THE ALIGNMENT OF EXTRINSIC MOTIVATED BEHAVIOUR AND METACOGNITIVE SKILLS AMONG FIRST YEAR UNDERGRADUATE MEDICAL STUDENTS

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ABSTRACT

Past literature indicates that there is a probability that medical students who lack alignment between Extrinsic Motivated Behaviour (EMB) and Metacognitive Skills (MS) may underperform which eventually leads to attrition or incompetency. Thus, the purpose of this research was to study the alignment of the EMB and MS of selected first year students enrolled in two undergraduate medical curricula, an existing integrated curriculum (NIC) and a newly introduced competency-based curriculum (UMMP) at a local Malaysian university. The four dimensions of EMB included external, introjected, identified and integrated regulations. The MS consisted of the knowledge and regulation dimensions of metacognition. Specifically, the study sought to (i) profile the student sample for their dimensions of EMB and MS; (ii) to determine the significant differences between the EMB dimensions and year-end achievement for the NIC and UMMP students; (iii) to determine the significant differences between the MS and year-end achievement for the NIC and UMMP students; (iv) to investigate the correlation (if any) between EMB and MS of the students with their year-end examination results; (v) to explore the alignment of EMB and MS for the NIC and the UMMP students, and (vi) to determine the interactions between EMB and MS with the year end result of students in both curricula. A total of 174 students and 159 students following the NIC and UMMP curriculum took part in this study respectively. The mixed model design was used where the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI) were administered to obtain quantitative data, while individual interviews were conducted to obtain qualitative data. The year-end examination results were utilised to represent students' achievement. The profiling showed that students from both curricula while still showing characteristics of all the

EMB dimensions were dominant in one of the dimensions. In the NIC curriculum, the one-way ANOVA analysis showed no significant differences between the four dimensions of EMB and achievement but in the UMMP curriculum, there were significant differences for the same analysis. For both curricula, a *t*-test revealed significant differences for MS scores with students' achievement. Pearson correlation results revealed that the total score for EMBI and MSI of the NIC curriculum were moderately correlated. In the UMMP curriculum, a small correlation was found between the total score for EMBI with MSI. A higher correlation was found between the total scores of EMBI and MSI with students' achievement in the UMMP curriculum compared to the NIC curriculum. A MANOVA analysis showed the dimensions of EMB and MS affected students' achievement in both curricula. Overall, the quantitative findings showed students in the UMMP curriculum indicated a better alignment between EMB and MS. Qualitative data revealed that this better alignment of EMB and MS among the students in the UMMP involved greater physical, cognitive and affective interactions. From the findings, implications of the study and suggestions for further research have been put forward.

ABSTRAK

Sorotan literatur menunjukkan bahawa terdapat kemungkinan pelajar bidang perubatan yang kekurangan kesejajaran tingkahlaku motivasi ekstrinsik (EMB) dan kemahiran metakognisi (MS) tidak dapat mencapai prestasi yang sepatutnya. Hal ini secara tidak langsung akan menyumbang kepada kadar kegagalan pelajar atau kekurangan kompetensi dalam kalangan pelajar perubatan. Kajian ini bertujuan untuk mengkaji kesejajaran tingkahlaku motivasi ekstrinsik dan kemahiran metakognisi dalam kalangan pelajar tahun pertama bidang perubatan yang mengikuti dua kurikulum NIC dan UMMP di sebuah universiti tempatan. Empat dimensi tingkahlaku motivasi ekstrinsik termasuklah *external, introjected, identified* dan *integrated regulations.* Kemahiran metakognisi meliputi *knowledge* dan *regulation of metacognition*. Secara khususnya, kajian ini telah (i) memprofil pelajar dalam dimensi EMB dan MS; (ii) menentukan perbezaan signifikan antara dimensi EMB dan prestasi akhir tahun bagi pelajar yang mengikuti kurikulum NIC dan UMMP masing-masing; (iii) menentukan perbezaan signifikan antara dimensi MS dan prestasi akhir tahun bagi pelajar yang mengikuti kurikulum NIC dan UMMP masing-masing; (iv) menyiasat korelasi (jika ada) yang wujud antara EMB dan MS pelajar dengan pencapaian akademik pelajar; (v) kesejajaran EMB dan MS bagi pelajar yang mengikuti kurikulum NIC dan UMMP, dan (vi) menerokai interaksi antara EMB dan MS dengan pencapaian akademik pelajar dalam kedua-dua kurikulum. Seramai 174 pelajar yang mengikuti kurikulum NIC dan 159 pelajar yang mengikuti kurikulum UMMP telah mengambil bahagian dalam kajian ini. Reka bentuk *mixed model* digunakan dalam kajian ini di mana *Extrinsic Motivated Behaviour Inventory* (EMBI) dan *Metacognitive Skills Inventory* (MSI) digunakan untuk memperoleh data kuantitatif, sementara data temubual dikumpulkan untuk

memperoleh data kualitatif. Pencapaian peperiksaan akhir tahun digunakan untuk mewakili pencapaian akademik pelajar. Profil pelajar dalam kedua-dua kurikulum menunjukkan bahawa terdapat satu dimensi yang lebih dominan walaupun pelajar mempunyai ciri-ciri kesemua dimensi EMB. Dalam kurikulum NIC, analisis ANOVA sehala menunjukkan bahawa keempat-empat dimensi EMB dan pencapaian akademik pelajar adalah tidak siknifikan. Walau bagaimanapun, dalam kurikulum UMMP, terdapat perbezaan yang signifikan bagi analisis yang sama. Dalam kedua-dua kurikulum, ujian-*t* menunjukkan perbezaan signifikan antara skor MS dengan pencapaian pelajar. Korelasi *Pearson* menunjukkan bahawa jumlah skor EMBI mempunyai korelasi yang sederhana dengan jumlah skor MSI dalam kurikulum NIC. Dalam kurikulum UMMP, korelasi yang lebih tinggi diperoleh antara jumlah skor EMBI dan MSI dengan pencapaian pelajar jika dibandingkan dengan kurikulum NIC. Analisis MANOVA juga menunjukkan bahawa EMBI dan MSI memberi kesan kepada pencapaian pelajar perubatan dalam kedua-dua kurikulum. Secara tuntasnya, dapatan data kuantitatif menunjukkan bahawa EMB dan MS dalam kalangan pelajar yang mengikuti kurikulum UMMP mempamerkan kesejajaran yang lebih meyakinkan. Dapatan kualitatif dalam kajian ini menunjukkan kesejajaran yang wujud dalam kalangan pelajar UMMP ini melibatkan interaksi fizikal, kognitif dan afektif yang lebih nyata. Daripada dapatan kajian, implikasi kajian dan cadangan untuk kajian lanjutan telah dibincangkan.

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AMS	Academic Motivation Scale
BMAT	BioMedical Admissions Test
CFCS	Community Family Case Studies
CGPA	Cumulative Grade Points Average
DPHS	Doctor, Patient, Health and Society
EMBI	Extrinsic Motivated Behaviour Inventory
ISM	Inventory of School Motivation
MBBS	Bachelor of Medicine and Bachelor of Surgery
MCAT	Medical College Admission Test
MIMOS	Malaysian Institute of Microelectronic Systems
MSI	Metacognitive Skills Inventory
MSLQ	Motivated Strategies for Learning Questionnaires
NIC	New Integrated Curriculum
OSCE	Objective Structured Clinical Examination
PPD	Personal and Professional Development
PBL	Problem-based learning
SCEQ	Student Course Experience Questionnaire
SDT	Self-determination Theory
STPM	Malaysian High School Certificate
TMC	Traditional medical curriculum
WHO	World Health Organization
UMMP	University of Malaya Medical Programme
UPU	Malaysian Central University Unit

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Motivation comprises many features which encompasses a variety of meaningful emotional connections related to learning and educational development (Sobral, 2004). One of the two classes of motivation, extrinsic motivation, refers to something which is done that lead to separate outcomes (Deci, Vallerand, Pelletier, & Ryan, 1991). Extrinsic motivation involves performing an activity with the intention of attaining some separable consequence such as receiving an award, avoiding guilt and gaining approval (Deci, Ryan, & Williams, 1996). This area of motivation concerns what moves people to act, think and develop (Ryan & Deci, 2008). Generally, people are inclined to internalise and integrate within themselves the regulation of activities that were initially prompted and regulated by external factors (Ryan & Deci, 2008).

Metacognitive Skills revolve around the term metacognition which was first introduced by John Flavell in the 1970s. Flavell described metacognition as the knowledge concerning one's own cognitive processes or anything related to them. Metacognitive skills also refers to learners' automatic awareness of their own knowledge and their ability to understand, control, and manipulate their own cognitive processes (Flavell, 1979). The presence of metacognitive skills is essential and should be prioritised if we want our future doctors to be independent and lifelong learners who are able to continuously assess the outcome of their actions to build new knowledge (Brown & Ann, 1997).

The ability to self-assess does not come naturally to the majority, but however it is a skill that can be learned (Brown & Ann, 1997). Past research has proved that students who possess metacognitive skills are able to perform better in their studies and are high achievers (Sternberg, 1985). Metacognitive skills encompass metacognitive

knowledge and metacognitive regulation. It is believed that metacognitive skills have to be emphasized in the teaching and learning process because:

i) Students cannot rely on their teachers' teaching all the time but must be able to plan and utilise the knowledge in a wide variety of tasks;

ii) Students have the habit of blindly following instructions which leads them to ineffective cognitive performance in intellectual tasks; and

iii) Metacognitive skills deficient students have no idea what they are doing as they are unable to determine the difficulty of the tasks, plan their actions, monitor their performance, use information and model mental graphical representations.

The medical curriculum in the University of Malaya is reviewed every five years. The old MBBS curriculum, also known as the New Integrated Curriculum (NIC) was used from 1998 through 2012 in the medical programme. The NIC was structured in three phases where students were taught about the normal human body in Phase I, an abnormal human body in Phase II and do their clinical postings in Phase III. During Phase I and Phase II, the medical students attend discipline-based didactic lectures where essential scientific concepts for basic medicine were introduced. Students are also introduced to problem-based learning sessions and other elective programmes throughout their five years in the medical school. Although the aim of the NIC curriculum was ideal in producing competent doctors, the curriculum which has been running for the past fourteen years appears to have certain weaknesses in the teaching and learning components based on feedback from the medical educators, patients and the society. Therefore, the faculty in the recent curriculum review decided to bring changes to the medical curriculum to suit the current trend in medical education.

Therefore, in the latest curriculum revision, the Faculty of Medicine of the University of Malaya introduced a new MBBS curriculum, and has been named as the University of Malaya Medical Programme (UMMP). Similar to the NIC, the UMMP adopts a five year programme where students are required to go through three stages. However, there are distinct differences in the teaching and learning approach of the UMMP curriculum where students learn in a multidisciplinary environment according to the block system. In addition to the existing basic and clinical sciences, Patient-Doctor sessions, Personal and Professional Development, the students are also involved in more interactive debates and presentations, self-directed learning sessions and clinical days where visits to wards are conducted by the clinicians beginning from Stage 1.

Apart from the knowledge gained in the classroom via lectures and self-directed learning, the ultimate aim of the interactive debates and presentations allows for students to practice their communication skills in terms of verbal and non-verbal cues interacting with colleagues and at the same time, boost their confidence in speech and language used. This approach is expected to help students to synthesise their ideas and will be able to gauge if others are able to understand and accept the content being presented. Being a teaching hospital, early exposure through visits to the wards as part of the curriculum would provide experience and awareness to the medical students in the University of Malaya on the real healthcare scenario outside the classroom. The students themselves will be able to reflect and assess their degree of comprehension through questioning and observations during the ward rounds.

Despite the changes done in the medical curriculum aimed to produce the best healthcare professionals, the quality of the students taken into the medical programme is also not compromised. There is a great demand for seats in medical schools especially for the public medical schools because the medical programmes in the public

universities are very heavily subsidized by the government (Lim, 2008). The admission to medical schools all these years has been based on the merit system where students' pre- university grades have been used as a form of measurement of their qualification. In the next section, the rationale of why the present study was conducted is discussed.

1.2 Rationale of Study

Medical curricula is said to be developed based on the premise that medical students have a deep desire to become practitioners and are strongly intrinsically motivated (Brissette & Howes, 2010). However, Ryan and Deci (2000b) believed that extrinsic motivation is an essential strategy for successful teaching and that one cannot just rely on the intrinsic motivation to foster learning.

Research has also revealed that there are medical students who behave as externally motivated learners where they are unmotivated intrinsically and are not striving hard to meet goals (Amabile, 1993; Thompson, 2014). These students may feel that there is a difference between the vision and mission of the medical schools and their own goals in life (Mann, 1999). These extrinsically motivated medical students tend not to perform well or fail their tests over the years in their medical examinations. The low achievement and failure rate of students, especially in long case studies have indicated that these students may not desire to be placed in medical schools (Luqman, 2013).

Knowles (1978) in his research proposed that as a person matures, motivation shifts from external motivation to internal motivation. According to Misch (2002), intrinsic and extrinsic motivation are context dependent, more so in the medical field. Misch (2002) has added that very often the drive to learn among medical students are associated to secondary benefits such as respect, admiration, wealth and position. Borges, Navarro, Grover, and Hoban (2010) conducted a study on factors influencing

physicians to choose a career path in academic medicine which revealed that this large question related to extrinsic motivation remains essentially unanswered in the literature.

In the Malaysian context, medical students are selected based on their pre-university scores and all the medical students of the University of Malaya are students who have gained perfect scores with a CGPA of 4.0. Nonetheless, stress among medical students is at an alarming 56% where examination and academic pressure have been identified as the most significant sources of depression, anxiety, and stress (Salam, Yousuf, Bakar, & Haque, 2013). This could be due to their choice in choosing the 'right course' (which may not necessarily be medicine) even though they have achieved very good grades before they entered the medical school. They face obstacles to their goal achievement, environmental changes, and life challenges such as transition from school to university and the change in role from being a student to a knowledgeable physician (Saravanan & Wilks, 2014).

Communication, positive attitude, motivation and students' passion in moving towards the job as a medical practitioner is very important. Most medical students deny their subjective feelings when they fail or get low grades (Mcloughlin, 2009). Students are often reluctant to study communication skills and may display initial and lasting resistance and scepticism when they are instructed to change their orientation and behaviour (Hannah, Millichamp, & Ayers, 2004). As a medical student, one must possess the drive and passion within oneself and be willing to adapt and foster to the new learning environment, in which is independent and self-directed learning is necessary. From the literature, the researcher has gathered that extrinsic motivation is important as this will lead to intrinsic motivation later on as the student matures and may affect the performance of medical students.

In addition, medical teachers voiced their worry over the students' communication skills and commitment towards their activities where students only

attend classes and perform activities if and only if an evaluation is being carried out. In a way, students will not go the extra distance to do more than what is required of a medical student. A newspaper article written by Tham (2013) revealed a research by a doctor of a local university which showed that Malaysian clinics had an error rate of 98% in documentation and over 41% made were errors related to medicines. These incidents could have been prevented (Tham, 2013). Students wanting to pursue medicine must have the passion and good grades as the course is intensive and the work load is rather demanding. This is where metacognitive skills are essential because being a doctor means one must make real decisions at the front line, when resources are limited and time constraints apply (Graber, Gordon, & Franklin, 2002). Medical students should also be aware of cognitive pitfalls and learn to develop strategies to encounter them (Croskerry, 2003).

Society's regard for entering a public medical school in Malaysia is extremely high so much so a student has to achieve a perfect score (as stated earlier) at the pre-university level in order to apply for the course and secure a place in the medical school. This public perception has driven many students to choose a critical course like medicine without ensuring if medicine is really what they want to do. Medical schools however, still experience attrition due to students who lose interest, lack motivation or simply wanted to do other courses in the first place, among other reasons. In addition, they also have no idea about the work load and amount of information they are required to know before being certified as a healthcare professional.

It is crucial for students to understand the demand of the course, expectations from the medical teachers as well as the faculty and the mental preparation needed to face the challenge of this noble profession. Being able to gain a seat in the medical school is a big achievement, but adapting to the overload of information, organising the

knowledge, planning and monitoring their academic achievement and being able to regulate, relate and evaluate their daily tasks are essential for medical students.

With the lack of literature on why students choose to enter medical school and an overflow of literature indicating medical students' stress, drop-out and inability to cope, it would be worthy to research on students' alignment of extrinsic motivated behaviour and metacognitive skills. This alignment in turn may have an effect on medical students' academic performance.

1.3 Problem Statement

In a recent piece of local news, 1000 of the 5000 Malaysian housemen employed each year do not complete their two-year training stint (Star, 2015) because they realised that they were unsuitable for the profession as the decision to study medicine was made by their parents.

Learning is said to be the ultimate outcome of medical education (Zuger, 2004). However, the social-economic and cultural changes have led many 'wannabe doctors' choosing the medical field without knowing their actual aim in becoming doctors. This could lead to dissatisfaction and demotivate them to work in the health care industry (Zuger, 2004). There have also been cases where medical doctors have resigned due to the dissatisfaction of the working hours and highlighted that it was their parents who wanted them to pursue medicine over other courses.

In an unpublished research conducted by MIMOS (2012), it was revealed that medical students of the University of Malaya tend to perform well in theory-based and Objective Structured Clinical Examination (OSCE) evaluations. This can be easily achieved, considering that they are selected from students with perfect scores at the pre-university level. All it takes is for the students to memorize all the facts they can and do the written tests without knowing if they have really understood the problems or they

are merely lucky if examination questions are repeated from past year papers. In addition, students who fail rarely see the totality of the medical curriculum content in any holistic sense (Mcloughlin, 2009). These students think that the information is meaningful only in its particular context, rather than in a universal context. This is an indication that their approach to learning facts is memorisation (Mcloughlin, 2009).

Interview procedures which were introduced as part of the selection criteria to enter medical schools seem to reduce the selection of students with lower communication capabilities but, however, did not prove any better than the traditional selection criteria at distinguishing the students with superior performance (Dahlin, Söderberg, Holm, Nilsson, & Farnebo, 2012). Test batteries, better known as admission tests like The Medical College Admission Test (MCAT) and BioMedical Admissions Test (BMAT) are administered to medical students in most of the medical schools across the United States, United Kingdom, Australia and Canada but these selection methods fail also to address other crucial requirements of the future healthcare professional (Dahlin, M., Söderberg, S., Holm, U., Nilsson, I. & Farnebo, L.O., 2012). The question that arose here was that if interviews and selection tests were sufficient?

Motivation in oneself is equally as important. Motivation is one of the most important psychological concepts in education and is related to academic outcomes in medical students (Tanaka, M., Fukuda, S., Mizuno, K. & Kuratsune, H., 2009) In a research conducted by Sobral (2004), the findings indicated that autonomous motivation had closer relationships with self-regulation of learning and academic success in a demanding medical programme. Other research has also revealed that intrinsic motivation and academic performance are significantly related (Tanaka et al., 2009; Tripathi & Chaturvedi, 2014)

Apart from intrinsic motivation, research has also shown that coping is related to external stimuli and one's own internal state, which is the extrinsic motivated behaviour

(Wells, 2009). This important component of motivation is essential because extrinsic motivation reflects on external control and true self-regulation (Ryan & Deci, 2000b).

Medical students who fail are said to be no less committed to their success as any of their peers. However, many of these students are only highly motivated to be successful in academic study and examinations just to graduate, rather than to think further ahead. It has been found that they often visualize themselves as medical students rather than a medical provider (Mcloughlin, 2009). These students also do not appreciate the evaluations they receive from Professors, Clinical Directors and Dean of Medical Schools (Mcloughlin, 2009). If medical students fail to comprehend the relevance of psychosocial topics to medical practice, their motivation to learn will be poor (Hutchinson, 2003). Thus, there is a need to investigate the extrinsic motivation of medical students.

Literature indicates that there are four categories of extrinsic motivation identified which are external regulation, introjected regulation, identified regulation and integrated regulation (Deci et al., 1996; Kusurkar, 2012a). External regulation reveals a very low degree of self-regulation and the behaviour is mainly controlled by demands or contingencies external to the person. It is also the least autonomous form of extrinsic motivation (Ryan & Deci, 2000b). This type of regulation is engaged with behaviours to obtain rewards or to avoid punishments. Medical students profiled under this dimension could have chosen to be in the medical school as they see possible fame in doing medicine. Introjected regulation shows a moderately low degree of self-regulation. The behaviour of this type of person is controlled by demands or contingencies within the person such as threats of guilt or self-esteem-relevant contingencies. A medical student who had perfect scores in his pre-university level for instance, would feel that it is a waste not to do a medical programme because medicine is seen as a critical course where limited seats are offered each year. On the other hand, a person with identified

regulation shows a moderately high degree of self-regulation and identifies and sees the importance of self-selected goals. Students profiled under this dimension see the healthcare profession as a field with promising job prospects and possible career advancement. The highest degree of self-regulation, also regarded as the most autonomous level of extrinsic motivation is integrated regulation where it is the most mature and self-determined form of extrinsic motivation. The integrated regulation cannot be shown spontaneously but increases over time (Deci et al., 1996) In this study, the Extrinsic Motivated Behaviour Inventory (EMBI) was developed to profile and categorise selected medical students' level of extrinsic motivation.

Overall, a lack of extrinsic motivated behaviour may affect medical students' studies which will lead to inefficiency in their future professional medical practice (Ryan & Deci, 2000a). This means that students who enrol themselves in medical schools should have a certain degree of extrinsic motivated behaviour (in particularly integrated regulation) which drives them to be successful not only as a medical student, but as a doctor.

Private sub-consciousness and self-reflection are insights and key factors to behavioural change (Grant, 2006). Metacognitive skills include how a student sets goals, sets learning styles of their own and reflects on one-self. Students' are said to have severely limited horizons in the world they live, in the sense that they tend not to read newspapers and seldom participate in discussions about current events (Mcloughlin, 2009). Besides this, medical students also face difficulties in tasks directly associated with efficiency and accuracy in managing academic and clinical skills in terms of information organization, planning processing and examination preparation.

Mcloughlin (2009) in his study found that intelligence as reflected in secondary education grades and by IQ tests are imperfect measures to predicting success in medical education. Therefore, obtaining perfect scores in secondary school may not

necessarily indicate the students' actual metacognitive skills level. Past research has shown that undergraduate medical students' independent learning in terms of monitoring and guiding their own learning process does affect their achievement (Edelbring, 2012). Hence, if the medical students have not acquired the metacognitive skills to organize information, plan and prepare, the students may face challenges in their hectic medical syllabus and thereafter during the clinical days. Hence, there is a need to identify if the medical students have achieved the necessary knowledge and regulation metacognitive skills in being a medical student and as a medical practitioner in the future.

It could be that the lack of alignment between the two dimensions of metacognitive skills and the four dimensions of extrinsic motivated behaviour may probably lead to underperformance which could lead to a high attrition rate and malfunction or incompetent medical practitioners. Therefore, in the present study the alignment of medical students' extrinsic motivated behaviour and their metacognitive skills were investigated in relation to medical students' performance. The alignment of the four dimensions of extrinsic motivated behaviour and the two dimensions of metacognitive skills could provide early indicators on medical students' academic performance which may affect their work performance later.

1.4 Research Objectives

Based on the problem discussed above, this study investigated the alignment of the four dimensions of extrinsic motivated behaviour with the two dimensions of metacognitive skills. This is because the type of extrinsic motivated behaviour one possesses may have an effect on the metacognitive skills which in turn affects the students' academic performance. Specifically, how medical students align the four

dimensions of extrinsic motivated behaviour with the metacognitive skills has not been researched on.

The specific objectives of the study were;

(1) To develop an Extrinsic Motivated Behavior Inventory (EMBI) for the dimensions of,

a) External Regulation

b) Introjected Regulation

c) Identified Regulation

d) Integrated Regulation

in order to describe the extrinsic motivated behaviour of the selected first year medical students enrolled in the NIC and the UMMP curricula at the University of Malaya

(2) To develop a Metacognitive Skills Inventory (MSI) for the components of,

a) Knowledge of metacognition

b) Regulation of metacognition

in order to describe the metacognitive skills of the selected first year medical students enrolled in the NIC and the UMMP curricula at the University of Malaya

(3) To investigate the alignment between extrinsic motivated behaviour and metacognitive skills among selected first year medical students of the NIC and the UMMP curricula at the University of Malaya

(4) To explore the alignment between extrinsic motivated behaviour and metacognitive skills among selected first year medical students of the NIC and

the UMMP curricula at the University of Malaya from the aspect of their achievement

1.5 Research Questions

Based upon the research objectives stated above, the research questions pertaining to this study were;

(1) What is the profile of selected first year medical students following the NIC and UMMP curricula for the dimensions of,

a) extrinsic motivated behaviour, and

b) metacognitive skills

(2) Is there a significant difference between selected first year medical students identified for the four dimensions of extrinsic motivated behaviour and their year-end examination results among,

a) students from the NIC curriculum, and

b) students from the UMMP curriculum

(3) Is there a significant difference between selected first year medical students identified for the two dimensions of metacognitive skills and their year-end examination results among,

a) students from the NIC curriculum, and

b) students from the UMMP curriculum

(4) What is the correlation (if any) between extrinsic motivated behaviour and metacognitive skills of the selected first year medical students with their year-end examination results in the,

a) NIC curriculum, and

b) UMMP curriculum

(5) How is the alignment of extrinsic motivated behaviour and metacognitive skills for the selected NIC and the UMMP first year medical students

(6) What are the interactions between extrinsic motivated behaviour and metacognitive skills with their year end result among the selected first year medical students in the,

a) NIC curriculum, and

b) UMMP curriculum

1.6 Significance of Study

The admission of students to the medical school in the University of Malaya is done based on their pre-university examination scores. Nevertheless, being a medical student is not only all about intelligence, but the drive and passion for the field is essential to help the student to cope with the syllabus and the hectic schedule as a practitioner later on. Fergusan, James, and Madeley (2002) and Hamdy et al. (2006) have put forward that cognitive factors typically explain only a small to moderate amount of variance in academic outcomes.

According to a study conducted by Deci et al. (1996), it is said that extrinsically motivated behaviour involves performing an activity with the intention of attaining some separable consequence such as receiving an award, avoiding guilt and gaining approval. Brissette and Howes (2010) have found that extrinsic motivators such as rewards, recognition and fame can weaken intrinsic motivation and end up controlling one's behaviour. Hence, medical students' choice to choose the MBBS course could be subconsciously influenced by their extrinsic motivated behaviour.

In this study, the Extrinsic Motivated Behaviour Inventory (EMBI) was utilised to identify the different dimensions of the extrinsic motivated behaviour of the selected medical students. The Metacognitive Skills Inventory (MSI) was developed by modification and derivation from various sources from past literature to assess the level of selected medical students' metacognitive skills. The correlation done between the two inventories was used to identify if the selected medical students were able to cope with the hectic syllabus once they enter medical school. From further statistical analysis, the relationship between students' metacognitive skills and the year-end examination results revealed if these students really gave deeper metacognitive thought into their thinking. In other words, the researcher aimed to also explore if the NIC and the UMMP curricula had any influence on the alignment of the medical students' extrinsic motivated behaviour and metacognitive skills from the aspect of students' academic achievement.

The EMBI developed in this study could possibly enable potential medical students to identify their dimensions of extrinsic motivated behaviour while the MSI would enable the student to gauge their metacognitive skills level. Hence, completing both the inventories would give students an idea on how both these two essential domains are aligned within themselves. Students will be able to understand themselves better and know what drove them to choose medicine and whether they are ready to be in the medical school which is full of challenges. This could enable them to consider carefully before making the decision as the alignment of the two domains could pre-facilitate their choice in choosing medicine.

Students who are already in the medical school could also use the EMBI to rediscover their motive for being in the medical school while the MSI could provide information for students to enhance their learning strategies. The alignment of the two domains would be able to assist medical students to reflect on their aims for being in the

medical school and also as a reminder of their effort to acquire knowledge and put the thoughts into action. Students will also be able to spend more time on activities which will enable them to perform and put their knowledge into good practice.

The alignment of the two domains will enable medical teachers to identify students who are struggling or facing difficulties to cope in the medical school. In addition, medical teachers would be able to plan effective teaching strategies which could optimise the medical students' learning process. Effective teaching strategies will help the medical students especially in the transition of pre-clinical to clinical years. As for the medical school, effective teaching approaches which enhance students' learning processes can be enriched. These approaches can be continuously reviewed and developed over the years to support and augment students' dynamic learning environment. The EMBI and MSI developed can be used as complementary tools for entry selection of medical students in addition to existing selection methods and criteria.

1.7 Operational Definitions

1.7.1 Extrinsic Motivated Behaviour

Extrinsic Motivated Behaviour is self-determined through developmental processes of internalization and integration and does not occur spontaneously (Ryan & Deci, 2000b). When the external regulation is internalized and integrated, then the student will accommodate and work more effectively (Vansteenkiste, Lens, & Deci, 2006). The Extrinsic Motivated Behaviour is classified into four different types with distinguishable degrees of regulations, which are; external regulation, introjected regulation, identified regulation and integrated regulation (Ryan & Deci, 2000b).

In the context of this study, the Extrinsic Motivated Behaviour among the MBBS students was measured by the Extrinsic Motivated Behaviour inventory developed in the study. Each type of regulation will now be defined. (Appendix A)

1.7.1.1 External Regulation

External regulation is controlled by demand and students who possess this type of regulation are engaging in a behaviour to obtain a reward or to avoid punishment (Ryan & Deci, 2000b). Medical students' who are external regulation dominant will be driven by rewards, grades or just to fulfill the course requirement as they perform tasks during lessons. The Extrinsic Motivated Behaviour in this study has 10 items to measure external regulation. (Appendix A)

1.7.1.2 Introjected Regulation

Introjected regulation is motivated by internal pressures in the students' self, such as ego, guilt or self-esteem. This type of regulation is within the person but external to the self (Ryan & Deci, 2000b). The Extrinsic Motivated Behaviour Inventory this study has 10 items to measure introjected regulation. (Appendix A)

1.7.1.3 Identified Regulation

Identified regulation occurs when a student is driven by values and personal satisfaction (Ryan & Deci, 2000b). The medical students who are identified regulation dominant see the importance of self-selected goals and the value of appropriate behaviour. These students have an aim and know what they seek for in doing the MBBS course. They are able to set their learning goals and are focused in their tasks. The Extrinsic Motivated Behaviour in this study has 10 items to measure identified regulation. (Appendix A)

1.7.1.4 Integrated Regulation

Integrated regulation is the most self-determined regulation which refers to an assimilation of values into the students' sense of self (Ryan & Deci, 2000b). This is also known as the most autonomous level and highest degree form of extrinsic motivated behaviour. A medical student who is integrated regulation dominant which is the most mature form of extrinsically motivated behaviour will behave with a true sense of willingness. A medical student who is categorised into this regulation will aim to do the best in what he/she is doing in the MBBS programme. One will go all out for tasks given and is willing to learn to achieve self-satisfaction with noble values added. A student dominant in this regulation does not give up easily and tries to attempt tasks successfully. The Extrinsic Motivated Behaviour in this study has 10 items to measure integrated regulation. (Appendix A)

1.7.2 Metacognitive Skills

Metacognition is a thinking ability that one can use to take charge of their own learning. One is aware of how they learn, one can evaluate their learning needs, one can also generate strategies to solve problems. Learners have been found to build metacognitive skills (Hacker, 2009). Metacognition in the context of this study refers to medical students' automatic awareness of their own knowledge and their ability to understand, control, and manipulate their own cognitive processes during lectures. Metacognition also refers to student's own thinking processes such as learning skills, memory capabilities and the ability to monitor their own learning. Metacognitive skills in this research are classified into:

1.7.2.1 Metacognitive Knowledge

Metacognitive knowledge is about students' own cognitive processes and understanding of how to regulate those processes to maximize learning (Gregory & Sperling, 1994). Medical students who demonstrate a high level of metacognitive knowledge will be able to understand the in-depth knowledge in the MBBS course. They will be able to digest difficult and abstract topics to make it simpler and more concrete. The learning goals that they set for themselves will be to attain knowledge and strive for excellence. The Metacognitive Skills Inventory in this study has 26 items to measure metacognitive knowledge. (Appendix A)

1.7.2.2 Metacognitive Regulation

Metacognitive regulations are processes that medical students use to control cognitive activities and to ensure that a cognitive goal has been met in sequence. This regulation helps students to set learning goals which consist of planning and monitoring cognitive activities, understand their learning styles, as well as reflecting and evaluate the learning outcomes (Hammann & Stevens, 1998).

Metacognitive skills are important not only when students are in medical school, but throughout the life of a medical practitioner. A person with a high degree of metacognitive regulation knows the stages in the process of learning and understands his own preferred approaches to solving a problem, can identify and overcome difficulties in learning and can bring learning from theoretical based facts learning to clinical situations. The Metacognitive Skills Inventory in this study has 26 items to measure metacognitive regulation. (Appendix A)

1.7.3 Alignment

According to the Oxford Dictionary, alignment means arrangement in a straight line or in correct relative positions. In the context of this study, the word alignment refers to how medical students' extrinsic motivations are parallel with their metacognitive skills. The researcher of the present study compared how first year medical students' extrinsic motivations are in line with their metacognitive skills and their academic performance in two curricula, the NIC and the UMMP.

1.7.4 Interactions

Interactions in this study refer to how the statistical effect of extrinsic motivated behaviour on the students' academic performance is dependent on the value of metacognitive skills. Interaction also refers to when a correlation between extrinsic motivated behaviour and metacognitive skills is affected by medical students' academic performance. This means, the strength of a correlation between extrinsic motivated behaviour and metacognitive skills is different depending on the medical students' academic performance in the two curricula.

1.7.5 MBBS Students

MBBS is the abbreviation used to refer to Bachelor of Medicine, Bachelor of Surgery and are the two first professional undergraduate degrees awarded upon graduation from medical schools in medicine and surgery by universities in various countries that follow the tradition of the United Kingdom, including the University of Malaya. The MBBS degree is awarded in the University of Malaya after an undergraduate course lasting five years. Students of the MBBS programme in the University of Malaya comprise of students who have undergone the University of

Malaya Science Foundation course, matriculation or Malaysian High School Certificate (STPM).

In Malaysia, students generally have three options of undergoing pre-university before entering the medical school: (i) The Centre of Foundation Studies; which is managed by the University of Malaya, (ii) Matriculation; which is applied through the Ministry of Education and has matriculation schools throughout Malaysia and (iii) STPM (*Sijil Tinggi Pelajaran Malaysia* or the Malaysian Higher School Certificate) which is offered to students as an A-level equivalent pre-university in local government schools.

1.7.5.1 The New Integrated Curriculum (NIC)

The NIC curriculum, also known as the New Integrated Curriculum was used as the curriculum in the MBBS course in University of Malaya since 1998. This curriculum was introduced in line with the Medical Faculty curriculum review and current trends in medical education in the 1980's. The duration of the course is five years and it is divided into three phases throughout the five years;

i) Phase I (First year) where medical students learn about the normal human body and its function.

ii) Phase II (Second year) where medical students learn about the body's reaction to injury and abnormalities.

iii) Phase III (Third to fifth year) is basically practice-based (clinical) medicine where medical students go for their clinical postings in local hospitals.

The New Integrated Curriculum was designed to provide an integrated framework of the essential concepts of the scientific basis of medicine with early emphasis of clinical relevance. Important concepts are revisited in a spiral effect

through all phases of the course. Problem-based, system-based and evidence-based approaches are introduced to encourage self-directed learning and sharpen problem-solving skills. The curriculum is also aimed at producing a competent doctor with a holistic approach to the practice of medicine.

The content of the New Integrated Curriculum course is divided into three main strands that run vertically through the course, namely (i) The scientific basis of medicine which includes the study of the normal human body and its function; the body's reaction to injury and practice-based medicine; (ii) The Doctor, Patient, Health and Society (DPHS) which includes the study of preventive, environmental and occupational health in the community; medical statistics, epidemiology, two field projects, Community Family Case Studies (CFCS) and family health; (iii) Personal and Professional Development (PPD) which includes improvement of learning, analytical, critical thinking and communication skills, nursing skills, medical ethics, research methodology and exposure to optional fields of interest via elective programs.

1.7.5.2 The University of Malaya Medical Programme (UMMP)

The newly introduced MBBS curriculum, also known as the University of Malaya Medical Program (UMMP) first rolled out in September 2013, replacing the New Integrated Curriculum and is in the transition stages of implementation. This curriculum was introduced in line with the Faculty of Medicine's curriculum review and the current trends in medical education. The duration of the medical course is five years and it is divided into four stages throughout the five years; (i) Stage 1 (1 year); (ii) Stage 2 (1 year); (iii) Stage 3A (1 1/2 years); (iv) Stage 3B (1 1/2 years). The UMMP curriculum approach is different to the NIC because it is conducted in block system according to the disciplines. The block system in Stage 1 and Stage 2 covers the human

structure and function, mechanisms of health and diseases, prevention, diagnosis and treatment of health and disease, development of professionalism and information skills. Besides Problem-based learning (PBL) sessions, Self-directed learning sessions are introduced with the aim of developing medical students' skills in acquiring relevant information. Visits to wards are also introduced in Stage 1 to enable medical students to gain experience in interacting with patients.

The University of Malaya Medical Program (UMMP) was designed to equip medical students with excellent clinical skills and practice readiness and to provide medical students with experience and awareness of health. The content of the UMMP course is divided into four broad themes that run throughout the course, namely (i) Basic and Clinical Sciences which is aimed at providing the scientific foundation of medical studies; (ii) Patient and Doctor sessions which covers clinical knowledge and skills, clinical reasoning and clinical communication; (iii) Population Medicine which involves interactive and encouraging debate and presentations; (iv) Personal and Professional Development (PPD) which includes sessions on aspects of personal development and professionalism, law relevant to medical practice, ethics and patient safety.

1.8 Scope of the Study

The scope for this research is only for MBBS students enrolled in the University of Malaya. This research involved only first year students of both the NIC and the UMMP curricula because the curricula are in transition stages of implementation. In this research, a Metacognitive Skills Inventory and an Extrinsic Motivated Behaviour Inventory were administered to the MBBS first year students of both the NIC and the UMMP curriculum in the University of Malaya.

The Metacognitive Skills Inventory enabled the researcher to identify the dimensions of students' knowledge and regulation skills. The researcher was also able to profile and identify medical students with different types and degrees of regulation using the Extrinsic Motivated Behaviour Inventory. As there was no selection tests conducted to choose these medical students, a correlation between both inventories was done to show the significance between students' metacognitive skills and their extrinsically motivated behaviour.

Both the inventories were administered to first year students of the NIC and the UMMP curriculum and statistical analyses were done to compare between the two groups of medical students who had undergone the two different approaches. The inventories were administered to students upon completing their first year as MBBS students. Interviews were conducted only with selected medical students based on their type and degree of self-regulation, identified from the Extrinsic Motivated Behaviour Inventory.

1.9 Limitation of the Study

This study involved first year MBBS medical students both from the NIC and the UMMP curriculum from University of Malaya, Kuala Lumpur. The limitation of this study is that although the researcher has explained that the research sought accurate and honest responses from the medical students to enable the analysis to be done accurately, some students could have answered the self – evaluation questions of the instruments with answers they considered as more correct or would reflect better on them.

1.10 Chapter Summary

Extrinsic motivated behaviour is a behaviour very much influenced by external factors such as rewards, recognitions, self-esteem, job demands and promising career pathway. Medicine being a critical course appears to be a popular programme among Malaysian students who scored a perfect score for their pre-university examinations. In this study, the Extrinsic Motivated Behaviour Inventory (EMBI) was developed to profile first year medical students at the University of Malaya according to the four dimensions; external, introjected, identified and integrated regulation. Besides the extrinsic motivated behaviour, one will require to have metacognitive skills to endure the hectic schedule and challenging syllabus in the medical school. The Metacognitive Skills Inventory (MSI) was also developed to study the two dimensions of metacognitive skills; metacognitive knowledge and metacognitive regulation.

The Faculty of Medicine in University of Malaya has recently reviewed the medical curriculum. The old MBBS curriculum, Newly Integrated Curriculum (NIC) was replaced with the University of Malaya Medical Programme (UMMP). Both curricula stretch across five years but use different approaches. In the NIC curriculum, medical students learn about the normal and human body in the first two years and have the clinical rotations from the third year onwards, through fifth year. There are however some differences in the teaching and learning environment in the UMMP curriculum. In the University of Malaya Medical Programme (UMMP), the content taught is according to block systems and students have designated self-directed learning themes, presentations and ward round visits from the first year onwards.

Both the Extrinsic Motivated Behaviour Inventory and the Metacognitive Skills Inventory developed were administered to the first year medical students of both the NIC and the UMMP curricula. Literature has indicated the existence and importance of the two domains and how they affect the academic performance of medical students.

The alignment of extrinsic motivated behaviour and metacognitive skills however has not been researched into and the findings from the study are essential and could benefit potential medical students in indicating if they have made the right selection to be in a medical school. Furthermore, current medical students can benefit in identifying areas of concern that they can improve in. In addition, medical teachers can be informed as to how enrichment of teaching and learning styles can be brought about in their medical curriculum review for the medical programme which can optimise students' learning and. In addition, the inventories can be used to complement existing entry selection criteria of students into the University of Malaya medical school. In the next chapter, a literature review on past research is discussed.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The medical profession has always been seen as a noble one, where lives are saved and diseases cured. The World Health Organization, (WHO) provides counsel and shares their organizations' models to facilitate the change in medical curricula progressively and acknowledges that the development of human resources for health is a complex and key element in reforming the health systems (Conaboy, Nugmanova, Yeguebaeva, Jaeger, & Daugherty, 2005). The World Health Organization also addresses both the political and regulatory environment and the professional and academic environment that affect the quality of medical schools (Conaboy et al., 2005).

A review of relevant literature indicates that much research in relation to motivation has been done in the medical education field. Al Shawwa et al. (2015) in their study found that excellent medical students have many different characteristics and they have strong motivation and find joy in their studies. This is also in accordance with House (2002) who found that students' characteristics, lifestyle, learning environments and instructional activities does affect their achievement.

Past research has focused on the importance of motivation, whereby the motivation is classified into intrinsic and extrinsic motivation and how it influences students' performance (Alireza et al., 2012; Kusurkar, Croiset, Galindo-Garre, & Ten Cate, 2013). In a research by Hurwitz et al. (2013) to study the perception of medical students, it was found that motivation is one of the most desirable affective qualities in medical students and doctors. It was also found that clear academic goals and motivation positively impact academic performance (Al Shawwa et al., 2015).

Dias et al. (2012) mentioned that motivation for choosing medicine is a personal aspect that can modulate the distress with academic demands. However, he did not

specify the type of motivation involved in detail. Tanaka et al. (2009) also mentioned that motivation is one of the most important psychological concepts in education and is related to academic outcomes in medical students. While the study conducted by Fergusan et al. (2002) concludes that motivation is important, the study also found that previous academic performance is not a perfect predictor of achievement in medical training.

Metacognitive skills refer to how much a student is able to plan to achieve a goal, especially as a medical student who is faced with overwhelming schedule and academic load. In the context of metacognitive skills, students not only need to acquire a level of cognitive achievement, but the student is also expected to be able to decide on the learning styles and reflect on their studies or activities which is related to their achievement (Lie & Kay, 2013). Effective interpretation of the information learnt in class, in order to monitor progress is also critical (Lie & Kay, 2013). Although the aspects of metacognitive skills have been studied widely in various fields, the alignment of the extrinsic motivated behaviour and metacognitive skills of medical students have not been looked into.

The NIC curriculum which has been used since 1998 aimed to produce competent doctors. The NIC curriculum which was used for fourteen years revealed weaknesses in the teaching and learning components emerging from the feedback of medical educators, patients, the society and medical students themselves. For example, there was a lack of standardisation in the teaching of prescribing skills across the undergraduate programme (Sim, Choo & Ng, 2009), knowledge incompetency of medical students in Malaysia (Mahyuni, 2013), medical students having unrealistic expectations of perfection (Zhou, 2014), feeling of incompetence and lack of motivation among first year medical students (Radeef, Faisal, Ali, & Ismail, 2014). In 2013, a newly revised MBBS curriculum called the UMMP was introduced in the University of

Malaya to address the dynamic changes in medical curricula globally and at the same time to improve on the weaknesses of the NIC curriculum.

2.2 Motivation in Education

Over the decades, researchers in the field of psychology globally have studied motivation using various methods and have generally put forward two major types of motivation, which is intrinsic and extrinsic motivation (Cheng & Cheng, 2012; Kusurkar, Cate, Vos, Westers, & Croiset, 2012b; Kusurkar, Croiset, Galindo-Garre, et al., 2013; Ryan & Deci, 2000d; Schunk, 2004; Sobral, 2004; Wolters, 2003). Researchers in the educational field have also explored how affective domains might influence achievement outcomes apart from the effects of cognitive factors alone (Pekrun, 2006; Pintrich, 2003). It was also proposed by the contemporary educational psychologist Linnenbrink (2006) that human thinking is much more flexible, fickle and is subject to motivation and emotions that may serve multiple purposes at a time.

The definitions for motivation in education by researchers include; motivation is the process where goal-directed activity is instigated and sustained (Pintrich & Schunk, 1996); stronger autonomous motivation reflects on higher levels of orientation, reflection in learning and peer-tutoring experience (Sobral, 2004), and motivation drives students to an appropriate sense of direction for efficient learning (Palmer & Devitt, 2007). Other definitions of motivation include motivation influences satisfaction strongly (Geus et al., 2010), motivation denotes the strength of a person's desire to attain a goal (Schmidt, Palminteri, Lafargue, & Pessiglione, 2010) and motivation as the power that triggers action that follows (Cheng & Cheng, 2012).

Researchers in recent years have come forward with several definitions; motivation acts as a lens for understanding the attributes of a programme (Emmett & McGee, 2013), motivation refers to a psychological concept that refers to a person's

willingness to put forth effort in order to achieve educational goals (Luqman, 2013) and motivation depends on whether the motivation is internal or external (Kusurkar, Croiset, Galindo-Garre, et al., 2013).

Intrinsic motivation is the type of motivation where one has the feeling of wanting to achieve a goal, because one truly wants to and takes pleasure or sees value in doing so. In accordance to the Self-determination Theory (SDT), intrinsic motivation is seen when an activity is done out of genuine interest, and controlled motivation is seen when an activity is done because of external factors (Ryan & Deci, 2000a). The stronger autonomous motivation such as intrinsic motivation is widely associated with students' learning, psychological endurance and adjustment from the learners themselves (Hamdan-Mansour, Hamaideh, Azzeghaiby, Hanouneh, & Aboshaiqah, 2015; Sobral, 2004).

Pintrich (2003) put forward the thought that, if a student believes he has a limited capacity for learning or feels unlikely to succeed, that student will not be as academically motivated. Pintrich (2003) also added that extrinsic motivation is the desire to do or achieve something not for the enjoyment of the thing itself, but because doing so leads to a certain result. Educationists have acknowledged how critical is the role of personal factors such as motivation will play in students' learning and performance (Dai & Sternberg, 2004; Grant, 2006; Linnenbrink, 2006; Pekrun, 2006; Pintrich, 2003; Schunk, Pintrich, & Meece, 2008; Schutz & Pekrun, 2007).

The affective domain of extrinsic motivation such as students’ willingness to receive information, internalising their beliefs and values and feelings of satisfaction has not been much studied but has been deemed to have an effect on student's performance. Figure 2.1 shows the taxonomy of human motivation which has been widely used as a building block in research involving motivation (Ryan & Deci, 2000b). In the present study, the researcher focused only on the component of extrinsic motivation.

Based on Figure 2.1 (Page 32), Ryan and Deci (2000b) had put forward the thoughts about amotivation, extrinsic motivation and intrinsic motivation which exist within oneself. The focus of this research is to look into extrinsic motivation which was categorised into external regulation, introjected regulation, identified regulation and integrated regulation. Amotivation is not being studied because generally, students who enter medical school somewhat have a level of motivation in them (Dias et al., 2012; Hurwitz et al., 2013; Kusurkar et al., 2012b).

2.3 Motivation in Medical Education

In medical education, past research have defined motivation as one of the most desirable qualities in medical students and doctors (Hurwitz et al., 2013; Lawson & Bearman, 2007). Motivation is also looked upon as one of the most important psychological concepts in education and is related to academic outcomes in medical students (Tanaka et al., 2009). Furthermore, motivation for choosing medicine is considered as a personal aspect that can modulate the distress with academic demands (Dias et al., 2012). However, the affective factors related to motivation have received less emphasis in the medical education literature (Artino, La Rochelle, & Durning, 2010).

The desire to be in a medical school is said to be driven by different motives. These could be due to factors such as the desire for intellectual challenge and or due to external factors such as pressure from parents, monetary rewards or recognition (Brissette & Howes, 2010; Kusurkar et al., 2012b; Ryan & Deci, 2000b). Sobral (2004) noted that medical students respond within a context of interlocking rewards and relationships, incentives and barriers as they go through their learning experiences.

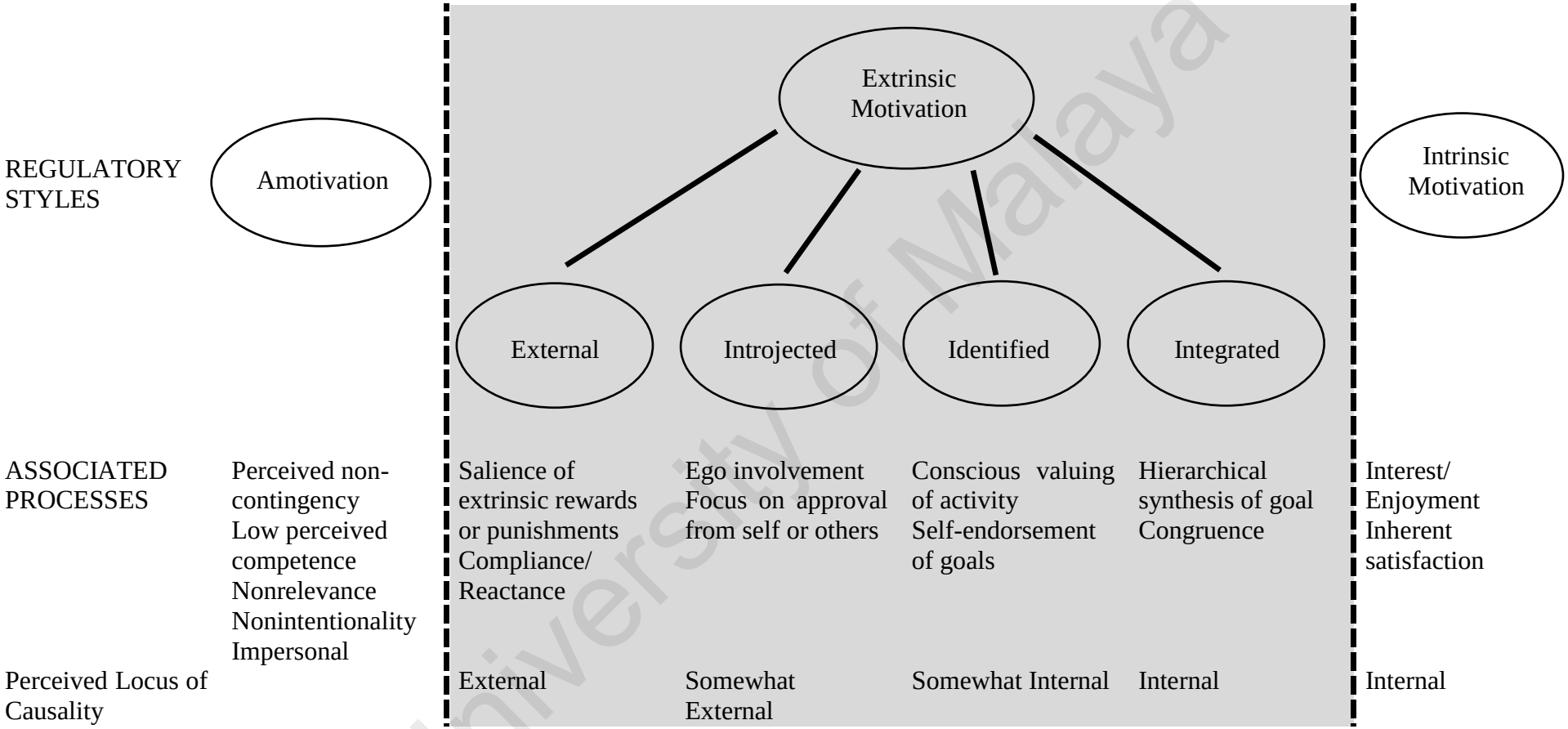


Figure 2.1: A Taxonomy of Human Motivation

Adapted from Ryan and Deci (2000b); *Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions*

The types of motivation displayed by medical students are said to be able to predict how students adjust to their study, the effort they put into their study, their academic performance in medical school and may also affect their preference to specialise in a specific medical area in the near future (Kusurkar et al., 2012b; Vansteenkiste et al., 2006). Artino et al. (2010) used motivational beliefs and achievement emotions to predict medical students' academic achievement in an introductory clinical reasoning course. It has also been noted that personal beliefs, emotions and academic outcomes interact as determinants of one another (Pekrun, 2006).

There have been numerous research studies which had been carried out to study intrinsic motivation and found that intrinsic motivation as compared to extrinsic motivation does lead a student to greater information processing, deep learning, better academic performance and a decrease in attrition rate (Alireza et al., 2012; Cheng & Cheng, 2012; Lin, McKeachie, & Kim, 2001; Tanaka et al., 2009; Vansteenkiste et al., 2006). Wolters (2003) review of literature emphasised on regulation of motivation as part of self-regulated learning. He indicated that regulation of motivation has been positively associated with the more cognitive and metacognitive elements and students are more likely to get better grades than students who do not regulate their motivation.

On the other hand, research conducted by Okello and Gilson (2015) revealed that policies have intended to target the extrinsic motivation for healthcare workers worldwide. Strategies such as pay-for-performance, establishing conducive work environments and new public management strategies are favoured by employers nowadays (WHO, 2007) and hence, extrinsic motivation does have an effect on healthcare professionals' beliefs and performance. Kusurkar and Croiset (2015) had put forward that more research into individual differences in motivation and learning are

important to ensure successful employment of strategies customized to medical students' needs and demands.

It is indeed a challenge for medical educators to better understand the personal factors such as motivation that lead to individual success in a medical school and beyond (Artino et al., 2010). It has also been found that students' autonomous motivation will encourage them to portray autonomy-supportive style of relating to the patients (Williams, Saizow, & Ryan, 1999). To the best knowledge of the researcher, there was only a study in the field of medical education which was conducted by Kusurkar, Croiset, Galindo-Garré, and Cate (2013) which classifies medical students according to their motivational profiles. They created subgroups of intrinsic or controlled motivation and studied how these affected learning in medicine. However, the classification of the students were done according to levels (high level or low level) of intrinsic motivation and controlled motivation in general. There is so far no study which focused on the classification and exploration of the dimensions of extrinsic motivated behaviour.

2.3.1 Methodology on Motivational Research in Medical Education

An analysis of methodologies used in previous studies by the researcher found different types of research approaches have been used to measure motivation. The commonly used research designs include qualitative, quantitative and mixed model designs. Perrot, Deloney, Hastings, Savell, and Savidge (2001) in their study to measure motivation of students in health profession colleges, used the Archer's survey to identify and validate an instrument that would only measure goal orientation preferences of students in health professional programmes.

Sobral (2004) utilised the Academic Motivation Scale (AMS) and administered the survey to 297 students after the first medical year from consecutive classes within a

four-year timeframe and obtained measures of learner orientation and reflection in learning. However, the usage of this instrument does not explicitly cover medicine-related sources of motivation, either externally determined or internally derived (Sobral, 2004). Zuger (2004) reviewed articles which contains subjective and objective indicators of present-day dissatisfaction among physicians. On a case study addressing the medical education reform in central Asian republics, Conaboy et al. (2005) reviewed both the political and regulatory environment and the professional and academic environment that affect the quality of medical schools.

Lawson and Bearman (2007) developed focus group and interview methodologies to provide detailed qualitative data to provide comprehensive insights including medical students' motivation within the Australian medical education system. Mcloughlin (2009) on the other hand used reflective essays and discovered that there was a need for students to construct meaningful linkages between information and concepts learned across different areas of medicine. However, medical students who begin to sense failure at the beginning of the course would find it challenging to be in medical school.

Alireza et al. (2012) researched on motivation and academic achievements in medical students using a cross-sectional correlational study. A self-report inventory, the Inventory of School Motivation (ISM) was administered and they found that higher motivation scores in areas of competition, effort, social concern, and task were accompanied by higher average marks at pre-clinical as well as clinical levels. However, students in the clinical levels showed greater motivation for social power as compared to the pre-clinical medical students. This revealed that extrinsic motivation can overpower the intrinsic motivation in medical students.

Maurer, Allen, Gatch, Shankar, and Sturges (2012) used an adapted version of the Academic Motivation Scale (AMS) and administered the survey to medical students

in the human anatomy and physiology course and found that students with intrinsic motivation and amotivation are significant with students' academic behaviour. It was also found that although the extrinsic motivation level was high, there was no significant correlation with the academic behaviour. Kusurkar et al. (2012c) reviewed literature on motivation theory related to education and on medical education curriculum development. They discovered that motivation drives learning and influences students' academic performance and is one of the main basis for improving students' metacognitive regulation. Pagnin et al. (2013) applied self-administered questionnaires in 277 medical students which revealed that medical students motivated by personal or family member's illness or death revealed a significant greater emotional exhaustion when compared with the students with other sources of motivation.

An internet-based electronic survey was used by Kusurkar, Croiset, Galindo-Garré, et al. (2013) to administer a modified version of the Academic Motivation Scale (AMS) to measure intrinsic and controlled motivation. The intrinsic motivation scores were calculated from the AMS in this study as an average of the scores on the three subscales of intrinsic motivation which is to know, to accomplish things and to experience stimulations (Vallerand et al., 1993) while controlled motivation scores were calculated by taking an average of only introjected regulation and external regulation extrinsic motivation scores. More recent research conducted by Zhang, Li, Li, Li, and Zhang (2015) on motivation among students showed the Academic Motivation Scale (AMS) was found to be psychometrically sound and could be used in China.

The extrinsic and intrinsic motivation subscales of the Motivated Strategies for Learning Questionnaires (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991) were chosen as counterparts of the AMS although the AMS is used in many other studies (Kusurkar, Croiset, Galindo-Garré, et al., 2013; Zhang et al., 2015). This is primarily because all the items used in the AMS consists of general motivation statements,

extrinsic motivation subscales and intrinsic motivation. Therefore the researcher did not attempt to use the AMS survey as the subscales were not able to measure the subscales of extrinsic motivation as intended in this study where four dimensions of extrinsic motivated behaviour are put forward (Ryan & Deci, 2000b) rather than three.

Feiz, Hooman, and Kooshki (2013) in their research had used the MSLQ and the results of study show that the questionnaire was reliable (alpha was .958). Six factors were obtained by exploratory factor analysis that explained 40.95% of total variance to evaluate the construct validity of the MSLQ questionnaire. The findings also support the fact that the MSLQ is a useful tool for assessing the motivated strategies for learning. Based on the literature review, there is no specific instrument which can be used to measure extrinsic motivation among medical students. Artino and Naismith (2015) noted that since there was no reference standard measure of emotion, therefore medical education researchers must be able to define and choose the measurement approaches accordingly. The researcher of the present study has gathered information on the Motivated Strategies for Learning Questionnaires (MSLQ) which was widely used in the field of education. The MSLQ does not include any measures of students' attempts to monitor, control, and regulate their motivation or affect, making it a limited instrument in terms of assessing important motivational and affective self-regulatory strategies adapted the items in the instrument. Thus, the researcher has then adapted the items from MSLQ and added on some item into the Extrinsic Motivated Behaviour Inventory (EMBI) used in this study accordingly.

To the best knowledge of the researcher, a thorough literature search has been conducted and there are no previous research undertaken in Malaysia which has used the mixed model design to study on extrinsic motivation among first year undergraduate medical students. The researcher has reviewed articles on several databases such as EBSCOhost, Science Direct, Direct Access e-Journals, MEDLINE and PubMed but was

unable to find any study which has researched upon students' alignment of extrinsic motivated behaviour and metacognitive skills in Malaysia. However, research have been conducted to study on one of the domains at a time, either on motivation or metacognition with other variables on medical students with the use of self-administered questionnaires and surveys.

In this study, the researcher used a mixed model design where two inventories were developed and administered to the medical students. Thereafter, an interview was carried out after the students were categorised into the different dimensions of extrinsic motivated behaviour.

2.4 Extrinsic Motivated Behaviour

> "*Some people seem to be driven by a passionate interest in their work, a deep level of enjoyment and involvement in what they do*." (Amabile, 1993)

Brown (2007) defined extrinsic motivated behaviour as the tendency to perform activities for known external rewards, such as monetary rewards and gifts or psychological such as praises. Extrinsic motivated behaviour is a type of motivation which comes from the outside and such motivation is similar to winning awards, receiving financial incentives and to attract attention from others (Karageorghis & Terry, 1969). Another interesting finding by Connell and Wellborn (1990) revealed that extrinsic motivation is associated with greater involvement in what a person does. This may also contribute to how more autonomous extrinsic motivation is associated with less drop outs and greater psychological well-being (Sheldon & Kasser, 1995; Vallerand & Blssonnette, 1992). Extrinsic motivation is also thought to be a construct that ensures whenever an activity is done in order to attain some separable outcome (Ryan & Deci, 2000b).

Pintrich (2004) also recognised that there are biological, developmental, contextual and individual constraints which can interfere with an individual's effort in his or her performance. Thompson (2014) described extrinsic motivation as the type of motivation which is frequently emphasised in the societies and when one is extrinsically motivated, the person tends to behave based on a highly regarded outcome rather than for the fun or development of the activity. Ryan and Connell (1989) investigated the different types of motivation achievement in behaviours, for example in doing homework among elementary school children, assessing the different dimensions of extrinsic motivated behaviour for engaging in these behaviours. They found that the four types of regulation were inter-correlated. Deci and Ryan (2000c) revealed that differences in attitudes and adjustment to the environment were also associated with the different types of extrinsic motivation. Other researchers have noted that different motivational regulations should reflect different motivation types with different qualitative differences (Zhang et al., 2015).

Further to this, Deci (1975) also explained that when a person's feelings of competence and self-determination are enhanced, his intrinsic motivation would increase. If his feelings of competence and self-determination are diminished, his intrinsic motivation will decrease. In other words, he pointed out that extrinsic motivated behaviour somewhat affects the intrinsic motivated behaviour. Karageorghis and Terry (1969) referred to extrinsic motivated behaviour as a type of motivation which is external, such as the motivation to win medals, receive financial rewards and to attract attention from the media.

The literature has defined extrinsic motivation generally except for Kusurkar (2012a) and Ryan and Deci (2000b) who added that the scope of extrinsic motivation behaviour is externally regulated to four different extents. Among the four components are:

a) External regulation

b) Introjected regulation

c) Identified regulation

d) Integrated regulation

Based on the literature review, the researcher of the present study concluded that the understanding of extrinsic motivated behaviour revolves around external factors such as rewards and praises which influences a medical student's motivation to work harder in his field. The less autonomous form of extrinsic motivation has the intention of performing the task which is not solely due to one's own choice and liking per se, but more to pleasing surrounding people, society and also to gain external rewards. In this study, the researcher categorised the dimensions of extrinsic motivated behaviour into external, introjected, identified and integrated regulation based upon The Taxonomy of Human Motivation (Ryan & Deci, 2000b).

2.4.1 External regulation

This type of behaviour that is regulated by external forces, such as pressure from others, rules, regulations, rewards and punishment, none of which are felt as free choice (Kusurkar et al., 2012b). Ryan and Deci (2000d) thought that such behaviours are performed to satisfy an external demand or obtain an externally imposed reward contingency. Individuals who possess external regulation typically experience externally regulated behaviour as controlled (DeCharms, 1968). External regulation is the only kind of motivation recognized by operant theorists B.F Skinner. Ryan and Connell (1989) suggest that the more the students were externally regulated, the less they showed interest, value or effort. They even have higher tendency to blame others, such as the teacher for negative outcomes.

2.4.2 Introjected regulation

Nicholls (1984) and Ryan and Deci (2000b) had defined introjected regulation as a behaviour in which a person performs an act in order to enhance or maintain self-esteem and the feeling of worth. This type of behaviour refers to behaviour that is regulated by accepted rules, often affected by guilt or shame (Kusurkar et al., 2012c). Introjected regulation was positively related to effort put forward, but was also related to more anxiety and to poorer coping with failures (Deci & Ryan, 2000c). Introjected regulation is also described a type of regulation that is still controlling and full of self-esteem because students perform with the feeling of pressure in order to avoid guilt or anxiety to attain ego and pride (Deci & Ryan, 2000c).

2.4.3 Identified regulation

Identified regulation demonstrates a type of behaviour that is regulated by externally originated behaviour patterns that have become personally valued, endorsed, and internalized (Kusurkar, 2012a). It is a more independent or self-determined form of extrinsic motivation (Ryan & Deci, 2000b). For example, the person has identified with the personal importance of a behaviour and has thus accepted its regulation as his or her own (Ryan & Deci, 2000b). Ryan and Deci (2000b) also found that identified regulation was associated with greater enjoyment of activities and more positive coping styles.

2.4.4 Integrated regulation

Integrated regulation is the highest degree and most autonomous behaviour that is regulated by values that have become deeply integrated within the self (Kusurkar, 2012a). Integration regulation comes to be when identified regulations have been fully assimilated to the self (Ryan & Deci, 2000b). According to Beswick (2007) finding, this

type of regulation occurs through self-examination and bringing new regulations into congruence with one's other values and needs. The more one internalizes the reasons for an action and assimilates them to the self, the more one's extrinsically motivated actions become self-determined (Beswick, 2007). Due to the assimilation of actions which became self-determined, some studies hardly recognized these actions as external regulation (Kusurkar, 2012a).

Therefore, integrated regulations share many similar qualities with intrinsic motivation (Ryan & Deci, 2000b). Although this type of regulation is very much valued by oneself, integrated regulation is still extrinsic because the behaviour is motivated by its presumed instrumental value with respect to some outcome (Ryan & Deci, 2000d).

2.5 Metacognition

The large area of cognition which led to the field of metacognition was first initiated by Flavell in the 1970s and was later enriched by renowned researchers in the field of metacognition such as Cross and Paris (1988), Kuhn and Dean (2004) and G. Schraw (2006). Flavell (1976) in his article stated that metacognition refers to one's knowledge concerning one's own cognitive processes or anything related to them. Flavell has since opened the path for the academic community to come forth and has enabled research related to metacognitive to have continued more than thirty years later. These include understanding and regulating one's own cognitive processes in order to monitor, direct and control them (Kincannon, Gleber, & Kim, 1999). Metacognition could be simply defined as thinking about thinking or as a "person's cognition about cognition" (Gama, 2004).

Pioneering the metacognition field in 1971, Flavell used the term "metamemory" to refer to an individual's ability to manage and monitor the input, storage, search and retrieval of the contents of his own memory. He implied with his

statements that metacognition is intentional, conscious, foresighted, purposeful, and directed at accomplishing a goal or outcome. All of these implications have all been carefully studied in subsequent research. In some cases, there have been controversies among researchers in metacognition.

In his 1976 article, Flavell recognized that metacognition consisted of both monitoring and regulation aspects. It was here that the term metacognition was first formally used in the title of his paper. He defined metacognition as any kind of cognitive transaction with the human or non-human environment with a variety of information processing activities going on. Hacker et al. (1998) redefined metacognition in a more comprehensive manner. He included that metacognition is the knowledge of one's own cognitive and affective processes and the ability to consciously and deliberately monitor and regulate those processes.

Flavell (1976) also identified three "metas" that children gradually acquire in the context of information storage and retrieval. Among the "metas" he meant were;

(a) The child learns to identify situations in which intentional, conscious storage of certain information may be useful at some time in the future

(b) The child learns to keep current any information which may be related to active problem-solving and have it ready to retrieve as needed

(c) The child learns how to make deliberate systematic searches for information which may be helpful in solving a problem, even when the need for it has not been foreseen.

Mahdavi (2014) has also put forward that metacognition is a unique and successful niche in the self-regulatory area. Everson and Tobias (2001) in their research mentioned that there is a difference in the metacognition of effective learners and ineffective learners. Metacognitive aware learners are found to be more effective learners, show higher performance levels, use more strategies and are able to regulate

their own learning better (Hammann & Stevens, 1998). The effective use of metacognition has been shown to predict learning performance (P. R. Pintrich et al., 1990). Students with higher metacognitive skills outperformed those with lower metacognitive skills in problem-solving tasks and there is a strong correlation between metacognition and degree completion (Lindner et al., 1996). Studies of adults in the work force have also shown a positive influence of metacognition on performance (Blakey & Spence, 1990). Many studies in the earlier years were related to laboratory training but recent studies have more tendency to examine metacognitive instruction in a classroom (Veenman, 2012). Despite the many years metacognition has been put into practice, there were still numerous definition on metacognition and its components (Zohar & Barzilai, 2013).

Hence, the researcher's understanding of metacognitive skills revolves around a higher level of cognitive process, where students are able to plan systematically to achieve a goal, able to determine their learning methods and styles and are able to reflect on their activities to enhance and enrich their knowledge in an assigned task. Metacognitive skills consist of two dimensions, which are metacognitive knowledge and metacognitive regulation (Baker, 1991; Brown, 1987; Gregory Schraw & Moshman, 1995).

2.6 Metacognitive Skills

Metacognitive skills is an occurrence when a person takes conscious control of learning, planning and selecting strategies, monitoring the progress of learning, correcting errors, analysing the effectiveness of learning strategies and changing learning behaviours and strategies when necessary (Dunlap, 2005). Reder and Schunn (1996), Kentridge and Heywood (2000) argued that metacognitive skills and processes need not operate in a person's conscious awareness. It was said that the central purpose

of education was not to prepare children for adult life and the working world (Hazari, 2014).

In contrary, Slavin (2009) quoted that students can learn how to assess their own understanding, manage their studying time and choosing an effective plan to strategise their learning process. Research conducted by Roebers, Cimeli, Röthlisberger, and Neuenschwander (2012) also have shown that metacognitive skills are improved during the school years if the teacher teaches metacognitive strategies to help students. Ghonsooly, Khajavy, and Mahjoobi (2014) suggested that metacognitive skills can be taught. Metacognitive awareness is crucial in medical education and for the medical profession because it revolves around the ability to direct and regulate one's own learning experience which is essential for success (Gonullu & Artar, 2014b). In this study, the researcher focused on metacognitive knowledge and metacognitive regulation.

2.6.1 Metacognitive Knowledge

Education theorists believe that the development of metacognitive knowledge begins at a young age and continues through adolescence (Gregory Schraw & Moshman, 1995). Metacognitive knowledge encompasses declarative knowledge, procedural knowledge and conditional knowledge (Brown, 1987; Jacobs & Paris, 1987). Declarative knowledge requires a student to know "about" what is learnt, meaning that a student is able to retrieve what is learnt from one's memory (Gregory Schraw & Moshman, 1995). Procedural knowledge requires the students to know "how" to use their knowledge. This refers to the execution on how the knowledge gained is applied into situations faced (Gregory Schraw & Moshman, 1995). Conditional knowledge requires students to know "when" and "why" a knowledge is applicable (Gregory Schraw & Moshman, 1995).

The research study findings of Hoseinzadeh and Shoghi (2012) showed the relationship between cognitive processes, especially knowledge of metacognition with academic achievement and noted that any change in students' especially knowledge of metacognition will affect on their abilities to improve their academic performance. Besides, students who are high achievers in academic learning domains such as reading, writing, mathematics and science also exhibit higher levels of metacognitive knowledge about that domain and have developed greater abilities in self-regulation (Baker & Cerro, 2000).

In medical schools, one of the most common stressors identified is the pressure of academics with an obligation to succeed (Sreeramareddy et al., 2007). Research carried out have showed that Problem-based learning (PBL) has been introduced to medical students to help medical students remember more of the acquired knowledge (Dochy, Segers, Van den Bossche, & Gijbels, 2003). This is due to the expectations that medical students and practitioners are expected to be knowledgeable and extremely effective and efficient in diagnosing and making complex decisions despite their limited mental resources at that particular moment (Eva & Regehr, 2005). Skilled learners do possess better metacognitive knowledge because this process facilitates thinking and self-regulation which improves their performances. Hence, the level of metacognitive knowledge in medical students is an essential continuous process which reflects their performance and may affect their way of attending to situations when they become practitioners in the future.

2.6.2 Metacognitive Regulation

Metacognitive regulation refers to how a person's thinking or learning is controlled (Gregory Schraw & Moshman, 1995). It a reflective approach to problem solving that involves stepping back from the immediate problem to examine and reflect

on the thinking process (Croskerry, 2003). This dimension of metacognitive consists of three essential skills; namely planning, monitoring and evaluation (Jacobs & Paris, 1987; Miller, 1985; Gregory Schraw & Moshman, 1995). In the context of medical students, metacognitive regulation encourages better use of the basic medical knowledge in nurturing clinical judgement, critical thinking and reflective practice (Maudsley & Strivens, 2000).

The planning process requires students to identify strategies, time allocation and resources to use in a task (Miller, 1985). The ability to plan is a skill that develops spirally in an individual from young (Gregory Schraw & Moshman, 1995), hence medical students are expected to be able to plan well as they mature and are entering adulthood. Planning for learning activities can include setting cognitive goals for learning and activating prior knowledge about the task and materials to be studied (Pintrich, 2004).

The monitoring process requires students to be constantly aware of their performance. They need to monitor their own progress towards the aimed goals, monitor their learning and comprehension in order to be able to make adaptive changes (Bransford, Brown, & Cocking, 1999; Pintrich, 2000). It was agreed that students who monitor tasks given to them tend to perform better as they are more organised and know what needs to be prioritised (Gregory & Sperling, 1994; Gregory Schraw & Moshman, 1995). Medical students are expected to be able to monitor their own environment and being able to identify distractions such as music, social media networking and talkative peers and subsequent attempts to make the learning environment more conducive for studying.

The evaluation process revolves around reflection on one's action (Baker, 1989). Reflection is a metacognitive process that creates a greater understanding of both the self and the situation, thus the student will be more careful in carrying out future actions

(Gregory Schraw & Moshman, 1995). Eva and Regehr (2005) pointed out that reflecting on one's practice in medical field is the ability to identify weaknesses and is useful in helping the professional practitioner to set appropriate learning goals. Reflection is an essential aspect required to develop both a therapeutic relationship and professional expertise in the medical field (Sandars, 2009).

Although Brown (1987) argued that these regulations may be an unconscious act but researchers have found that metacognitive regulation does affect the performances of students (Gregory & Sperling, 1994; Gregory Schraw & Moshman, 1995). Hence, the level of metacognitive regulation in medical students is important in enabling students to plan, monitor and evaluate themselves in order to be better learners and cope with the hectic syllabus in the MBBS programme.

2.6.3 Methodology in Past Research of Metacognitive Skills in Medical Education

The Metacognitive Awareness Inventory has been used in the field of education for research purposes (Edelbring, 2012; Gregory & Sperling, 1994; Roshanaei, 2005; Gregory Schraw, Olafson, Weibel, & Sewing, 2012; Tanner, 2012; Zafarmand, Ghanizadeh, & Akbari, 2014). There has also been research on medical students' metacognition conducted using different methods.

In medical education, Turan and Demirel (2010) carried out a study on metacognition with pre-clinical students where the Metacognition Awareness Inventory (MAI) was used and one to one interviews were also conducted. Even though the items of the inventory developed by Gregory and Sperling (1994) were taken as the basis for the development of this scale, a different scale was developed and was improved in this study. In a separate research, a questionnaire was designed for measuring attitudes towards group and individual learning, alongside with the Metacognitive Awareness Inventory (Lumma-Sellenthin, 2012).

Eichbaum (2014) described the metacognitive approach to the medical humanities and how it is designed to develop students as eager learners and flexible thinkers, together with their capacity for cognitive and emotional monitoring and regulation.

Stansfield et al. (2015) in a study on metacognition revealed that metacognitive effort showed the largest decline over time and affects medical students' clinical empathy attitudes. The emergence of metacognitive effort in the clinical years suggests empathy may appear lesser for students after clinical exposure and may have resulted in much of the observed decline in clinical empathy attitudes.

2.7 Research in other Medical Curricula

Teunissen and Westerman (2011) researched on transitions in medical school. Their research focused on the transition from non-clinical to clinical training, it was revealed that students need to relearn what they thought they knew and must learn new things in a more self-directed way. It was suggested that medical education should assist medical students and doctors in developing the coping skills they need to effectively deal with the challenges presented by new environments to transform a transition from a threat to a learning opportunity.

Kassab, Al-Shafei, Salem, and Otoom (2015) examined the relationships between the different aspects of students' course experience, self-regulated learning, and academic achievement of medical students in a blended learning curriculum. The study utilised the Student Course Experience Questionnaire (SCEQ), the Motivated Strategies for Learning Questionnaire (MSLQ) while students' academic achievement was measured by the scores of the students at the end of the course. Out of the many aspects researched upon, neither the quality of the course experience nor the

motivational beliefs contribute to students' academic achievement, but metacognition can positively influence the academic achievement of medical students.

Kusurkar et al. (2012c) in their study explored if student motivation has guided developments in medical education curricula. The study utilised the Learning-Oriented Teaching model as a framework and found that motivation drives learning and influences students' academic performance. Changes in medical curricula were aimed at improving students' cognitive processing of content or metacognitive regulation rather than on stimulating motivation. However, the research suggested that developing a medical curriculum to specifically stimulate motivation in students may powerfully influence the outcomes of curricula.

Nouns, Schauber, Witt, Kingreen, and Schüttpelz-Brauns (2012) compared the development and retention of knowledge in the basic medical sciences based on two medical curricula, a traditional medical curriculum (TMC) and a PBL reformed medical curriculum (RMC). The study revealed that the development of medical knowledge is consistent in both curricula and there is no significant difference in this outcome between the traditional and PBL courses. Aung, Somboonwong, Jaroonvanichkul, and Wannakrairot (2015) in a recent research in a country in Asia studied on how an intervention program has changed pre-clinical students' motivation, measured using a translated version of the AMS scale. The results of the study revealed that students' academic motivation increased after participation in the three-day academic program.

There were research conducted to study or compare medical curricula, however, these research are rather limited. In this current study, the researcher compared the extrinsic motivated behaviour, metacognitive skills and academic performance of the medical students in two curricula.

2.8 Alignment of Extrinsic Motivated Behaviour and Metacognitive Skills

According to the Oxford Dictionary, alignment means arrangement in a straight line or in correct relative positions. In the context of this study, the word alignment refers to how medical students' extrinsic motivations are in line with their metacognitive skills.

Deci, Lens and Vansteenkiste conducted a study in 2006 which demonstrated intrinsic goal framing. The study compared intrinsic to extrinsic goal framing and no-goal framing and results showed that intrinsic motivation produced deeper engagement in learning activities, better conceptual learning and higher persistence at learning activities as compared to extrinsic motivation in general. Another study conducted by Deci and Ryan (2000c) also revealed that lacking of extrinsic motivated behaviour may affect students' studies and which will lead to inefficiency of their professional practice. The components of motivation were discussed generally and researchers agree that motivation is an important aspect in education (Emmett & McGee, 2013; Palmer & Devitt, 2007; Vansteenkiste et al., 2006).

Although much research has been conducted on the motivational aspects of medical students, the studies done did not focus on extrinsic motivated behaviour specifically. Medical students also often think they are only students but do not visualise themselves as medical provider in the future (Mcloughlin, 2009). This shows that they are motivated to graduate, but that does not mean that they will be good doctors (Mcloughlin, 2009). Although Chandler and Connell (1987) suggests that extrinsic regulations become more internalized as they are transformed into intrinsic motivation, Ryan and Deci (2000a) do not think likewise. They believe that the four types of extrinsic motivation is not a developmental continuum, meaning that one does not have to progress through each particular stage of internalization, instead one can initially

adopt a new behavioural regulation at any point along (Ryan & Deci, 2000b). Thus, the researcher of the present study profiled the students according to their extrinsic motivated behaviour and studied the significance of the said dimensions with students' metacognitive skills dimensions and their academic achievement.

Metacognition has always been widely discussed in the fields of education and medicine (Blakey & Spence, 1990; Kurata, Seta, & Ikeda, 2012; Roshanaei, 2005; Turan & Konan, 2012). It has been said that the scaffolding of knowledge of medical students involves metacognition (Flavell, 1976). It is undeniable that medical students should possess metacognitive skills in order to perform well academically. Eichbaum (2014) put forward that metacognitive approach enhances not only students' thinking and learning skills but also develops their professional identity by including topics that affect the students' emotional lives, such as emotional regulation, coping and resilience, and empathy.

In this study, metacognitive skills are investigated because metacognitive skills are essential for medical students as they ought to know what they have learnt, how to use the knowledge gained, when and why a knowledge is applied in medical contexts. In medical schools, some of the learning that goes on takes place outside the classrooms or lecture halls and students have to be able to control and regulate their learning environment. Medical students' extrinsic motivated behaviour and metacognitive skills cannot be assumed to be hierarchically or linearly structured and that all medical students are able to plan, monitor and evaluate their learning process orderly.

The researcher chose to study on the alignment of the extrinsic motivated behaviour and the metacognitive skills because these are essential psychological tools in medical students which can occur simultaneously and dynamically as the student progresses through the learning tasks (Pintrich, 2004). If these students achieve a higher degree of extrinsically motivated behaviour and acquired metacognitive skills, then the

medical students are well aligned and can be predicted to be good medical practitioners in the future.

2.9 Chapter Summary

This chapter discussed past literature which have contributed to the knowledge encompassing motivation in general; extrinsic motivation specifically, metacognitive skills and also research conducted for different medical curricula. Based on the review, many of the studies which focused on the topics of motivation and metacognition did not reveal how these two domains affect or relate to each other. Past research had focused generally on motivational and metacognitive studies, mainly in the field of education. In this current research, the researcher sought to discover how extrinsic motivation and metacognition are related and how they influence the students' performance.

The line of thought is that, if medical students have a lower degree (least autonomous) of extrinsic motivated behaviour, will they be able to sustain and keep up with the challenging years in medical school and be a safe doctor thereafter? Based on the literature review done, the researcher was however unable to find any previous research which used the mixed model design to study extrinsic motivation and metacognitive skills among first year undergraduate medical students. Therefore, in the next chapter, the conceptualisation of the study which includes the theoretical and conceptual framework will be discussed.

CHAPTER 3: CONCEPTUALISATION OF THE STUDY

3.1 Introduction

In this study, the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI) were developed and administered to first year medical students in both the NIC and UMMP curricula. In the University of Malaya, pre-university students are not required to sit for any entrance test before being selected to be enrolled as medical students. These medical students have scored perfect scores in their pre-university examinations (STPM, Matriculation or Foundation studies) and are offered a place by the Malaysian Central University Unit (UPU). The selection of medical students into the university is based upon the merit system and securing a place in the public medical school has become very competitive among students who aspire to do medicine. Articles by Freedman (2015) and Pak (2013) revealed that these competitive scenarios occur both locally in Malaysia as well as globally in other countries.

The recent review in the medical curriculum has shown significant changes in the University of Malaya Medical Programme (UMMP) in terms of the teaching and learning approach. In terms of the content delivery, lectures are delivered according to the block system where a normal and abnormal body of a human is taught simultaneously as opposed to the New Integrated Curriculum (NIC). In the NIC, first year students learn about a normal human body and in the second year they learn about the abnormalities in the human body. In both curricula, problem-based learning (PBL) sessions are conducted in similar ways. However, the sessions are found to be more structured in the UMMP curriculum. One of the distinct differences of the two curricula lies in the presentations of the sessions and early exposure to clinical ward rounds.

Students in the UMMP curriculum are exposed to site visits in the early stages of their first year where these students are brought to various medical departments such as the Medical Microbiology Lab, the Bio-Imaging Department, Trauma and Emergency Department, Department of Rehabilitation Medicine, Department of Primary Care Medicine and the Blood Bank Department and are instructed on their roles and functions. Having site visits and exposure to clinical settings during ward rounds in the first year of medical study certainly have excited many of the medical students, if not all. As opposed to the UMMP curriculum, students in the NIC curriculum go to the wards only from the third year onwards, which is referred to as their first clinical year.

Since there are differences in the teaching and learning approaches in the NIC and UMMP curricula, the researcher profiled the medical students' extrinsic motivated behaviour and metacognitive skills of both curricula and investigated if being a medical doctor is whom they really choose to be or is it due to other external reasons which lead them to the decision. A thorough search of literature in many databases showed that the extrinsic motivated behaviour and metacognitive skills have not been researched upon specifically among Malaysian medical students. Besides, there were also no literature on either the extrinsic motivated behaviour or the metacognitive skills domains and academic performance among Malaysian medical students. Therefore, in this study the researcher identified the four dimensions of extrinsic motivated behaviour and the two dimensions of metacognitive skills of the medical students enrolled in the NIC and UMMP curricula. The alignment between the extrinsic motivated behaviour and metacognitive skills among first year medical students were investigated. Furthermore, the alignment was studied in relation to the students' academic performance. This alignment has not been investigated before as far as the researcher can determine.

This study was conducted among two batches of first year medical students, involving the last batch of students from the NIC curriculum and the first batch of

students from the UMMP curriculum. There were approximately 200 medical students per batch in the University of Malaya. The profiles of the two batches of students were compared to determine the effect of the UMMP curriculum towards their extrinsic motivated behaviour and metacognitive skills. The researcher of the present study believed that if the students achieved a high level or more autonomous degree of extrinsic motivated behaviour and acquired the essential metacognitive skills, then they are well aligned and will be able to withstand the demanding needs of the medical course.

Data for the study were obtained from four sources, namely: the Extrinsic Motivated Behaviour Inventory (EMBI), the Metacognitive Skills Inventory (MSI), First year-end examination scores and interviews. The Statistical Package for the Social Sciences Version 20 (SPSS 20) was used to process and to analyse the quantitative data collected from the study. In this chapter, the conceptual framework and theoretical framework of the study will be presented.

3.2 Conceptual Framework

Research related to motivation levels of students have been conducted widely across all disciplines since the 1960s. In this study, the researcher gathered information on studies involving motivation in education, motivation in medical education, extrinsic motivation in education, metacognitive skills in education and metacognitive skills in medical education.

On the educational side, a study conducted by Karageorghis and Terry (1969) defined extrinsic motivated behaviour as a type of motivation which comes from the outside. Such motivation is similar to winning awards, receiving financial incentives and to attract attention from others (Deci & Ryan, 2008).

Table 3.1: Research on Motivation in Education

Year	Authors	Research
2015	Bo Zhang Yi Ming Li Jian Li Ye Li Houcan Zhang	The Revision and Validation of the Academic Motivation Scale in China
2013	Sjanett de Geus Greg Richards Vera Toepoel	How subjective experience mediates the relationship between motivation and satisfaction
2013	Gerald Ledford Jr. Barry Gerhart Meiyu Fang	Negative Effects of Extrinsic Rewards on Intrinsic Motivation: More Smoke Than Fire
2013	Joshua Emmett Dean McGee	Extrinsic Motivation for Large-Scale Assessments: A Case Study of a Student Achievement Program at One Urban High School
2012	Ching-Mei Cheng Tsui-Ping Cheng	Reflections of the Role of Motivation on Learning English for Successful College EFL Learners in Taiwan
2012	Maryam Habibian	ESL performance in reading motivation and reading comprehension in democratic and authoritarian contexts
2011	Kourosh Amrai Shahrzad Elahi Motlagh Hamzeh Azizi Zalani Hadi Parhon	The relationship between academic motivation and academic achievement students
2011	Jessica S ängera, Edmund Wascherb	The influence of extrinsic motivation on competition-based selection
2008	Edward Deci Richard Ryan	Self-determination theory and the role of basic psychological needs in personality and the organization of behavior
2004	Paul Pintrich	A Conceptual Framework for Assessing Motivation and Self-Regulated Learning in College Students
2001	Linda Perrot Linda Deloney Jan Hastings Shelia Savell Mildred Savidge	Measuring Student Motivation in Health Professions' Colleges

Table 3.1 shows a summary of research which were conducted on motivation in the field of education. Much of past research has focused on the relationship between motivation and academic achievement (Amrai et al., 2011; Cheng & Cheng, 2012; Emmett & McGee, 2013). Based on past research in the medical field, motivation was also found to be one of the key factors to being a successful doctor (Hurwitz et al., 2013; Lawson & Bearman, 2007). A study conducted by Kusurkar (2012a) revealed that motivation does drive learning and influences medical students' academic performance. Ryan and Deci (2000b) stated that extrinsic motivation is a construct that comes into play whenever an activity is done in order to attain some separable outcome. In direct contrast to extrinsic motivation, intrinsic motivation refers to doing an activity simply for the enjoyment of the activity itself, rather than its instrumental value (Deci & Ryan, 2000c; Thompson, 2014; Tripathi & Chaturvedi, 2014).

Recent studies among medical students have also showed that motivation is one of the desired qualities in doctors (Hurwitz et al., 2013; Lawson & Bearman, 2007). However, these studies did not explain in detail with regards to extrinsic and intrinsic motivation. In the present study, the researcher gathered data on selected medical students' extrinsic motivated behaviour by categorizing the students based on their score using the Extrinsic Motivated Behaviour Inventory (EMBI). In other words, the Extrinsic Motivated Behaviour Inventory (EMBI) also enabled the researcher to profile the medical students according to the different types of extrinsic regulations. The development of the instrument and usage of the Extrinsic Motivated Behaviour Inventory (EMBI) will be explained further in Chapter 4. The summary of motivational related research in the medical field which are very much focused on medical students is shown in Table 3.2.

Table 3.2: Research on Motivation in Medical Education

Year	Authors	Research
2015	Tim Dornan, Emma Pearson, Peter Carson, Esther Helmich Christine Bundy	Emotions and identity in the figured world of becoming a doctor
2015	Ayman Hamdan-Mansour, Shaher Hamaideh, Saleh Azzeghaiby, Salah Hanouneh, Ahmad Aboshaiqah	Psychosocial Correlates of Motivation for Academic Accomplishment among University Students
2014	Gemma Cherry, Ian Fletcher, Helen O'Sullivan Tim Dornan	Emotional intelligence in medical education: a critical review
2013	Pagnin, De Queiroz, De Oliveira Filho, Gonzalez, Salgado, Cordeiro e Oliveira, Lodi, Melo	Burnout and career choice motivation in medical students
2013	Steven Hurwitz, Brian Kelly, David Powis, Robyn Smyth, Terry Lewin	The desirable qualities of future doctors - A study of medical student perceptions
2013	Rashmi A Kusurkar, Gerda Croiset Francisca Galindo-Garré Olle Ten Cate	Motivational profiles of medical students: Association with study effort, academic performance and exhaustion
2013	Muhammad Luqman	Relationship of academic success of medical students with motivation and pre-admission grades
2012	Rashmi Kusurkar Ten Cate Vos Westers Croiset	How motivation affects academic performance: a structural equation modelling analysis

Table 3.2: Research on Motivation in Medical Education (Continued)

Year	Authors	Research
2012	Rashmi Kusurkar Croiset Mann Custers Ten Cate O	Have motivation theories guided the development and reform of medical education curricula? A review of the literature
2012	Maurer Allen Gatch Shankar Sturges	Students' Academic Motivations in Allied Health Sciences
2012	Dias Pagnin de Queiroz Pagnin Reis Olej	Effects of electroacupuncture on stress-related symptoms in medical students: a randomised controlled pilot study
2012	Alireza Yousefy Gholamreza Ghassemi Samaneh Firouznia	Motivation and academic achievement in medical students
2010	Nicole Borges Stephen Manuel Carol Elam Bonnie Jones	Differences in motives between Millennial and Generation X medical students
2010	Anthony Artino Jeffery La Rochelle Steven Durning	Second-year medical students' motivational beliefs, emotions, and achievement
2010	Jérémie Lefevre Morgan Roupret Solen Kerneis Laurent Karila	Career choices of medical students: a national survey of 1780 students
2009	Caven Mcloughlin	Characteristics of Students Failing Medical Education: An Essay of Reflections
2009	Tanaka Fukuda Mizuno Kuratsune Watanabe	Stress and coping styles are associated with severe fatigue in medical students
2004	Sobral	What kind of motivation drives medical students' learning quests?

Much of past research had focused on the motivation as an affective domain as a whole (Alireza et al., 2012; Dias et al., 2012; T. Maurer, Weiss, & Barbeite, 2003; Perrot et al., 2001; Sobral, 2004; Wolters, 2003). However, there has yet to be a study that has looked in detail at medical students' extrinsic motivated behaviour. Hence, the researcher of the present study attempted to further explore extrinsic motivated behaviour in medical students through the development of the Extrinsic Motivated Behaviour Inventory (EMBI). Kusurkar (2012a) in her study had classified extrinsic motivated behaviour into four components, which are external, introjected, identified and regulated.

Previous to this, instruments were developed mainly to study motivation as an affective domain as a whole (Deci & Ryan, 2008; Kusurkar et al., 2012c). Furthermore, literature indicates that there is minimal information on extrinsic motivated behaviour and medical students' performance. Extrinsic motivators such as deadlines, competitiveness and examinations can overshadow intrinsic motivation and end up controlling one's behaviour (Brissette & Howes, 2010). Thus, the Extrinsic Motivated Behaviour Inventory (EMBI) was developed in this study to identify the type and degree of regulation (based upon Kusurkar (2012a) possessed by medical students in the study.

Figure 3.1 (Page 63) shows a summary of some of the research which have been conducted on motivation in the field of education and medical education as well as research which delved into extrinsic motivated behaviour in education.

The researcher of the present study has outlined what are the desired values and qualities in developing future medical doctors based on the literature review which are related to motivation and factors which drives the motivation of medical students specifically. To identify the types of desired motivation, the present researcher found that past research have pointed out that motivation is one of the most important

psychological concepts and that this trait is one of the most desirable quality of medical students as well as medical doctors (Hurwitz et al., 2013; Tanaka et al., 2009).

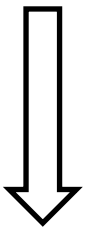
Although intrinsic motivation does affect medical students' academic performance (Tanaka et al., 2009), understanding of extrinsic motivation was also found to be associated with greater engagement in activities (Connell & Wellborn, 1990), greater psychological well-being (Sheldon & Kasser, 1995) and a lower dropout rate (Vallerand & Blssonnette, 1992). Based on the discussion above, it can be put forward that a research gap exists related to how the four dimensions of extrinsic motivated behaviour could affect medical students' metacognitive skills and academic performance. (Figure 3.1 Page 63)

Metacognition of students is another field that has been made significant by John Flavell since the 1970s. According to Flavell (1976), metacognition is any kind of cognitive transaction with the human or non-human environment with a variety of information processing activities going on. He also recognised metacognition as the knowledge concerning one's own cognitive processes or anything related to them (Flavell, 1979). Metacognition is not uncommon in the field of education and has evolved over the years (Baird, 1988; Everson & Tobias, 2001; Gama, 2004; R. Garner & Alexander, 1989; Hacker et al., 1998; Hutchinson, 2003; Kentridge & Heywood, 2000; Gregory Schraw & Moshman, 1995; Veenman, 2012; Zohar & Barzilai, 2013). The literature reviews in the field of metacognitive skills encompass two dimensions, namely knowledge of metacognition and regulation of metacognition.

Knowledge of metacognition has very much been associated with the usage and arrangement of knowledge gained in the classroom with students' existing thoughts (Gregory & Sperling, 1994). According to Stewart, Cooper, and Moulding (2007), the component of metacognitive knowledge consists of statements of declarative knowledge, procedural knowledge and conditional knowledge.

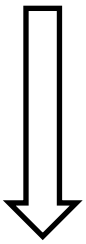
MOTIVATION IN EDUCATION

- motivation drives students to appropriate sense of direction, for efficient learning (Palmer & Devitt, 2007)
- motivation indeed strongly influence satisfaction (Geus et al., 2010)
- motivation refers to a psychological concept that refers to a person's willingness to put forth effort in order to achieve educational goals (Luqman, 2013)
- motivation acts as a lens for understanding the attributes of a program (Emmett & McGee, 2013)



MOTIVATION IN MEDICAL EDUCATION

- motivation is one the most desirable quality to be instilled in medical students and doctors (Hurwitz, Kelly, Powis, Smyth, & Lewin, 2013; Lawson & Bearman, 2007)
- motivation is one of the most important psychological concepts in education and is related to academic outcomes in medical students (Tanaka et al., 2009)
- motivation drives learning and influences students' academic performance (Kusurkar, 2012a)
- motivation are classified into intrinsic and extrinsic motivation (Alireza, Gholamreza, & Samaneh, 2012; Kusurkar, Croiset, Mann, Custers, & Cate, 2012c)
- motivation for choosing medicine is a personal aspect that can modulate the distress with academic demands (Dias et al., 2012)



EXTRINSIC MOTIVATED BEHAVIOUR IN EDUCATION

- extrinsic motivation is associated with greater engagement of activities (Connell & Wellborn, 1990)
- extrinsic motivation is associated with less drop out (Vallerand & Blssonnette, 1992)
- extrinsic motivation is associated with greater psychological well-being (Sheldon & Kasser, 1995)
- extrinsic motivation is a construct pertaining to whenever an activity is done in order to attain some separable outcome (Ryan & Deci, 2000b)

Figure 3.1: Past Studies on Motivation

On the other hand, regulation of metacognition refers to how students plan, monitor and evaluate their learning process (Hammann & Stevens, 1998). The development of the Metacognitive Skills Inventory (MSI) based on these components are discussed in Chapter 4, section 4.5.1 Development of research tools. Table 3.3 shows a summary of some research which have been conducted on metacognition in the field of education.

Table 3.3: Research on Metacognition in Education

Year	Author	Research
1976	Flavell	Beyond IQ: A Triarchic Theory of Human Intelligence
1979	Flavell	Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry
1985	Sternberg	Beyond IQ: A Triarchic Theory of Human Intelligence
1990	Blakey Spence	Developing metacognition
1996	Reder Schunn	Metacognition does not imply awareness: Strategy choice is goverened by implicit learning and memory
1997	Brown Ann	Transforming schools into communities of thinking and learning about serious matters
1998	Douglas Hacker John Dunlosky Arthur Graesser	Metacognition in Educational Theory and Practice
1998	Hammann Stevens	Metacognitive awareness assessment in self-regulated learning and performance measures in an educational psychology course
1999	Kincannon Gleber Kim	The effects of metacognitive training on performance and use of metacognitive skills in self-directed learning situations
2000	Kentridge Heywood	Metacognition and Awareness

Table 3.3: Research on Metacognition in Education (Continued)

Year	Author	Research
2001	Everson Tobias	The ability to estimate knowledge and performance in college: A metacognitive analysis
2004	Reder Schunn	Integrating metacognition instruction in interactive learning environments
2005	Joanna Dunlap	Changes in students' use of lifelong learning skills during a problem-based learning project.
2006	Ormrod	Educational Psychology: Developing Learners

Major developments in medical curricula include the introduction of standardised and regulated medical education which some students find difficult to cope with (Kurata et al., 2012). It has also been found that problem-based lessons (PBL), learner-centered, integrated teaching, outcome-based and community-based approaches are some of the curricular changes which have been structured to improve students' metacognition (Blakey & Spence, 1990). Metacognitive skills play a very important role to improve the knowledge of co-creation skills especially in the field where there is no pre-defined definite answer (Kurata et al., 2012).

In the field of medicine, medical students are required to think out of the box and analyse scenarios which differ from one to another (Kurata et al., 2012). It is difficult for learners to be trained specifically for metacognitive skills since these skills are quite tacit, latent and context dependent meaning that one cannot observe another's cognitive processes as it happens in one's mind just as internal self-dialogue cannot be observed (Kurata et al., 2012). Thus, it can be stated that, the heavy laden medical syllabus can demotivate the students and challenge their cognitive ability to its limits.

The summary of metacognition research in the medical field related to medical students is as shown in Table 3.4 (Page 66).

Table 3.4: Research on Medical Students' Metacognition

Year	Author	Research
2015	Stansfield, Brent Schwartz, Alan O'Brien, CeliaLaird Dekhtyar, Michael Dunham, Lisette Quirk, Mark	Development of a metacognitive effort construct of empathy during clinical training: a longitudinal study of the factor structure of the Jefferson Scale of Empathy
2014	Ipek Gonullu Muge Artar	The Impact of Metacognition Training on Metacognitive Awareness of Medical Students
2014	Ipek Gonullu Muge Artar	Metacognition in medical education
2014	Eichbaum, Quentin	Thinking about Thinking and Emotion: The Metacognitive Approach to the Medical Humanities that Integrates the Humanities with the Basic and Clinical Sciences
2012	Turan Konan	Self-Regulated Learning Strategies Used in Surgical Clerkship and the Relationship with Clinical Achievement
2012	Edelbring	Measuring strategies for learning regulation in medical education: Scale reliability and dimensionality in a Swedish sample
2011	Ido Roll Vincent Aleven Bruce M. McLaren Kenneth R. Koedinger	Metacognitive Practice Makes Perfect: Improving Students' Self-Assessment Skills with an Intelligent Tutoring System
2005	Susan Sunny Cooper Pen é e Stewart	Metacognitive Development in Professional Educators
2005	Roshanaei	Metacognitive Skills and Cognitive Skills in Engineering and Medical Students
2004	Cindy Hmelo-Silver	Problem-Based Learning: What and How Do Students Learn?
2003	Croskerry	The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them

Metacognitive skills consist of metacognitive knowledge and metacognitive regulation which reflect on medical students' performance. Medical students who have better metacognitive skills are said to be able to use their knowledge acquired and then plan, monitor and regulate their learning process more systematically and effectively (Baker & Cerro, 2000; Hacker et al., 1998; Hammann & Stevens, 1998; Lie & Kay, 2013). Based on the literature review the researcher of the present study attempted to further explore metacognitive skills among medical students through the development of the Metacognitive Skills Inventory.

The literature review on both motivation and metacognition have revealed the gap that thus far, as much as the researcher can determine, no research has been done to investigate the dimensions of extrinsic motivated behaviour and metacognitive skills among medical students. Therefore, the present research will investigate the alignment between the extrinsic motivated behaviour and metacognitive skills among medical students. Specifically, the researcher wanted to profile the different dimensions of extrinsic motivation in medical students and compare these dimensions with the students' level of metacognitive skills and academic achievement.

The level of extrinsic motivation is believed to have an effect on medical students' performance, decision making as medical students and later on as healthcare practitioners. Medical students who are at the highest degree or most autonomous level of extrinsic motivated behaviour (integrated regulation) are also thought to be able to internalise their behaviour (Borges et al., 2010; Ryan & Deci, 2000d) and show higher metacognitive skills scores (Kusurkar et al., 2012c).

From the gathered information, much research has identified motivation as an essential affective domain for medical students but did not clearly explain the type of motivation involved. There is a lack of research that has looked into extrinsic motivated behaviour specifically and the literature search did not turn up any past evidence that

there was an instrument or inventory developed for extrinsic motivated behaviour for medical students. The administration of the Extrinsic Motivated Behaviour Inventory developed for this study gave insight as to the type of regulation first year medical students of the NIC and UMMP curricula possess. Thereafter, the researcher used the type of regulation identified to see if there was any significant difference between extrinsic motivated behaviour and year end examination results of the medical students in the NIC and UMMP curricula.

It is also clearly seen that although much research has been done to study the metacognition of medical students, there has been no research which associated motivation with medical students' metacognitive skills. Therefore, the Metacognitive Skills Inventory which consists of metacognitive knowledge and metacognitive regulation enabled the researcher to score the first year medical students of the NIC and UMMP curricula. The researcher further analysed if there was any significant difference between metacognitive skills and the year-end examination results of the medical students in the NIC and UMMP curricula based on the Metacognitive Skills Inventory score.

Past research shows that there were no specific studies done to address extrinsic motivated behaviour of medical students, let alone the classification of medical students into the different types of extrinsic motivated behaviour. Hence, the researcher attempted to profile the medical students based on their different types of extrinsic motivated behaviour regulations. How the extrinsic motivated behaviour of first year medical students identified were aligned with their metacognitive skills was then established.

Figure 3.2 (Page 69) shows the flow of the two main domains (extrinsic motivation and metacognitive skills) and the gaps identified which led to the conceptual framework of the present study.

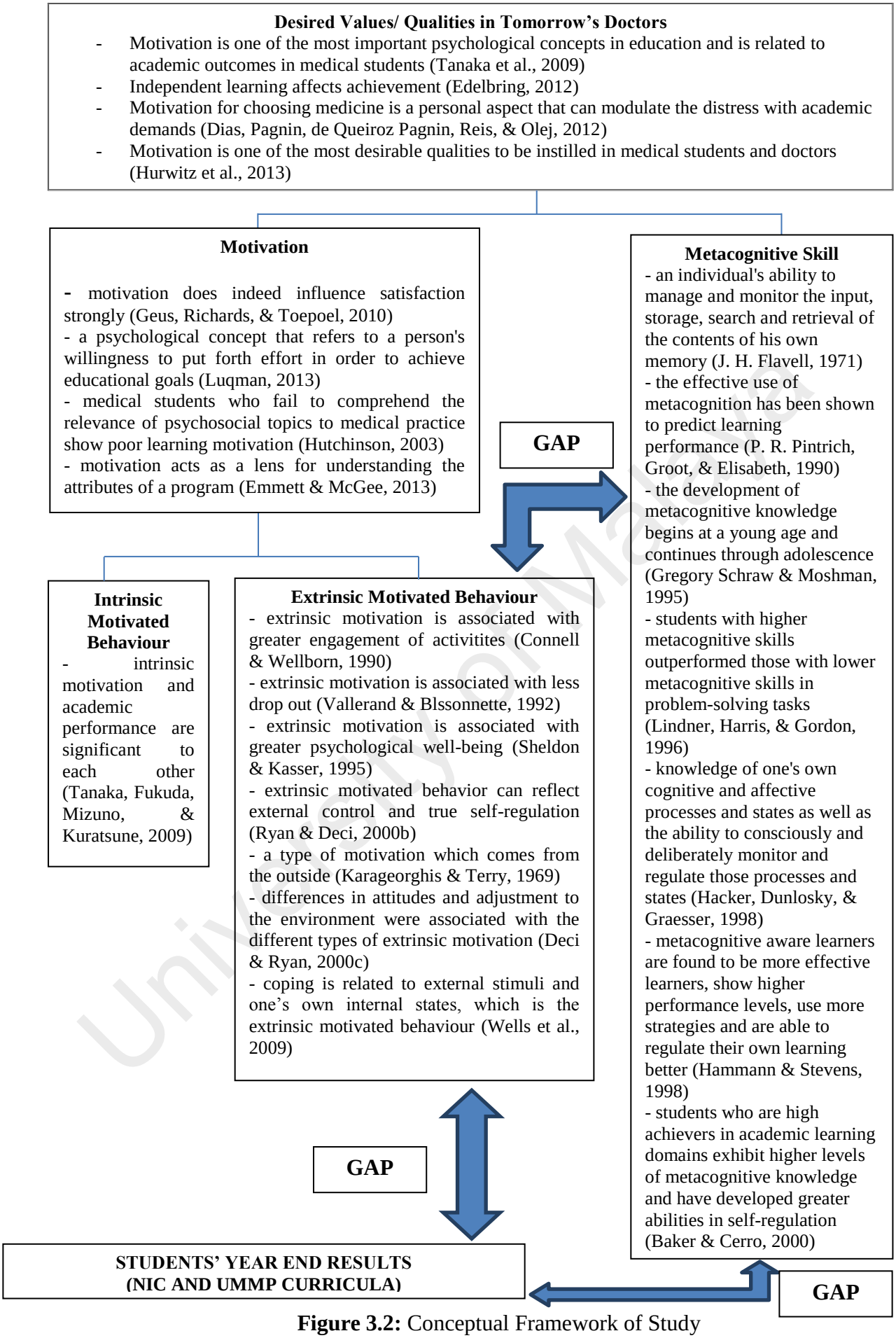


Figure 3.2: Conceptual Framework of Study

The researcher has thus far discussed on how the gaps of the present study were conceptualized (Figure 3.2, Page 69) with regards to motivation amongst medical students in terms of the type of regulations in extrinsic motivated behaviour and have formulated the present research to try and contribute to the existing findings of both motivation and metacognition research in the field of medical education. Theories which are involved in the present research will be discussed in detail in the following section, the Theoretical Framework.

3.3 Theoretical Framework

In this section, the theoretical framework that underpinned the study is described. The Self-Determination Theory (SDT) and the Assimilation Theory were selected as the base for the present research.

3.3.1 Self-Determination Theory

Self-determination theory (SDT) was founded by Edward Deci and Richard Ryan from the University of Rochester, New York in the 1980s. Deci and Ryan (2000c) revealed that extrinsic motivated behaviours must be externally prompted initially. They added that the main reason a person is more likely to be willing to do something is because they are valued by significant others to whom they feel connected, which includes family, a peer group or a society.

Due to this, it is suggested that to facilitate extrinsic behaviour it will be good to provide a sense of belonging and connectedness to the person, group or desired goal or better known as sense of relatedness in Self-determination theory (Ryan & Deci, 2000d). This theory distinguishes various types of motivational states and even suggests that extrinsic rewards may be more effective than intrinsic rewards. It also examines individual differences in intrinsic and extrinsic motivation. SDT is a general motivation

theory that encompasses all activities in life, be they in education, sports, or some other domain. It represents a broad framework for the study of human motivation and personality (Ryan & Deci, 2000a). SDT states that human beings have a natural tendency to develop towards autonomous regulation of behaviour (Kusurkar et al., 2012c). In principle, human beings are intrinsically motivated to learn and to take on challenges. Motivation is indeed an important aspect in education as it impacts learning outcomes and the well-being of students (Kusurkar et al., 2012b).

Deci and Ryan (2000c) noted that if these universal needs (competence, relatedness and autonomy) are met, students will function and grow optimally. Conditions supporting the individual's experience of autonomy, competence and relatedness are argued to foster the most volitional and high quality forms of motivation and engagement for activities, including enhanced performance, persistence and creativity (Deci & Ryan, 2000c). SDT is a meta-theory for framing motivational studies. It defines intrinsic and varied extrinsic sources of motivation and a description of the respective roles of intrinsic and types of extrinsic motivation in cognitive and social development and in individual differences (Ryan & Deci, 2000b).

According to the SDT approach, a regulation that has been internalized may be only introjected and that type of regulation could leave people feeling satisfied with their needs for competence and relatedness (Ryan & Deci, 2000a). However, to only introject a regulation and thus to be controlled by it will not leave a person feeling self-determined (Ryan & Deci, 2000a).

In this study, the principles of SDT are adopted because medical students' different dimensions extrinsic motivation can drive their metacognitive knowledge and metacognitive regulation. Self-determination is crucial because medical students in their first year will experience a great leap of transition from their pre-university level to the university environment. Since the researcher was able to profile the students according

to their extrinsic motivated behaviour, it was interesting to see how self-determined the students were in both the NIC and UMMP curricula in adapting themselves to the different demands and challenges in the course. Self-directed learning sessions and presentation skills would require students' own effort, likewise for the ward round visits. In the process of acquiring knowledge, the learning style and regulating the dynamic approach in the medical students would align the two domains and is revealed in their academic performance.

3.3.2 Assimilation Theory

David Ausubel in the early 1960s developed the assimilation theory, also known as the subsumption theory. The assimilation theory of learning which is a cognitive learning theory and is widely applied to the area of meaningful verbal learning (Schunk, 2004). Assimilation theory is based on Piaget's genetic epistemology and focuses on the assimilation hypothesis, which assumes that new learning experiences are always integrated into pre-existing knowledge structures. The assimilation theory can be applied to medical students in which the new information learnt in medical school is incorporated into an anchoring structure already present in the student from their prior knowledge gained during pre-university level.

The learning process becomes meaningful when students engage themselves in relevant activities which enable them to relate what is learnt theoretically and what is being practised. The enriched learning experience allows the students to accommodate the new knowledge gained and regulate the knowledge to suit their needs. The medical curriculum was aimed to build students' knowledge and allows them to retain the knowledge which will come in handy when they practise as healthcare professionals. Based on the Table 3.5 (Page 73), David Ausubel's Assimilation Learning Theory focuses on what he describes as "Meaningful Learning" (Schunk, 2004).

Table 3.5: The Differences in Meaningful Learning as opposed to Rote Learning

Meaningful Learning	Rote Learning
Non- arbitary, non-verbatim substantive incorporation of new knowledge	Arbitrary, verbatim incorporation of new knowledge
Deliberate effort to link new knowledge with other higher order concepts	No effort to link new knowledge with other higher order concepts
Learning related to experiences	Learning unrelated to experiences
Affective commitment to relate new knowledge to prior learning	No affective commitment to relate new knowledge to prior learning
Knowledge is retained much longer	Generally knowledge cannot be recalled after hours or days
Added capacity for subsequent learning of related materials	No added capacity, in fact may inhibit learning, for subsequent learning of related materials.
Can be applied in a variety of new problems or contexts (transferable)	Transferability to new problems or contexts is minimal

Note: Adapted from (Schunk, 2004)

Meaningful learning here means the process where new information is related to an existing relevant aspect of the individual's knowledge structure. This component of his theory fits with the concepts of short and long term memory in cognitive information processing and integrates the cognitive, affective and psychomotor domains (Schunk, 2004) which are essential traits to instill in doctors. Table 3.5 shows the differences in meaningful learning as opposed to rote learning based on Schunk (2004).

Based on the two theories presented, the theoretical framework for this study is illustrated in Figure 3.3 (Page 77). In the present study, the researcher had combined the principles of SDT and assimilation theory. In Figure 3.3, it is shown that Extrinsic Motivation comprises of four dimensions; external, introjected, identified and integrated regulation. Metacognitive skills comprises of two dimensions; knowledge of

metacognition and regulation of metacognition. The letter 'A' indicates that medical students' extrinsic motivation reflects on their adaptation to the learning process which occurs through the assimilation of new concepts learnt in their first year into prior concept frameworks within the student. The letter 'B' relates metacognitive skills to the assimilation theory in terms of effective learning as a process in which medical students gather the new structure of knowledge in medical school and consciously make changes to fit in with the existing concepts they already have to form meaningful learning.

The letter 'C' represents the extrinsic motivated behaviour acting on students and their intrinsic motives which are deep-rooted in human nature and widely associated with Self-Determination Theory. Very often medical students are moved by external factors such as reward systems, grades, evaluations or even opinions they fear others might have of them. Since there are different dimensions of extrinsic motivated behaviour identified, these dimensions of motivations may not necessarily be due to external reward or support, but the higher degree of extrinsic motivation can sustain passions, and efforts. According to Karagiannidis, Barkoukis, Gourgoulis, Kosta, and Antoniou (2015) motivation can influence several cognitive, affective, and behavioural consequences. This relates to how the Self-Determination Theory can affect medical students' metacognitive skills (The letter 'D') especially in goal setting, monitoring and evaluating their own learning process. More importantly in this study, Self-Determination Theory focus on how both the extrinsic motivation and metacognitive skills can facilitate medical students' well-being and the quality of their academic performance as seen as represented by the letter 'E'. From the two theories put forward, the alignment of the extrinsic motivated behaviour and metacognitive skills can be represented by the letter "F" where the researcher of the present study compared how first year medical students' extrinsic motivations are in line with their metacognitive

skills and first year medical students' academic performance in the two curriculum, NIC and UMMP curricula.

While the researcher recognised that self-determination is crucial for the fact that first year medical students will experience a great leap of transition, the assimilation theory applied in the present study will support the new information learnt in medical school into the anchoring structure present in students' prior knowledge. The demands and challenges in both the NIC and UMMP curricula which comprises of different learning approaches and presentation skills would require students' own effort which reflects on the self-determination theory. The learning process becomes meaningful, as discussed in the assimilation theory when students engage themselves into relevant activities which enable them to relate what is learnt theoretically in the classroom with the practical side of their learning process.

3.4 Chapter Summary

The factors of motivation and metacognition have been widely researched upon in the field of education and recently in the field of medical education. However, there has been minimal research to date which focused on students' motivation in general or metacognition in relation to students' academic achievement. There has so far been no research which focused on the extrinsic motivated behaviour in a medical student, let alone the alignment of this domain with metacognitive skills. Extrinsic motivated behaviour in a medical student may or may not affect metacognitive skills and have not been explored explicitly. However, medical students' alignment of extrinsic motivated behaviour and metacognitive skills is worthy of research because students' learning styles and their ability to cope with the hectic schedule are reflected in their academic performance. The learning theories underpinned in this study explains about how students' behaviour can change the outcome of their learning styles and also affect their

academic performances. In the next chapter, the methodologies used in this study are discussed in detail.

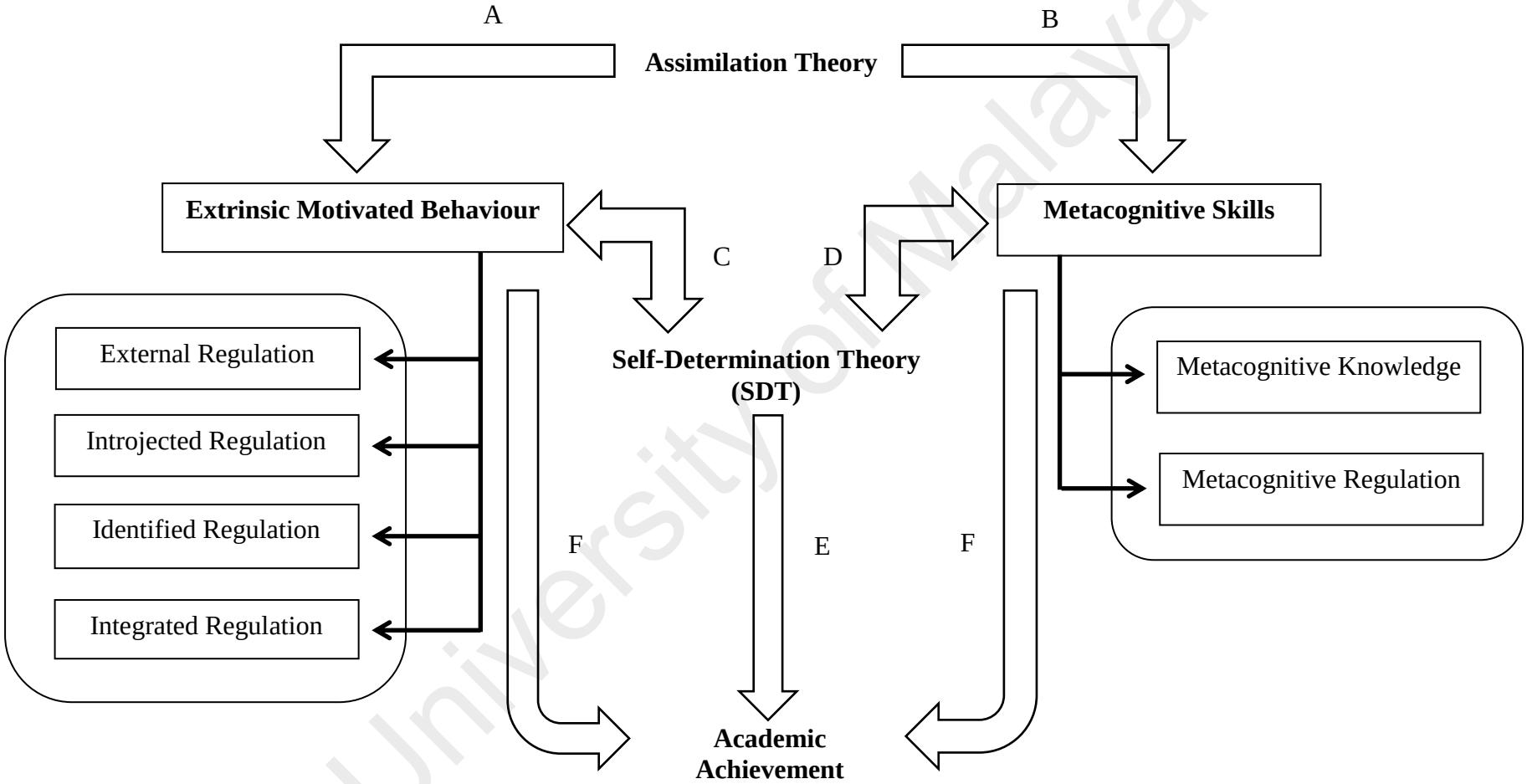


Figure 3.3: Theoretical Framework

CHAPTER 4: METHODOLOGY

4.1 Introduction

This study was designed to investigate the alignment between the extrinsic motivated behaviour and metacognitive skills of first year undergraduate medical students. For this purpose, the present research developed two inventories. The first inventory is the Extrinsic Motivated Behaviour Inventory (EMBI) which was developed and categorised according to the dimensions of External Regulation, Introjected Regulation, Identified Regulation and Integrated Regulation put forward by Ryan and Deci (2000b) while the second inventory is the Metacognitive Skills Inventory (MSI) for the components of Metacognitive Knowledge and Metacognitive Regulation.

Specifically, the study attempted to profile students' into the four dimensions of extrinsic motivated behaviour and relate these dimensions to students' metacognitive skills and their academic achievement. It also sought to compare extrinsic motivated behaviour and metacognitive skills in first year undergraduate medical students of the two different curricula, NIC and UMMP. In addition, interviews were conducted to gain further insight to confirm the category of different dimensions of extrinsic motivated behaviour into which students were categorised in. The alignment between the extrinsic motivated behaviour and metacognitive skills of medical students is important, as this could possibly produce medical students who will make good medical practitioners in the future. In this study, the two inventories were administered to the first year undergraduate medical students enrolled in the NIC and UMMP curricula in University of Malaya.

A mixed model design was used in this study. Both quantitative and qualitative data collection techniques were used. Both the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI) which were developed were

administered to obtain the quantitative data. The quantitative technique enables the data obtained from the questionnaires to gauge the relationship between the extrinsic motivated behaviour and the metacognitive skills which were determined based on statistical analysis.

After answering questionnaires from the inventory, the medical students were selected for individual interviews with the researcher. The students who were selected for the interviews were chosen based on their responses given in the EMBI. The researcher categorised these students based on their score for the different dimensions of extrinsic motivated behaviour. The qualitative technique involved a series of interviews to enable the researcher to further explore and gain more in-depth understanding of the medical students' extrinsic motivated behaviour and metacognitive skills.

A total of 333 first year undergraduate medical students (174 from the NIC curriculum and 159 from the newly introduced UMMP curriculum) from the University of Malaya participated in this study. Data for the study was obtained from the two inventories developed and interviews. The Statistical Package for the Social Sciences (SPSS) Version 20 was used to process and analyse the quantitative data collected from the inventories.

This chapter will discuss the methodology used in this study as follows:

(i) Selection of Sample

(ii) Location of the Research

(iii) Data Collection Duration

(iv) Procedures of Research

(v) Preliminary Development of the Instruments - Phase 1 and Phase 2

(vi) Reliability of Instruments

(vii) Analytical Methods

4.2 Selection of Sample

In this study, the researcher invited 205 first year MBBS students of the NIC curriculum and 179 first year MBBS students of the UMMP curriculum who are enrolled in the University of Malaya to participate. These students had obtained perfect scores in their pre-university studies (STPM, Matriculation and University of Malaya Foundation Studies) necessary as their entry requirements into the MBBS course and were offered a place by the Malaysian Central University Unit (UPU). In the University of Malaya, pre-university students do not sit for any entrance test before being selected to be enrolled as medical students. This is unlike in the United Kingdom where applicants who intend to do medicine have to sit for UKCAT or BMAT tests. Similarly in the United States of America, applicants who intend to do medicine are required to have a first degree and thereafter medicine is taken as a postgraduate degree.

In this study, the researcher chose first year medical students because there was a curriculum review which took place in the University of Malaya. As the curriculum change is in a transition period, the researcher of the present study obtained information from the last cohort of first year medical students enrolled in the NIC curriculum. Information was also collected from the first year cohort of students in the UMMP curriculum. Comparisons were then made for students' extrinsic motivation and metacognitive skills of both groups.

Both the NIC and UMMP curricula students undergo the same duration of lessons in their first year of medical school. For both the NIC and UMMP curricula, students who have completed their first year were invited to complete the EMBI and MSI survey that profiled and assessed their level of extrinsic motivation and metacognitive skills. The participation of the first year medical students was not mandatory.

After the self-administered inventories were returned to the researcher, the researcher entered the scores of the students' responses using SPSS Statistics Version 20. The selection of the students for interview was based on the profiling of students into the four different dimensions of the extrinsic motivated behaviour using the Extrinsic Motivated Behaviour Inventory (EMBI). The students' scores were matched with the four different dimensions of extrinsic motivated behaviour. From the categories of external, introjected, identified and integrated regulation, the researcher invited three students from each category respectively for an individual interview. The researcher decided to invite only three students from each category respectively because the students have a very hectic schedule and each student may be able to only spend less than an hour each for the interview.

For the interview, the researcher arranged comfortable seating for the selected students to facilitate communication and explained the purpose of the interview to the students including asking for consent before beginning the session. Along the interview session, the researcher picked up phrases that the students used to probe further to clarify points and to encourage more explanation. The researcher also used open-ended questions and avoided leading questions.

This process was repeated with the first year medical students in the new UMMP curriculum. There were a total of twenty four interviewees; twelve from each NIC and UMMP curriculum respectively. From the NIC curriculum, all the twelve students turned up as scheduled for the individual interviews. The researcher accommodated the interview sessions to the students' free time in the faculty. As for the UMMP curriculum, one out of the twelve students was not able to attend and had to reschedule the interview session with the researcher.

4.3 Location of the Research

The administration of both the inventories was conducted at the lecture halls in the Faculty of Medicine where the first year medical students attended lectures. The interviews were conducted in a room in the Medical Education Research and Development Unit, MERDU.

4.4 Data Collection Duration

The data collection for the research involving first year medical students from the NIC curriculum was conducted at the end of the first academic year in September 2013. The end of the academic year for the UMMP curriculum was held at the end of July 2014. A total of three months was allocated for the data collection of each batch of the first year MBBS students from both the NIC and UMMP curricula. This was intended to provide ample time for the researcher to administer both the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI). The researcher also allocated time in the three months to conduct the interviews on the selected first year medical students. Table 4.1 shows the duration for the data collection purposes.

Table 4.1: Timeline on Data Collection

Time/ Duration	Data Collection Activities
September 2013	Administration of EMBI and MSI to first year medical students in NIC Curriculum at the end of the academic year
August – October 2013	Interviews conducted amongst first year medical students in NIC Curriculum
July 2014	Administration of EMBI and MSI to first year medical students in UMMP Curriculum at the end of the academic year
July – October 2014	Interviews conducted amongst first year medical students in UMMP Curriculum

4.5 Procedures of Research

In this research, there were two phases involved before the inventories were ready to be administered. The first part revolves around the development of the instruments. The two instruments to be used for the quantitative data were the Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI). Some of the items in Extrinsic Motivated Behaviour Inventory (EMBI) were adapted from A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich et al. (1991) while items from Metacognitive Skills Inventory (MSI) were adapted from Metacognitive Awareness Inventory (MAI) by Gregory and Sperling (1994) to cater to the needs of first year medical students.

The development of the Extrinsic Motivated Behaviour Inventory (EMBI) is explained further in Section 4.5.1 Phase 1: Development of tools for research**.** The items were then sent to experts in the fields of medicine and education for review and validation and a pilot study was also conducted. The validations which were done include content validation, face validation and construct validation. Based on the comments given, the researcher changed the terminologies and language used where necessary as shown in Table 4.5 and Table 4.6 in Section 4.5.1 (Page 89-91).

As soon as the items were reviewed and validated, the items were refined and sent for a second round of validation where the panel of experts agreed on the changes made and reviewed the items again to ensure that the items were suitable for the intended group of students in the study. The researcher obtained further responses when a pilot study was carried out among the first year medical students of other medical schools before administering the inventories to the first year MBBS students in the University of Malaya. Further details on the pilot study are discussed in Section 4.5.2 Phase 2: Pilot Study (Page 92). The following section encompasses the development of the instrument for the present study.

4.6 Preliminary development of the instruments

The development of the Metacognitive Skills Inventory and the Extrinsic Motivated Behaviour Inventory (EMBI) underwent two phases before the researcher administered it to the first year MBBS students.

4.6.1 Phase 1: Development of tools for research

Two inventories were developed for this study, the Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI).

Extrinsic Motivated Behaviour Inventory (EMBI)

The Extrinsic Motivated Behaviour Inventory (EMBI) was developed and consists of the four dimensions; External Regulation, Introjected Regulation, Identified Regulation and Integrated Regulation. This inventory consists of 40 items, where each of the four dimensions consists of 10 items. There were 30 items which were adapted from a total of 81 items in a study conducted by Pintrich et al. (1991) entitled A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ which was developed more than two decades ago does not have items to assess all components of the study to measure medical students' extrinsic motivation. Furthermore, there were some overlap in the scales of the MSLQ and components of the conceptual model (Pintrich, 2004). Hence, an additional of 10 questions were developed by the researcher for the purpose of this study.

The items from the MSLQ were not categorised into the different dimensions of extrinsic motivated behaviour as the items from the MSLQ are used for general educational studies and the questions are used widely in the field of self-directed learning. Therefore, the items were first selected, adapted and categorised based on the

researcher's understanding of the four dimensions of extrinsic motivated behaviour which are External Regulation, Introjected Regulation, Identified Regulation and Integrated Regulation. The researcher then had the adapted questions validated by experts to suit the context of the MBBS programme and in the medical field. Further details on the panel experts are explained in the section on Validation of EMBI and MSI. The examples of items for each dimensions of the EMB are shown in Table 4.2.

Table 4.2: Examples of Items adapted from MSLQ for EMBI

Dimension of EMB	**Original item from MSLQ**	**Adapted item for EMBI**
External Regulation	I want to do well in this class because it is important to show my ability to my family, friends, employer or others	I want to do well in the MBBS programme because it is important to prove my capability to my family, friends, employer or the society
Introjected Regulation	I am very interested in the content area of this course	I decided on taking up the MBBS course only after my Foundation studies/ STPM/ Matriculation results were released
Identified Regulation	Understanding the subject matter of this course is very important to me	Understanding the subject matter of the MBBS course is important to prepare me to be a doctor
Integrated Regulation	I believe I will receive an excellent grade in this class	I believe I will achieve an excellent grade in this course because I believe I am born to be a doctor

The items were put on a six-point Likert scale. A six-point Likert scale was chosen because there is no middle point for a respondent to either choose or think about what he should choose. The six-point scale is a semi-forced measure to allow the respondent to choose a response that is not neutral. Instead, if a five-point Likert scale is

used, 3 is the middle point answer usually given by many respondents which indicates uncertainty.

Metacognitive Skills Inventory (MSI)

The Metacognitive Skills Inventory was adapted and consists of metacognitive knowledge and metacognitive regulation items. These items were adapted from the Metacognitive Awareness Inventory (MAI) designed by Gregory and Sperling (1994). This instrument has also been used in studies of adult metacognition by Hammann and Stevens (1998) and Sperling, Howard, Staley, and DuBois (2004). There were altogether 52 items in this inventory which were adapted according to the context of the medical field and are scored based on a six-point Likert scale. Likert in 1932 had developed the principle of measuring attitudes by asking people to respond to a series of statements about a topic, in terms of the extent to which they agree with the items, and so tapping into the cognitive and affective components of attitudes (McLeod, 2008).

In the Metacognitive Skills Inventory (MSI), the statements comprise of the two component categories of metacognition which are metacognitive knowledge and metacognitive regulation (Gregory & Sperling, 1994). The knowledge component consists of statements of declarative knowledge, procedural knowledge and conditional knowledge (Cooper & Stewart, 2005). Declarative knowledge refers to knowledge about oneself and strategies to be used in their learning process. Procedural knowledge refers to knowledge about strategies to use to solve a problem. Conditional knowledge refers to when and why students choose to use the strategies. This shows an objective measurement on how students put their thoughts into thinking.

On the other hand, the regulation component covers planning or goal setting, organizing and managing information, monitoring in which students assess their learning process and strategies used, debugging where students use strategies to correct

errors or reflect on mistakes done and evaluation where students analyse their performance and weigh the effectiveness of the strategies used. The examples of items for each dimension of the MSI are shown in Table 4.3.

Table 4.3: Examples of Items adapted from MAI for MSI

Dimension of MSI	**Original item from MAI**	**Adapted item for MSI**
Metacognitive Knowledge	I try to use strategies that have worked in the past	I use learning strategies that have worked in the past during my STPM/ Matriculation/ Foundation years
Metacognitive Regulation	I periodically review to help me understand important relationships	As a medical student, I review my lessons daily to help me understand important relationships between my lessons and clinical preparation

Validation of Items for EMBI and MSI

Once the inventories were finalised, face validation of the items was carried out by panel of experts. The profiles of the panel of experts are summarised as shown in Table 4.4.

Table 4.4: Profiles of Panel of Experts

Panel	**Role**	**Department**	**Years of Experience**
Expert Panel 1	Medical Teacher	Department of Pharmacology	30 Years
Expert Panel 2	Medical Teacher and Chartered Psychologist	Dean's Office	31 Years
Expert Panel 3	Science Teacher	Medical Education and Research Development Unit	30 Years

Validity refers to the extent in which a test measures what it claims to measure. It is important for the items in the inventory to be valid in order for the results to be accurately applied and interpreted later. There were three types of validity carried out in this study; content validity, face validity and construct validity.

Content validity is essential because the items on the inventory represent the entire range of possible items the study should cover. The expert can rate each item's relevance to the respondents as they are experienced in the medical field. Face validity is a simple form of validity in which researchers determine if the items in the inventory seem to measure what is intended to measure. Objectively, face validity means that the validity of the test is taken at face value by looking at whether the inventory appears to measure the metacognitive skills and extrinsic motivated behaviour of the medical students. Face validity only means that the test looks like it works and does not mean that the test has been proven to work.

The researcher carried out face validity and content validity of both the inventories. The items were checked by two medical teachers who teach medical students enrolled in the MBBS course, where one of the experts is from the department of Pharmacology and another is a chartered psychologist from the department of the Dean's Office. A science based senior lecturer from the Medical Education Research and Development Unit, Faculty of Medicine, University of Malaya who had more than 20 years of experience teaching secondary and pre-university students was also involved in the validation process. Based on the face validity and content validity, there were several changes which was made to both the inventories. The items were also checked in terms of the suitability of language and content to be administered in the Malaysian context.

Construct validity is generally viewed as a unifying form of validity for psychological measurements, subsuming both content and criterion validity (Strauss &

Smith, 2009). The researcher used construct validation as the process provides information that leads to a sounder basis for subsequent constructs of the inventories. Construct validity was done after content and face validation were carried out. In this study, construct validity was done by piloting the inventories to thirty first year medical students in other medical schools. This was carried out to enable the researcher to know if the items demonstrate an association between the test scores and the prediction of a theoretical trait. Further discussion on the construct validation where the pilot study conducted is discussed in Section 4.5.2 (Page 92).

Table 4.5 shows examples of items which had changes in the EMBI after face validity and content validity were conducted.

Table 4.5: Examples of Items in EMBI after Face Validity and Content Validity

Items in EMBI	Items in EMBI after Face Validity and Content Validity
The most important thing for me right now is to improve my overall grade point average to please my parents.	The most important thing for me right now is to improve my overall grade point average to so as not to disappoint my parents.
Getting a good grade in the class is the most satisfying thing for me right now.	Getting a better grade than my friends in the class is the most satisfying thing for me right now.
I want to do well in this class because it is important to show my ability to my family, friends, employer or the society.	I want to do well in this course because it is important to prove my capability to my family, friends, employer or the society.
I choose materials that I can learn from even if they do not guarantee a good grade.	I choose the materials from which I can learn, even if they do not guarantee a good grade.
It is important for me to learn the course material to be competent with other students.	It is important for me to learn the course material to be as competent as other students.
I will be able to use what I learn in this course in other courses.	I will be able to use what I learn in this course in my profession as a doctor.
I believe I will achieve an excellent grade in this course and I am born to be a doctor.	I believe I will achieve an excellent grade in this course because I believe I am born to be a doctor.

Table 4.5: Examples of Items in EMBI after Face Validity and Content Validity (Continued)

Items in EMBI	Items in EMBI after Face Validity and Content Validity
I have an uneasy, upset feeling when I take an exam.	I have an uneasy, upsetting feeling when I take an exam.
I often find that I have been reading for a class, but I don't know what it was all about.	I often find that although I have been reading for a lesson, I don't know what it was all about.
I set goals for myself and other team members in order to direct my activities in class such as PBL classes.	I set goals for myself and other team members in order to direct my activities in class such as during lectures/ tutorial classes.
I often feel so lazy or bored when I study the materials for MBBS course that I quit before I finish what I planned to do.	I often feel so lazy or bored when I study the materials for MBBS course that I quit before I finish studying what I planned to study.
I decided on the MBBS course only after my Foundation studies/ STPM/ Matriculation grades were out.	I decided on taking up the MBBS course only after my Foundation studies/ STPM/ Matriculation results were released.
I often think it is a waste if students with good grades in Foundation studies/ STPM/ Matriculation do not take up medical courses.	I think it is a waste of talents if students with good grades in Foundation studies/ STPM/ Matriculation do not take up medical courses.
I think being a medical student is more prestigious than any other field.	I think being a medical student is considered to be more prestigious than being one in any other field.
It is important that a medical student learn to love and care for their patients, just like their own self.	It is important that a medical student learn to love and care for the patients, just like his/ her own self.
I tend to sway my attention when the class/ lectures gets bored.	I tend to lose my attention when the class/ lectures gets bored.

Table 4.6 (Page 91) shows the examples of items which had changes in the EMBI after face validity and content validity were conducted.

Table 4.6: Examples of Items in MSI after Face Validity and Content Validity

Items in MSI	Items in MSI after Face Validity and Content Validity
I often ask myself if I am meeting my goals by taking up the MBBS course.	I always ask myself if I am meeting my goals in life by taking up the MBBS course.
I consider several alternatives to a problem before I answer, for example in PBL lessons.	I consider several alternatives to a problem before I answer, for example in tutorial classes.
I pace myself while learning in order to have enough time.	I pace myself while learning in order to have enough time for revision.
I understand my intellectual strengths and weaknesses.	I am aware of my intellectual strengths and weaknesses.
I know how well I did once I finish a test.	I know how well I have done once I finish a test.
I am good at organizing information gathered from class, lecturers and other resources such as PBL lessons.	I am good at organizing information gathered from classes, lecturers and other resources.
I am good at remembering information from reading materials and lectures for example anatomy and biochemistry.	I am good at remembering information from reading materials and lectures such as those on anatomy and biochemistry.
I ask myself if there was an easier way to do things after I finish a task.	I ask myself if there has been an easier way to do things after I finish a task.
I often review my lessons daily to help me understand important relationships between my lessons and clinical preparation.	I review my lessons daily to help me understand important relationships between my lessons and clinical preparation.
I ask others for help; friends and lecturers when I don't understand something.	I ask friends and lecturers for help when I don't understand something.
I know when each strategy I use will be most effective.	I know when the strategy I use will be most effective.
I ask myself how well I accomplish my goals once I'm finish.	I ask myself how well I have accomplished my goals once I finished.
I ask myself if I have considered all options after I solve a problem.	I ask myself if I have considered all options after solving a problem.
I ask myself if I learned as much as I could have once I finish a task.	I ask myself if I have learned as much as I could have once I finish a task.

4.6.2 Phase 2: Pilot Study

The objectives of the pilot study were to estimate the time required for the subjects to complete both the inventories and to find out the suitability of each item in the inventories. The pilot study was carried out after content and face validation of both the inventories were done. A pilot study among thirty first year MBBS students was conducted at two private institutions of higher learning. These students were first year MBBS students chosen by invitation, who were of similar age and have had undergone pre-university education. The researcher took approximately two months to gather all the information in the pilot study and to test out the results statistically. The statistical results showed that Cronbach-alpha reliability for both the Extrinsic Motivation Behaviour Inventory and the Metacognitive Skills Inventory are 0.75 and 0.94 respectively (Table 4.7). After the pilot study, both the inventories were refined by the expert panels in terms of grammatical errors before administering to the first year medical students.

Table 4.7: Reliability of Instruments during Pilot Study

Instruments	**Cronbach's Alpha**	**Number of Items**
Extrinsic Motivation Behaviour Inventory	.747	40
Metacognitive Skills Inventory	.942	52

The summary item statistics for EMBI and MSI in the pilot study is shown in Table 4.8 and Table 4.9 respectively.

Table 4.8: Summary Item Statistics for Extrinsic Motivated Behaviour Inventory (EMBI) for Pilot Study

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.947	1.600	5.733	4.133	3.583	1.424	40

Table 4.9: Summary Item Statistics for Metacognitive Skills Inventory (MSI) for Pilot Study

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.699	3.133	5.733	2.600	1.830	0.206	52

4.7 Reliability of Instruments

The researcher also tested out the reliability of both the Extrinsic Motivation Behaviour Inventory and the Metacognitive Skills Inventory.

Table 4.10: Reliability of Extrinsic Motivation Behaviour Inventory (EMBI)

Cronbach's Alpha	Number of Items
.844	40

The result in Table 4.10 shows that, for Extrinsic Motivation Behaviour Inventory the Cronbach-alpha reliability is 0.84. This reliability is satisfactory. According to Schmitt (1996), a Cronbach-alpha value of 0.70 and above is considered satisfactory. The summary item statistics for EMBI for the study is shown in Table 4.11.

Table 4.11: Summary Item Statistics for Extrinsic Motivated Behaviour Inventory (EMBI)

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.129	2.586	5.287	2.701	2.044	.492	40

The result in Table 4.12 shows that, for the Metacognitive Skills Inventory, the Cronbach-alpha reliability is 0.96. This reliability is satisfactory. According to Schmitt (1996), a Cronbach-alpha value of 0.70 and above is considered satisfactory.

Table 4.12: Reliability of Metacognitive Skills Inventory

Cronbach's Alpha	Number of Items
.963	52

The summary item statistics for MSI is shown in Table 4.13.

Table 4.13: Summary Item Statistics for Metacognitive Skills Inventory (MSI)

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4.428	3.874	5.017	1.144	1.295	.049	52

Figure 4.1 below shows the steps taken to derive the Extrinsic Motivated Behaviour Inventory and Metacognitive Skills Inventory.

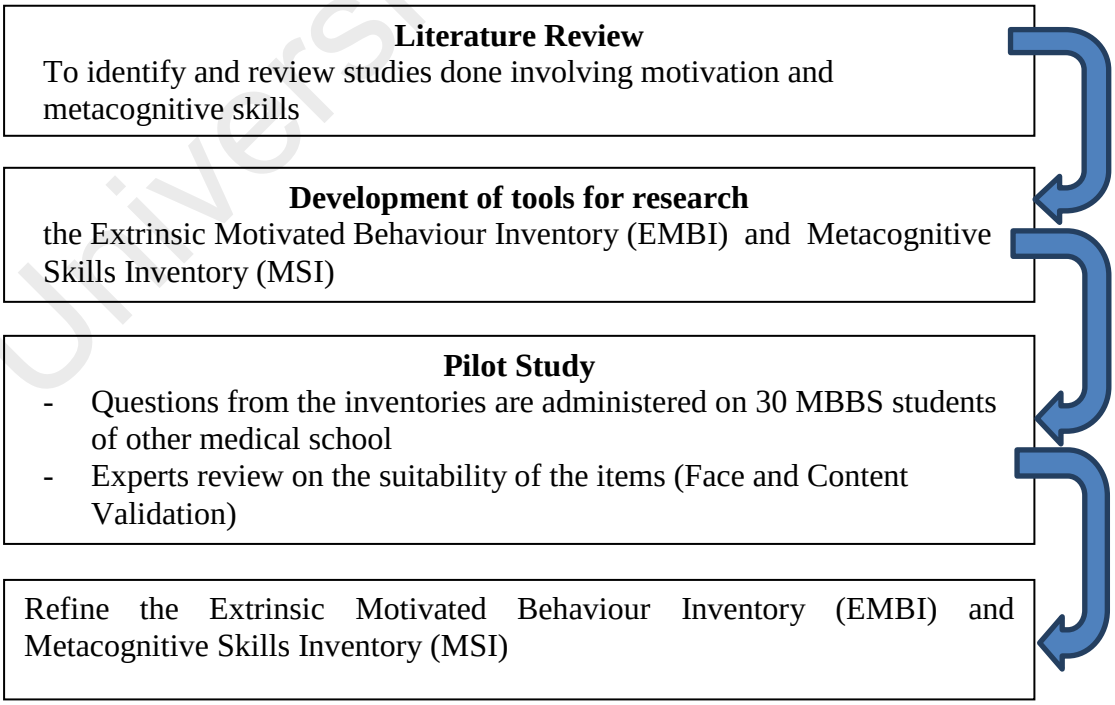


Figure 4.1: Steps involved in developing the Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI)

4.8 Analytical Methods

The data obtained from the two inventories were analysed quantitatively. The researcher used statistical analysis tests using the Statistical Package for the Social Sciences (SPSS) Version 20 which is also widely used for other quantitative analysis besides the social sciences.

The data from interviews were analysed qualitatively. The researcher first transcribed all the interviews according to medical students in the different dimensions of extrinsic motivated behaviour. The researcher then memoed the important keywords and provided early codings for the findings of the interviews (Appendix B). Emerging themes were formed to describe the medical students' thoughts. All the quantitative and qualitative findings are discussed in Chapter 5.

4.8.1 Analysis of quantitative data

For each of the sample, students have a choice to answer on a Likert-scale of 1 to 6, where 1 represents strongly disagree and 6 represents the strongly agree statements. Raw scores were generated for both the Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI) administered. The researcher tested the normality of the scores for the Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI) as well as the Year End Result before the statistical tests were carried out. This is to ensure that when normal data is obtained, parametric tests can be carried out. For parametric tests, the variance is assumed to be homogeneous. A series of statistical tests such as *t*-test, One-way ANOVA, Pearson Correlation, Two-way ANOVA and MANOVA were used to analyse the data to enable the researcher to answer the research questions.

4.8.1.1 Analysis of Extrinsic Motivated Behaviour Inventory (EMBI)

The Extrinsic Motivated Behaviour Inventory (EMBI) which was completed by the students were answered based on a Likert scale. The students' scores were summed according to the students' responses and the researcher categorised the medical students into the different dimensions of Extrinsic Motivated Behaviour Inventory (EMBI); external, introjected, identified and integrated regulations.

Table 4.14: Items Categorised in the Different Dimensions of EMBI

Dimensions of Extrinsic Motivated Behaviour	Items
External Regulation	No.1, No.5, No.9, No.13, No.17, No.21, No.25, No.29, No.33 and No.37
Introjected regulations	No.2, No.6, No.10, No.14, No.18, No.22, No.26, No.30, No.34 and No.38
Identified Regulation	No.3, No.7, No.11, No.15, No.19, No.23, No.27, No.31, No.35 and No.39
Integrated Regulation	No.4, No.8, No.12, No.16, No.20, No.24, No.28, No.32, No.36 and No.40

If the students' score was the highest for the sum of the items for external regulation, the student was then categorised as having external regulation. The total raw score for the Extrinsic Motivated Behaviour Inventory was considered as a ratio scale because the scores can be compared as multiples of one another. The researcher then categorised the Extrinsic Motivated Behaviour score into the different dimensions to form nominal scale data.

To find the significant difference between medical students identified for the four dimensions of extrinsic motivated behavior and year-end examination result, the researcher first analysed using one-way ANOVA tests. ANOVA (ANalysis Of VAriance) is a general method for studying sampled-data relationship (Clarke & Cooke,

1998). The one-way ANOVA compares the means between the four dimensions of extrinsic motivated behaviour and determines whether any of those means are significantly different from each other. Then, a post-hoc test was administered to determine which of the dimensions of extrinsic motivated behaviour were significantly different in terms of year-end examination results. A Pearson Correlation was also used to study the correlation of the four dimensions of extrinsic motivated behaviour and the year-end examination results to determine the relationship if any.

4.8.1.2 Analysis of Metacognitive Skills Inventory (MSI)

The Metacognitive Skills Inventory (MSI) which was completed by the students were answered based on a Likert scale. The scores for the two dimensions of Metacognitive Skills Inventory; metacognitive knowledge and metacognitive regulation enabled the researcher to analyse the students' metacognitive skills.

For the dimensions of metacognitive skills, the researcher summed the scores of items for the different dimensions as shown in Table 4.15 (Page 98). The raw score for ‘knowledge of metacognition’ is the sum of the scores for procedural knowledge, declarative knowledge and conditional knowledge. The raw score for ‘regulation of metacognition’ is the sum of the scores for Information Management Strategies Regulation, Debugging Strategies, Planning Regulation, Comprehension Monitoring and Evaluation Regulation.

The total raw scores for metacognitive skills were obtained from the sum of the dimensions of knowledge of metacognition and regulation of metacognition. To find the significant difference between medical students identified for the two dimensions of metacognitive skills and year-end examination result, the researcher used the *t*-test analysis.

Table 4.15: Items Categorised in the Different Dimensions of Metacognitive Skills

Dimensions of Metacognitive Skills		Items
Metacognitive Knowledge	Procedural Knowledge	No.3, No.14, No.27, No.33
	Declarative Knowledge	No.5, No.10, No.12, No.16, No.17, No.20, No.32, No.46
	Conditional Knowledge	No.15, No.18, No.26, No.29, No.35
Metacognitive Regulation	Information Management Strategies Regulation	No.9, No.13, No.30, No.31, No.37, No.39, No.41, No.43, No.47, No.48
	Debugging Strategies	No.25, No.40, No.44, No.51, No.52
	Planning Regulation	No.4, No.6, No.8, No.22, No.23, No.42, No.45
	Comprehension Monitoring	No.1, No.2, No.11, No.21, No.28, No.34, No.49
	Evaluation Regulation	No.7, No.18, No.24, No.36, No.38, No.50

The *t*-test was used to compare the means between the two dimensions of metacognitive skills and to determine whether any of those means were significantly different from the students' year end examination. A Pearson Correlation was also used to study the correlation of the two dimensions of metacognitive skills and the year-end examination results.

4.8.1.3 Analysis Between Extrinsic Motivated Behaviour Inventory (EMBI) and Metacognitive Skills Inventory (MSI)

Pearson Correlation was used to study the correlation between extrinsic motivated behaviour and metacognitive skills as illustrated in Figure 4.2. This analysis was done based on the raw score of both the Extrinsic Motivated Behaviour Inventory

(EMBI) and Metacognitive Skills Inventory (MSI) of the students from both the NIC and UMMP curricula.

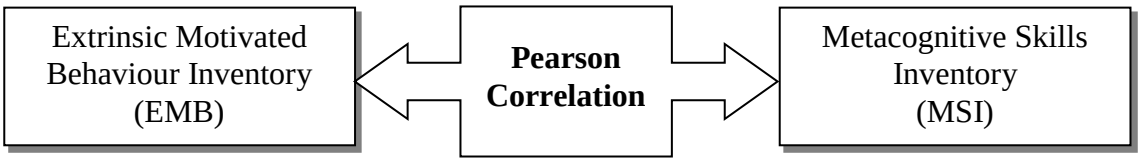


Figure 4.2: Correlation for Raw Scores of Extrinsic Motivated Behaviour Inventory and Metacognitive Skills Inventory (MSI)

Further exploration on the interactions of extrinsic motivated behaviour and the two dimensions of metacognitive skills with the students' year end examination were carried out using the two-way ANOVA. The two-way ANOVA statistical test was used to analyse both the students of the NIC and UMMP curricula to show the main effects and any interactions between the domains in the two curricula. The alpha value was set at 0.05 for all statistical tests carried out. A summary of the statistical analysis for one-way ANOVA, *t*-test, and two-way ANOVA for both the NIC and UMMP curricula are illustrated in Figure 4.3.

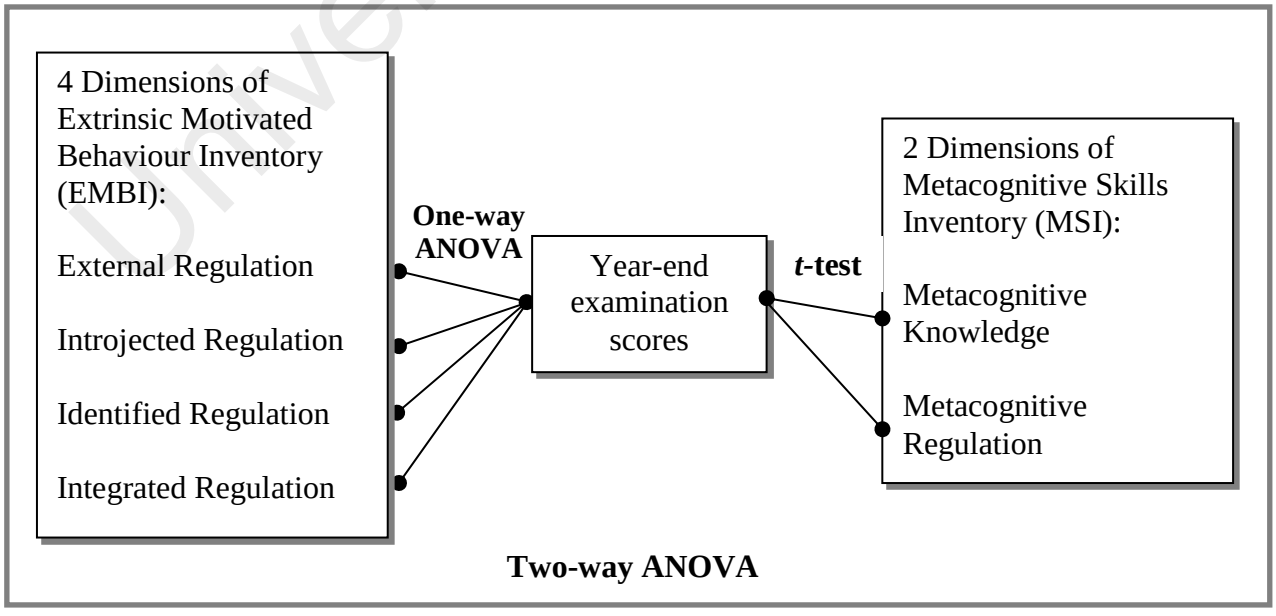


Figure 4.3: Statistical Analysis for Quantitative Data for the NIC Curriculum and UMMP Curriculum

Multivariate analysis of variance (MANOVA) is a statistical test similar to ANOVA, but with several dependent variables. ANOVA tests for the difference in means between two or more groups, while MANOVA tests for the difference in two or more vectors of means. In this study, the researcher used the MANOVA statistical analysis to study the alignment between the students' extrinsic motivated behaviour, their metacognitive skills and year end examination results of students from both the NIC and UMMP Curricula.

For this purpose, the researcher utilised the total raw score of the MSI and classified the students to low, moderate and high metacognitive skills level. The range of scores for the low level of metacognitive skills is 52-155, where the student's responses were mostly 1 or 2 on the Likert Scale for the items in the Metacognitive Skills Inventory. The range of scores for the moderate level of metacognitive skills is 156-259, where the student's responses were mostly 3 or 4 on the Likert Scale while the range of scores for the high level of metacognitive skills is 260-312, where the student's responses were mostly 5 or 6 on the Likert Scale as shown in Table 4.16.

Table 4.16: Classification of Students' Level of Metacognitive Skills

Metacognitive Skills Inventory Raw Score	**Level**
52 – 155	Low
156 – 259	Moderate
260 – 312	High

This classification was done to study the differences of the dimensions of EMB and the levels of MSI to interpret the alignment of the two domains with students' year end examination results; for example, a student who was categorised as having integrated regulation and high metacognitive skills level and the significance of this to his/ her year-end examination results.

Based on the students' categorisation into the different dimensions of EMB and different levels of MSI, the MANOVA statistical test was used to analyse statistically; the crux of this study which is the alignment between the students' extrinsic motivated behaviour, their metacognitive skills and year end examination results of students from both the NIC and UMMP Curricula. The illustration on the summary of the data analysis is shown in Figure 4.4.

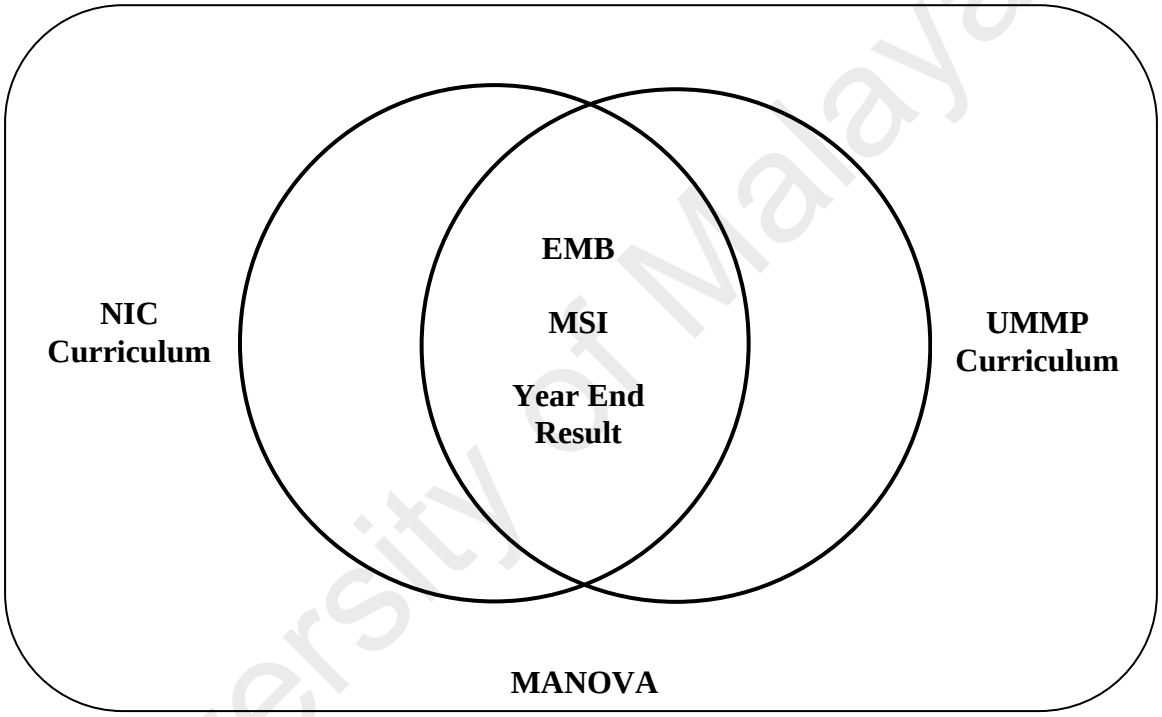


Figure 4.4: Statistical Analysis to Study the Alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills of Students from the NIC Curriculum and UMMP Curriculum

4.8.2 Analysis of qualitative data

The samples of students chosen for the interview were desirably from the four different dimensions of extrinsic motivated behaviour. Upon obtaining the statistical results, the researcher chose twelve medical students enrolled in the respective curriculum identified for the four different dimensions of Extrinsic Motivated Behaviour as samples for the interview.

To collect qualitative data, the researcher conducted a semi-structured interview because semi-structured interview allowed the participants to fully express their viewpoints and experiences more comfortably and in a less threatening manner. The interviews conducted contributed to rich and thick qualitative data for the researcher to analyse. According to Gall, Gall, and Borg (2003), this method reduces researcher biases within the study, particularly when the interviewing process involves many participants.

The researcher had a peer review session on the type of interview questions to be put forward. For each question, the researcher indicated the questions which will help to address the feasibility of asking the intended questions. In addition, the questions were carefully read and the rationale for each question was discussed. The students who were selected to participate in the interviews were asked identical questions, but the questions were worded so that responses obtained are open-ended. This open-endedness allows the participants to contribute as much detailed information as they desire and it also allowed the researcher to ask probing questions as a means of follow-up (Turner, 2010).

The interview recordings (Appendix B) were transcribed immediately upon completing the interview session with the interviewee. The transcribed interview data was memoed and coded to enable the researcher to gain an in-depth understanding and helped to define the four dimensions of Extrinsic Motivated Behaviour in greater depth to compliment the statistical analysis produced.

Table 4.17 (Page 103) shows the examples of how the transcribed data were memoed and early coding were assigned to enable the researcher to come up with themes. The summary of the data analysis to answer the research questions for the study is shown in Table 4.18 (Pages 104 and 105).

Table 4.17: Example of the Summarized Qualitative Data Analysis

Dimensions of Extrinsic Motivated Behaviour	**Coding**	**NIC Curriculum**	**UMMP Curriculum**
External Regulation	Parents	*...it was not my choice, hmm... actually it's my parents. My parents want one of their daughter to be a doctor* *(Student 4, External Regulation, NIC Curriculum, 08/10/2013)*	*..My parents.. my parents want one of the children to be a doctor. I am the youngest so... I just follow the flow, as what my parents wanted.* *(Student 7, External Regulation, UMMP Curriculum, 16/07/2014)*
Introjected Regulation	Self-Esteem	*...In school I only have the thoughts of going into medicine... Until I come into medicine then only I know how it is... I realized it is not easy!* *(Student 8, Introjected Regulation, NIC Curriculum, 10/10/2013)*	*...we are only told all about medicine only...We are molded to do medicine... since I am from MRSM and boarding school students should aim to do medicine or engineering at least* *(Student 2, Introjected Regulation, UMMP Curriculum, 17/07/2014)*
Identified Regulation	Career Pathway	*... I was not influenced by anyone. I actually plan to do forensics. In order to do that, I have to take medicine...* *(Student 3, Identified Regulation, NIC Curriculum, 08/10/2013)*	*...Interest... my father didn't want me to do medicine...I don't like mechanical things* *(Student 5, Identified Regulation, UMMP Curriculum, 18/07/2014)*
Integrated Regulation	Inspira-tion in One-self	*... I wanted to be a doctor... my parents don't want me to be a doctor...I want to be that kind of doctor that comforts my patients... It was my inspiration* *(Student 2, Integrated Regulation, NIC Curriculum, 07/10/2013)*	*...I should do something for my community...my family don't force me to go into medicine...always tell me to "do what you can do"; if that is what I want to do* *(Student 3, Integrated Regulation, UMMP Curriculum, 17/07/2014)*

Table 4.18: Summary of Data Analysis

Research Question	Measurement Scale	Type of Analysis
1. What is the profile of the dimensions of a) extrinsic motivated behaviour among students following the NIC and UMMP curricula b) metacognitive skills among students following the NIC and UMMP curricula	Dimensions of EMB: Nominal scale Dimensions of MSI: Nominal scale	Descriptive Statistics
2. Is there a significant difference between medical students identified for the four dimensions of extrinsic motivated behaviour and their year-end examination results among a) students from the NIC curriculum b) students from the UMMP curriculum	Dimensions of EMB: Nominal scale Exam Results: Ratio scale	One way ANOVA and Post-hoc test
3. Is there a significant difference between medical students identified for the two dimensions of metacognitive skills and their year-end examination results among a) students from the NIC curriculum b) students from the UMMP curriculum	Dimensions of MSI: Nominal scale Exam Results: Ratio scale	*t*-test
4. What is the correlation (if any) between extrinsic motivated behaviour and metacognitive skills of the medical students in the a) NIC curriculum b) UMMP curriculum	Raw scores: Ratio scale	Pearson Correlation
5. How is the alignment of extrinsic motivated behaviour and metacognitive skills for the NIC and the UMMP students		MANOVA

Table 4.18: Summary of Data Analysis (Continued)

Research Question	Measurement Scale	Type of Analysis
6. What are the interactions between extrinsic motivated behaviour and metacognitive skills with their year end result among the medical students in a) NIC curriculum b) UMMP curriculum		Two-way ANOVA to examine both main effects and interaction

4.9 Chapter Summary

Based on the methodology discussed, the researcher developed two inventories, the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI). The development of the inventories consists of two phases where the validity and reliability of the inventories were carried out. A pilot study was conducted in the second phase of development of the research instruments before the inventories were used in the actual study.

The administration of the Extrinsic Motivated Behaviour Inventory enabled the researcher to categorise the medical students into the four dimensions of extrinsic motivated behaviour based on the scores of the respective items. The Metacognitive Skills Inventory enabled the researcher to categorise the students into the two dimensions and study the relationship between the students' extrinsic motivated behaviour and their metacognitive skills. Further classification into the different levels of metacognitive skills was carried out to run the MANOVA test.

This chapter also explained the statistical tests carried out such as *t*-tests, ANOVA, two-way ANOVA and MANOVA which enabled the researcher to study the correlation between the dimensions of the researched domains and students' performance in their year-end examination results and also to answer all the research

questions. The researcher was also able to further explore the insight of the student's motivated behaviour and to compliment the statistical analysis based on the interviews conducted.

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Introduction

This chapter puts forward the results and the discussion of the present study. Two instruments developed, the Extrinsic Motivated Behaviour Inventory (EMBI) and the Metacognitive Skills Inventory (MSI) were administered to 174 first year medical students following the NIC curriculum and 159 first year medical students following the UMMP curriculum at the University of Malaya at the end of the academic year to study the alignment of extrinsic motivated behaviour and metacognitive skills among first year undergraduate medical students.

The development of the instruments used has been discussed earlier in Chapter 4. The SPSS Software Version 20 was used in the statistical analysis of the study data in accordance to the research questions. The correlation between the four dimensions of extrinsic motivated behaviour and metacognitive skills with first year medical students' year end examination results was studied. The research also focused on studying the significance between the four dimensions of extrinsic motivated behaviour and the two dimensions of metacognitive skills with the students' year end examination results. In addition to the statistical results, individual interviews conducted with the selected medical students' in both the NIC and UMMP curricula, enabled further exploration of the impact of the curriculum change on the alignment between extrinsic motivated behaviour and metacognitive skills among first year medical students of both the NIC and UMMP medical curricula.

In this chapter, the analyses of the demographics of the medical students following the NIC curriculum and the UMMP curriculum followed by results from both the EMBI and MSI are presented and discussed. The findings are presented following the sequence of the research questions presented in Chapter 1 (Section 1.4, Page 13).

5.2 Demographics of the Study Samples

This section describes the demographic findings such as gender and the pre-university education of the two study samples.

5.2.1 First Year MBBS Students of the NIC Curriculum

The NIC curriculum had a total of 205 students. Of this number, only 174 students out of 205 students participated (84.88%) in this study. The students who did not participate in the actual study were absent during the administration of the inventories, which was at the end of the academic year.

The 174 students following the NIC curriculum consisted of 79 male students (45.4%) and 95 female students (54.6%) (Table 5.1).

Table 5.1: Composition by Gender of the First Year MBBS Students of the NIC Curriculum

Gender	Frequency, *n*	Percentage, %
Male	79	45.4
Female	95	54.6
Total	174	100.0

The following section reveals the Pre-University education of the first year medical students following the NIC curriculum. In Malaysia, students generally have three options of studying at the pre-university level prior to entering the medical program at the University of Malaya: (i) a one-year Foundation Studies (University of Malaya program), (ii) a one-year Matriculation Program; offered by the Ministry of Education through matriculation centres throughout Malaysia and (iii) a two-year STPM Program (Malaysian Higher School Certificate), an A-level equivalent pre-university qualification in schools following the Malaysian curriculum.

Of the 174 first year medical students following the NIC curriculum, 94 (54.0%) of them were from Centre of Foundation Studies, 79 (45.4%) of them were from Matriculation and only 1 (0.6%) was a candidate who had taken the STPM examination. Table 5.2 shows the distribution of first year MBBS students following the NIC curriculum by their pre-university education respectively, in the actual study.

Table 5.2: Distribution of First Year MBBS Students of the NIC Curriculum by Pre-University Education

Pre-University Education	Frequency, *n*	Percentage, %
Centre for Foundation Studies (PASUM)	94	54.0
Matriculation	79	45.4
STPM	1	0.6
Total	174	100.0

5.2.2 First Year MBBS Students of the UMMP Curriculum

For the UMMP curriculum of 179 students only 159 students participated (88.83%) in this study. The students who did not participate in the study were absent during the administration of the inventories at the end of the academic year. These 159 students following the UMMP curriculum were made up of 57 male (35.8%) and 102 female (64.2%) first year medical students (Table 5.3).

Table 5.3: Composition by Gender of the First Year MBBS Students of the UMMP Curriculum

Gender	Frequency, *n*	Percentage, %
Male	57	35.8
Female	102	64.2
Total	159	100.0

For the 159 UMMP first year medical students, 70 of them were from Centre of Foundation Studies (44.0%), 89 were from Matriculation (56.0%) and there were no candidates who had sat for the STPM examination. Table 5.4 shows the distribution of first year MBBS students of the UMMP curriculum by their pre-university education respectively, in the actual study.

Table 5.4: Distribution of First Year MBBS Students of the UMMP Curriculum by Pre-University Education

Pre-University Education	Frequency, *n*	Percentage, %
Centre for Foundation Studies (PASUM)	70	44.0
Matriculation	89	56.0
Total	159	100.0

Following the presentation of the sample demographics above, the first research question in relation to the profile of the samples from the two curriculum is discussed in the following section.

5.3 The Extrinsic Motivated Behaviour and Metacognitive Skills Profiles of the Student Samples

Students' scores for the different dimensions of the Extrinsic Motivated Behaviour from the inventory were categorised according to the sum of the scores obtained for the items which reflected the dimensions as shown in Chapter 4 (Table 4.14; Page 96). The following section discusses the analysis and categorisation of the items in the EMBI following both the NIC and UMMP curricula students and the normality of the scores before the parametric statistical analysis were carried out.

The Metacognitive Skills Inventory comprised of 52 items which consists of two dimensions; Knowledge of metacognition and Regulation of metacognition. The knowledge dimension of metacognition consists of items with regards to procedural

knowledge, declarative knowledge and conditional knowledge. The metacognitive regulation dimension consists of items with regards to Information Management Strategies, Debugging Strategies, Planning, Comprehension Monitoring and Evaluation. Students' scores for the two different dimensions of metacognitive skills from the inventory were categorised as shown in Chapter 4 (Table 4.15; Page 98).

In answering the first research question, the results are reported in four sections, namely;

(i) The Extrinsic Motivated Behaviour Profiles of the Medical Students following the NIC Curriculum

(ii) The Extrinsic Motivated Behaviour Profiles of the Medical Students following the UMMP Curriculum

(iii) Profiling of Metacognitive Skills dimensions among medical students following the NIC curriculum

(iv) Profiling of Metacognitive Skills dimensions among medical students following the UMMP curriculum

5.3.1 The Extrinsic Motivated Behaviour Profiles of the Medical Students following the NIC Curriculum

The normality of the sample for their extrinsic motivated behaviour scores by using numerical and graphical methods was computed. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to compare the Extrinsic Motivated Behaviour scores in the sample to a normally distributed set of scores with the same mean and standard deviation. Table 5.5 shows the results on the normality of the Extrinsic Motivated Behaviour scores of first year MBBS students of the NIC curriculum.

Table 5.5: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution for Medical Students in the NIC Curriculum

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Extrinsic Motivation Score	.044	174	.200*	.994	174	.717

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

For a sample size of smaller than 2000 elements, the Shapiro-Wilk test is used. In this study, the Shapiro-Wilk test was used because there were only 174 first year medical students in the NIC curriculum. From the results shown in Table 5.5, the *p*-value is 0.717 which is greater than 0.05. The *p*-value indicates that the EMBI score has a normal distribution.

Table 5.6 : Mean, standard deviation, minimum and maximum of Extrinsic Motivated Behaviour Score (*n*=174) in the NIC Curriculum

	Mean	**S.D.**	**Minimum**	**Maximum**
EMBI Score	164.51	15.22	119	200

Table 5.6 shows the EMBI scores of the medical students following the NIC curriculum. A mean score of 164.51 was obtained, while the overall score ranged from a minimum of 119 to a maximum of 200, with a standard deviation of 15.22.

A histogram of the EMBI scores with a normal curve superimposed was obtained to graphically check on the normality of the EMBI score distribution. Figure 5.1 shows the histogram of the EMBI score for the 174 first year medical students in the NIC curriculum in the present study. The distribution curve shows a normal distribution as suggested by the mean (164.5), median (165.0) obtained through descriptive statistics, which differs only slightly. The class mode has a class mid-point of 157. The distribution curve has indicated a skewness of -0.10.

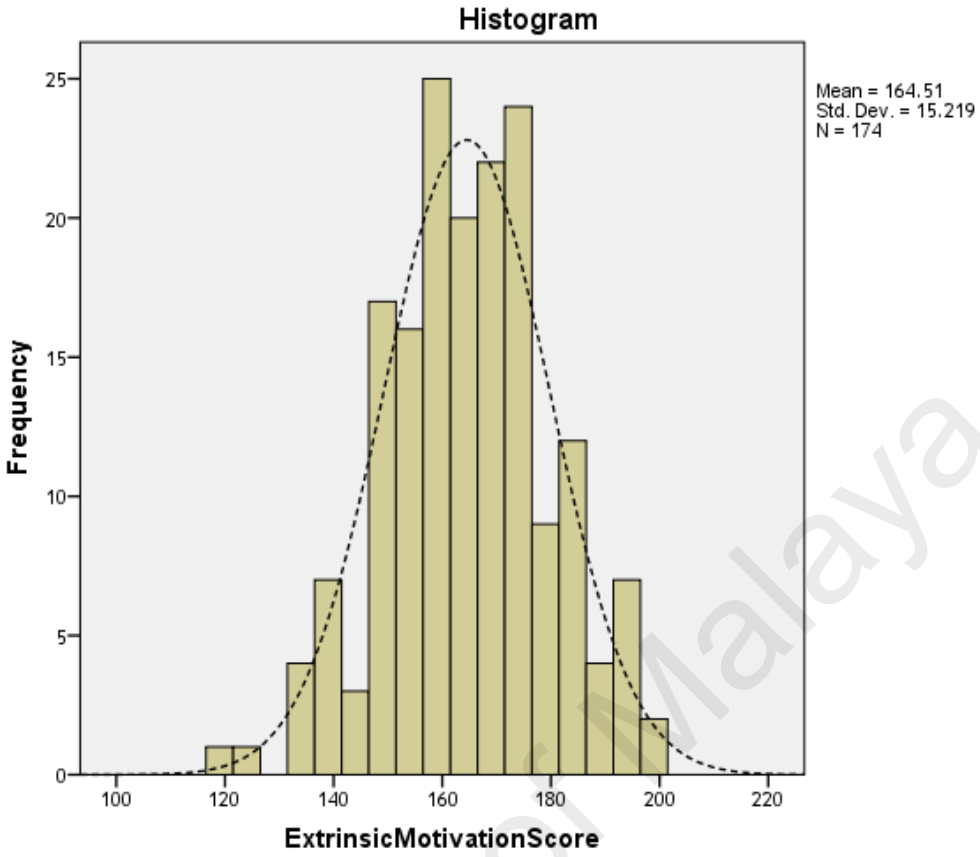


Figure 5.1: Histogram for the EMBI score for first year MBBS students of the NIC Curriculum

Figure 5.1 shows the normal curve on the distribution of the EMBI score from the first year MBBS students of the NIC curriculum. From the histogram, the mode appears to be close to the centre of the range. Since the scores showed normality, parametric statistical analysis was used to analyse the findings of the inventory.

Figures 5.2 to 5.6 show the categorisation of first year medical students following the NIC curriculum into the four different dimensions of extrinsic motivated behaviour. In the present study, the profile of the students according to their dominant dimension of extrinsic motivated behaviour was generated (Figure 5.2).

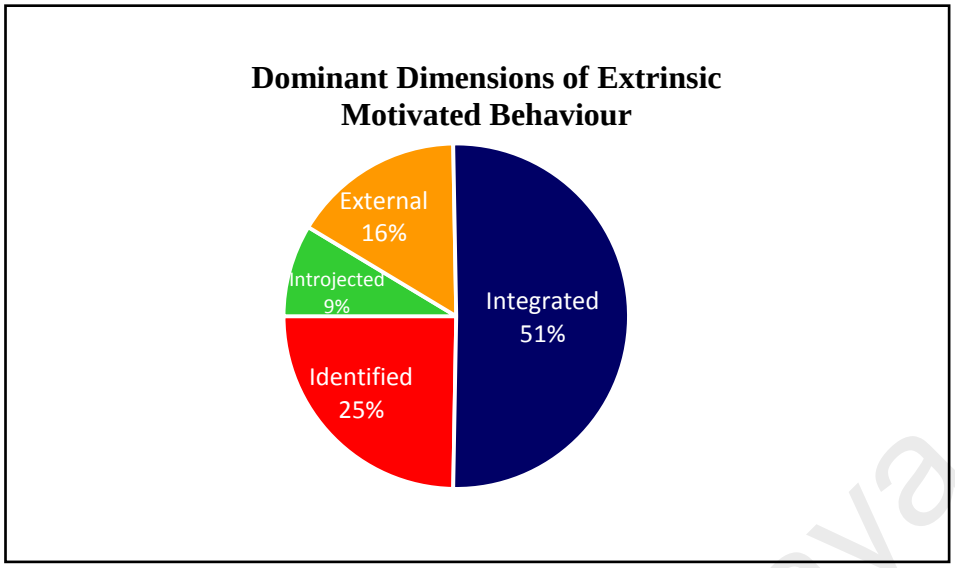


Figure 5.2: Dimensions of Dominant Extrinsic Motivated Behaviour in First Year MBBS Students of the NIC Curriculum

Nevertheless on closer scrutiny, it was revealed that students have a combination of dimensions of extrinsic motivated behaviour as shown in Figures 5.3 to 5.6. This finding was complemented by the qualitative data from the interviews.

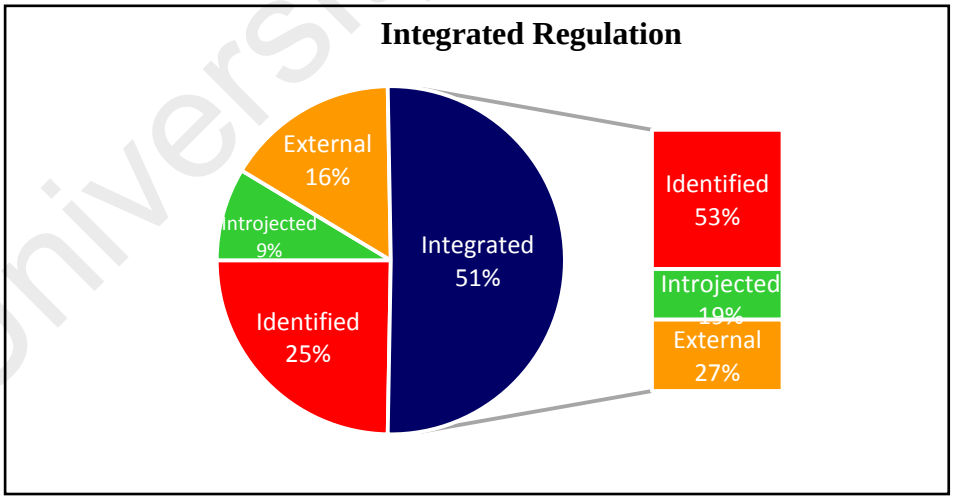


Figure 5.3: Combination Dimensions of Integrated Regulation in First Year MBBS Students of the NIC Curriculum

Based on Figure 5.3, 51% of the students were categorised as being dominant in integrated regulation, which is the highest degree of extrinsic motivated behaviour. When this 51% was further analysed, it was revealed that 53% of them also displayed identified regulation, 19% of them also displayed introjected regulation category and 27% of them displayed external regulation category. Therefore, a student who is categorised as being in the integrated regulation category (the most autonomous form of extrinsic motivation) would also have other dimensions within his or herself.

In an interview with Student 9 who was categorised as being in the integrated regulation category, he revealed that his choice to do medicine was also influenced by his sister who works in the hospital but at the same time, he indicated that he himself was inspired to do medicine and even turned down an offer of a scholarship to pursue engineering in Germany; therefore displaying a combination of integrated regulation and identified regulation.

> *...I decided to follow my sister to the hospital and I like the working environment in the hospital. Yes, result was important. Actually I got engineering in Germany under National Civil Service Department (JPA) because the Prime Minister promised everyone a scholarship. I wanted to do medicine.*
> *(Student 9, Integrated Regulation, NIC Curriculum, 14/10/2013)*

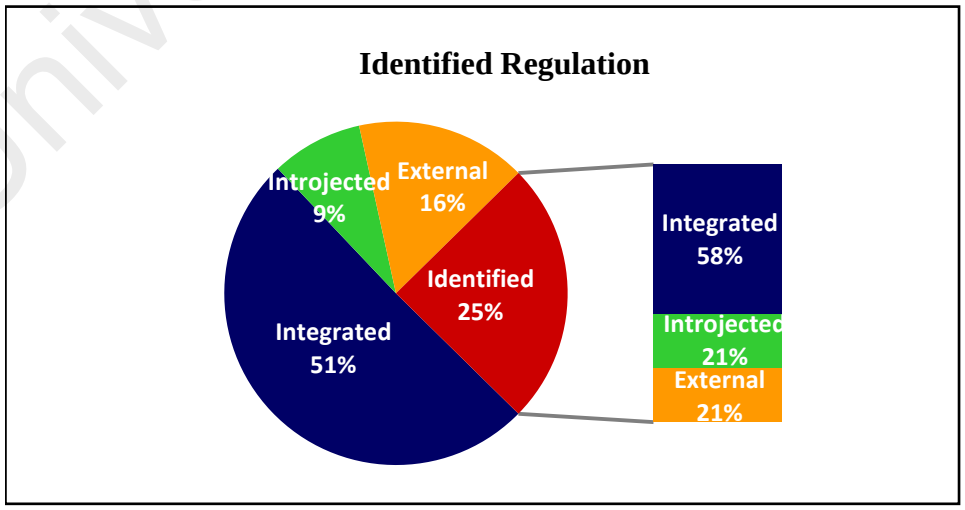


Figure 5.4: Combination Dimensions of Identified Regulation for First Year MBBS Students of the NIC Curriculum

Based on Figure 5.4, 25% of the students were categorised as being in the identified regulation category. Out of this 25%, 58% of them also displayed integrated regulation category, 21% of them displayed the introjected regulation category and 21% of them displayed the external regulation category. The interview with Student 11 showed that the student's choice to do medicine was influenced by his parents and also his own self-esteem as he had scored good results and had a good co-curricular score; therefore displaying a combination of identified regulation and introjected regulation.

> *...my 1st choice is pharmacy. Parents told me grades is not so bad, marks for co-curriculum, which is about 97%.They say why don't give it a try to choose MBBS. I also think if correct choice, in the end I choose MBBS*
> *(Student 11, Identified Regulation, NIC Curriculum, 15/10/2013)*

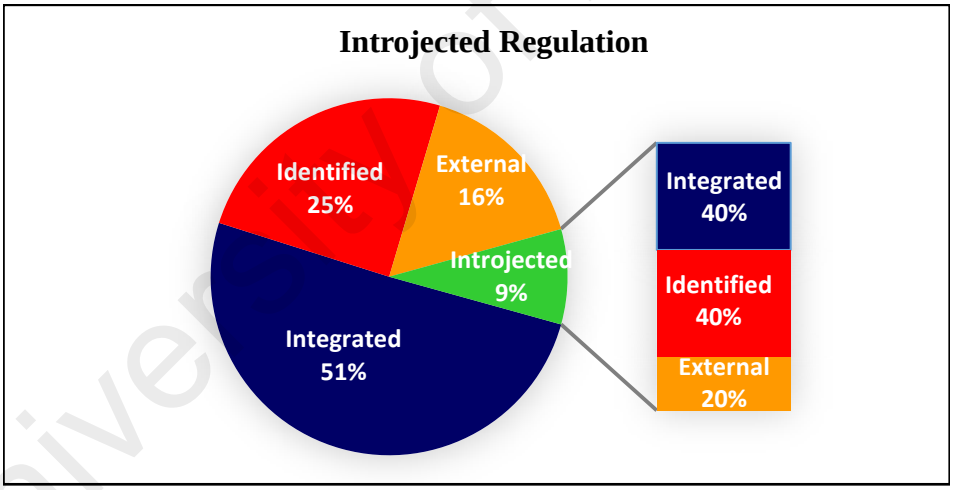


Figure 5.5: Combination Dimensions of Introjected Regulation for First Year MBBS Students of the NIC Curriculum

Figure 5.5 shows that 9% of the students were categorised as being in the introjected regulation dimension. Out of this 9%, there were 40% of them who also displayed the integrated regulation category, 40% who also displayed the identified regulation category and 20% of them who displayed the external regulation category. A high percentage of students categorised under the introjected regulation dimension seem to also display integrated and identified regulation dimension within themselves.

Student 8 who was categorised as being in the introjected regulation dimension pointed out that she had been influenced by her parents who were both doctors and somehow only had the thought of entering medical school. Hence, the choice to be in medical school was also influenced by self-esteem and parents; therefore displaying the external regulation and introjected regulation dimensions.

> *In school I only have the thoughts of going into medicine. Both my parents are doctors. Until I come into medicine then only I know how it is. My parents told me it's easy but I realized it is not easy! I have never thought of other career. (Student 8, Introjected Regulation, NIC Curriculum, 10/10/2013)*

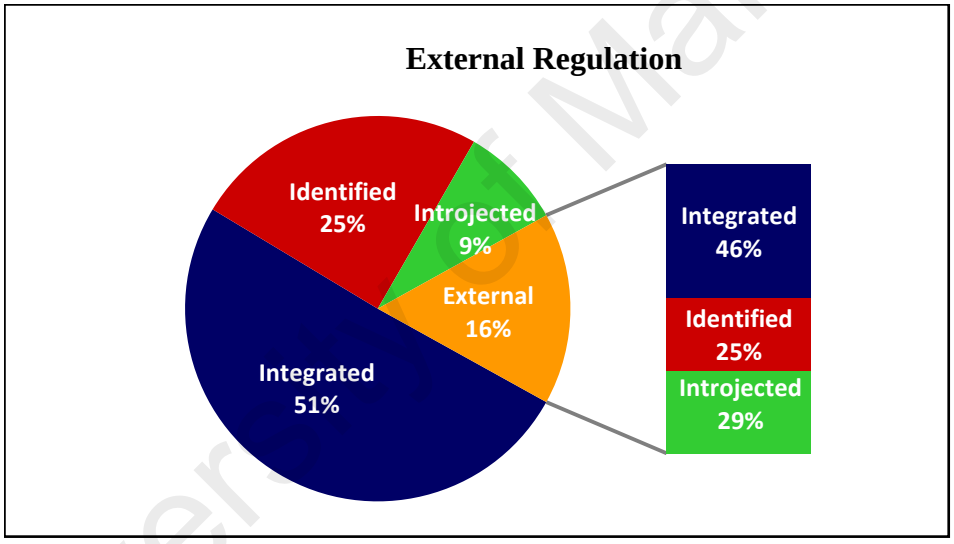


Figure 5.6: Combination Dimensions of External Regulation for First Year MBBS Students of the NIC Curriculum

Based on Figure 5.6, 16% of the students were categorised as being in the external regulation dimension. Out of this 16%, there were 46% of them who also fell into integrated regulation dimension, 25% of them who displayed the identified regulation dimension and 29% of them who were categorised as being in the introjected regulation dimension.

From the interview with Student 10 who was categorised as being in the external regulation dimensions, it was found that although the student's choice was influenced by

her brother and mother (external regulation), it was also her self-esteem that made her think that she has the potential to be a doctor (introjected regulation).

> *...My brother said that I got the potential to be a doctor. I am the youngest and he asked me to be a doctor. I talked to my mom, and my mom persuade me too. I'm the youngest and is the potential one to be a doctor*
> *(Student 10, External Regulation, NIC Curriculum, 14/10/2013)*

Based on Figures 5.3 to Figure 5.6, it is clearly shown that although students were categorised into the four different dominant dimensions of extrinsic motivated behaviour, the study discovered that these students also have a combination of other dimensions of extrinsic motivated behaviour within themselves.

5.3.2 The Extrinsic Motivated Behaviour Profiles of the Medical Students in the UMMP Curriculum

The normality of the sample for the data of the EMBI of the MBBS students in the UMMP curriculum in terms of their extrinsic motivated behaviour score was also investigated using numerical and graphical methods. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to compare the Extrinsic Motivated Behaviour score in the sample to a normally distributed set of scores with the same mean and standard deviation.

Table 5.7 shows the results on the normality of the Extrinsic Motivated Behaviour scores of first year MBBS students of the UMMP curriculum. The Shapiro-Wilk test was used because there were only 159 medical students from the first year UMMP curriculum. From the result, the *p*-value is 0.512 which is greater than 0.05 for the EMBI score for first year MBBS students of the UMMP. The *p*-value indicated that the EMBI score for first year MBBS students of the UMMP curriculum showed a normal distribution.

Table 5.7: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution for Medical Students in the UMMP Curriculum

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Extrinsic Motivation Score	.038	159	.200*	.992	159	.512

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 5.8: Mean, standard deviation, minimum and maximum of Extrinsic Motivated Behaviour Score (n=159) in the UMMP Curriculum

	Mean	**S.D.**	**Minimum**	**Maximum**
Extrinsic Motivation Score	164.52	13.73	122	203

Table 5.8 shows the EMBI scores of the medical students following the UMMP curriculum. The mean score of 164.52 was obtained, while the overall score ranged from a minimum of 122 to a maximum of 203, with a standard deviation of 13.73.

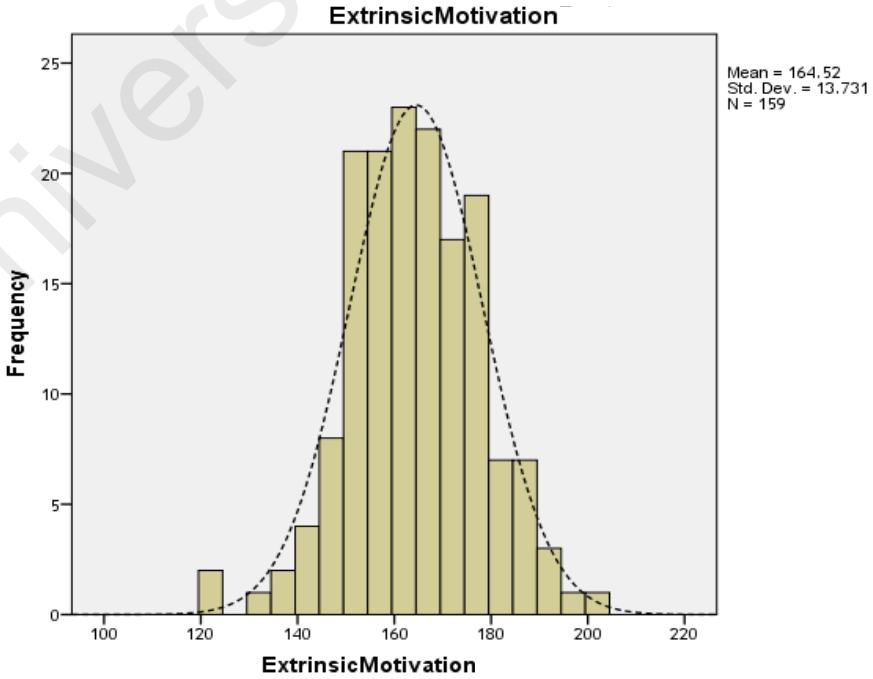


Figure 5.7: Histogram for the Extrinsic Motivated Behaviour Inventory Score for First Year MBBS Students of the UMMP Curriculum

A histogram of the EMBI scores with a normal curve superimposed was obtained to check on the normality of the EMBI scores distribution. Figure 5.7 shows the histogram of the EMBI score for the 159 first year medical students in the UMMP curriculum in this study.

The distribution curve for EMBI score for first year MBBS students of the UMMP curriculum showed a normal distribution as suggested by the mean (164.5), median (164.0) obtained through descriptive statistics, which differs only slightly. The class mode had a class mid-point of 154. The distribution curve had a skewness of -.076. These statistics indicates a normal distribution for the EMBI score for the 159 first year medical students in the UMMP curriculum. From the histogram, the mode is close to the centre of the range. Since the scores are normal, parametric statistical analysis was used to analyse the findings of the inventory.

Figures 5.8 to 5.12 show the categorisation of first year medical students following the UMMP curriculum into the four different dimensions of extrinsic motivated behaviour. In the present study, the profile the students according to their dominant dimension of extrinsic motivated behaviour in the UMMP curriculum were generated (Figure 5.8).

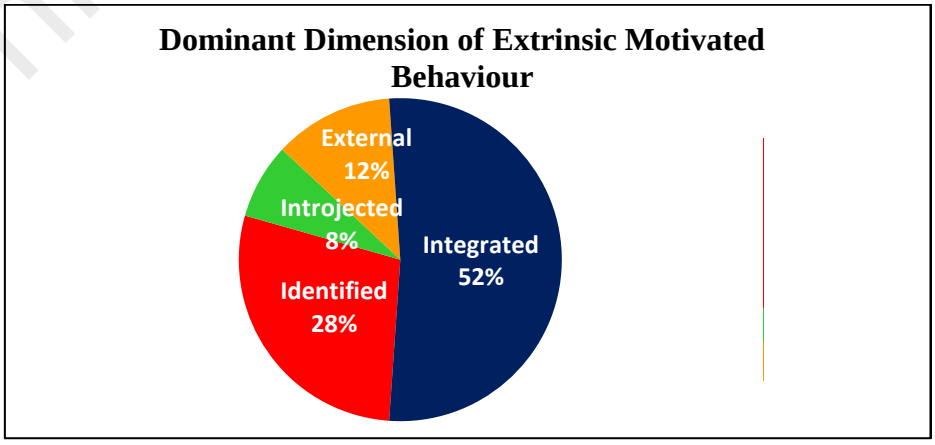


Figure 5.8: Dominant Dimensions of Extrinsic Motivated Behaviour among First Year Students in the UMMP Curriculum

Nevertheless, on closer scrutiny, it was revealed that students have a combination of dimensions of extrinsic motivated behaviour as shown in Figures 5.9 to 5.12. This finding was complemented by the qualitative data from the interviews.

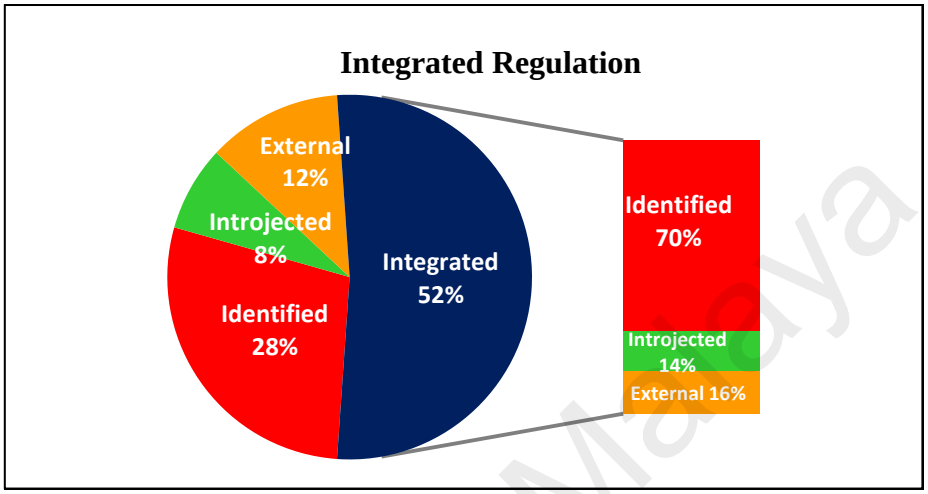


Figure 5.9: Combination Dimensions of Integrated Regulation for First Year Students in the UMMP Curriculum

Based on Figure 5.9, 52% of the students were categorised as being dominant in integrated regulation, which is the highest degree of extrinsic motivated behaviour. When this 52% students were further analysed, it was revealed that there were 70% of them also displayed identified regulation category, 14% of them also displayed introjected regulation category and 16% of them displayed external regulation category. An interview with Student 9 who was categorised as being in the integrated regulation category showed that he was also inspired by the services by healthcare providers and that he sees a career path in that direction (identified regulation).

> *... It's the challenge and I actually want to help people and also serve the community... I may want to be a pediatrician or a cardiologist...*
> *Basically I want to help people, and I find that kids are very helpless. I remember we had problem with my sister when she was young...and I saw how the pediatrician worked and that inspires me...*
> *I remember there was this doctor we were going out with, he's a radiologist. He was so professional, I find that it lead us in a way and it is like you can see yourself in the future!*
> *(Student 9, Integrated Regulation, UMMP Curriculum, 21/07/2014)*

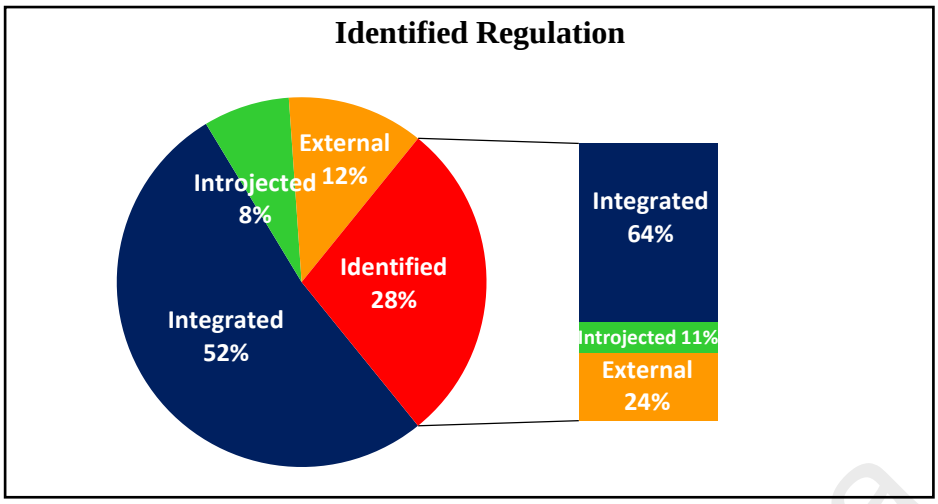


Figure 5.10: Combination Dimensions of Identified Regulation for First Year Students in the UMMP Curriculum

Based on Figure 5.10, 28% of the students were categorised as being dominant in the identified regulation dimension. Out of this 28% student, 64% of them also displayed integrated regulation category, 11% of them also displayed introjected regulation category and 24% of them displayed external regulation category. A high percentage of the students categorised as being dominant in the identified regulation dimension displayed integrated regulation category within themselves. An interview with Student 11 categorised as being dominant in the identified regulation dimension revealed that he also has self-determination and interest within himself; therefore displaying a combination of integrated regulation and identified regulation.

> *I was interested in medicine in the first place. Socially is great, I meet a lot people and stuffs... so it's nice!*
> *(Student 11, Identified Regulation, UMMP Curriculum, 22/07/2014)*

He added that the life experiences gained has encouraged him to study a medicine course.

> *…my grandfather died because of diabetes, he lived longer than he had... and I never believed that doctors save lives! Because if they do, everyone lives forever... so I felt because of what has happened in my grandfather's case, we have to pay forward. Now it is more like on an earning thing, medicine interest*

me and the check-list is not there unlike school days. So I just need to open the book and learn
(Student 11, Identified Regulation, UMMP Curriculum, 22/07/2014)

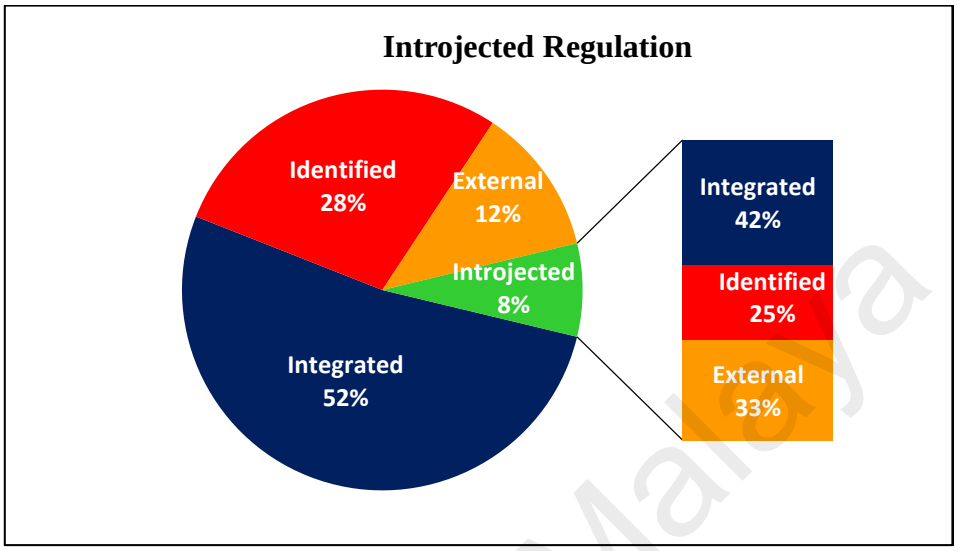


Figure 5.11: Combination Dimensions of Introjected Regulation for First Year MBBS Students of the UMMP Curriculum

Based on Figure 5.11, 8% of the students were categorised as being dominant in the introjected regulation dimension. Out of this 8% student, 42% of them also displayed integrated regulation category, 25% of them also displayed identified regulation category and 33% of them displayed external regulation category. A large percentage of the students categorised under this regulation displayed integrated regulation category. An interview conducted with Student 10 who is categorised as being dominant in introjected regulation revealed that within herself, there was an inner self who wanted to do medicine to help others.

My family has different members who suffered different diseases such as diabetes, stroke and cancer. So I thought if I learn medicine, I can at least study and tell them how to prevent from the disease
(Student 10, Introjected Regulation, UMMP Curriculum, 21/07/2014)

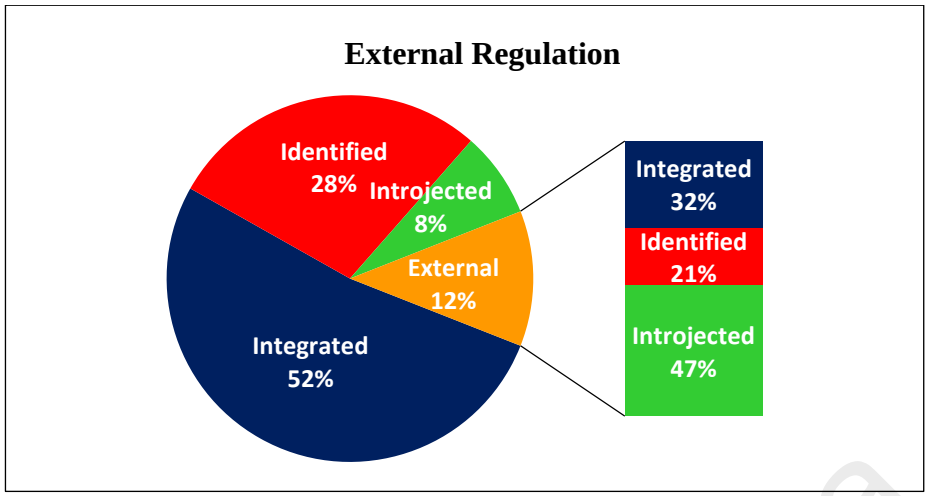


Figure 5.12: Combination Dimensions of External Regulation First Year MBBS Students of the UMMP Curriculum

Based on Figure 5.12, 12% of the students were categorised as being dominant in the external regulation dimension. Out of the 12% of students, 32% of them also displayed integrated regulation category, 21% of them also displayed identified regulation category and 47% of them displayed introjected regulation category. Based on the figures shown, a high percentage of students categorised as being dominant in the lowest degree of extrinsic motivation dimensions, which is external regulation displayed introjected regulation category rather than identified regulation category or integrated regulation as shown in other dimensions of EMB.

An interview conducted with Student 7 who was categorised as being dominant in having the external regulation revealed that although his choice to do medicine was what his parents wanted, he also pointed out that he just went on with what was offered to him.

> *I just follow the flow, as what my parents wanted. I never expected to be in UM…if I am given a choice to choose again, I will not choose medicine*
> *(Student 7, External Regulation, UMMP Curriculum, 16/07/2014)*

Based on Figure 5.9 to Figure 5.12, it is clearly shown that although students were categorised in the four different dimensions of extrinsic motivated behaviour, the

findings of the research discovered that these students had a combination of other dimensions of extrinsic motivated behaviour within themselves.

In both the NIC and UMMP curricula, the findings showed that a higher percentage of students were categorised as being dominant in having integrated regulation, which is the most autonomous or highest degree of external motivation.

5.3.3 The Metacognitive Skills Profiles of the Medical Students in the NIC Curriculum

The following sections discuss the statistical analysis carried out for Metacognitive Skills Inventory (MSI) data for the students following the NIC and UMMP curricula respectively. The normality of the sample for their MSI scores was investigated by using numerical and graphical methods. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to compare the MSI scores of the students to a normally distributed set of scores with the same mean and standard deviation. Table 5.9 shows the results on the normality of the MSI scores of first year medical students following the NIC curriculum.

Table 5.9: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution for Medical Students in the NIC Curriculum

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Metacognitive Skills Score	.044	174	.200*	.992	174	.432

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

In this study, the Shapiro-Wilk test was used because there were only 174 students from the first year NIC curriculum who participated in the study. From the result, the *p*-value is 0.432 which is greater than 0.05. The *p*-value indicates that the

MSI scores of first year medical students of the NIC curriculum have a normal distribution.

A histogram of the MSI scores with a normal curve superimposed was obtained to check on the normality of the MSI scores distribution. Figure 5.13 shows the histogram of the MSI scores for the 174 first year medical students in the NIC curriculum in this study. Figure 5.13 shows the normal curve on the distribution of the MSI scores. The mode appears to be close to the centre of the range.

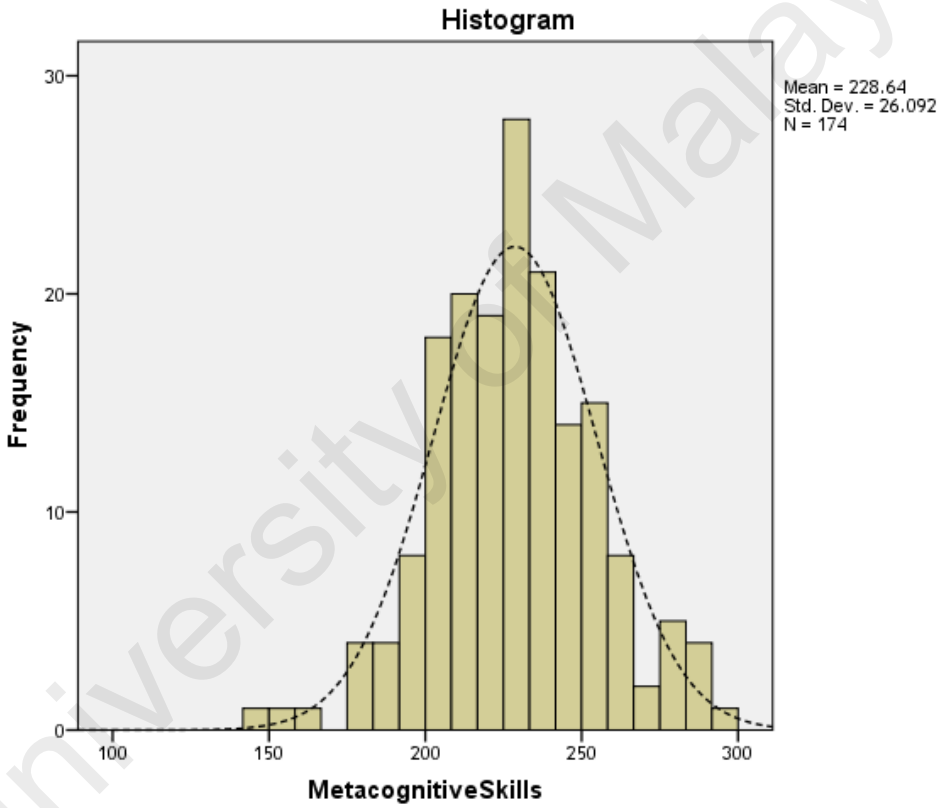


Figure 5.13: Histogram for the Metacognitive Skills Score for First Year Medical Students of the NIC Curriculum

Figure 5.13 shows the normal distribution graphically for the Metacognitive Skills score for first year MBBS students of the NIC curriculum. Since the scores are normal, parametric statistical test was used to analyse the findings of the inventory.

Table 5.10: Mean, Standard Deviation, Minimum and Maximum MSI Score for Medical Students in the NIC Curriculum (n=174)

	Mean	**S.D.**	**Minimum**	**Maximum**
MSI Score	228.64	26.09	145	296

Table 5.10 shows the MSI scores of the first year medical students. The mean score of 228.64 was obtained, while the overall score ranged from a minimum of 145 to a maximum of 296, with a standard deviation of 26.09.

The distribution curve shows a normal distribution as suggested by the mean (228.64), median (228.00) obtained through descriptive statistics, which differs only slightly. The class mode has a class mid-point of 208. Besides, the distribution curve has a skewness of -0.015. These statistics indicate a normal distribution for the MSI scores for the 174 first year medical students in the NIC curriculum.

From the results, the mean for MSI score of first year students in the NIC curriculum revealed a lower score compared to the mean for MSI score of first year students in the UMMP curriculum. The interview conducted with selected first year medical students gave some insights in relation to the curriculum. Student 10 revealed that there was too much to study even in the first year of the medical course.

> *The studying part is stressful. There is a lot in the syllabus, terms and subjects and the exam also. The subjects are compiled and tested in one paper. All medical terms... They compile all the subjects in one paper so it is quite stressful..*
> *(Student 10, Low Metacognitive Level, NIC Curriculum, 13/10/2013)*

Student 6 revealed that the structure of the course was different but tried to adapt. For example, the syllabus for the first year was similar to what students have learnt in their pre-university. However, they need to adapt to the syllabus which requires them to apply their prior knowledge to what is being taught. The adaptation of the students in the curriculum can be related to the Assimilation Theory put forward earlier in

Chapter 3. When students enter medical school, they basically would require to recap the prior knowledge learnt in pre-university level and adapt to the additional information which is delivered in first year in the medical program.

> *Starting of my MBBS for sure I am not very stress and then... I am not used to the structure. Suddenly there are so much to study and remember... I slowly adapt*
> *(Student 6, Moderate Metacognitive Level, NIC Curriculum, 09/10/2013)*

For Student 2 who can be categorised into high metacognitive level also found the curriculum structure challenging. However, he revealed that he adapted to improve on the situation.

> *...when I first entered I found it so different… It is really challenging being in medical school… there were too much studying. It was stressful and I ended up studying and not sleeping and also not eating so well. I think it got a little better and being consistent was better.*
> *(Student 2, High Metacognitive Level, NIC Curriculum, 07/10/2013)*

From the interviews conducted, the students following the NIC curriculum seem to find it challenging in their first year of medical study.

5.3.4 The Metacognitive Skills Profiles of the Medical Students in the UMMP Curriculum

The data for the MSI scores of the first year medical students in the UMMP curriculum was collected at the end of the academic year. To analyse the scores, the normality of the sample for their MSI scores at beginning and at the end of the academic year was investigated by using numerical and graphical methods. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to compare the MSI scores in the sample to a normally distributed set of scores with the same mean and standard deviation. Table 5.11 shows the results on the normality of the MSI scores of first year medical students of the UMMP curriculum.

Table 5.11: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution for Medical Students in the UMMP Curriculum

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Metacognitive Skills Score	.050	159	.200*	.984	159	.071

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

In this study, the Shapiro-Wilk test was used because there were only 159 students from the first year UMMP curriculum who took part. From the result, the *p*-value for MSI scores was 0.071 which is greater than 0.05. Both the *p*-values indicated that the MSI scores for first year medical students of the UMMP curriculum have a normal distribution.

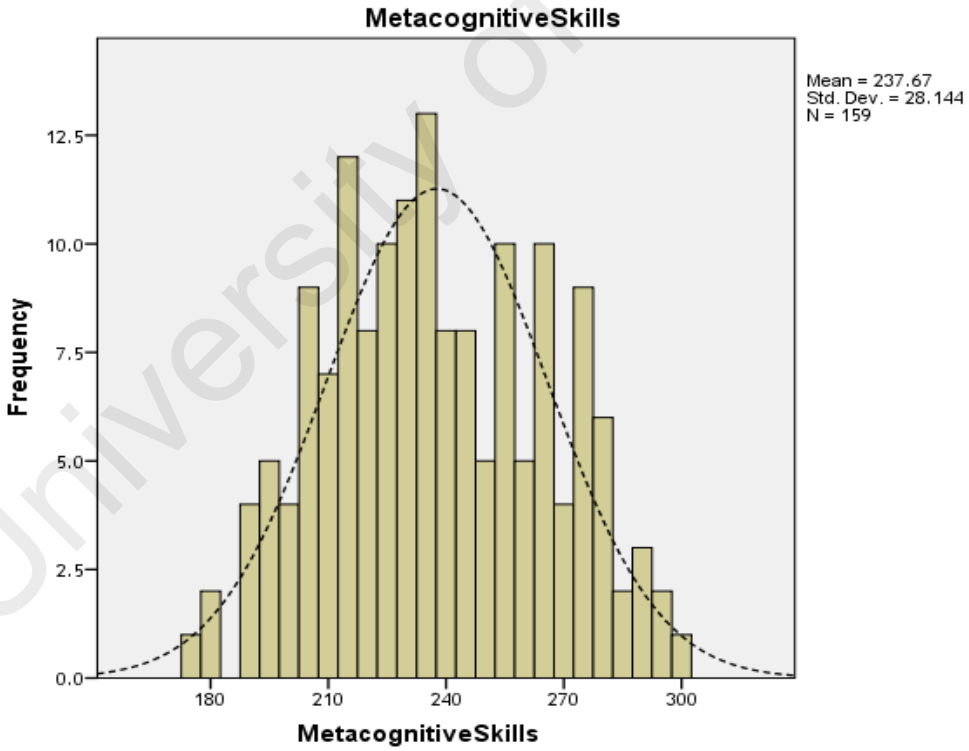


Figure 5.14: Histogram for the Metacognitive Skills Inventory Scores for First Year Medical Students of the UMMP Curriculum

A histogram of the MSI scores with a normal curve superimposed was obtained to check on the normality of the scores distribution. Figure 5.14 shows the histogram of

the MSI scores for the 159 first year medical students in the UMMP curriculum in this study. The distribution curve for the MSI scores for first year medical students of the UMMP curriculum showed a normal distribution suggested by the mean (237.67), median (235.0) obtained through descriptive statistics, which differs only slightly. The class mode has a class mid-point of 214. The distribution curve has a skewness of 0.135. These statistics suggest a normal distribution for the MSI scores for the 159 first year medical students in the UMMP curriculum.

Figure 5.14 showed the normal curve on the distribution of the MSI score from the first year medical students of the UMMP curriculum. From the histogram, the mode appears to be close to the centre of the range. Since the MSI scores appear to be normal at both beginning of the academic year and at the end of the academic year, parametric statistical analysis was used to analyse the findings of the inventory.

Table 5.12: Mean, standard deviation, minimum and maximum of MSI Score (*n*=159)

	Mean	**S.D.**	**Minimum**	**Maximum**
MSI Score	237.67	28.14	175	300

Table 5.12 shows the MSI scores of the first year medical students. The mean score of 237.67 was obtained at the end of the academic year, while the overall score ranged from a minimum of 175 to a maximum of 300, with a standard deviation of 28.14.

From the results, the mean for MSI score of first year students in the UMMP curriculum revealed a higher score compared to the mean for MSI score of first year students in the NIC curriculum. The results shown could possibly be due to clinical immersion introduced from the first year and PBL sessions which are aligned with the weekly lecture topics had somehow encouraged the students to manage what had been

taught in the classroom with their clinical exposures. They learn to see the real world scenario and that could lead them to putting their thoughts into deeper meaning. The clinical immersion sessions conducted was in line with previous study which indicated effective interpretation of the information learnt in the class as proposed by Lie and Kay (2013) who added that the monitoring progress is also critical. Student 5 responded by indicating how ward rounds and PBL which are aligned to weekly learning topics helped in regulating their thoughts;

> *I like the Pt-Dr session, the PBL sessions and... PBL is a recap of the study. Like every week, there are cases given for different disease and our group member will bring up a topic and others listens and we can revise on what is taught and also revision for that we studied for that week.*
> *(Student 5, High Metacognitive Level, UMMP Curriculum, 18/07/2014)*

Student 12 revealed his enjoyment during the ward rounds in the transcribed interviews which gave further insight as to how ward rounds enabled students to interpret information learnt in the classroom. These thoughts also supports the research carried out by Dochy et al. (2003) which showed that Problem-based learning (PBL) has been introduced to medical students to help medical students remember more of the acquired knowledge.

> *I learnt a lot in this course and it allows us to have hands-on sessions. It is not just about studying the facts, it can be boring. Visits to the hospital actually add up the fun.*
> *(Student 12, High Metacognitive Level, UMMP Curriculum, 22/07/2014)*

Student 12 further elaborated on how he is able to apply knowledge gained from the classroom with actual practice.

> *...during the clinical days... I can make use of the knowledge I gained from what I learnt in the classroom but then again, you need to be very well equipped with knowledge*
> *(Student 12, High Metacognitive Level, UMMP Curriculum, 22/07/2014)*

On being asked what the best moment in his first year was in medical school, he instantly replied;

> *I would say it was the first Pt-Dr visit. We see how to check the patients, and it really touched me*
> *(Student 12, High Metacognitive Level, UMMP Curriculum, 27/07/2014)*

From the interview, the affective aspect of the student towards the profession was revealed when the student said that how treating the patients touched him emotionally. The interview conducted also revealed that the medical students in the first year UMMP curriculum generally have no problem in regulating their knowledge as these students scored a perfect score in their Pre-university.

> *...I know what kind of things to encounter now.*
> *(Student 4, Moderate Metacognitive Level, UMMP Curriculum, 18/07/2014)*

> *We know what to focus on at least and what we should really know.*
> *(Student 9, High Metacognitive Level, UMMP Curriculum, 21/07/2014)*

Students also indicated that the UMMP curriculum was more systematic and structured.

> *.. our curriculum is more structured. We have blocks and I would say it is more systematic.. if we study anatomy then it's very focused on anatomy. It is more focused... I think this curriculum is more structured, we have an idea what we are going to go through.*
> *(Student 2, High Metacognitive Level, UMMP Curriculum, 17/07/2014)*

This could likely be due to the self-learning sessions which were included in the UMMP curriculum, the students also tend to show more initiative and are more responsible for what needed to be covered in the syllabus;

> *...the lecturer will answer if we ask questions. I sometimes ask question in the class... we have a system where we do mentor-mentee.*
> *(Student 4, Moderate Metacognitive Level, UMMP Curriculum, 18/07/2014)*

I did constant revision. It really helps a lot, much better than before and there is no need to push everything to the end to one-shot especially during the study week.
(Student 5, High Metacognitive Level, UMMP Curriculum, 18/07/2014)

The interview conducted however was also able to indicate that some students may have acquired the knowledge but were not able to juggle the knowledge and set goals, plan and evaluate themselves accordingly.

For example, Student 6 revealed that she was not able to juggle the overflow of knowledge; Student 8 also pointed out that he was still not able to handle the subjects and the activities in the course;

...it is difficult to keep up. There are just too much things to keep up. I didn't know how to cope...only block 2.
(Student 6, Moderate Metacognitive Skills, UMMP Curriculum, 16/07/2014)

There were too many subjects and we were new... suddenly we are exposed to so many new things
(Student 8, Moderate Metacognitive Skills, UMMP Curriculum, 21/07/2014)

This finding can be compared to the findings of Eva and Regehr (2005) who stated that medical students are expected to not only be knowledgeable but should also be efficient in making decisions when they practice later. In the next section, the four dimensions of extrinsic motivated behaviour and year end examination results for the NIC curriculum and UMMP curriculum are discussed to answer the second research question.

5.4 The Four Dimensions of Extrinsic Motivated Behaviour and Year End Examination Results

The results for this section are reported in two sections, namely;

(i) The four EMB dimensions and Year End Examination Results for the NIC Curriculum

(ii) The four EMB dimensions and Year End Examination Results for the UMMP Curriculum

5.4.1 The Four Dimensions of EMB and Year End Examination Results Among Medical Students in the NIC Curriculum

The data analysis and discussion in this section are in accordance to the sequence of the research questions to answer the second research question. The following discussion is related to the data for the Extrinsic Motivated Behaviour of the MBBS students in the NIC curriculum which was collected at the end of the academic year. Table 5.13 shows the EMBI scores of the medical students. A mean score of 164.51 was obtained, while the overall score ranged from a minimum of 119 to a maximum of 200, with a standard deviation of 15.22.

Table 5.13: Mean, Standard Deviation, Minimum and Maximum Extrinsic Motivated Behaviour Score for Medical Students in the NIC Curriculum (*n*=174)

	Mean	**S.D.**	**Minimum**	**Maximum**
EMBI Score	164.51	15.22	119	200

To report on the significant difference between the mean scores of the dimensions in EMB and their year-end examination results, the One-way ANOVA test was used. The One-way ANOVA of the year end examination results for the four dimensions of EMB of students in the old curriculum gave an F ratio of 0.26 which is not significant at the 0.05 level as shown in Table 5.14.

Table 5.14: ANOVA of Year End Examination Results for Students of Different Dimensions of Extrinsic Motivated Behaviour in the NIC Curriculum

Source of variation	Sum of square	df	Mean square	F-value	Level of significance
Between groups	179.47	3	59.82	.255	.858
Within groups	39888.01	170	234.64		
Total	40067.48	173			

This result indicated that there were no significant differences in the mean scores of the four dimensions of Extrinsic Motivated Behaviour and first year medical students' year-end examination results of the NIC curriculum.

The interview explains the different dimensions of extrinsic motivated behaviour within oneself. When asked about their choice on choosing medicine, a student who was categorised as dominant in external regulation named their parents as the primary factor;

> *...it was not my choice, hmm... actually it's my parents. My parents want one of their daughter to be a doctor. I being the youngest take it as a motivation. (Student 4, External Regulation, NIC Curriculum, 08/10/2013)*

A student who was categorised as being dominant in introjected regulation revealed that their choice in choosing medicine was because of self-esteem;

> *I wanted to do dentistry very badly... It's also a bit of a family urm... it was motivating.. they keep on pushing for if it's not dentistry, then do medicine. My dad was a dentist. My dad is very happy that I am doing medicine. I don't think I have any other choice, my family hadn't given me any other choice. They said, why don't you finish this first, how hard can it be?*
> *(Student 1, Introjected Regulation, NIC Curriculum, 07/10/2013)*

Another student who was categorised as being dominant in identified regulation, had in mind about his future plans in his working life and mainly chose medicine because of career pathway;

No, I was not influenced by anyone. I actually plan to do forensics. In order to do that, I have to take medicine I guess ... and then take my master of pathology later.
(Student 3, Identified Regulation, NIC Curriculum, 08/10/2013)

Student 2 who was categorised as being dominant in integrated regulation showed a distinct response and indicated that he chose medicine because of the intrinsic inspiration.

Well I wanted to be a doctor. I myself wanted medicine. I wanted to be a doctor since so long ago so yeah, it is entirely me. I have met many doctors before, some doctors are very cool, some very nice. They make you feel better, feel so happy after u see that kind of doctor. I want to be that kind of doctor that comforts my patients. It was my inspiration.
(Student 2, Integrated Regulation, NIC Curriculum, 07/10/2013)

From the statistical correlation results and the interviews conducted, the findings appeared to be parallel to the findings of a research by Ryan and Connell (1989) who found that the four types of regulation were inter-related.

The study revealed that there was no significant correlation between the students' dimensions of Extrinsic Motivated Behaviour and their year-end result because all the students regardless of the dimensions find the course to be challenging. Student 10 identified to be dominant in the external regulation dimension indicated that the learning process was stressful;

So far, for the curriculum is stressful. The studying part is stressful. There is a lot in the syllabus, terms and subjects and the exam also. The subjects are compiled and tested in one paper. All medical terms... They compile all the subject in one paper so it is quite stressful
(Student 10, External Regulation, NIC Curriculum, 14/10/2013)

Student 6 being dominant in the introjected regulation dimension found difficulty in adapting and that there was so much to do in the learning process;

> *... I am not used to the structure. Suddenly there are so much to study and remember.*
> *(Student 6, Introjected Regulation, NIC Curriculum, 09/10/2013)*

Student 12 being dominant in identified regulation dimension found that there was so much to study and questioned his own learning style;

> *It is quite challenging in the MBBS course, I suddenly feel there are a lot of things to study. I do my revision but I think sometimes the way I study is not effective*
> *(Student 12, Identified Regulation, NIC Curriculum, 15/10/2013)*

Student 2 being dominant in the integrated regulation dimension found that there were irregularities in the daily routine but does indicate that she tried to adapt;

> *... It was stressful and I ended up studying and not sleeping and also not eating so well. I think it got a little better and being consistent.*
> *(Student 2, Integrated Regulation, NIC Curriculum, 07/10/2013)*

However, students who are not dominant in the dimension of external regulated tend to be more positive towards their learning ability and are able to cope better in their studies. The findings of the study would suggest that in order for the medical students to do well in the examinations, one not only needs to be positive, but also to be more pro-active and persevere throughout the whole academic year. When students' extrinsic motivation are dominant at the highest level (integrated regulation), medical students tend to perform better which is similar to the findings by Tanaka et al. (2009) and Vansteenkiste et al. (2006).

The transcribed interviews revealed medical students' extrinsic motivated behaviour was similar to the research conducted by Mann (1999). In his study, he describes that medical students who are motivated and are striving hard to meet goals acknowledged that there is a difference between the medical schools' goals and their

own goals in life. These instances were revealed when they indicated self-initiatives in learning and showed signs of being more independent while learning.

Student 2 revealed how he sourced for other materials and his positivity in facing the challenges;

> *... I found it so different. It wasn't like in school where you read everything from the book. One book is not enough... we have to take our own initiative to find sources from internet. We have to be independent, ... It is really challenging being in medical school. I had to go online to find for a lot of information, new techniques of treatment. It's a challenge. It is a challenge to learn more I think.*
> *(Student 2, Integrated Regulation, NIC Curriculum, 07/10/2013)*

Student 9 revealed how he needs to prepare within himself in facing the challenges;

> *You have to connect the knowledge... If there's this symptoms, we need to know why this happen, what do we need to check.. But I think that's the good part, we need to enjoy the work. But before reaching that, you need to study and work so hard.*
> *(Student 9, Integrated Regulation, NIC Curriculum, 14/10/2013)*

The findings of the research revealed that the different dimensions of extrinsic motivated behaviour were rather similar to some thoughts put forward in previous literature. For example, Brissette and Howes (2010) said that the medical curricula was developed for medical students who have a deep desire to become medical practitioners and are strongly intrinsically motivated or a more autonomous degree of extrinsic motivation. The findings of the present study were however different to that of Misch (2002) who said that very often the drive to learn in medical students are associated to secondary benefits such as respect, admiration, wealth and position. The data gathered and analysed in the present research did not reveal any information from the first year medical students which showed that their choice to do medicine was inclined towards respect, admiration, wealth and position.

5.4.2 The Four Dimensions of EMB and Year End Examination Results Among Medical Students in the UMMP Curriculum

This section discusses the four dimensions of extrinsic motivated behaviour and first year medical students' academic performance in the UMMP curriculum. In this section, the students' score for the four dimensions of extrinsic motivated behaviour at the end of the academic year and their year-end results were discussed.

Table 5.15: One-way ANOVA of Year End Examination Results for Students of Different Dimensions of Extrinsic Motivated Behaviour for the UMMP Curriculum

Source of variation	Sum of square	df	Mean square	F-value	Level of significance
Between groups	462.67	3	154.22	3.41**	.019
Within groups	7020.62	155	45.29		
Total	7483.30	158			

** F-value is significant at the 0.05 level

The one-way ANOVA of the means scores for the four dimensions of Extrinsic Motivated Behaviour of year end examination results of students in the UMMP curriculum gave an F ratio of 3.41 which is significant at the 0.05 level as shown in Table 5.15. This result indicated that there were significant differences among students' mean scores in different dimensions of extrinsic motivated behaviour with their year-end examination results.

Due to the significant differences from the one-way ANOVA test, the post hoc Tukey tests were subsequently performed and revealed significant differences for two dimensions of EMBI means; which were the integrated regulation and external regulation dimensions at the 0.05 level. The mean difference between the pair of other dimensions of EMBI was found to be not statistically significant as shown in Table 5.16.

Table 5.16: Multiple Comparisons (Post Hoc Tukey tests) of Dimensions of Extrinsic Motivated Behaviour for the UMMP Curriculum

Pairs of groups compared	Mean difference	Standard error	Level of significance
Integrated & External	5.84*	1.9	.011
Identified & External	4.56	2.1	.141
Introjected & External	-5.97	2.8	.136
Identified & Introjected	1.41	2.4	.939
Integrated & Introjected	.13	2.2	1.000
Identified & Integrated	1.28	1.4	.789

*The mean difference is significant at the 0.05 level

There were significant differences between first year medical students' dimensions of extrinsic motivation behaviour and their year end result based on the statistics. In addition to this, consistency between students who were dominant in integrated regulation and external regulation were observed. From the statistics, the students dominant in these two dimensions have performed differently for their year-end examinations. The findings of the study suggests that for the UMMP curriculum, first year medical students dominant in external regulation find it challenging and difficult to cope with the medical programme.

The interviews conducted were used to complement the quantitative data. The transcribed interview data provided some insight on students who have external regulation and integrated regulation.

Student 4 revealed that there was a lot to study and that he finds it a difficult challenge to adapt;

> *This system is very new, it is challenging... I cannot cope with the curriculum because there was so much to study*
> *(Student 4, External Regulation, UMMP Curriculum, 18/07/2014)*

This is similar to the findings by Ryan and Connell (1989) who suggested that students with external regulation tend to show less interest and effort. On the other hand, Student

5 was aware that more effort is needed, she revealed that she revised her lessons only when there is an assessment;

> *... in medicine I have to work harder ... I study only when we have quiz (Student 5, External Regulation, UMMP Curriculum, 18/07/2014)*

Student 2 revealed that she had difficulty in identifying the correct learning style to adapt to the challenging curriculum;

> *... It was quite hard to catch up with teachings, syllabus and I still didn't find the correct way to study until now.*
> *(Student 2, External Regulation, UMMP Curriculum, 17/07/2014)*

First year medical students categorised as being dominant in integrated regulation dimension do feel good and excited with the ward rounds, clinical exposure and being in medical school. In addition, they learn to adapt well and describe themselves as being more advantaged than their seniors or peers in other medical schools;

> *...it has been very interesting... we had a lot of surprises. This is very new, and I think among medical schools around here, I've not seen clinical practice done in the first year... I find that that's interesting I have friends studying medicine in other place...and they didn't seem to achieve what I have learnt in my first year very. So I think that is very advantageous to us*
> *(Student 9, Integrated Regulation, UMMP Curriculum, 21/07/2014)*

From their response, the students who were categorised as being dominant in the integrated regulation dimension of extrinsic motivated behaviour found enjoyment and meaning of being in a medical school;

> *I learnt a lot in this course and it allows us to have hands-on sessions... It is not just about studying the facts... Visits to the hospital actually add up the fun.*
> *(Student 12, Integrated Regulation, UMMP Curriculum, 22/07/2014)*

They seemed to be more self-determined which appears to be similar to previous findings which indicated that the values they have had become deeply integrated within the self (Beswick, 2007; Kusurkar, 2012a; Ryan & Deci, 2000b);

> *... I can adapt. I learn to be independent. Although tough, sometimes you feel like falling down but I know I must stand up again...*
> *(Student 3, Integrated Regulation, UMMP Curriculum, 17/07/2014)*

From the interviews conducted, the students categorised as being dominant in the dimensions of extrinsic motivated reflect on the degree of their extrinsic motivated behaviour. Although the students were profiled according to the dominance in the four dimensions of extrinsic motivated behaviour, the students are thought to have a combination of different dimensions of extrinsic motivated behaviour which was further explored in the interviews.

The interviews with the medical students categorised in the four different dominant dimensions of extrinsic motivated behaviour also showed that their choice to do medicine was inter-related with the other dimensions. The insights from the interview with students with different dominance of dimensions extrinsic motivated behaviour were used to explain the integrated and external regulations of extrinsic motivated behaviour. When asked about their choice on choosing medicine, students categorised as being dominant in the dimension of external regulation also stated their parents as one of the primary factor, among others;

> *My parents..my parents want one of the children to be a doctor. I am the youngest so... I just follow the flow, as what my parents wanted... it was not a very nice experience... because I failed my foundation.*
> *(Student 7, External Regulation, UMMP Curriculum, 16/07/2014)*

From Student 7's statement, his choice of entering the medical school was clearly the choice of his parents and somehow the external regulation in him has affected his performance in his foundation block.

Student 1 who was categorised as being dominant in the dimension of introjected regulation mainly chose medicine because of self-esteem;

> *My mom...partly also because my sister is a doctor... I was from SBP. They expose us only to medicine and engineering courses only when we were there. (Student 1, External Regulation, UMMP Curriculum, 17/07/2014)*

Student 1's choice to do medicine also appeared to be influenced by his parent's and also exposure in a boarding school (SBP). Although Student 1 thought that the UMMP curriculum was exciting, she also pointed out that other disruptions in the curriculum also affected her performance;

> *...we are undergoing the new curriculum and one thing that is different is that we are exposed to patients in the first year itself. This is very exciting for us. And I think this exposure is good for us, rather than to wait until our third year only then we get to see the real patients... this will prepare us better instead of waiting until the clinical days.. Everytime we have CSU, the session is cancelled. Almost every time... but in the exam, CSU questions will appear. I feel that this is not fair to us.*
> *(Student 1, External Regulation, UMMP Curriculum, 17/07/2014)*

Student 2's choice to do medicine also appear to be influenced by exposure in a boarding school (MRSM) and because students in boarding schools are strongly encouraged to do critical courses such as medicine, therefore there is a higher level of self-esteem within themselves;

> *I think basically it was our school... I was in MRSM since form 1. When we enter, we are only told all about medicine only...my teachers will only talk all about being in medical school, nothing about other courses. we were only told all about medicine. We are moulded to do medicine. I felt that since I am from MRSM and boarding school students should aim to do medicine or engineering at least*
> *(Student 2, Introjected Regulation, UMMP Curriculum, 17/07/2014)*

Student 2 also revealed the learning style he adopted while doing his first year medical programme;

...our curriculum is more structured. We have blocks and I would say it is more systematic compared to the senior's syllabus. Quite relax also... The self-study time, I used to go home. I feel no one conducts and no one monitors. I do self-study Only when there are exams... other than that, no, not really (Student 2, Introjected Regulation, UMMP Curriculum, 17/07/2014)

The responses given by a student categorised as dominant in the dimension of external regulation and a student categorised as dominant in the dimension of introjected regulation were compared. It was revealed that the latter found the UMMP curriculum more structured but did not show great effort in her daily learning routine where she only studied when being monitored or when there are examinations.

Actually my parents don't encourage me to do medicine because they feel it is too stressful for me. Teachers... No, I don't think so. I have friends who also want to study medicine so we discuss a bit... If you are hardworking in matriculation, you will get good results... that's what I feel. In matriculation, the lecturer spoon feed us, gave us many exercise, we have many past year questions to do but in medicine we don't have past year papers.
(Student 10, Introjected Regulation, UMMP Curriculum, 21/07/2014)

Student 10 seemed to have chosen medicine due to her self-esteem. However, she too felt stressful and found the transition from pre-university to medical school different because in the medical school, most of the lessons are self-directed. Student 5 and Student 11 responded that it was their own choice to study medicine and that he was clear about he really likes to study.

My mom wanted me to do law actually... my dad, he didn't pressure me to do medicine. He was fine with my choice
(Student 11, Identified Regulation, UMMP Curriculum, 22/07/2014)

Interest... my father didn't want me to do medicine. He said that it is not a good choice... There are too many doctors now, he didn't like. I think the course is lively and interesting. I don't like mechanical things.
(Student 5, Identified Regulation, UMMP Curriculum, 18/07/2014)

When asked about how they coped with their lessons, Student 5 commented that the early exposure to wards encouraged their learning process while Student 11 found joy in discovering what he is learning in medical school;

> *... we get the opportunity to be exposed to the clinical environment, which is the actual scenario in the hospital next time when we come out to work. At least we get to see real patients and not fake patients.*
> *(Student 5, Identified Regulation, UMMP Curriculum, 18/07/2014)*

> *Honestly, I have never felt stress before. I didn't have to cry myself to sleep... Now it is more like on an earning thing, medicine interest me and the check-list is not there unlike school days. So I just need to open the book and learn. Now that I am in the waters now, it makes me motivated...*
> *(Student 11, Identified Regulation, UMMP Curriculum, 22/07/2014)*

The findings of the research found that both the students have positive thoughts in relation to their learning environment. Student 3 and Student 9 who were categorised as dominant in the dimension of integrated regulation responded that it was their own choice to choose medicine.

> *...I think I should do something for my community. Actually, my family don't force me to go into medicine. They don't pressure me to do well but always tell me to "do what you can do"; if that is what I want to do*
> *(Student 3, Integrated Regulation, UMMP Curriculum, 17/07/2014)*

The findings from the research revealed that the students' choice of doing medicine was clear; they themselves wanted to do the course to serve the community and also achieve their own aspirations. Their statements seemed to bring out the true fact that they enjoyed medical school and found meaning in learning.

> *It's the challenge and I actually want to help people and also serve the community... parents not really but yeah, they think it's a good thing. Teachers... I think. Friends, not really*
> *(Student 9, Integrated Regulation, UMMP Curriculum, 21/07/2014)*

As quoted from Amabile (1993), she believes that some people seem to be driven by a passionate interest in their work, a deep level of enjoyment and involvement in what they do and this seem to be reflected in students categorised in the dimension of integrated regulation.

The findings of the present research reveal that medical students who were categorised as being dominant in the integrated regulation were similar to the thoughts of Kusurkar et al. (2012c). These medical students' choice to choose medicine was within one-self and they tend to be able to strategise learning styles and were able to cope better with the syllabus. From the interviews, these two students (Student 3 and Student 9) categorised as being dominant in the dimension of integrated regulation seemed to be able to cope, and regulate their own studies although they too find the syllabus to be challenging. These students showed and discussed learning strategies which were different to students categorised as dominant for the other dimensions.

> *... I learn by myself all this while. We don't really have a lot of coaching since school days... As doctors, we encounter patients. If we don't communicate well, how can we relate or tell them? It is not only about treating the patients but also to educate them the basic health and knowledge they need to know*
> *(Student 3, Integrated Regulation, UMMP Curriculum, 17/07/2014)*

However, both of the students did mention that communication skills were important to prepare them to be a medical practitioner.

> *I always thought studying is like a one week thing... I soon realised that it is not enough, the volume of things to study is insane. I use to study like less than 8 hours but now I cannot do that... communication is in fact the most important element because at the end of the day, you talk to the patients! (Student 9, Integrated Regulation, UMMP Curriculum, 21/07/2014)*

The enjoyment factor could be the reason as to why students who are categorised as being dominant in this dimension of Extrinsic Motivated Behaviour tend to do better in their year-end examination. This may attribute to the statistical results which revealed

an inverse effect among the students who were categorised as being dominant in external regulation and their year end result. Hence, students who were less dominant in external regulation or more dominant in integrated regulation will most likely perform better in their examinations.

From the findings of this study, some similarities with previous literature were discovered. The result supports past findings by Hutchinson (2003); Ryan and Deci (2000a); Tanaka et al. (2009) where motivation was found to be one of the most important psychological concepts in education and is related to academic outcomes in medical students. Past literature has also indicated that higher levels of motivation do affect the academic performance. From this, the findings of Dias et al. (2012) who said that motivation for choosing medicine is a personal aspect that can modulate the distress with academic demands seem to be similar to the findings of this study. Furthermore, Luqman (2013) believed that motivation is a psychological concept that refers to a person's willingness to put forth effort in order to achieve educational goals.

From this study, it is found that the findings put forward by Dias et al. (2012); Hurwitz et al. (2013); Lawson and Bearman (2007); (Tanaka et al., 2009) who put forward that motivation is one of the most desirable quality to be seen in medical students were similar in the context of this research. The researcher also found that the basis put forward by both Ryan and Deci (2000b) and Ryan and Deci (2000a) who thought that extrinsic motivation is an essential strategy for successful teaching and that one cannot just rely on the intrinsic motivation to foster learning was very reasonable. This is simply because as the students go through the curriculum and matures over the period of time (Knowles, 1978), there are other external factors which will drive a student's learning process (Hannah et al., 2004; Misch, 2002).

The thoughts of Brissette and Howes (2010) who put forward that a medical curricula is developed based on the premise that medical students have a deep desire to

become healthcare practitioners and are intrinsically motivated does not seem to be applicable because the extrinsic motivated behaviour of medical students do drive students' learning too.

In the next section, the two dimensions of metacognitive skills and year end examination results for the NIC curriculum and UMMP curriculum are discussed to answer the third research question.

5.5 The Two Dimensions of Metacognitive Skills and Year End Examination Results

In this section, the data analysis and discussion on the significance of the two dimensions of metacognitive skills and year end examination results for the NIC and UMMP curricula are put forward. In answering the third research question, the significance of the two dimensions of metacognitive skills and year end examination results for the NIC curriculum and UMMP curriculum is discussed.

The results of this section are reported in two sections, namely;

(i) The two MSI dimensions and Year End Examination Results for the NIC Curriculum

(ii) The two MSI dimensions and Year End Examination Results for the UMMP Curriculum

5.5.1 The Dimensions of Metacognitive Skills and Year End Examination Results Between Medical Students in the NIC Curriculum

In this section, the analysis on students' mean scores for the two dimensions of metacognitive skills and their year-end results for first year medical students in the NIC curriculum are discussed.

Table 5.17: Independent Sample *t*-Tests Between Knowledge of Metacognition and Regulation of Metacognition and Year-End Result for Students in the NIC Curriculum

	Mean Difference	**S.D**	**t**	**df**	
Knowledge of Metacognition	8.81	2.32	3.80**	172	.000
Regulation of Metacognition	17.00	4.70	3.62**	172	.000

** t-value is significant at the 0.05 level

A *t*-test was carried out to study if there is a significant difference between the dimensions of the metacognitive skills with medical students' first year results at the end of the academic year. The statistical *t*-test result in Table 5.17 revealed that both the dimensions, Knowledge of Metacognition ($t = 3.80$, df = 172, $p<.05$) and Regulation of Metacognition were significant ($t = 3.62$, df = 172, $p<.05$). Hence, there is a significant difference between the two dimensions of metacognitive skills and year end result for students in the NIC curriculum.

5.5.2 The Dimensions of Metacognitive Skills and Year End Examination Results for Medical Students in the UMMP Curriculum

This section consists of discussion on the two dimensions of metacognitive skills and first year medical students' academic performance in the UMMP curriculum. In this section, the students' score for the two dimensions of metacognitive skills at the end of the academic year and their year-end results were discussed. A *t*-test was carried out to study if there is a significant difference between the dimensions of the metacognitive skills with medical students' first year results. The statistical *t*-test result as shown in Table 5.18 revealed that the knowledge of metacognition ($t = 2.21$, df = 157, $p<.05$) and regulation of metacognition ($t = 3.29$, df = 157, $p<.05$) were both statistically significant.

Table 5.18: Independent Sample T-Tests Between the Dimensions of MSI and Year-End Result for the UMMP Curriculum

	Mean Difference	**S.D**	**t**	**df**	
Knowledge of Metacognition	7.96	2.44	3.26**	157	.001
Regulation of Metacognition	16.13	4.79	3.37**	157	.001

** *t*-value is significant at the 0.05 level

The findings of the research revealed that the statistical significance between the knowledge of metacognition and regulation of metacognition of medical students of the UMMP curriculum to be consistent throughout the academic year. This is consistent with a previous finding by Edelbring (2012) which said undergraduate medical students' independent learning in terms of monitoring and guiding their own learning process does affect their achievement.

Once again, the findings for the first year medical students in the UMMP curriculum matches the research by Kincannon et al. (1999) who indicated that understanding and regulating one's own cognitive processes enables the person to monitor, direct and control information. In the next section, the correlation between extrinsic motivated behaviour and the metacognitive skills scores of students in the NIC and UMMP curricula and their year-end results respectively is discussed to answer the fourth research question.

5.6 The Correlation between Extrinsic Motivated Behaviour and Metacognitive Skills

In this section, the correlation between extrinsic motivated behaviour and the metacognitive skills scores of students in the NIC and UMMP curricula and their year-end results is discussed respectively to answer the fourth research question. The results of this section are reported in two sections, namely;

(i) Correlation between Extrinsic Motivation Behaviour and Metacognitive Skills among students following the NIC Curriculum

(ii) Correlation between Extrinsic Motivation Behaviour and Metacognitive Skills among students following the UMMP Curriculum

5.6.1 Correlation between Extrinsic Motivation Behaviour and Metacognitive Skills among Students Following the NIC Curriculum

For the NIC curriculum, the statistical correlation between EMBI score and MSI score showed that it was significant at the 0.01 level.

Table 5.19: Correlation between the EMBI, MSI and Year End Result in NIC Curriculum

		EMBI Score	**MSI Score**	**Year End Results**
EMBI Score	Pearson Correlation	1	.439**	-.130
	Sig. (2-tailed)		.000	.087
MSI Score	Pearson Correlation		1	.179*
	Sig. (2-tailed)			.018

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation of also indicated a moderate correlation value (r=0.44) between Extrinsic Motivated Behaviour and Metacognitive Skills. These results indicated that when the students' motivation increases, the metacognitive skills increase too. It was also revealed that there was a small statistical correlation (r=0.18) that was significant at the 0.05 level between the MSI score and year end results. There were however, no significant statistical correlation between the EMBI score and year end results (Table 5.19).

The interview with students gave some insight on how their dominant dimensions of extrinsic motivated behaviour affects the metacognitive skills and year end results.

Student 5 being dominant in the external regulation dimension and displaying a moderate level of metacognitive skills appear to have made lesser effort and shows poor time management resulting in poor examination results;

> *my result... My time management is not properly scheduled. I did not fully revise everything... there was a lot to revise. It takes time...*
> *(Student 5, External Regulation, Moderate Metacognitive Skills, NIC Curriculum, 09/10/2013)*

It is revealed that students dominant in the external regulation dimension were not able to manage their schedule well and due to this, their results were poorer. For example, Student 10 who stated;

> *I don't want to repeat supplementary...I did not really study. Although I can study last minute, but I realised that I cannot study last minute in medicine. I cannot study long duration, like nothing more than 1 hour*
> *(Student 10, External Regulation, Moderate Metacognitive Skills, NIC Curriculum, 14/10/2013)*

A more motivated student on the other hand will try to adjust. For example Student 3;

> *The lecture notes given are simple, you need to read up more.*
> *(Student 3, Identified Regulation, High Metacognitive Skills, NIC Curriculum, 08/10/2013)*

and adapt to the hectic workload and thus perform better in the examinations as stated by Student 2;

> *We have to be independent... there were too much studying...I think it got better and being consistent...*
> *(Student 2, Integrated Regulation, High Metacognitive Skills, NIC Curriculum, 07/10/2013)*

The medical students in the NIC curriculum, their relationship between the extrinsic motivated behaviour, metacognitive skills and year end results can be summarized as shown in Figure 5.15.

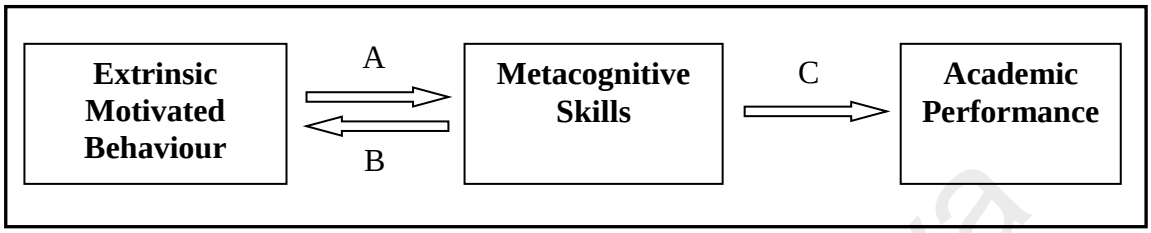


Figure 5.15: Correlation between the Extrinsic Motivated Behaviour, Metacognitive Skills and Year End Results in the NIC Curriculum

From the figure, it can be put forward that medical students' extrinsic motivated behaviour affects their metacognitive skills as shown in (A). The correlation also showed that students' metacognitive skills do affect their academic performance (C). These findings for (A) matches what was found by Karagiannidis et al. (2015) where motivation can influence cognitive processes. However, the present study showed that the level of metacognitive skills also influences students' extrinsic motivated behaviour (B). This means that students who are more dominant in an autonomous form of extrinsic motivated behaviour (integrated regulation dimension) will have higher metacognitive skills.

This finding was similar to study conducted by Beswick (2007) and Kusurkar (2012a) that the adaptation and assimilation of students' thoughts promotes self-determination. From Figure 5.15, the relationship relates how the Self-Determination Theory can affect medical students' metacognitive skills in setting their goals, monitoring their lesson and evaluating their own learning process which in turn affects their academic performances.

5.6.2 Correlation between Extrinsic Motivation Behaviour and Metacognitive Skills among Students Following the UMMP Curriculum

Towards the end of the academic year, the statistical correlation between EMBI scores and MSI scores shown in Table 5.20 revealed that it is not significant even at the 0.05 level.

Table 5.20: Correlation between the EMBI, MSI and Year End Result in UMMP Curriculum

		EMBI Score	**MSI Score**	**Year End Results**
EMBI Score	Pearson Correlation	1	-.069	-.161*
	Sig. (2-tailed)		.387	.042
MSI Score	Pearson Correlation		1	.453**
	Sig. (2-tailed)			.000

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The statistical correlation between the EMBI scores and year end results showed that it was significant at the 0.05 level. The correlation also indicated a small correlation value (r=-0.16) between EMBI scores and year end results. This indicated that most probably, as students' extrinsic behaviour decreases, the extrinsic motivation could slowly evolve into intrinsic motivation. As mentioned by Ryan and Deci (2000b) extrinsic motivation can undergo orientation change after a period of time when they internalise what is being taught. Therefore, the results showed a negative value. This scenario is an interesting finding as the students in the UMMP curriculum are more exposed to clinical sessions and are given opportunity to have clinical exposure during ward rounds in the first year;

I think this curriculum is good.. compared to our seniors, we are undergoing the new curriculum and we are exposed to ward rounds earlier
(Student 2, Introjected Regulation, High Metacognitive Skills, UMMP Curriculum, 17/07/2014)

Student 6 pointed out that going for the ward rounds enabled students to understand better what they have learnt in the classroom;

...the clinical part. I like it because we are not just sitting there. You can practice what you learn. They are very much related to what we learnt, I find it very useful if we have practicing time. We can bind what we learn
(Student 6, Introjected Regulation, High Metacognitive Skills, UMMP Curriculum, 16/07/2014)

Besides, they also have the doctors as their role models when they go for site visits;

...the clinical days. I enjoyed the site visits.. I remember there was this doctor... a radiologist. He was so professional, I find that it lead us in a way and it is like you can see yourself in the future
(Student 9, Integrated Regulation, UMMP Curriculum, 21/07/2014)

The statistical correlation between the MSI scores and year end results showed that it was significant at the 0.01 level. The correlation also indicated a moderate correlation value (r=0.45) between MSI scores and year end results.

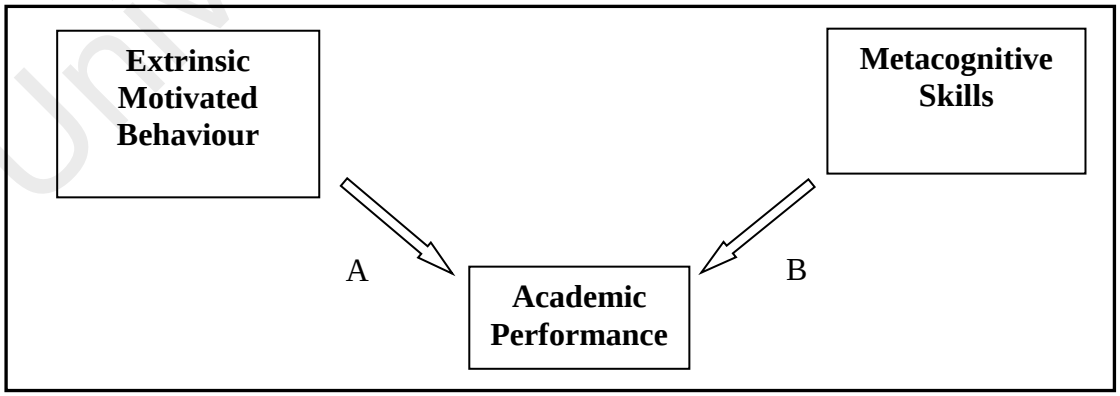


Figure 5.16: Correlation between the Extrinsic Motivated Behaviour, Metacognitive Skills and Year End Results in the UMMP Curriculum

It can be said that for first year medical students in the UMMP curriculum, the relationship between the extrinsic motivated behaviour, metacognitive skills and year end results for students following the UMMP Curriculum can be summarized as shown in Figure 5.16 (Page 155).

For the UMMP Curriculum, students' extrinsic motivated behaviour appear to affect their academic performance as shown in (A). The finding was similar to findings of studies conducted by Dai and Sternberg (2004); Pintrich (2003); Tanaka et al. (2009) and Dias et al. (2012) where extrinsic motivation demonstrated whenever a learning activity is done will have different outcome, in this instance the medical students' academic performance. The relationship as indicated in (B) showed that medical students' metacognitive skills affect students' academic performance. This finding is similar to other studies in the field of education as found in studies conducted by Gonullu and Artar (2014b).

From the figure, the correlation between the extrinsic motivated behaviour and metacognitive skills with medical students' academic performance was different in the UMMP curriculum as compared to the NIC curriculum. For the UMMP curriculum, both the EMBI and MSI showed there was a correlation with students' academic performance. Unlike the UMMP curriculum, only the MSI scores correlate with students' academic performance in the NIC curriculum. This means that students' extrinsic motivated behaviour alone can influence their academic performance. Hence, it is essential to identify students' extrinsic motivated behaviour in addition to the merit obtained in pre-university level before they enter the medical school as indicated in study conducted by Luqman (2013) which indicated that some students do not desire to be placed in the medical school. This will also allow healthier competition among students who desire to be in public medical schools, especially when it is heavily subsidised by the government as mentioned by Lim (2008) and places are limited.

In the next section, the alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills with students' Year End Results among students in the NIC Curriculum and the UMMP curriculum and their year-end results respectively is discussed to answer the fifth research question which is the crux of the present research.

5.7 The Alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills of Medical Students with Year End Results

In this section, the alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills with students' Year End Results in the NIC Curriculum and the UMMP curriculum and their year-end results respectively are discussed.

A MANOVA test was carried out to study the alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills with the year-end results of first year medical students in the University of Malaya. Before the MANOVA test was carried out, the normality of the year-end results for the different dimensions of extrinsic motivated behaviour and grouping (Low, Moderate and High) of metacognitive skills were carried out.

Table 5.21: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution

Motivation		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
External Regulation	Year End Results	.144	21	.200*	.949	21	.324
Introjected Regulation	Year End Results	.257	10	.060	.887	10	.157
Identified Regulation	Year End Results	.109	30	.200*	.974	30	.652
Integrated Regulation	Year End Results	.091	113	.023	.984	113	.204

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 5.21 (Page 157) shows the results on the normality of the year-end results of the different dimensions of extrinsic motivated behaviour for first year medical students following the NIC curriculum. From the result in Table 5.21, the *p*-value for the four dimensions of extrinsic motivated behaviour were greater than 0.05 which indicated that the data are not significant. Hence, all the *p*-values indicate that the score for all the four dimensions of extrinsic motivated behaviour for first year medical students of the NIC curriculum has a normal distribution.

A normality test was carried out on students year end results based on the different grouping of metacognitive skills scores. Table 5.22 shows the results on the normality of the year-end results of the different grouping of MSI score for first year medical students of the NIC curriculum.

Table 5.22: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution

Metacognitive Skills Group		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Moderate	Year End Results	.068	83	.200*	.987	83	.579
High	Year End Results	.110	91	.008	.973	91	.054

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

From the result in Table 5.22, the *p*-value for the different grouping for the level of metacognitive skills was greater than 0.05 and are not significant. Hence, all the p-values indicate that the score for the grouping of different levels of metacognitive skills for first year medical students of the NIC curriculum has a normal distribution. Since the data was found to have normal distribution, the MANOVA statistical analysis was then be carried out.

Table 5.23: MANOVA for Extrinsic Motivated Behaviour, Metacognitive Skills and Year-End Results of NIC and UMMP Medical Curricula

Tests of Between-Subjects Effects						
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	YEMarks	648.678[a]	7	92.668	1.921	.066
	MetacognitiveSkills	57451.195[b]	7	8207.314	13.875	.000
Intercept	YEMarks	483864.140	1	483864.140	10031.304	.000
	MetacognitiveSkills	8997623.802	1	8997623.802	15211.336	.000
Motivation	YEMarks	318.158	3	106.053	2.199	.088
	MetacognitiveSkills	39695.059	3	13231.686	22.369	.000
Motivation * Group	YEMarks	290.080	3	96.693	2.005	.113
	MetacognitiveSkills	7499.720	3	2499.907	4.226	.006
Group	YEMarks	5.889	1	5.889	.122	.727
	MetacognitiveSkills	139.505	1	139.505	.236	.628
Error	YEMarks	15676.511	325	48.235		
	MetacognitiveSkills	192240.036	325	591.508		
Total	YEMarks	1105093.000	333			
	MetacognitiveSkills	18320473.000	333			
Corrected Total	YEMarks	16325.189	332			
	MetacognitiveSkills	249691.231	332			

a. R Squared = .040 (Adjusted R Squared = .019)

b. R Squared = .230 (Adjusted R Squared = .214)

A multivariate analysis of variance (MANOVA) in Table 5.23 showed statistically significant interaction between Extrinsic Motivated Behaviour and Metacognitive Skills in both the NIC and UMMP medical curricula, $F(3, 332) = 4.23$, $p < .05$.

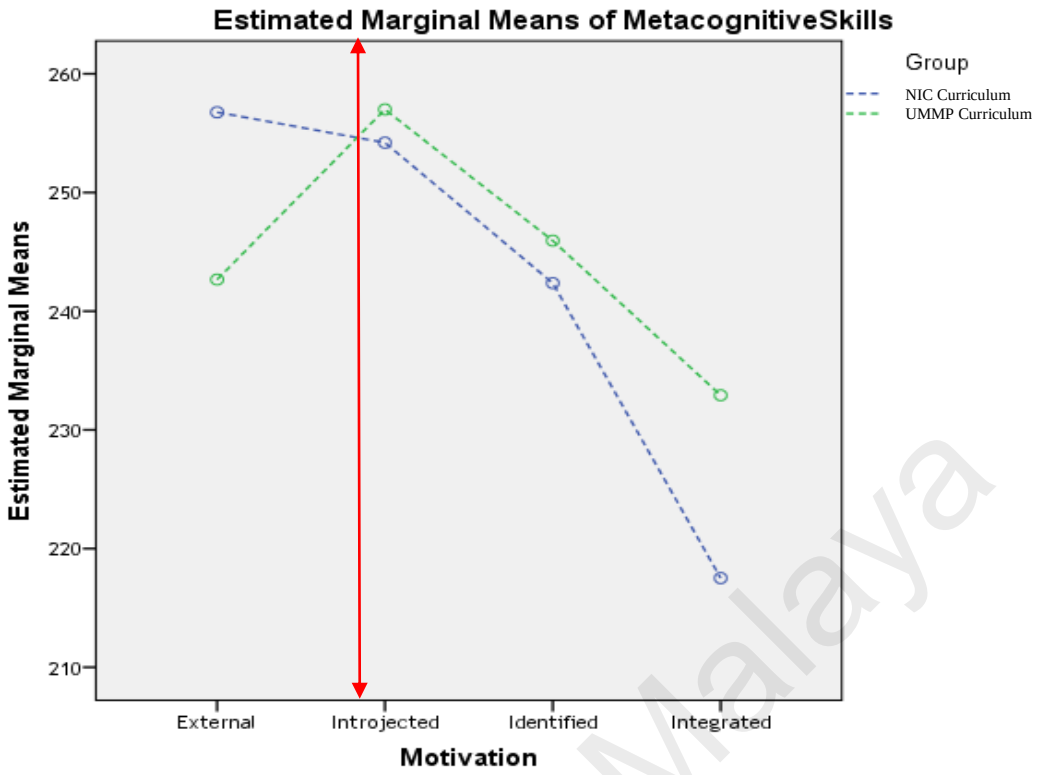


Figure 5.17: Graph for the Interactions Between Extrinsic Motivated Behaviour, and The Metacognitive Skills for First Year Medical Students of NIC and UMMP Medical Curricula

Upon conducting the MANOVA statistical analysis, the results showed a statistically significant interaction between Extrinsic Motivated Behaviour and Metacognitive Skills in both the NIC and UMMP medical curricula. Figure 5.17 shows the graph for the interactions between Extrinsic Motivated Behaviour and the Metacognitive Skills for first year medical students of both the NIC and UMMP medical curricula. A similar pattern in the interactions for Extrinsic Motivated Behaviour and the Metacognitive Skills for first year medical students in both the NIC and UMMP medical curricula was observed. Hence, the results revealed that the Extrinsic Motivated Behaviour and the Metacognitive Skills for first year medical students of the NIC and UMMP medical curricula are aligned.

When the medical students in the NIC curriculum were asked on how the additional changes would affect their learning style and performance, the transcribed interviews added some insight to the study. It is noted that medical students'

communication skills were one of the many concerns by students. For example, Student 5 stated;

> *... communication skills, we as a doctor later also need to know these skills*
> *(Student 5, External Regulation, Moderate Metacognitive Skills, NIC Curriculum, 09/10/2013)*

while Student 1 suggested that ward rounds will help to understand the lessons better;

> *...if I went to the hospital to do ward rounds or at least are exposed in 1st year, the realisation to know more things, and at least would be a little better in 1st year*
> *(Student 1, External Regulation, Moderate Metacognitive Skills, NIC Curriculum, 07/10/2013)*

Students from the NIC curriculum touched on the importance of introducing ward rounds in first year. For instance, Student 6 said;

> *The first year itself we should go ward round... no need to wait. You will know if you are suitable for the course or not when you go for ward rounds*
> *(Student 6, Introjected Regulation, Moderate Metacognitive Skills, NIC Curriculum, 09/10/2013)*

As for the medical students in the UMMP curriculum, the transcribed interviews gave some insight to the study as to how the curriculum can be further improved to enhance the learning capacity of the medical students. The findings of the research revealed that students' main concern was mainly on the time allocated for the Language in Medicine Block. This can be seen in the statement by Students 4, 5 and 9 below.

> *...shorten LiM because in one week we have a lot of lectures in one week in Block 2*
> *(Student 4, External Regulation, Moderate Metacognitive Skills, UMMP Curriculum, 18/07/2014)*

> *... English block is good, we learnt a lot of important terminologies, but just shorten it maybe?*
> *(Student 5, Identified Regulation, High Metacognitive Skills, UMMP Curriculum, 18/07/2014)*

the time was spent too long for Language in Medicine. We could have given way to second block with the time spent for LiM.
(Student 9, Integrated Regulation, High Metacognitive Skills, UMMP Curriculum, 21/07/2014)

Based on the transcribed interviews, it can be interpreted that first year medical students in the UMMP programme had more exposure to clinical settings and being able to visit the wards across their first year as compared to first year medical students in the NIC programme.

In the next section, the interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills with students' Year End Results in the NIC Curriculum and the UMMP curriculum respectively are discussed to answer the sixth research question.

5.8 Interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills with Students' Year End Results

In this section, the interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills with students' Year End Results in the NIC Curriculum and the UMMP curriculum and their year-end results respectively will be discussed. The results of this section are reported in two sections,

(i) Interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills With Students' Year End Results in the NIC Curriculum

(ii) Interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills With Students' Year End Results in the UMMP Curriculum

5.8.1 Interactions of the Extrinsic Motivated Behaviour and Metacognitive Skills with Students' Year End Results in the NIC Curriculum

To study the interactions between the extrinsic motivated behaviour and metacognitive skills of medical students in the NIC curriculum, a two-way ANOVA test was carried out to study on the examine the interaction.

Since the normality tests were carried out in the previous sections as shown in Table 5.21 and Table 5.22, statistical MANOVA analysis was carried out to compare the alignment of the Extrinsic Motivated Behaviour and Metacognitive Skills with the year-end results of first year medical students for the NIC and UMMP medical curricula in University of Malaya.

Table 5.24: Two-way ANOVA for Extrinsic Motivated Behaviour, Metacognitive Skills and Year-End Results in the NIC Curriculum Tests of Between-Subjects Effects

Dependent Variable: Year End Results

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	213.504[a]	7	30.501	.594	.760
Intercept	238653.115	1	238653.115	4650.384	.000
Motivation * Metacognitive Skills Group	143.263	3	47.754	.931	.427
Metacognitive Skills Group	1.505	1	1.505	.029	.864
Motivation	89.650	3	29.883	.582	.627
Error	8518.956	166	51.319		
Total	566786.000	174			
Corrected Total	8732.460	173			

a. R Squared = .024 (Adjusted R Squared = -.017)

Table 5.24 reveals the statistical results for Two-way ANOVA for Extrinsic Motivated Behaviour, Metacognitive Skills and Year-End Results in the NIC Curriculum.

A two-way ANOVA test which was conducted to find the interaction and main effects revealed that there was no statistical significance for the interaction among the dimensions of Extrinsic Motivated Behaviour, level of Metacognitive Skills and the Year End Results for first year students in the NIC curriculum.

Figure 5.18 showed the graph for the interactions between Extrinsic Motivated Behaviour, Metacognitive Skills with the Year-End Result for first year medical

students of the NIC curriculum. Although the statistical results did not show any significant interactions, there is a distinct pattern in the interactions for dominant introjected, identified and integrated regulation students which was observed. The students who are categorised as being dominant in these dimensions and have high metacognitive skills score seemed to score better for their year-end results. However, it appears in the study that students who are categorised as being dominant in external regulation dimension but have high metacognitive skills score seemed to obtain lower scores for their year-end results. This means that in order for medical students to perform well in their examinations, the desire to be in the medical school must come within one-self coupled with high metacognitive skills, which includes the ability to plan, monitor, evaluate and manage their learning style.

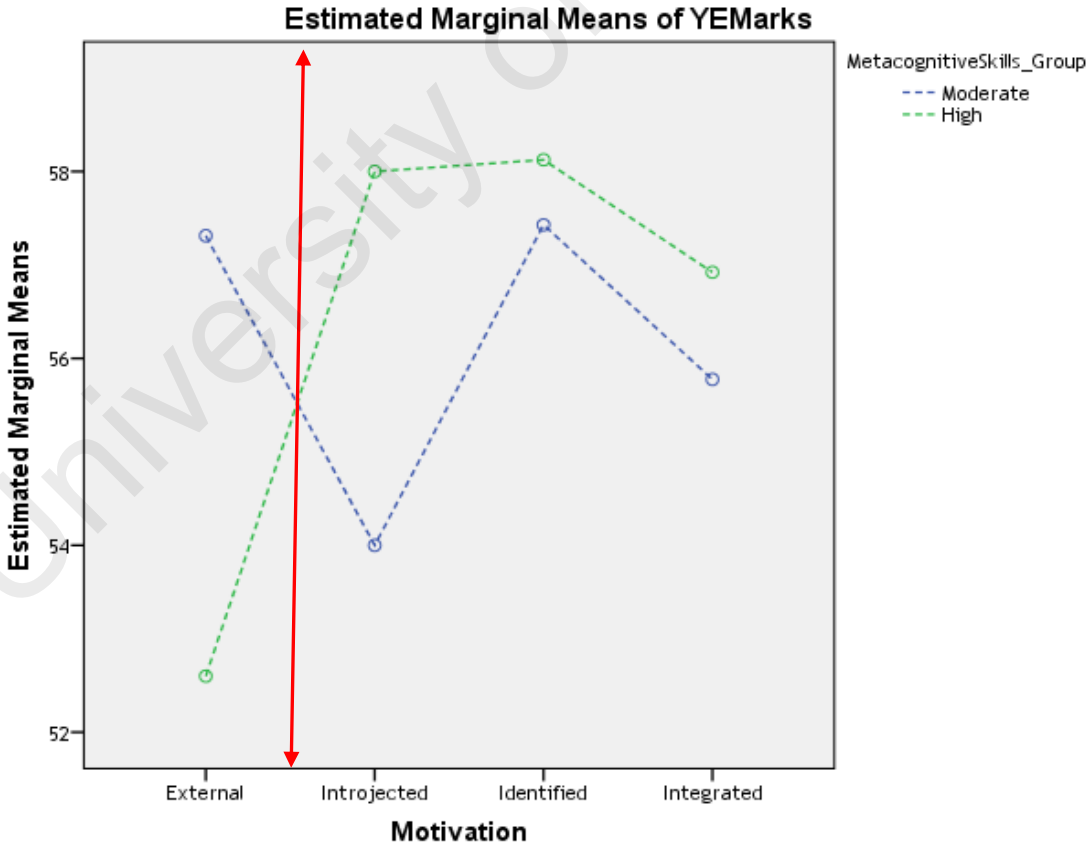


Figure 5.18: Graph for the Interactions between Extrinsic Motivated Behaviour, Metacognitive Skills with the Year-End Result for First Year Medical Students of the NIC Curriculum

Figure 5.18 showed that the more dominant is the extrinsic motivated behaviour dimension displayed by a student, the higher is their metacognitive skills. Students dominant in the more autonomous extrinsic motivated behaviour dimensions showed higher metacognitive skills and better academic performance. This pattern was similar to the study by Borges et al. (2010) and Ryan and Deci (2000d) who put forward that medical students who are at the highest dimension of extrinsic motivated behaviour are also thought to be able to internalise their behaviour.

The findings shown in this figure are also similar to the findings of the study conducted by Hammann and Stevens (1998) where medical students with higher metacognitive levels were found to be more effective learners and showed higher performance levels because they used more strategies and were able to regulate their own learning better. However, this pattern is not applicable in describing students who possess the lowest dimension of extrinsic motivated behaviour.

A two-way ANOVA test was carried out to study the interactions and main effects on the Extrinsic Motivated Behaviour and Metacognitive Skills with the year-end results. Before the two-way ANOVA is carried out, the normality of the year-end results for the different dimensions of EMBI and grouping (Low, Moderate and High) of Metacognitive Skills were carried out.

Table 5.25 shows the results on the normality of the year-end results of the different dimensions of Extrinsic Motivated Behaviour for first year MBBS students of the new curriculum.

Table 5.25: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution

EMBI Dimensions		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
External Regulation	Year End Results	.122	15	.200*	.950	15	.527
Introjected Regulation	Year End Results	.236	8	.200*	.883	8	.203
Identified Regulation	Year End Results	.068	32	.200*	.981	32	.840
Integrated Regulation	Year End Results	.082	104	.083	.985	104	.309

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

From the result, the *p*-value for all the four dimensions of EMBI were greater than 0.05 and thus, not significant. Hence, all the *p*-values indicated that the score for dimensions of EMBI for first year MBBS students of the UMMP curriculum has a normal distribution.

Table 5.26 shows the results on the normality of the year-end results of the different grouping of Metacognitive Skills for first year MBBS students of the UMMP Curriculum.

Table 5.26: Kolmogorov-Smirnov and Shapiro-Wilk Tests for Normality Distribution

Metacognitive Skills Group		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Moderate	Year End Results	.078	56	.200*	.983	56	.591
High	Year End Results	.079	103	.122	.983	103	.195

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

From the result of the normality test, the *p*-value for the different grouping of Metacognitive Skills was greater than 0.05 and thus, not significant. Hence, all the *p*-values indicated that the score for the different grouping of Metacognitive Skills for first year medical students of the UMMP curriculum has a normal distribution. The statistical analysis for two-way ANOVA was then carried out. The statistical result for two-way ANOVA is presented in Table 5.27.

Table 5.27: Two-way ANOVA for Extrinsic Motivated Behaviour, Metacognitive Skills and Year-End Results in the UMMP Curriculum

Tests of Between-Subjects Effects

Dependent Variable: Year End Results						
Metacognitive Skills Group	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Moderate	Corrected Model	78.231[a]	3	26.077	.711	.550
	Intercept	92460.755	1	92460.755	2522.113	.000
	EMBI Dimensions * Metacognitive Skills Group	.000	0	.	.	.
	EMBI Dimensions	78.231	3	26.077	.711	.550
	Metacognitive Skills Group	.000	0	.	.	.
	Error	1906.322	52	36.660		
	Total	171935.000	56			
	Corrected Total	1984.554	55			
High	Corrected Model	555.224[b]	3	185.075	4.244	.007
	Intercept	104262.501	1	104262.501	2390.618	.000
	EMBI Dimensions * Metacognitive Skills Group	.000	0	.	.	.
	EMBI Dimensions	555.224	3	185.075	4.244	.007
	Metacognitive Skills Group	.000	0	.	.	.
	Error	4317.708	99	43.613		
	Total	366372.000	103			
	Corrected Total	4872.932	102			

a. R Squared = .039 (Adjusted R Squared = -.016)

b. R Squared = .114 (Adjusted R Squared = .087)

Based on Table 5.27, the year-end results of the first year students in the new MBBS curriculum were subjected to a two-way analysis of variance having four dimensions of EMBI (External Regulation, Introjected Regulation, Identified Regulation, Integrated Regulation) and three Metacognitive Skills level (High, Moderate, Low). Only high level of Metacognitive Skills and the dimensions of Extrinsic Motivated Behaviour show interactions and has an effect that is statistically significant $F(3,102) = 4.24$, $p = .007$ at the .05 significance level.

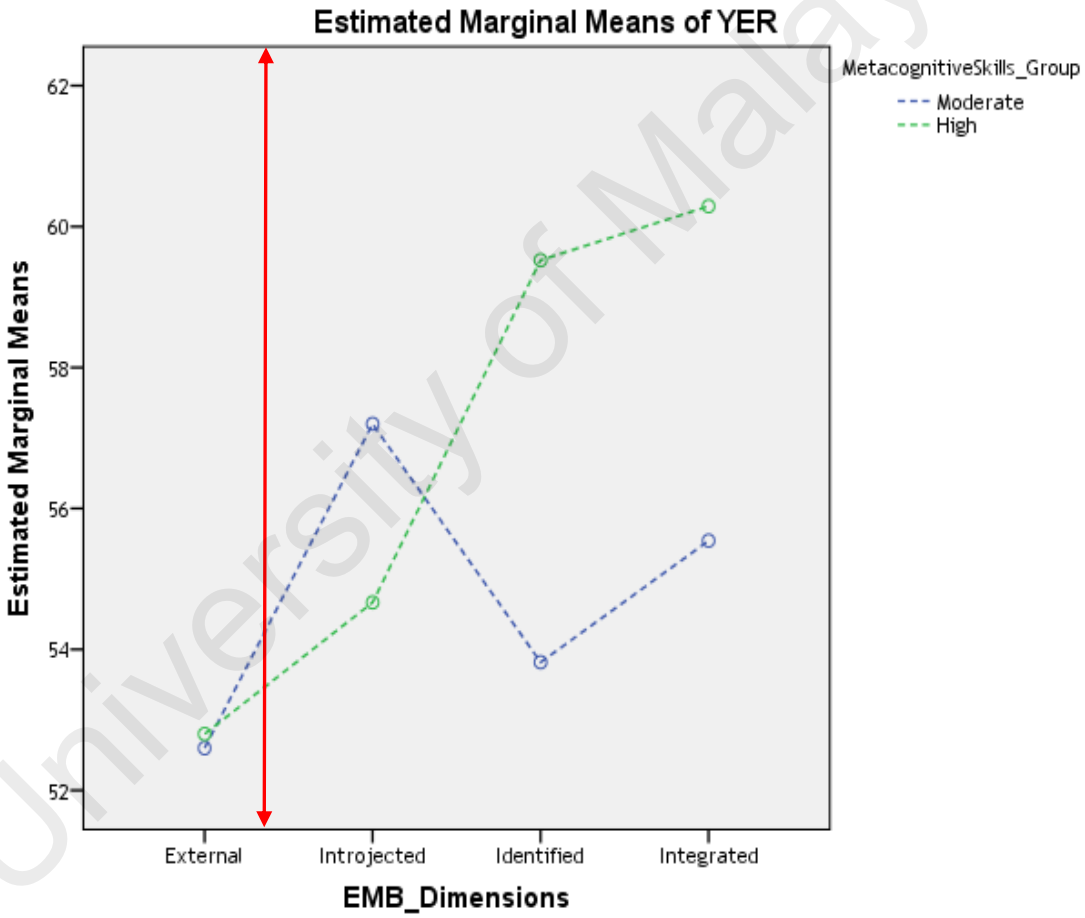


Figure 5.19: Graph for The Interactions Between Extrinsic Motivated Behaviour, Metacognitive Skills with The Year-End Result for First Year Medical Students of The UMMP Curriculum

Figure 5.19 shows the graph for the interactions between the dimensions of EMBI, Metacognitive Skills with the Year-End Result for first year medical students of the UMMP curriculum. The statistical results show that only a high level of

Metacognitive Skills and the extrinsic motivated behaviour dimensions have interactions and have an effect. There was a distinct pattern in the interactions for dimensions of extrinsic motivated behaviour with high level metacognitive skills score. The students who had high metacognitive skills scores seemed to show an exponential pattern with the four dimensions of extrinsic motivated behaviour and had higher scores in their year-end results. However, it appears that students who are categorised as dominant in the dimension of external regulation seemed to have scored lower for their year-end results regardless of their metacognitive skills scores.

Both the NIC and UMMP medical curricula revealed that students who have more autonomous extrinsic motivated behaviour (towards intrinsic motivation) and have higher metacognitive skills will perform better in their academic performance. The high metacognitive skills group revealed similar patterns in both the NIC and UMMP medical curricula. The results were however, more obvious in the UMMP curriculum.

First year medical students in the UMMP curriculum revealed better alignment of the extrinsic motivated behaviour and their metacognitive skills as compared to first year medical students in the NIC curriculum. This is also in line with Ghonsooly et al. (2014) and Roebers et al. (2012) studies which outlined that metacognitive skills can be taught. The awareness of students' own metacognitive skills is important as this would address to how students plan, monitor and evaluate their own learning style and activities done in the medical school which appear to be very challenging (Croskerry, 2003; Grant, 2006).

Hence, the results obtained above was able to lead to the crux of the current study, which is on the alignment of the extrinsic motivated behaviour and metacognitive skills among first year undergraduate medical students. It can be concluded once again that, in order for medical students to perform well in their examinations, the desire to be in the medical school must come from within oneself coupled with high metacognitive

skills. The high metacognitive skills include the ability to plan, monitor, evaluate and manage their learning style.

5.9 Chapter Summary

This chapter presented the findings of the study and the discussion to answer the research questions. The research questions focused on the significance between first year medical students' Extrinsic Motivated Behaviour and Metacognitive Skills with their Academic Performance in the NIC and UMMP medical curricula.

The distribution of students according to their gender and pre-university studies were presented. The students were profiled and were categorised into the dominant dimensions of EMB. Further to that, students were also found to have a combination of dimensions of EMB. For the MSI, students are categorised according to their total score and profiled as having low, moderate or high level of metacognitive skills.

For the second research question, the results showed that there were no significant differences between the medical students identified for the four dimensions of EMBI in their year-end examination results among students following the NIC curriculum. For the UMMP curriculum, the results showed that there were significant differences between the medical students identified for the four dimensions of EMBI in their year-end examination results. Further post-hoc tests revealed that students dominant in external regulation and integrated regulation scored significantly different in their year-end results.

For the two dimensions of metacognitive skills and students' academic achievement, there were statistical significance showed in both the NIC and UMMP curricula. The results revealed that metacognitive skills in students regardless of the medical curriculum they follow are essential as these skills affect their academic performance.

For students following the NIC curriculum, there was a moderate correlation between the EMBI score and the MSI score. However, only the MSI score showed a small correlation with students' academic performance. For students following the UMMP curriculum, there was a small correlation between the EMBI score with academic performance. The correlation between the four dimensions of EMBI in their year-end examination results also revealed that the external regulation has a negative correlation with students' year-end results. The MSI score showed moderate correlation with academic performance. There were however, no statistical correlation found in the EMBI scores and MSI scores for students following the UMMP curriculum. The correlation between the MSI scores and students' year-end examination results revealed that there is a stronger correlation with students' metacognitive skills score and year-end results in the UMMP curriculum compared to that of the NIC curriculum.

The MANOVA statistical analysis showed statistically significant interaction between extrinsic motivated behaviour and metacognitive skills in both the NIC and UMMP medical curricula. Interviews conducted with first year medical students in both the NIC and UMMP medical curricula also gave insights to the findings of the study. Although both the curricula showed statistically the alignment of the extrinsic motivated behaviour and metacognitive skills in the students, the findings in from the students following the UMMP curriculum was more evident.

The two-way ANOVA test to find the interaction and main effects revealed that there was no statistical significance for the interaction among the dimensions of Extrinsic Motivated Behaviour, level of Metacognitive Skills and the Year End Results for students following the NIC curriculum. As for students following the UMMP curriculum, only students with higher level of metacognitive skills and more autonomous dimension of extrinsic motivated behaviour shows interactions and has effect that was statistically significant. The statistical results were complemented with

relevant interview data from first year medical students following the respective curriculum.

In the next chapter, implications of the study, suggestions for future studies and the conclusion will be discussed.

CHAPTER 6: SUMMARY, IMPLICATIONS AND CONCLUSION

6.1 Introduction

In this chapter, the summary of the research findings, implications and contributions of the research towards existing literature, recommendations for further research and the conclusion is discussed.

6.2 Summary of Research Findings

The present study was able to categorise and profile the medical students into the four different dominant dimensions of extrinsic motivated behaviour based on the EMBI. Qualitative interview data obtained complemented the statistical data which showed that medical students have a combination of dimensions of extrinsic motivated behaviour within themselves.

In the UMMP curriculum, there were statistical significant differences between students with external regulation (the least autonomous level of extrinsic motivation) and integrated regulation (the most autonomous level of extrinsic motivation) with their achievement. This result implies that the differences in their dominant dimensions of extrinsic motivated behaviour can possibly affect the student's achievement. Students who were categorised as being dominant in the dimension of integrated regulation portray behaviour which is very similar to intrinsic motivation where the students show great interest and truly see the value in achieving their goals in becoming a medical practitioner. Hence, they tend to strive harder and work towards excellence even though the first year in medical school is challenging for them.

As opposed to the UMMP curriculum, students in the NIC curriculum who learn basic and clinical sciences appear to have ‘forcefully studied’ for their first year examinations which was entirely theory-based based on the insight gained from the

interview sessions with the NIC curriculum students. The challenging syllabus and hectic schedule in their first year where they learn about a human body, apparently caused them to be exhausted and bored as they do not see the link between the knowledge learnt and how this knowledge will be integrated into practice.

On the other hand, the students in the UMMP curriculum who have had more clinical immersion in their first year together with more self-directed learning sessions, appear to have realised their desire of being in the medical school. Interviews with the students have revealed that students who were exposed to clinical days earlier are more able to relate the importance of what has been taught in the classroom to what is observed in the wards. Thus, qualitative data complemented the quantitative statistics which revealed that there were correlations between students' EMB with academic performance and MSI with academic performance amongst students following the UMMP Curriculum.

Students across both the NIC and UMMP curricula revealed that, apart from the extrinsic motivation which drives them to be in the medical school, knowledge gained in the classroom is also very important.

> ***"To make an individual metacognitively aware is to ensure that the individual has learned how to learn." (Garner, 1988)***

The most important thing to learn is that the students have to be able to recall and reflect on what has been taught in the classroom and apply it into the actual real world setting where they are expected to face challenging scenarios such as being able to make important decisions where limited resources and time constraints apply (Gonullu & Artar, 2014a) .

It was found that in both the NIC and UMMP curricula, the two dimensions of metacognitive skills do affect the students' year-end examinations. This shows that

metacognitive skills are important skills for medical students to acquire. From the results of NIC curriculum, although students' dimensions of extrinsic motivated behaviour do not show correlation with their year-end results, the four dimensions of extrinsic motivated behaviour correlates with the metacognitive skills.

Results from the UMMP curriculum revealed that students' performance are influenced by the dominant dimensions of extrinsic motivated behaviour as well as metacognitive skills. The results have revealed that early exposure to clinical days such as ward rounds and early bedside teachings does alter students' extrinsic motivation as they are exposed to the real life scenario. Although a student may come in to the medical school not wanting to do medicine on his or her own will, this student may potentially have a shift of thought as he or she goes through the learning activities in the UMMP curriculum. This gives them the opportunity to recall and reflect on their thoughts, regulate the teachings learnt in the classroom and reflect upon what has been taught and what to be practiced.

The study found that there was alignment of extrinsic motivated behaviour and metacognitive skills among medical students in both the NIC and UMMP curricula. However, the alignment of the two domains is more distinct among the first year medical students from the UMMP curriculum. The results showed that medical students in the UMMP curriculum are better aligned in terms of their extrinsic motivated behaviour and their metacognitive skills as compared to the medical students in the NIC curriculum. Ultimately, the findings reported here with the administration of the EMBI and MSI provided supportive evidence but in a completely novel context of first year undergraduate medical students following the NIC and UMMP medical curricula. The implications of the study towards medical education are discussed in the next section.

6.3 Implications of the Study for Medical Education

Based on the findings of the current study, there are a few implications for medical school teachers and medical students. The Extrinsic Motivated Behaviour Inventory (EMBI) can be an instrument to profile the dominant dimensions of extrinsic motivated behaviour, of medical students. The statistical results and complementary qualitative data indicate that the EMBI can be used as a predictive tool by medical schools to profile potential medical students during the selection process to gauge their suitability to be placed in the medical school. This will also help medical students to have some thoughts on their suitability to be enrolled in the medical school. However, the findings also suggest that there could be a possibility that medical students' dominant extrinsic motivations may change along their journey in doing medicine across the years. This finding sheds more light to the existing literature that, apart from intrinsic motivation that influence students' learning outcomes as mentioned by Alireza et al. (2012); Cheng and Cheng (2012); Tanaka et al. (2009) stated that the different dimensions of extrinsic motivation are equally as important.

Medical students and medical teachers will also be able to measure students' metacognitive knowledge and metacognitive regulation using the MSI. The MSI can also be used as part of an assessment tool for medical teachers to assess the medical students from time to time. This will enable them to monitor and advise students who are under their supervision or mentoring programme as the students progress in medical school. This can help them to plan, set goals and monitor their progress as they move from one academic year to another in medical school.

As discussed previously, students following both the NIC and UMMP curricula showed alignment in their extrinsic motivated behaviour with their metacognitive skills. The alignment is more evident in the UMMP curriculum. These findings can also imply

that in an integrated medical program, teachers may have some degree of control over the educational outcomes and have subconsciously taught the metacognitive skills to the medical students during hands-on session. This can be seen from feedback given by medical students following the UMMP curriculum that during their clinical immersion, students' extrinsic motivation were triggered and metacognitive skills started to emerge. The findings of this study can be used as an indicator for policy makers and stakeholders, especially for curriculum review to improve a medical curriculum.

The findings on the alignment of extrinsic motivated behaviour and the metacognitive skills of first year medical students in this study showed that both the inventory can be predictive of students' academic performance. The findings of this study also imply that a more autonomous form of extrinsic motivated behaviour which is the integrated regulation coupled with high level of metacognitive skills will enable medical students to reflect, make sense of the reason why they are in the medical school work towards their academic achievement. While reflecting on one's practice, this will enable the identification of weakness and able to set appropriate goals as suggested by Eva and Regehr (2005).

From the findings it appears that early exposure to actual medical settings may trigger students' interest and make more sense to the students on their aim in being in the medical school. In addition, these findings suggest that medical teachers should consider more exposure for the first year medical students to the actual medical settings in the medical programme structure, innovative ways in delivering content matter, teaching methods, providing constructive feedback in the classroom and in clinical ward rounds. These factors may have an impact on students' extrinsic motivation and subsequently their metacognitive skills over the years being in the medical school, especially as they move from the pre-clinical to the clinical years.

Hence, this type of approach to medical education research could benefit educators - both medical schools and medical teachers who strive to understand better the factors that influence individual success in the medical school and beyond. In the next section, suggestions for further research are put forward.

6.4 Suggestions for Further Research

This study focused only on the first year medical students in a Malaysian medical school. Hence, further research can be conducted as follows:

i. Conduct a longitudinal study to compare the medical students across the strands (Stage 1 to Stage 3.2) of the medical curriculum over a few years. The medical students are followed over the academic years where their Extrinsic Motivated Behaviour, Metacognitive Skills and academic achievement will be researched upon. When the medical students are in their clinical years (Stage 3.1 and Stage 3.2), the research can be conducted not limited only to academic achievement but can also be expanded to include essential clinical skills.

ii. In Malaysia, the number of private medical schools has been increasing rapidly in the recent years. While appearing similar at the surface level, there are vast differences in the medical programmes offered. Therefore, a similar research can be extended to study and compare the medical students across the academic years for different medical schools in Malaysia to address the nation's needs in producing safe and competent healthcare professionals.

iii. The EMBI and MSI can be used as a remedial tool by profiling students according to the dominant EMB dimensions for students who are repeating the academic year. An interview can be conducted among medical students who have had to repeat an academic year upon profiling them using the EMBI and MSI.

iv. A similar study can extended to include a larger group of students pursuing other healthcare courses and education such as nursing, pharmacy, bio-medical, by adapting the EMBI and MSI to these fields.

6.5 Conclusion

From the findings of the study, it can be concluded that the EMBI and the MSI can be used to profile future medical students' dominant extrinsic motivated behaviour to gauge medical students' knowledge and regulation respectively. This in turn could indicate to future applicants their suitability to be in medical school.

Medical schools should realise that apart from intrinsic motivation, the dominant extrinsic motivated behaviour dimension plays a great role in students intending to do medicine. The alignment of both the domains could possibly help to improve the psychological well-being of the medical students if identified at different stages of medical school as they move from one academic year to another. Perhaps this will reduce burnout and attrition rates which is a common occurrence in medical schools. Therefore, rather than producing healthcare professionals who are solely content-based, the nation could perhaps aim to produce healthcare professionals who are not only competent in their knowledge, but who would be able to endure the training in medical school and provide excellent healthcare services. Policy makers, stakeholders and the society should also realise that a medical curriculum and a medical school who emphasise on the psychological well-being of the medical students right from the start will be able to produce safe and competent healthcare professionals.

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