# AN ACADEMIC RESILIENCE SCALE AND MODEL FOR MALAYSIAN ADOLESCENTS

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# AN ACADEMIC RESILIENCE SCALE AND

# MODEL FOR MALAYSIAN ADOLESCENTS

by

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To refind meaning in this PhD, I always get inspiration from my family:

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GPA             Grade Point Average

SES             Socio-economic Status

EFA             Exploratory Factor Analysis

CFA             Confirmatory Factor Analysis

MRFA            Minimum Rank Factor Analysis

PCA             Principal Component Analysis

CR              Composite Reliability

AVE             Average Variance Extracted

PLS-SEM         Partial Least Square-Structural Equation Modelling

PPC             Perceived Parental Care

PTC             Perceived Teacher Care

APG             Academic Performance Goal

EO              Educational Optimism

# SKALA DAN MODEL RESILIENSI AKADEMIK UNTUK REMAJA MALAYSIA

## ABSTRAK

Walaupun berlatarbelakangkan taraf sosioekonomi kurang baik, yang boleh mengekang pencapaian akademik majoriti remaja, sebahagian daripada mereka mampu untuk berjaya secara akademik. Pencapaian luar biasa ini, ditakrifkan sebagai resiliensi akademik, menimbulkan persoalan: berkaitan faktor individu, keluarga dan sekolah membolehkan sebahagian pelajar memperoleh pancapaian lebih baik bebamding rakan sebaya mereka daripada status sosioekonomi yang sama (SES rendah). Persoalan tersebut cuba diterokai berdasarkan faktor-faktor resiliensi daripada kerangka sosiobudaya tempatan. Penyelidikan kuantitatif ini telah menyepadukan tinjauan literatur dalam bentuk teoritikal dan empirikal ke dalam "*Kerangka Transaksi-Sosio-Eko-Budaya Resiliensi Akademik*". Penyelidikan ini telah membina skala dan model resiliensi akademik untuk remaja Malaysia. Kebolehpercayaan dan kesahan skala dan model telah diuji dan dikukuhkan menerusi kajian rintis dan kajian sebenar mengenai resiliensi akademik remaja daripada golongan SES rendah yang berasal dari kawasan luar bandar Kedah, Malaysia. Para responden telah dipilih secara rawak melalui teknik persampelan tempat-hari-waktu. Analisis menggunakan program FAKTOR versi 10.7, analisa *Minimum Rank Factor* terhadap data yang diperoleh daripada kajian rintis 2 ($N = 308$) dan 4 ($N = 127$) telah mengenal pasti dua sumber interpersonal dan dua aset intrapersonal resiliensi akademik. Sumber interpersonal yang dikenalpasti adalah "tanggapan terhadap kepedulian ibu bapa" dan "tanggapan terhadap kepedulian guru", sementara aset intrapersonal adalah "matlamat prestasi akademik" dan "optimisme pendidikan".

Analisa *Partial Least Square-Structural Equation Modelling* (PLS-SEM), menggunakan versi SmartPLS 3.2.7, menunjukkan bahawa aset intrapersonal bertindak sebagai pengantara kepada kesan positif sumber-sumber interpersonal terhadap purata mata gred (GPA) remaja yang mempunyai resiliensi akademik yang mengambil bahagian dalam kajian utama ($N = 190$). Hasil kajian juga mendapati terdapat tiga dapatan yang signifikan. Pertama, tanggapan terhadap kepedulian ibu bapa dilihat sebagai sumber interpersonal terbaik yang menjelaskan kebanyakan variasi positif dalam matlamat prestasi akademik dan optimisme pendidikan. Kedua, tanggapan terhadap kepedulian guru mempunyai pengaruh yang kuat terhadap matlamat prestasi akademik berbanding terhadap optimisme pendidikan. Ketiga, matlamat prestasi akademik adalah aset intrapersonal terbaik yang menerangkan sebahagian besar sumbangan positif terhadap prestasi peperiksaan. Dapatan kajian telah menghasilkan (a) skala yang boleh dipercayai dan sah untuk mengukur resiliensi akademik dan (b) mencadangkan model untuk meningkatkan sumber interpersonal dan aset intrapersonal pelajar yang kurang resilien dalam kalangan remaja di Malaysia. Model ini memberikan implikasi kepada pembuat dasar, pentadbir sekolah, guru sekolah, dan ibu bapa dengan meningkatkan kefahaman tentang perbezaan resiliensi akademik dalam kalaugan pelajar daripada tahap SES, sekolah, dan kejiranan yang sama.

# AN ACADEMIC RESILIENCE SCALE AND MODEL

# FOR MALAYSIAN ADOLESCENTS

## ABSTRACT

Despite their socioeconomically-disadvantaged backgrounds, which impede academic achievements of the majority, some adolescents can academically succeed. This exceptional achievement, defined as academic resilience, raises the question: what and how individual, familial, and school factors enable some adolescent students to perform the same task better than their peers from the same socioeconomic status (low SES). To enhance understanding of this question and to explore factors underlying academic resilience from the local sociocultural frame of reference, this quantitative research integrated various theoretical and empirical literature into a "*Socio-Eco-Cultural-Transactional Framework of Academic Resilience*". Using this framework, an academic resilience scale and model for Malaysian adolescents was developed. Reliability and validity of the scale and model were tested and established through pilot and main studies on academic resilience of adolescents with low SES in a rural area of Kedah, Malaysia. The participants were randomly selected through a venue-day-time sampling technique. Using FACTOR 10.7 version, a Minimum Rank Factor Analysis of data collected from pilot study 2 ($N = 308$) and 4 ($N = 127$) identified two interpersonal resources and two intrapersonal assets of academic resilience. The resources appeared to be "perceived parental care" and "perceived teacher care", while the assets appeared "academic performance goal" and "educational optimism". A Partial Least Square-Structural Equation Modelling (PLS-SEM) analysis, using SmartPLS 3.2.7 version, displayed that the intrapersonal assets mediate the positive effect of interpersonal resources on grade point average (GPA)

of academically-resilient adolescents participated in the main study ($N = 190$). As a result, three significant findings could be highlighted. First, perceived parental care appeared to be the best interpersonal resource that explains most of the positive variance in both academic performance goal and educational optimism. Second, perceived teacher care exerted the stronger influence on academic performance goal than on educational optimism. Third, academic performance goal was the best intrapersonal asset that explains most of the positive contribution to exam performance. Based on these findings, the research has provided (a) a reliable and valid scale for measuring academic resilience and (b) proposed a model for enhancing the interpersonal resources and intrapersonal assets of non-resilient students among adolescents in Malaysia. The model has implications for policymakers, school administrators, school teachers, and parents by enhancing the understanding why some students are academically resilient, while not their peers from the same SES, school, and neighbourhood.

# CHAPTER 1

# INTRODUCTION

## 1.1    Overview

Although the majority of adolescents from socioeconomically disadvantaged backgrounds fail or underachieve in academic tasks and exams, some with the same background can be successful. This exceptional achievement is defined as academic resilience (Morales & Trotman, 2004) and begging the question: What is right with these adolescents? What protects them? (Bogenschneider, 1998; Garmezy, 1983; Rutter, 1979, 1983, 1985, 1987; Shean, 2015; Werner, 1990; Werner & Smith, 1982). These questions have decentralised the focus on "what is wrong with non-resilient adolescents" and thus have laid the foundation of resilience research, including studies of academic resilience. Research on academic resilience addresses the question of what and how interpersonal resources (e.g., parent and teacher) and intrapersonal assets (e.g., achievement motivation and educational optimism) enable some students to perform the same task better than those who have the same background (Kuldas, Hasim, & Ismail, 2015a; Kuldas, Hasim, Ismail, & Samsudin, & 2015b). This question should be addressed, so that an optimal resilience-enhancing model and strategy can be developed for non-resilient students (Miller, 2002, Russo & Boman, 2007), particularly for those among Malaysian adolescents (Kuldas et al., 2015a, 2015b).

Empirical research on academic resilience among Malaysian adolescents is nascent (Kuldas et al., 2015a, 2015b). The available literature on the Malaysian context has shown no valid scale for measuring academic resilience of Malaysian adolescents (Kuldas et al., 2015a, 2015b). Therefore, the need for a reliable and valid instrument

to measure academic resilience, which is based on a social-ecological-cultural perspective, takes on even greater urgency.

Self-report measures used in social science research on the local context are generally translations of measures developed for a Western context. Any translation from the Western to a Southeast-Asian context, raises question about the suitability of these translated or adapted scales in terms of accurately gauging constructs related to Malaysian adolescent' sense of self, beliefs, or worldviews (Kuldas & Sefa, 2016). This question goes well beyond the translation procedure and psychometric properties, it draws attention to individualistic versus collectivistic cultural values, especially differences in independent and interdependent self-construals (Kuldas & Sefa, 2016) as well as in teaching and learning styles (Kuldas, Allahyar, Hashim, Ismail, & Samsudin, 2014a).

The independent self-construal is promoted predominately in an individualistic culture like North American, West Europeans, and Australian. In contrast, the interdependent self-construal is developed predominantly in a collectivistic one, such as the Chinese (Singelis, 1994), Malay (Winskel, Salehuddin, & Stanbury, 2013), Malaysian (Mohammad & Azman, 2014), or Japanese (Markus & Kitayama, 1991) traditional culture. These ways of self-construals are also reflected in the language used (Ishii, 2013). As an outstanding example for the individualistic view, a standing-alone letter I, in the English language, represents the self as ─ transcending interpersonal relationships ─ a context-free entity with traits distinctive and independent of social roles (Cousins, 1989). In comparison with this view, as an example of the collectivistic view, the word "*saya*" literally means "servant or slave" in Bahasa Melayu (Dewan Bahasa dan Pustaka, 1986) and Bahasa Indonesia

(Surjaman, 1968). The word *saya* refers to "I" in the English language (Dewan Bahasa dan Pustaka, 1986; Surjaman, 1968) and originates from the Sanskrit word "*sahaya*" (Jones, 2008, p. 277). The original Sanskrit word *sahaya* (सहाय) literally means "follower" — as a companion, friend, adherent, ally, and helper — and refers to a person who goes along with another person (Monier-Williams, 1898, p. 1195). Another example of collectivistic culture can be given from the Japanese language. The word "*jibun*" in Japanese stands for one's self and is referred to as "one's share of the shared life space" (Hamaguchi, as cited in Markus & Kitayama, 1991, p. 228).

Given that most students habitually follow their cultural preferences from early childhood, they develop a specific mode of thought. Findings show that the independent self-construal corresponds to an analytic and logical mode of thought — explicit self-evaluations — whereas the interdependent self-construal corresponds to a holistic and dialectical mode of thought — implicit self-evaluations (Kuldas & Bulut, 2016; Ishii, 2013; Nisbett, Peng, Choi, & Norenzayan, 2001). Language and thought are conjoined in a mutually reinforcing relationship. Verbal and visual language can be considered as the frame of thinking, moulding perceptual, affective, and cognitive processes of thoughts, the way humans encode, store, and retrieve information (Kuldas, Abu Bakar, Ismail, 2012; Kuldas, Ismail, Hashim, & Abu Bakar, 2013b).

Thus, when adopting or adapting a scale, to disregard the differences between the interdependent and independent sense of self is likely to be considered an attempt to impose the individualistic sense on Malaysian adolescents, or at least to be seen as forcing them to rank their agreements on a scale measuring an independent worldview. Although one may argue that Malaysian adolescents, especially from recent generation, have or developed an independent or individualistic sense of self, the strong influence

of Malaysian collectivist society is not easily avoidable in daily life. This influence is observable especially when Malaysians are asked to express their opinions or perceptions about themselves and others (Mohammad & Azman, 2014). Most important, the global manifestation of a convergence of values and behaviour among adolescents and youths, has not yielded a generalisable model or measurement of resilience (Ungar et al., 2008). To what extent an adopted or adapted scale for measuring resilience is appropriate to gauge the cultural differences is still an unclear issue.

As research on acculturation revealed, individual and social well-being can result from the resistance to the hegemonic culture, which is usually associated with Western-style consumerism, secularism, and democratisation (Grant et al., 2004). Resilience may depend on cultural and contextual variables, that is, "definitions of resilience are ambiguous when viewed across cultures" (Ungar et al., 2008, p. 174). For example, in some collectivist cultures, resilience can be viewed as the capacity to accept a situation rather than to change it (Strong, 1984). This does not suggest that the concept of resilience, developed in the Western context, cannot be helpful in an Eastern context, but the construct of resilience needs to be modified to reflect cultural aspects (Yu & Zhang, 2007). Otherwise, merely applying findings or ideas of research focusing on resilience in "White Middle-Class Western" contexts to children and adolescents with dissimilar social and cultural backgrounds may be of no benefit, even harmful to them (Ungar, 2005, Ungar, Brown, Liebenberg, & Othman, 2007). Adolescents and youths' resilience is embedded in the complex social ecologies of their families and communities. As Ungar (2011) emphasized, resilience as positive developmental growth is embedded culturally and historically; resilience reflects culture, everyday practices of shared values, beliefs, language, and customs.

Hence, researchers and psychologists need instruments to assess cultural influence in the development of resilience (Clauss-Ehlers, Yang, & Chen, 2006). Researchers may initially adopt a contextualisation approach (Farh, Cannella, & Lee, 2006) to develop a reliable and valid scale for measuring academic resilience of Malaysian adolescent students, exploring the resilience assets and resources from the local sociocultural frame of reference. Following his frame of reference, this research has been based on socio-eco-cultural approach and aimed at developing an academic resilience scale and model for Malaysian adolescents. The research findings may contribute to answering the question how to help those who are academically non-resilient. To this aim, this chapter, first, presents background and statement of the research problem; next, objectives and questions of the research; and last, conceptual and operational definitions.

## 1.2    Problem Background

Background of the problem is essentially twofold: teacher and student background. However, to explain how this approach may contribute to the solution of problem and thus to the vision of the Ministry of Education Malaysia, the problem is explainable under five subsections. The first subsection is the introduction of the problem background. The second subsection is about teacher background, attributable to the underachievement of educational endeavours that are aimed at the promotion of Malaysian students' thinking skills. The third subsection elaborates on this underachievement. The fourth subsection is about student background, drawing attention to risk factors that Malaysian adolescent students suffer from and are affecting their performance in cognitive or academic tasks. The fifth subsection exemplifies the problem background with the association between Malaysian

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adolescents' low SES (a specific risk factor) and their underachievement in mathematics and science. The problem background thereby shows the need for an academic resilience approach to enhancing academic performance of Malaysian adolescents, particularly the need for research on how to help those who are academically non-resilient.

### 1.2.1   Introducing Background of the Problem

Adolescence is an age of promise, but also a period of risk (Lerner, 1995). The adolescence period of life comes along with changes and challenges in terms of physical and cognitive development. In this hectic period, many adolescents may suffer more from various risk factors such as low socioeconomic status, substance abuse, sexual abuse, and teenage pregnancy. Findings indicate that such disadvantaged backgrounds of Malaysian adolescent students lead to failure or underachievement in their academic performance (Kuldas et al., 2015a).

During the adolescence period of life between puberty and maturity, students can be subjected to suffering from various challenges, such as neglectful or conflictual relationships with parents, teachers, friends, or peers. Although this hectic period is not necessarily universal and inevitable (Eccles et al., 1993), many Malaysian adolescent students suffer from such challenges in one way or another. Hashim (2007) contended that "Malaysian teenagers, in general, face various life challenges and experience distress. They are at risk of becoming dissatisfied and unhappy teenagers and may choose to become involved in negative activities such as gangsterism, bullying, drug abuse, sexual misconduct, and crime" (p. 112).

The majority of adolescent students who are exposed to such risk-factors in Malaysia (Tan et al., 2012) or in other countries (Doll, Jones, Osborn, Dooley, & Turner, 2011; Flouri, Tzavidis, & Kallis, 2010; Hanewald, 2011) demonstrate failure or suboptimal performance in cognitive or academic tasks. Due to the failure in acquiring and applying cognitive skills, students even without disadvantaged backgrounds may also be at risk of being unable to perform optimally in future academic or cognitive tasks. Empirical evidence indicated that students' thinking skills, especially the critical thinking, in Malaysian public institutions of secondary (Nagappan, 2000) and higher learning (Nagappan, 2010) were below the expected proficiency level. A perusal review of literature on teaching thinking skills (Kuldas et al., 2014a) argued that the suboptimal task performance of the students should not be ascribed solely to the incompetence of educators in teaching how to think. The disadvantaged backgrounds of students should also be taken into account to make a comprehensive evaluation of their task performance (Hanewald, 2011).

Disadvantaged backgrounds that increase the likelihood of an unfavourable experience or outcome are referred to as risk factor (Durlak, 1998). Risk factors are related to: (a) underdeveloped intrapersonal assets of individuals (e.g., underdeveloped interpersonal skills) (b) their family background (e.g., low socioeconomic status); (c) their school experience (e.g., academic failure); and (d) the environment in their community (e.g., lack of concern and social support). In particular, a neglectful relationship is a common risk factor. Relying on their longitudinal studies, Cicchetti and Manly (2001) and Lansford et al. (2002) concluded that children suffering from neglectful relationships are at risk of depression, delinquency, and academic failure during the period of childhood, adolescence, and adulthood.

Notwithstanding such risk factors, some students can be academically successful (Morales, 2008; Morales & Trotman, 2004). As Benard (1995) argued, such a resilience requires the promotion of intrapersonal assets, such as a sense of purpose. A sense of purpose is associated with achievement motivation, optimism, persistence, and educational aspirations. An effective way to foster such a sense is to provide at-risk students with a caring relationship (Masten, Best, & Garmezy, 1990). Caring relationships with a member in the family (siblings or parents), school (peers or teachers), and community (neighbours or friends) environment are potential protective factors (interpersonal resources), as evidenced by a growing body of literature (e.g., Abdul Kadir et al., 2012a, 2012b; Benard, 2004; Benson, Leffert, Scales, & Blyth, 2012; Doll et al., 2011; Flouri et al., 2010; Garmezy, 1985; Luthar, Cicchetti, & Becker, 2000; Masten & Coatsworth, 1998; Masten et al., 1990; Rutter, 1987; Werner & Smith, 1992). This body of literature shows that caring relationships with at-risk adolescents help them counteract risk factors, promote intrapersonal resilience assets, and stimulate towards academic success.

Hence, as Nor Ba`Yah Abdul Kadir and her colleagues (2012b) emphasised, Malaysian adolescent students who are at-risk (e.g., educational failure), require a caring relationship with an individual who helps them with love, care, and attention. A caring relationship means that an at-risk adolescent will always be under the attention of someone who genuinely cares about who he or she is (e.g., listening to him or her). At-risk adolescents need a safe relationship or environment to trust and to be trusted, to love and to be loved, to respect and to be respected, and to meet human basic needs (food, drink, and shelter), so that they can develop and demonstrate resilience (Hanson & Kim, 2007), including thinking skills.

### 1.2.2 Promoting Thinking Skills of Malaysian Adolescents

Educational endeavours are mainly aimed at moulding students into resilient learners (critical and creative thinkers, effective problem solvers) so that they can gain admittance to better living opportunities and advanced education. Resilience can be (a) the process of human development (Benard, 1991), (b) the developmental capacity with respect to individual differences in responding to risk factors (Rutter, 1990), and (c) the outcome as a quick recovery from an experienced risk factor (Hanewald, 2011). A desired change in the process, capacity, and outcome of human development requires teaching students how to acquire and apply thinking skills. Meeting their motivational needs, such as achievement-goal motivation, is also necessary (Kuldas et al., 2014c, 2015c). Thinking skills alongside motivational factors are the core internal resilience assets that need to be boosted. Thus, a variety of challenges in cognitive, emotional, societal, personal, or educational aspects human development can be ameliorated.

The promotion of thinking skills is central to the educational philosophy and policy of countries around the world, including Malaysia. The integrated curriculum for Malaysian secondary schools requires every teacher "to use teaching-learning methods and techniques which will stimulate, encourage, and develop the thinking abilities of students" (Curriculum Development Center, 1989, p. 27). The Ministry of Education Malaysia (2013) has recognised the aim of equipping Malaysian students with thinking skills (i.e., rendering them intellectually rigorous, emotionally stable, and academically resilient) as central to all their endeavours in order to actualise the vision of the national education philosophy.

To prepare public school teachers in Malaysia, a number of workshops, programmes, and short courses on critical thinking have been conducted since the 1980s; but training them in the teaching of thinking skills more explicitly started at teacher education colleges in 1994 (Nagappan, 2001). The thinking skills programme is basically adapted from a model developed by Robert Swartz and Sandra Parks at the National Centre for Teaching Thinking in Boston; therefore, it is called as the "Boston Model" in Malaysia (Educational Planning and Research Division, 1994). Instead of applying a pre-packaged curriculum or programme, the Boston Model suggests the "infusion approach" — integrating thinking skills into all teaching subjects — following four components, namely introduction to content and process, thinking about thinking, active thinking, and thinking application (Swartz & Parks, 1994). According to Swartz and Parks, these components allow the teaching of the same skills in distinct subjects at all grade levels. In order to suit the local needs, the Teacher Education Division made an additional component (i.e., consolidation and enrichment activities). All these efforts raise the question: has the objective been achieved optimally or satisfactorily?

### 1.2.3 Achievements in Teaching and Learning of Thinking Skills

Programmes and approaches for the teaching of thinking skills meet with several criticisms. On one hand, the intervention programmes are inaccessible to the majority of students (Warburton & Torff, 2005). On the other hand, by no means, they assure students of the transference of thinking skills to a new context (Kuldas et al., 2014a; Kuldas, Ismail, & Hashim, 2013). For example, a subject-specific approach to teaching problem-solving skills provides little help for how to deal with a problem but rather facilitates problem identification (Ruggiero, 1995). Hu and colleagues (2011)

designed a curriculum for teaching primary school students how to think in a specific context and how to transfer or apply the knowledge to a new context. The design was based on the strengths of the programmes and approaches as well as aimed at stimulating interest in a domain-specific subject. Nevertheless, the curriculum failed after a four-year intervention. Even most of the participants were still unable to compare and classify targeted concrete concepts. Furthermore, there was no significant effect on low achievers' performance. As Lipman (1985) argued, the subject-specific approach remains promising the skills transference.

According to Hu and colleagues (2011), the abovementioned failure is mainly due to teachers' lack of knowledge about thinking skills, particularly in teaching novice students and low achievers. A considerable number of studies suggested a similar conclusion. For instance, Stapleton (2011) and Zohar (2004) reported that most teachers, who were trained to enable students think critically, had insufficient understanding of what critical thinking means. This lack of understanding was ascribed to suboptimal performance in critical thinking skills of students from various countries, such as China (Tian & Low, 2011), Singapore (National University of Singapore, 2003), Israel (Zohar, 2008), Saudi Arabia (Al-Qahtani, 1995), and the United States (Marin & Halpern, 2011). Highlighting the required understanding, Marin and Halpern (2011) affirmed that most of the trained teachers inadequately prepare adolescent students for demands of cognitive tasks inside and outside the classroom environment.

Although the Ministry of Education Malaysia (2013) centralised the role of teachers in moulding students into critical and creative thinkers, a considerable percentage of them are inadequately trained to teach thinking skills. Nagappan (2001) described that 41% of secondary school teachers from Malaysian public educational

institutions did not receive any training, nor did training the rest of 59% bring a significant improvement on their perceptions of teaching thinking skills (i.e., beliefs in their own pedagogical knowledge, skills, and attitudes). Mahyuddin, Pihie, Elias, and Konting (2004) similarly claimed that many secondary school teachers in Malaysia are not able to effectively incorporate thinking skills in their teaching strategies. Attributable to the teachers' inadequate preparation, the secondary school students' critical thinking skills occurred below the expected proficiency level (Nagappan, 2000, 2001). Nagappan (2000) stated that "after 12 or 13 years of public education, many students are unable to give evidence of a more than superficial understanding of concepts and relationships that are fundamental to … subjects they have studied" (p. 1). Relying on more recent findings, Nagappan (2010) emphasised the need for a comprehensive review of programmes for the teaching of thinking skills in Malaysian educational institutions.

However, solely considering educators responsible for students' underachievement leads to a questionable evaluation. Casting light on the role of teachers overshadows the role of students ─ what role do Malaysian students play in their suboptimal achievement? A comprehensive or convincing evaluation of students' cognitive performance requires shedding light on negative emotional states (e.g., fear of failure), lack of motivation (e.g., low interest), and risk factors (e.g., low socioeconomic status) they experience. Other factors such, as students' perceptions and teacher-student interaction patterns, on the acquisition and application of the recommended skills need to be taken into account, too (Kuldas et al., 2014a).

As reported on undergraduate students' perspectives on the recommended cognitive skills (Devadason, Subramaniam, & Daniel, 2010; Nikitina & Furuoka, 2012), the students believe that educators alone cannot enable them to acquire and

apply knowledge and skills, as their own endeavours crucial as well in this process. However, the scarcity of evidence for such perceptions is attributable to the inconclusive evaluation of the underachievement. Nikitina and Furuoka (2012) found that the literature on the recommended skills leaves the students' perceptions largely unclear. What cognitive skills do Malaysian students perceive to be necessary for the acquisition and application? Due to the scarcity of evidence, educators provide the students with less helpful guidance on recognising what cognitive skills (assess their strengths and weaknesses) and how they can acquire and develop (Nikitina & Furuoka, 2012). As an evaluative review (Shakir, 2009) suggested, further studies are needed to identify Malaysian students with lacking in cognitive skills proficiency in order to organise special courses that would help them realise their strengths and weaknesses, and ultimately enhance their cognitive performance.

In addition, the programmes and approaches for teaching of thinking skills largely focus on the cognitive domain (e.g., metacognitive skills, self-awareness and volitional attention), thus, leave little room for the affective domain that includes desires and fears of students (Kuldas et al., 2014a). Affective factors, especially negative (e.g., sadness and hopelessness) and positive emotions (e.g., task enjoyment or hopefulness), mould teacher-student interaction patterns, thereby steering the process of teaching and learning thinking skills (Kuldas et al., 2014a). The efforts should also be aimed at stimulating student interest in the acquisition and application of thinking skills (Hu et al., 2011). Negligence of the affective domain would lead to providing educators (from Malaysian secondary and higher education) with insufficient insight into students' perspectives and teacher-student interaction patterns, thereby providing inadequate help in establishing a caring relationship with their students.

### 1.2.4  Are Malaysian Adolescents At Risk of Academic Underachievement?

In 2010, the Malaysian adolescent population (10 to19 years old) was estimated to be 5.5 million (UNICEF, 2010), while the Malaysian youth demography (15 to 25 years old) was numbered around 5.2 million (Department of Statistics Malaysia, 2010), which is approximately 19 % of the total population. Relying on the World Youth Report (2005), Abdul Kadir and colleagues (2012b) estimated that 25% of the population would be classified as at-risk youth. According to the Malaysian Youth Report (Hamzah, 2007), substance abuse and underage sexual intercourse are the most prevalent risk behaviour among the adolescents and youths.

A series of recent studies on Malaysian youths drew attention to the increased socially undesirable behaviours, such as pornography and truancy (Mey, 2009, 2010), as well as increased crime rate like drug abuse or addicts (Ghani, Zamani, Rahman, Zainal, & Sulaiman, 2008; Mohamed, Marican, Elias, & Don, 2008). This has raised the concern over juvenile delinquency (Nasir, Zamani, Yusooff, & Khairudin, 2010). Family, peer, and school environments directly or indirectly contribute to these risk behaviours. In particular, negligence, as an absence of a caregiving relationship with adolescents, is a significant risk factor underlying the development of risk behaviours. Related studies showed that most of the drug addicts started abusing substance when they were still secondary school students (Ghani et al., 2008). Malaysian teenagers perceived negative parental attitude as the factor leading to drug abuse; associating their actions with their unfulfilled needs for respect, love, and fair treatment from their neglecting parents (Low, Zulkifli, Yusof, Batumalail, & Aye, 1996). In a further research (Low, Ng, Fadzil, & Ang, 2007), Malaysian adolescent boys (13-17 years old) ascribed their involvement in sexual intercourse to tension and pressure from

family. On the other hand, another study (Zulkifli & Low, 2000) showed that adolescents who were free from parental control (i.e., living away from their parents) appeared to have more experience of sexual intercourse, which could be due to the pressure of peers or social groups. Thus, risk factors in all these cases are attributable to the absence of a caregiving relationship with parents, friends, or peer groups (i.e., the lack of external protective factors).

Talib, Mamat, Ibrahim, and Mohamad (2012) asserted that there is a considerable number of teenage pregnancy and illegitimate children in Malaysia. Concern over these social issues is growing in the country (see Low, 2009; Shahabudin & Low, 2013; Tan et al., 2012). According to reviewed studies by Talib and colleagues, 43% of youth respondents (all from the Malay community) started to have dates as early as their ages of 13-15. At the age of 16-17, 35% of them begun to kiss and caress their partners. As reported by the Health Ministry of Malaysia (Talib et al., 2012), 54% of youth participants (17-24 years old) had more than one sexual partner. Relying on further evidence obtained from the National Registration Department, Talib et al. proclaimed that around 234,647 illegitimate infants were born out of 2 million births between 2006 to 2009 years in Malaysia. Yet, the prevalence of teenage pregnancy is increasing in the country (Tan et al., 2012). The prevalence among 4500 teenagers (12-19 years old) increased to 5.4% in the state of Negeri Sembilan (Lee, Chen, Lee, & Kaur, 2006). A similar study (Anwar, Sulaiman, Ahmadi, & Khan, 2010) reported a much higher prevalence; 12.6% among 1139 students (15-20 years old), in the state of Penang alone. These risk factors are mostly attributable to neglect (e.g., family is not a source of strength or not close enough), unemployment, and lower levels of educational and socioeconomic status (Omar et al., 2010; Tan et al., 2012).

In a recent study (Nik Farid, Che'Rus, Dahlui, & Al-Sadat, 2013), the strongest predictor of underage sexual intercourse appeared to be a history of sexual abuse during the childhood of incarcerated adolescents (aged 12–19 years) in Malaysia. This was followed by past experience in alcohol and illicit drug abuse, as well as pornography. Participants of the study consisted of 1049 incarcerated adolescents from more than half of all welfare institutions within the 11 states in peninsular Malaysia. Among these adolescents, 654 with the mean age of 14 (range 8-19) reported sexual intercourse. Nik Farid and colleagues stressed that child abuse generates a deeper sense of worthlessness, and thus, associated with higher rates of depression. In a study by Abdul Kadir and Desa (2013), Malaysian female university students who suffered from depression reported an experience of physical and sexual abuse as well as parental antipathy and neglect during childhood.

Physical (e.g., slapping face, head, or ears) and emotional (e.g., threatening, insulting, or embarrassing) violence (Kasim, Shafie, & Cheah, 1994), especially sexual violence against children may be at a higher level than reported in Malaysia (Choo, Dunne, Marret, Fleming, & Wong, 2011). A total of 6.8% of 616 respondents consisting of Malaysian student nurses and medical assistant trainees, informed about their childhood experiences of sexual abuse (Singh, Yiing, & Nurani, 1996). A meta-analysis of prevalence rates of child sexual abuse across countries indicated that 8.3 % of Malaysian female respondents had suffered some form of sexual abuse before their age of 18 (Pereda, Guilera, Forns, & Gómez-Benito, 2009). This prevalence rate is, however, likely to be higher in the present time as the meta-analysis has relied on only one early study by Singh and colleagues (1996).

Kassim and Kasim (1995) found that child sexual abuse is significantly associated with family-related risk factors (i.e., neglect, unemployment, and lower levels of educational and socioeconomic status). However, the loss of some traditional values, according to which parents used to bring up their children, could also be a reason for an increase in child sexual abuse (see Lalor, 2004). Raybeck and De Munck (2010) argued that Malaysian traditional values, such as showing concern for others and the social networks within the community, are attenuated by modernisation. Raybeck highlighted that, for the first time after conducting many studies on the traditional values of Malay communities, he encountered villagers who did not know the names of their neighbours.

Traditional values could allow neighbours act on the part of parents in observing and correcting a maltreatment or abuse. According to Abdul Kadir and colleagues (2012b), a caring neighbourhood climate can be a significant predictor of socially desirable behaviour. Such a neighbourhood, moreover, may consolidate the feeling of belonging to the community. In traditional cultures advocating the neighbourhood climate, violence against others or even against oneself tend to be lower but may occur more and more as globalisation encourages the sentiments of individualism within one's values (Arnett, 1999). The loss of traditional values might be conceived as the loss of caring relationships. Choo and colleagues (2011) found that one in every three Malaysian adolescents (15-17 years old) had multiple experiences with various types of violence, which they strongly associated with the lack of caring relationship with parents as well as individuals in their schools and neighbourhoods.

These family-, community-, and individual-related risk factors are attributable to academic underachievement and dropping out of school in Malaysia (Tan et al., 2012). To protect children and adolescents against such risk factors, Nik Farid and colleagues (2013) suggested developing innovative programmes such as workshops on parenting skills to help caregivers grasp the significance of nurturing their children. For a similar suggestion, Weatherley and colleagues (2012) highlighted the paucity of comprehensive studies on the sexual abuse of children in Malaysia and drew attention to the need for a school-based sexual abuse prevention curriculum (see also Choo et al., 2011). For better innovative programmes or effective curriculum, further investigations on the sexual abuse of children as well as on the sexual tendencies of adolescents are needed. The risk and protective factors relevant to academic resilience could be considered (Kuldas et al., 2015a).

According to Hashim (2007), "the increasing social problems among teenagers in Malaysia are, in fact, a manifestation of their inability to cope with the challenges of everyday life". Therefore, "it is essential to understand the type of problems teenagers in Malaysia are facing and whether or not they are equipped with adequate coping skills to deal with these challenges" (p. 98). Hashim displayed that 34.9% out of 209 respondents (Malaysian adolescent students, 16 years old in average), experienced various forms of distress at home (e.g., disputing with siblings and parents); 31.5% at school (e.g., being in conflict with peers and teachers, being hit and embarrassed by them); and 77.0% in relation to difficulties in academic subjects (e.g., Mathematics, Physics, English Language, and History). A similar study, by Wahab and colleagues (2013), focusing on a total of 360 secondary boarding school students (16 years old in average) in Malaysia, revealed that the prevalence of stress, anxiety,

and depression was slightly higher (39.7%, 67.1% and 44.9%, respectively) compared with previous studies (see Ramli et al., 2008; Yusoff, 2010; Yusoff et al., 2011). These findings suggest that low SES (see also Ong, Chandran, Lim, Chen, & Poh, 2010), high academic pressure, and the lack of parental support are significantly linked to the risk factors that may lead to academic failure or poor performance as well as disciplinary problems at school. The inability to deal with stress alongside with socioeconomic disadvantaged backgrounds and peer pressure appeared to be the major reasons for substance use (Baharudin, Krauss, Yaacob, & Pei, 2011). Similar reasons are also attributable to underage sexual intercourse and teenage pregnancy (Tan et al., 2012).

A student may be exposed to multiple risk factors while growing up and therefore be disengaged in learning and teaching activities or be affected emotionally (hopelessness or depression) and physically (deteriorating appearance or self-harming). An at-risk student suffers from aggregated effects of multiple risk factors more than a specific risk factor (Hanewald, 2011; Masten et al., 1990). A single risk factor usually brings about the modest inhibitory effect on students' performance, academic underachievement (Appleyard, Egeland, Van Dulmen, & Srouge, 2005; Fergusson, Horwood, & Lynskey, 1994; Oades-Sese, Esquivel, Kaliski, & Maniatis, 2011). In comparison to those having multiple protective factors, students suffering from various risk factors have different needs to meet academic success. Not every educator or institution can meet all the varying needs of at-risk students. Moreover, most educators may be unaware of the inhibitory effect of risk factors or recognise resilience levels of their students; yet, those having the awareness may have little or no opportunity to control or ameliorate the effects or to deal with risk factors (Russo & Boman, 2007). An educator or educational institution may provide developmental

supports that promote academic success, but may not be able to eliminate every risk factor or the bulk of risk factors that promote failure. Due to the failure in enabling adolescent students to acquire and apply thinking skills, they can be at risk of being unable to meet challenges in cognitive tasks inside and outside the school environment.

The onset of high-risk behaviours, such as illicit drug use, among Malay Muslim adolescents is associated with family, social, and individual characteristics (Farid et al., 2016). In particular, parents' SES should be taken into account when assessing risk and protective factors among Malay Muslim adolescents (Farid et al., 2016). This link between parental SES and risk behaviours has been found among most of 1341 adolescents who were Malay Muslims from three large states of Peninsular Malaysia: Selangor, Perak, and the Federal Territory of Kuala Lumpur (Farid et al., 2016). Such findings substantiate "Problem-Behavior Theory" (Rew, 2005) that adolescents showing one type of risk behaviour are likely to engage in other types, mainly because they learn and practice various risk behaviours in their own social ecology, where risk behaviours do not occur in isolation.

### 1.2.5 Low Socioeconomic Status and Mathematics Achievements among Malaysian Adolescents

Malaysian school students' underachievement in national and international tests is a source of worry. Such an underachievement happened in the Third International Mathematics and Science Study – Repeat (TIMSS-R, 1999) as well as in the Trends in International Mathematics and Science Study (TIMSS), from 1999 (Ministry of Education, 2012) to 2011 (Mullis, Martin, Foy, & Alka, 2012). In these assessment tests, Malaysian students' performance was below the average in solving questions requiring the understanding of basic concepts. However their task performance in the 2003 cycle

indicated some improvement, their achievements in the 2007 (Ministry of Education, 2012) and 2011 cycles (Mullis et al., 2012) declined sharply.

Another source of the worry, almost 60% of students from 152 secondary schools in Malaysia, who participated in the Programme for International Student Assessment (PISA 2009+), failed to meet the minimum numerical benchmarks in mathematics (Ministry of Education 2012). A similar failure occurred in PISA 2012 with regard to proficiency levels of problem-solving skills in tackling real life problems. Almost 72% of students from 100 schools in Malaysia failed to meet the expected performance in exploring and understanding as well as representing and formulating the problem situation (OECD 2014). "The sample of schools tested in TIMSS reflects the overall performance of Malaysia's schools based on a distribution of schools by national performance band" (Ministry of Education 2012, p. 3-9). Their underachievement or failure in mathematics is hereby considered representative of the Malaysian secondary school students. Thus, for the past two decades, there has been only a promising improvement in learning and performance of mathematics among Malaysian school students (Kuldas, Sinnakaudan, Hashim, & Ghazali, 2016).

Researchers (Ghazali, Rahman, Ismail, Idros, & Saleh, 2003; Sinnakaudan, Kuldas, Hashim, & Ghazali, 2016) strongly asserted that this issue reoccurs mainly due to the fact that conventional curriculum and textbooks for mathematics teaching and learning activities in the classroom are geared toward the memorisation rather than the understanding of why and how algorithms are computed. By contrast, the Ministry of Education (2012) stated that: "Incomplete coverage of the concepts assessed in TIMSS by the national curriculum is unlikely to account for the decline" (p. 3-9), but more likely that mathematics teachers insufficiently perceive and practice the curriculum content.

However, the Ministry showed no compelling reason or evidence neither for the decline nor for the teacher perception and practice (Sinnakaudan et al., 2016). Therefore, the evaluation by the Ministry appears to be inconclusive (Kuldas et al., 2016).

Compelling evidence for Malaysian secondary school students' mathematics achievement indicates that their gender, family background, language spoken at home, educational resources and aids at home, and expected educational level have a significant influence on their achievement levels (Ismail & Awang, 2008). In other words, an implementation of mathematics curriculum is determined by social, cultural, economic, and individual factors (Chen, Li, & Yang, 2015). Example of the determinants are: (a) the extent of resources used for teaching mathematics in the classroom, (b) professional development of mathematics teachers, (c) student's motivation (Mullis et al., 2012), (d) the ability for learning mathematics (Gersten, Jordan, & Flojo, 2005), (e) the learning resources and support at home (NCTM, 2000), (f) socioeconomic status (Starkey & Klein, 2008), and (g) culture and language (Saxe, 2015). In particular, as Dyson, Jordan, and Glutting (2013) documented, most children from low-SES begin school with a very limited experience of numerical situations. By contrast, children from high- and middle-SES develop number sense earlier and therefore outperform those from low-SES in mathematics (Chen et al., 2015).

The Ministry of Education (2013) claimed that its commitment to improving academic performance of students with socioeconomically-disadvantaged backgrounds had led to some desirable achievements in international assessments of their performance. In the Malaysia Education Blueprint (2013), it is stated that:

"The impact of socio-economic status on student outcomes is less significant in Malaysia than in other systems around the world. For example, only 10% of the Malaysian variance between schools in the PISA 2009+ assessment can be explained by socio-economic factors, as compared to the OECD average of 55%, which indicates a far larger gap in most other countries. This is good news for Malaysia, as it shows that our education system is on its way to being truly equitable". (Chap. 3, p. 21)

However, a recent analysis (Saw, 2015) documented that gaps between mathematics achievements of Malaysian school children from high and low-SES in TIMSS (1999, 2003, 2007, and 2011) have rapidly widened (from 38.9 to 53.1 points). Moreover, although the Ministry aspires to provide an equitable system of education for all Malaysians, the largest gaps in achievement of equitable outcomes originate from students' SES. As noted in the Blueprint for higher education (2015), socioeconomic status still remains one of the biggest determinants of educational outcomes in primary, secondary, as well as higher education in Malaysia.

As the Ministry of Education (2013) concluded, with respect to states, districts, schools, SES, and gender, there are significant variations in performance of Malaysian students. In particular, "In terms of educational equity, socioeconomic status is still the most significant driver of variances in student outcomes, despite the government's concerted investment in financial support for students from low-income families" (MOE, 2013, Chap. 3, p. 28). "Although this is a common problem in many countries around the world, it is of the utmost importance that the education system seeks to combat the fact that a child's academic performance is often largely dependent on family income" (MOE, 2013, Chap. 3, p. 17). Notwithstanding their low SES, some students demonstrate desirable performance, but it is largely unclear, the extent to which these students' interpersonal resources and intrapersonal assets account for their academic performance. The research has provided some clarifications for this issue.

## 1.3 Problem Statement

To have resilient and intellectually rigorous students, who are critical and creative thinkers, is a central objective to educational endeavours in Malaysian secondary and higher education. However, students from Malaysian public institutions of secondary and higher learning are found to be lacking the expected proficiency level of the thinking skills (Kuldas et al., 2015a, 2015b). The evidence has indicated that educators cannot solely be responsible for this unsatisfactory result. Various risk factors, particularly socioeconomically disadvantaged backgrounds, which students suffer from, should also be taken into account. Not only the reviewed literature has confirmed that risk factors leading to failure or poor performance in academic tasks are associated with family background (e.g., low socioeconomic status and neglect), negative experience in school (e.g., a lack of caring relationship with teachers) and immediate community (e.g., lack of social support), but also the pilot study 2 has showed the association of low SES with low GPA among Malaysian adolescents.

Despite such risk factors that prevent the majority of students from succeeding, some students with the same background can demonstrate academic resilience. How Malaysian adolescent students are able to have academic resilience is unclear. Empirical data concerning how the students develop and demonstrate academic resilience has yet to be provided (Kuldas et al., 2015a, 2015b). In particular, interpersonal resources and intrapersonal assets of resilience among rural adolescents have not been studied adequately (Didkowsky & Ungar, 2017). This inadequacy disables school teachers to apply an academic resilience model for helping those non-resilient academically, thereby being unable to contribute to the achievement of educational objective (Kuldas et al., 2015a, 2015b). Therefore, how interpersonal

resources (protective factors like teachers and parents) can contribute to academic achievements need to be explored and explained further (Hashim, 2007).

Although at-risk adolescent students who demonstrate academic resilience are a minority, the question is what enables them to perform the same task better than the majority from the same background. In particular, how are Malaysian at-risk adolescent students enabled to develop and demonstrate academic resilience? This issue should be brought to light in order to develop a resilience-enhancing approach and model for those at-risk adolescents who are still non-resilient academically (Russo & Boman, 2007). This issue calls for research on identifying Malaysian adolescents who are academically resilient, thereby developing an academic resilience model. There is a need to provide a resilience-enhancing model for non-resilient Malaysian adolescents needs (Kuldas et al., 2015a, 2015b). Such a model would allow educators to meet the students' needs for enhancing thinking skills, counteracting risk factors, and demonstrating academic resilience.

Therefore, the research was aimed at the achievement of three main objectives. The leading objective was to identify interpersonal resources and intrapersonal assets of academic resilience among socioeconomically disadvantaged Malaysian adolescents. The achievement of this objective required the development of a reliable and valid scale. Given that the literature offers no standardized tool to assess academic resilience based on the sociocultural-ecological perspective, development of measurement tools that are reliable and valid across diverse adolescent populations is central to research on resilience (Pritzker & Minter, 2014). To ensure data quality, research on the determinants and associations of resilience as well as an evaluation of

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