompson, & Barnsley, 1985). Barnsley and colleagues discovered that the ice-hockey athletes from America's hockey league are mostly born at the first quarter (January – March) of the cut-off date, which the grouping criteria are according to the year where the athlete was born.

The effect of the RAE would highly affect how the athlete performed where it might lead to the maturity of physical condition and development of the young athlete in the same age group (Baxter-Jones, Helms, Maffulli, Baines-Preece, & Preece, 1995). If an individual born in 1st Jan 2007 to be compared to another individual that born in 31st Dec 2007, although both are in the age of 12 by the time of 1st Jan 2019 according to the year they were born, but the individual born at 1st Jan 2007 is relatively 12 months older than the one who was born in 31st Dec 2007, which may result in different in their maturity cognitively and physically (Bell-Walker & Williams, 2008; Wattie, Schorer, Tietjens, Baker, & Cobley, 2012). Tanner (1978) found that for a 10 year old child who was born in the first three months and the last three months of the calendar year, a relatively younger 10 years old child (born in the

last 3 month of the calendar year) can be 0.2m shorter and 27kg lighter than the one who is relatively older (born in the first 3 month of the calendar year). The relatively older athlete in the same age group has the tendency to be selected to represent the team and then their country compared to the younger one (Nakata & Sakamoto, 2011).

Hence, the research was carried out to understand how Malaysia U18 basketball athlete developed and if the RAE existed during the selection. This could help to determine what type of activity Malaysian U18 basketball athlete gone through and how coaches selecting their athlete, is it based on their physical appearance due to RAE or based on talent.

1.2 Problem Statement

It is undeniable that lots of research about sport specialization which had been conducted and it is useful for trainers, athletes, coaches, and parents. Such studies help to monitor how they can help one to be successful but still, there are some questionable parts which may lead to vague results according to their findings, which is it structured training since young age would lead to success or purposed training start at later age would?

However, past research (Bonal, Jiménez, & Lorenzo, 2020; Côté, 1999; Côté et al., 2003; Côté & Hay, 2002; Ericsson et al., 1993; Low et al., 2017; Price, 2017; Tan

& Low, 2014) has led to the useful information and open up the pathway for other researchers to further examine and improve the body of knowledge on the development of elite athletes. Those previous findings had proven that an athlete has to go through tremendous hours of practice before they would be able to perform at the elite level (Côté & Hay, 2002). Back in Malaysia, there were several researches about the development of athletes in other sports such as badminton (Abu Bakar, 2016; Low et al., 2017), swimming (Tan & Low, 2014), but for Malaysia basketball athletes development related study can hardly be obtained. The development pathway of Malaysia basketball athlete has not given a clear path.

The development pathway of athletes were classified into two different categories, which is the development pathway of individual sports athlete and the development pathway of team sports athlete, according to the previous findings. Individual sports-related research as from previous researchers such as dart (Duffy, Baluch, & Ericsson, 2004), triathlon (Hodges, Kerr, Starkes, Weir, & Nananidou, 2004), gymnastic (Law, Côté, & Ericsson, 2007), swimming (Tan & Low, 2014) middle distance running (Young & Salmela, 2010), and golf (Hayman, Polman, Borkoles, & Taylor, 2013), showing that they underwent a significantly higher amount of time involved in deliberate practice compared to team sport athletes (Baker et al., 2003). But, according to the research done, those findings stated that the consistency of time spent in deliberate practice is not consistent due to the differences in carrier life span within each sport. A professional dart athlete is found to spend 12,389 hours, about 15 years of training (Duffy et al., 2004) before they are able to perform in the pro while

international wrestler spent about 5,882 hours, about 10 years for training (Starkes, Deakin, Allard, Hodges, & Hayes, 1996).

But then all the findings stated that it took years before an athlete to achieve the highest level, therefore to invest in an athlete, is best to start early. How early should one start investing in a career as an athlete? Some findings on swimmers who started specializing at a young age had resulted in early retirement from their career. Early specialization swimmers have shown results of early retirement or drop out from their sports compared with those who had early diversification and late specialization (Jones et al., 1995). Athletes tend to burn out from the sport they specialized from an early age. Law and colleagues (2007) found that rhythmic gymnasts who started their intensive training at the age of 12 to 13, in a large amount of time involved in deliberate practice including warm-up, ballet, technique, routines and conditioning, caused the young gymnasts to burn out and eventually drop out from their sport (Côté et al., 2007; Fraser-Thomas, Côté, & Deakin, 2008). Long hours (for Olympic gymnasts, 18,835 hours; for international gymnasts, 6.686 hours) of deliberate practice since a very young age resulted in high injuries rate (Law et al., 2007).

Then not all athletes would be suitable to start with early specialization. For example triathlon athletes, they were not involved in deliberate practice from a young age (Baker, Côté, & Deakin, 2005). World class triathlon athlete involved in other sports for about 5,500 hours at their younger age. This finding concluded that early

diversification in sports could produce elite athletes too, which contradicted with the theory of deliberate practice.

As a result, the development pathway for athletes to be successful in their professional career seems to be unequivocal. Individual sport and team sport have different development pathways and the hours involved in deliberate practices are specific and unique according to each sport as well. The development pathway of an athlete is important to study as it provides us the information about how athlete develops, what activities to engage in, and how many hours a day, to enable them to have a desirable professional career in their sport. Yet, all those results and findings are based on athletes who were not from Malaysia.

To the best of the researcher's knowledge, studies which focused on the development pathways that related to elite basketball athletes in Malaysia is limited according to what had been discussed above. The literature references about the development pathways of athletes such as badminton, swimmer can be obtained but those related to basketball athletes in Malaysia is not as handful, especially for those focusing on the practice factor for basketball, but there are a few findings related to RAE for Malaysia athletes (Rong & Lee, 2020). Therefore, it's keen to know how Malaysia basketball athletes develop. Comparing the development pathways of Malaysia basketball athletes with the other's to understand the differences is important for improvement (Bonal et al., 2020; Price, 2017).

The development pathways of Malaysia youth basketball athletes has been chosen as the target population for the study. This study involves the Malaysian Schools Sports Council (MSSM) 2019 basketball tournament players.

1.3 Importance of Research

The importance of developing successful international athletes is crucial for a country to be able to get known internationally. Therefore, the information about the development pathways to develop a successful athlete can help the country, coaches and the athletes which see themselves to get involved in sports and make it as theirs career. The findings of this research would hope to be able to work as guidelines for the sports development council such as the state sports council, national sports council, and even schools to develop basketball players efficiently. The findings in the research hoped to be able to give coaches a shred of empirical evidence as guidelines when they are preparing their team or players as the references about development pathway in sports for Malaysian is still finite.

Developing young athletes can assure sports development in the country would be based on systematic and sport science-based development programmes. The involvement in sports for the young athlete should start from their school before getting to the district, state, national and then international. This may ensure Malaysia

will have the capacity to produce the world-class basketball players to compete at the international stage such as SEA, Commonwealth, Asian and Olympic Games level.

Hence, the findings from this study would provide informed guidelines, as a benchmark to relevant authorities on how to develop elite basketball players. It may then work as a connection link for further research and coaches or other stakeholders such as parents and teachers. They will be educated on how to focus their kids or players to perform in their game, the time needed to spend in their practice and the type of practice needed before they can involve their players or children in the elite level basketball game. Nevertheless, the findings can work as a reference for other sport researchers to identify the new talent for new basketball players or other sports, which helps to develop a better sport community in Malaysia.

1.4 Objective of Study

The study focuses on the development pathway of basketball athlete from novice to elite. Therefore, some objectives about the research study would be

i. Identify the basketball related milestones of the elite youth basketball players in the MSSM basketball tournament.

ii. Identify the type and amount of activities involved for elite youth basketball players in the MSSM basketball tournament.

iii. Identify and compared the development pathway of elite youth basketball players in the MSSM basketball tournament.

iv. Identify the existence of RAE among the basketball athletes in elite youth basketball players in the MSSM basketball tournament.

1.5 Research Question

According to the objective of study, the following question will be answered in the findings as

i. What type and amount of activities does a basketball player involved in most?

ii. What is the milestone achieved for basketball player in MSSM basketball tournament?

iii. What is the development pathway for basketball player to reach elite level?

iv. Is the RAE exists among the state Basketball team selection?

1.6 Research Hypothesis

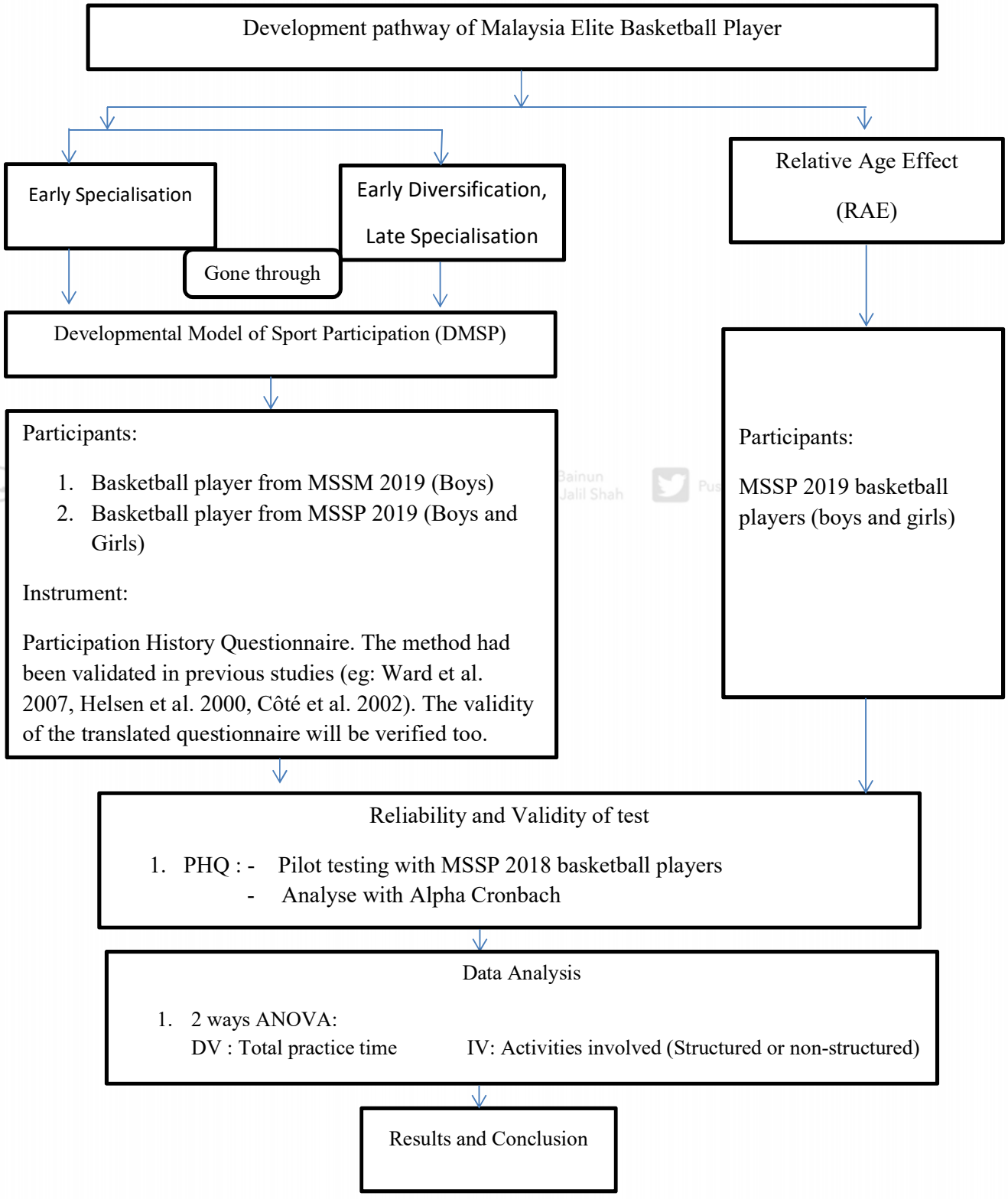
The research hypothesis used to identify the assumption made before the research started and hence the hypothesis will then be tested

1. H_{01}: There will be no significant different for the top 3 teams and bottom 3 teams for both boys and girls category in the time they start engaging in their main sport.
2. H_{02} : The Top 3 U18 boys and girls U18 will have no significant different in The total amount of time accumulated in basketball activities from start age until now compared to the bottom 3 U18 boys and girls team.
3. H_{03} : The top 3 U18 boys and girls team will have no significant in the amount of time involved in structured and unstructured activities compared to bottom U18 boys and girls team.
4. H_{04} : There will be no significant different with the amount of time involved in structured and unstructured activities for the age range 7-12 years old and 16-18 years old for both Top and Bottom U18 boys and girls.
5. H_{05} : The will be no significant different in the involvement in basketball related activities for both successful and unsuccessful U18boys and girls teams at the age range of 13 to 15 years old, 7 to 12 years old and 16 years old and above.
6. H_{06} : There will be no significant different in amount of involvement in other sports for top 3 and bottom 3 U18 teams.
7. H_{07} : Birth months for MSSM U18 and U12 boys and girls basketball athlete will not be overrepresented at the first quarter of the closing year.

1.7 Conceptual Framework

Table 1

Theoretical Framework



1.8 Limitations of the Study

The study focused on the MSSM basketball players from the participating states in Malaysia on how much time they have spent in basketball before being selected as basketball players to represent their states. The RAE study is focusing on only their date of birth, no including their weight, height and maturity status.

The limitation of the study considered where the honesty of participants during answering the questionnaire cannot be controlled. However, the data collected are able to be validated based on the coaches and parents recall. On the other hand, the research is focusing on how RAE affects the development pathway of basketball athlete in Malaysia. Therefore, the other factors such as the family background of athlete, social economic status etc. are all not taking into consideration during this research.

1.9 Operation Definition

- **Elite**

  Elite basketball players are considered as those who get selected and played in MSSM 2019 basketball tournament.

- **Deliberate practice**

  The practice with a clear purpose to improve/ sharpen skills.

- **Relative Age Effect (RAE)**

  The bias of the participants in youth sports mostly been choose were born in the early quarter before the specific cut-off date.

- **Milestones**

  Milestones mean the involvements in main sport, practice gone through and achievements for an elite basketball player gone through from beginner until the elite level.

1.10 Conclusion

The development pathway of athletes was always varied from what we heard from one coach to another. But then researchers have categorized and concluded them into only two, the deliberate practice, where the young athlete has to undergo only one sport specific training which is called early specialization since a young age. Another pathway is deliberate play, where young athletes undergo multi-sports during their

young age before they decide which to choose to pursue a professional career in one sport at their investment years, 16 and above (Côté, 1999; Côté et al., 2003; Côté & Hay, 2002). Therefore the study is focusing on identifying the development pathway of elite basketball athlete in Malaysia, where the type of activities are involved in, the hour spent in deliberate practice or deliberate play before they get selected as elite basketball players and as well as their milestone achievement in their career. The RAE will be identified by collecting data from the MSSP U12 basketball tournaments where the date of birth of athlete will be collected as well as the height and weight of the athlete for comparison. To understand how athlete growth, PHQ has been used to study the development history of all the basketball players and then analyzed results obtained.

The findings of the study will then give an idea for all the parties that wish to develop professional athlete on they should prepare their athlete before their investment age. The Malaysia Amateur Basketball Association (MABA) and the recently developed basketball club, NS Matrix basketball club, Red Baron basketball club, etc. will be able to get through some ideas on the findings of the research to develop their basketball athlete. Coaches, parents, teachers, and managers can then understand when is the best time to develop their young athlete if they wanted their athlete to go professional in the sports they play.