DEVELOPMENT OF AN INFORMATION LITERACY EDUCATION MODEL BASED ON SCHOOL CULTURE MEDIATED BY MOTIVATION AND SELF-EFFICACY

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2018

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THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

FACULTY OF EDUCATION

UNIVERSITY OF MALAYA

KUALA LUMPUR

2018

UNIVERSITY OF MALAYA

ORIGINAL LITERARY WORK DECLARATION

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Registration/Matric No: PHB 1

Name of Degree: DOCTOR OF PHILOSOPHY

Title of Project Paper/Research Report/Dissertation/Thesis ("this work"):

DEVELOPMENT OF AN INFORMATION LITERACY EDUCATION MODEL BASED ON SCHOOL CULTURE MEDIATED BY MOTIVATION AND SELF-EFFICACY

Field of Study: CURRICULUM AND INSTRUCTIONAL TECHNOLOGY

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ABSTRACT

The purpose of this study was to develop an Information Literacy Education (ILE) model based on school information literacy culture created through hidden curriculum and mediated by motivation and self-efficacy. This model plays as a supporting system to support current ILE efforts with the hope to minimize the current problems of ILE faced in Malaysian schools. By utilizing the Design and Developmental Research approach (Richey & Klein, 2007), this study was conducted in three phases. Phase 1 was needs analysis phase. This phase was a mixed method research design and consisted of two stages. Stage one was a focus group discussion with school administrators. Three themes were identified from the qualitative data, they were school culture that values: (i) Information and Communication Technology (ICT) and student-centered teaching and learning, (ii) independent learning and autonomy support, and (iii) character development. Stage two was a survey involving 386 secondary school teachers. The needs analysis phase justified the need to develop the ILE model. Next, the model was then developed at Phase 2, the model development phase. The development process of the model was guided by Social Cognitive Theory and Self-Determination Theory. This phase also consisted of two stages. Stage one was the instruments development and validation. Stage two was the hypotheses development and hypothesized model development. The data were collected from 610 secondary school students. Through these processes, a hypothesized ILE model was developed. This model contained of four main constructs: The School Information Literacy Culture consisted of four factors, namely Perceived Autonomy Support, Fairness, Respect, and Activities; the Information Literacy Skills was defined as Information literacy, Independent Learning, Mutual Respect and Ethics; Motivation was operationalized through Introjected Regulation and Identified Regulation; and Self-efficacy was measured by a single factor with six items. Finally, the hypothesized model of ILE was evaluated using Partial Least Square Structural Equation Modeling (PLS-SEM) approach in Phase 3, the model evaluation phase. This phase took a three-stage approach where Stage one was model specification, Stage two was the evaluation of measurement model and Stage three was the evaluation of structural model. The measurement model was assessed on internal consistency reliability, indicator

reliability, convergent validity and discriminant validity in two levels. The first level was the first-order constructs and second level were the higher-level constructs. The results of analysis indicated that both levels of measurement models fit the data properly. The hypothesized structural model was examined in the second stage including six direct paths representing hypotheses H_1, H_2, H_3, H_4, H_5 and H_6 and three indirect paths representing hypotheses H_7, H_8 and H_9. The empirical findings indicated that all of the hypotheses were supported. Through the rigorous model development and the confirmed reliability and validity of the model evaluation, the ILE model meets the requirement of its role as a supporting system to support current ILE efforts by embedding the information literacy learning into school culture and also focusing on its influence on students' motivation and self-efficacy to enhance students' information literacy skills.

PEMBANGUNAN MODEL PENDIDIKAN LITERASI MAKLUMAT BERDASARKAN BUDAYA SEKOLAH MELALUI PENGANTARA MOTIVASI DAN EFIKASI KENDIRI

ABSTRAK

Kajian ini bertujuan untuk membangunkan model Pendidikan Literasi Maklumat (PLM) berlandaskan budaya literasi maklumat sekolah yang direka melalui kurikulum tersembunyi melalui pengantara motivasi dan efikasi kendiri. Model ini berperanan sebagai sistem sokongan untuk menyangga PLM sedia ada. Hal ini bertujuan untuk menangani masalah PLM yang dihadapi oleh sekolah-sekolah di Malaysia. Dengan menggunakan pendekatan kajian reka bentuk dan pembangunan (*Design and Developmental Research Approach*) (Richey & Klein, 2007), kajian ini dilakukan melalui tiga fasa. Fasa 1 ialah fasa analisis keperluan. Fasa ini menggunakan reka bentuk kaedah campuran yang merangkumi dua peringkat. Peringkat pertama merupakan sesi perbincangan kumpulan fokus dengan pihak pentadbir sekolah. Tiga tema telah dikenal pasti berdasarkan data kualitatif yang dikumpul. Tema tersebut ialah: (i) Teknologi Informasi dan Komunikasi (*Information and Communication Technology*) serta pengajaran dan pembelajaran berpusatkan pelajar, (ii) pembelajaran kendiri dan sokongan autonomi, serta (iii) pembangunan sahsiah. Peringkat kedua pula merupakan satu kajian tinjauan yang melibatkan 386 orang guru sekolah menengah dengan menggunakan borang soal selidik. Hasil analisis keperluan dalam Fasa 1 telah menjustifikasikan bahawa terdapat keperluan untuk membangunkan model PLM. Seterusnya, model tersebut dibangunkan pada Fasa 2 yang dikenali sebagai fasa pembangunan model dengan berkerangkakan Teori Kognitif Sosial dan Teori Penentuan Diri. Fasa ini juga merangkumi dua peringkat. Peringkat pertama ialah pembangunan dan pengesahan instrumen. Peringkat kedua pula merupakan perkembangan hipotesis dan pembangunan model hipotesis. Pengumpulan data telah dilakukan ke atas 610 orang pelajar sekolah menengah. Hasilnya, model hipotesis PLM telah dibangunkan. Model ini mengandungi empat pembolehubah utama: (i) Budaya Literasi Maklumat Sekolah yang terdiri daripada empat faktor, iaitu Sokongan Autonomi, Keadilan, Penghormatan dan Aktiviti; (ii) Kemahiran Literasi Maklumat yang terdiri daripada Literasi Maklumat, Pembelajaran Kendiri, Saling Menghormati dan Etika; (iii) Motivasi dioperasi melalui *Introjected Regulation* dan *Identified Regulation*; serta (iv) Efikasi Kendiri yang diukur melalui faktor tunggal dengan enam

item. Akhirnya, Fasa 3 merupakan satu fasa penilaian model yang menilai model hipotesis PLM dengan menggunakan pendekatan Pemodelan Persamaan Struktural dengan *Partial Least Square* (PLS-SEM). Fasa ini terdiri daripada tiga peringkat. Peringkat pertama ialah spesifikasi model, peringkat kedua ialah penilaian model pengukuran, manakala peringkat ketiga pula merupakan penilaian model struktur. Model pengukuran dinilai berdasarkan *internal consistency reliability*, *indicator reliability*, *convergent validity* dan *discriminant validity* dalam dua tahap. Tahap pertama merupakan pembolehubah tahap dasar, manakala tahap kedua pula merupakan pembolehubah tahap tinggi. Hasil kajian ini menunjukkan bahawa kedua-dua tahap model pengukuran adalah bersesuaian dengan data kajian ini. Model struktur hipotesis diperiksa di peringkat kedua termasuk enam laluan langsung yang mewakili hipotesis H_1, H_2, H_3, H_4, H_5 dan H_6 dan tiga laluan tidak langsung yang mewakili hipotesis H_7, H_8 dan H_9. Secara tuntasnya, hipotesis kajian ini adalah disokong oleh penemuan empirikal dalam kajian ini. Pendek kata, model PLM telah memenuhi keperluan peranannya sebagai sistem sokongan untuk menampung kekurangan PLM sedia ada dengan menerapkan pembelajaran literasi maklumat ke dalam budaya sekolah. Dalam hal ini motivasi dan efikasi diri pelajar untuk meningkatkan kemahiran literasi maklumat pelajar harus diberi tumpuan sepenuhnya.

ACKNOWLEDGEMENTS

This work would not have been possible without the help of many people who guided me and had faith in me in this process. I wish to acknowledge the support and encouragement of many individuals throughout the educational process of my PhD study.

My heartiest thanks and appreciation to my supervisor, Prof. Dr. Saedah Siraj for her kind, important advice and guidance throughout the entire process. Her encouragement was invaluable. A special note of appreciation goes to my co-supervisor, Dr. Nabeel Abdallah Abedalaziz for his expertise, guidance and support given especially in the early stage of my research. I would like to thank all of the members of my thesis committee for their detailed input which has improved my work.

I am grateful to the Malaysia Ministry of Higher Education for granting me the MyPhD Scholarship in conducting this research. My special acknowledgement goes to all the experts, schools, principals, teachers and students who were willing to take part in my present study. Thank you for your active participation and valuable feedback that contributed to the results in the study.

Last but not least, my sincere thanks and love to my husband Hong Tat ,whose words of encouragement were never silent and whose belief in me never ceased. I would like to thank my three sons Kai Jie, Kai Cong and Kai Yu who were so independent and supportive, and I am thankful also to my parents, brothers, sister and sister-inlaw who have been supporting me in numerous other ways.

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LIST OF ABBREVIATIONS

CET	:	Cognitive Evaluation Theory
DDR	:	Design and Development Research
IL	:	Information Literacy
ILE	:	Information Literacy Education
ILSC	:	Information Literate School Community
LMT	:	Library and Media Teacher
OIT	:	Organismic Integration Theory
PLS	:	Partial Least Square
PLS-SEM	:	Partial Least Square-Structural Equation Modeling
SCT	:	Social Cognitive Theory
SDT	:	Self-Determination Theory
SEM	:	Structural Equation Modeling
SRC	:	School Resource Center

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CHAPTER 1 INTRODUCTION

Introduction

21st century is an era of accelerating change, students in this information age are highly immersed in a digital environment, and they are more familiar with a world which is dominated by changing technologies. The most obvious difference between the older generation of educators/parents, and their students/children is that members of the older generation were all born and grew up in the "Industrial Age," while their students and children were born in and are growing up in the "Information Age." The result of this significant difference is the culture and attitude gap that exists between educators and their students (Prensky, 2001). Prensky (2001) describes those born after 1980, following the introduction of digital technology, as "digital natives". Since they were born in the digital age, they are surrounded by digital technology from early childhood to later stages of their lives (including in their daily learning and leisure/entertainment activities). On the contrary, most educators and parents who were born before the Information Age have become "digital immigrants" (Prensky, 2001). In most situation in the school settings, while students' brains have been rewired to connect to the world of rapid change, educators still carry most of the practices of teaching and learning from the past. This scenario is clearly observed by Howard Gardner. Gardner (2006) in his book *Five Minds for the Future* reminds us, that current formal education still prepares students for the world of past, not for the world of future. He criticizes that we acknowledge the importance of science and technology, but do not teach scientific ways of thinking, and we understand the factors of globalization but have not made much efforts in preparing students so that they can survive in the world which is very much different from anything we could imagine (Gardner, 2006).

The similar voice is raised by the Organization for Economic Cooperation and Development (OECD) Education Directorate's Andreas Schleicher (2011):

> A generation ago, a teacher could expect that what they taught would last their students a lifetime. Today, because of rapid economic and social change, schools have to prepare students for jobs that have not yet been created, technologies that have not yet been invented, and problems that we don't yet know will arise. (Schleicher, 2011, p. 2)

How can educators prepare students for jobs that do not exist yet, to manage ever changing technologies, or deal with a flood of information and solve any problem they will confront with in their future work life? All of these require educators to think in terms of educating students to prepare them for the "unknown," rather than just supplying them with content or knowledge that they may never need or encounter again in a significant way in their lives. If the key skills of workers in the Industrial Age are hardworking, following directions, getting along with other, and being professional; the workers in this Information Age would need the ability to think deeply about issues, able to reason and make decision critically, solve problem creatively, work in team, communicate clearly through all sorts of media, to be flexible, to take initiative and lead when necessary, able to learn ever-changing technologies, deal with a flood of information and to produce something new and useful.

In his 1970 book, *Future Shock,* Alvin Toffler (1970) cites the view of Herbert Gerjuoy, whom he interviewed about future education:

> The new education must teach the individual how to classify and reclassify information, how to evaluate its veracity, how to change categories when necessary, how to move from the concrete to the abstract and back, how to look at problems from a new direction—how to teach himself. Tomorrow's illiterate will not be the man who can't read; he will be the man who has not learned how to learn. (Toffler, 1970, p. 271)

With this in mind, a key focus of teaching and learning in this century would actually be about "skills" that would enable students to become "information literate" and "independent lifelong learner". 21st century educators need to understand the fact that the education context has changed due to the information explosion and the fast rate of technological change, therefore, schooling needs to be reconfigured, changes must be made in terms of the way we conduct school, the emphasis of school curriculum and the way we orchestra learning to better prepare our students to be successful in the Information Age.

Background of the Study

Many information literacy initiatives and programs, such as the formulation of guidelines, standards, teaching strategies, and the development of information literacy models, can be found in developed countries such as the United States, the United Kingdom, Australia, and New Zealand. In the United States, there are different information literacy guidelines and standards intended for primary, secondary and college students. For example, the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) in their landmark publication in 1998, *Information Power: Building Partnerships for Learning,* includes the full content of Information Literacy Standards for Student Learning. According to the characteristics of primary and secondary students, the set of standards describes three main categories, namely Information Literacy, Independent Learning and Social Responsibility. Each of these categories is further divided into 3 standards which contain 3 to 5 indicators and sum up with 29 indicators (Librarians & Communications, 1998). Moreover, information literacy became part of the national agenda for U.S. schools and was integrated as a goal into their educational technology plans in December 2000 (Virkus, 2003).

The development of information literacy education in Southeast Asia has been relatively slow, compared to western and European countries. In 2004, a project for the development of information literacy education through school libraries in Southeast Asia, funded by UNESCO's *Information for All Program*, used a survey to examine the then-current state of information literacy education in Southeast Asia. Countries involved in the survey included Cambodia, Indonesia, Laos, Malaysia, the Philippines, Thailand, and Vietnam. According to the project report, obstacles to school library development that was related to information literacy education included

(among others): Low literacy rate, classroom shortage, shortage of trained classroom teachers, shortage of trained teacher-librarians, limited school library collections, small or no budget for school libraries, lack of awareness among senior Ministry of Education officials about the role of school library programs, information literacy concept, shortage of space, limited facilities/equipment, and few guidelines on how to integrate information literacy into regular teaching programs (Singh, 2005). In short, much effort needs to be carried out to promote information literacy education in this region.

In Malaysia, the implementation of information literacy education in public schools is normally led by the school library or School Resource Center (SRC). An School Resource Center is run by a full-time teacher librarian known as a Library and Media Teacher (LMT). The duties of an Library and Media Teacher include (1) administrative matters, (2) organization of information resources, and (3) reading guidance and information literacy (Malaysia Selangor State Educational Technology Division SETD, 2007). Hence, the Library and Media Teacher is expected to help teachers and students to acquire information literacy skills and to ensure the implementation of information literacy education in the school. In practice, however, aside from the problems of the School Resource Centers described in the UNESCO report previously mentioned, the Library and Media Teachers actually face many other challenges in carrying out their duties. According to Shyh Mei Tan and Singh (2008), 60% of the Library and Media Teachers that participated in their study claimed that they were not exposed to or trained in information literacy. This finding is similar to that in a report of the Ministry of Education (2006), which indicated that about 70% of teachers were untrained in information literacy. Shyh Mei Tan and Singh (2008) also found that 61.9% of the Library and Media Teachers did not teach information

literacy in the School Resource Centers due to the lack of a framework and curriculum resources, lack of a time allocation in their timetables, and uncertainty about whether information literacy should be taught as a separate subject or integrated into their taught subjects.

The later findings by Shyh Mee Tan (2014) regarding the readiness of school librarians to implement information literacy in schools, and the identification of factors influencing the implementation of information literacy in Malaysian schools, indicated that the professional qualifications of school librarians have an impact on their cognitive, functional, and technical readiness, whereas, their experience as school librarians has a significant impact on technical readiness only.

Inspired by Henri (2000) on the idea of Information Literate School Community (ILSC) which refers to "a school community that places a high priority (policy, benchmarking, funding and evaluation) on the pursuit of teacher and student mastery of the processes of becoming informed," Abrizah Abdullah (2008) suggested a way of building an Information Literate School Community through the "Digital Library" approach. The author demonstrated on how to implement this idea through students' history project to inculcate information literacy skills. This seems to be a reliable approach in creating an Information Literate School Community, but again, as put forward by the author, the teacher librarians need to play their pivotal role to ensure resource-based learning is a major focus and is included in the school's curriculum plan, as well as planning a whole school approach to information literacy instruction (Abrizah Abdullah, 2008). This is not so easy for Library and Media Teachers if the school leadership do not take initiative or support this idea. Considering the current

situation of Library and Media Teachers, much effort needs to be done to make this approach a realization.

Numerous studies suggested that one of the applicable approaches to information literacy education is through inquiry-based approach such as project-based learning, problem-based learning or resource-based school project (Abdullah, 2007; Bruce, 1997; Buchanan, Harlan, Bruce, & Edwards, 2016; Maybee, 2013). To shed more light in this area, Halida Yu, Siti Arpah Noordin, Sobariah Awang Mukhtar, and Abrizah Abdullah (2011) conducted a case study research aiming at better understanding the integration of information literacy through school project assignment in Malaysian secondary school. Their findings revealed that the project assignments given to students are more of superficial and fact-finding exercise rather than a meaningful researching task or problem solving learning activities (Halida Yu et al., 2011). This is in line with the findings from document analysis of students' project by Abrizah Abdullah (2008) that most of the reports are mere recitation of information. The main reason is that "the teachers work hard to ensure that their students get maximum scores in the project assignment by sharing with their students the project 'scoring criteria' or marking scheme which is meant to be for teachers for project assessment purposes" (Halida Yu et al., 2011, p. 95).

Apparently, what have learned by the students in this process were not the information literacy skills but more on how to get a higher grade. Although the type of project-based learning is claimed to be effective in training students to be equipped with information literacy skills, empirical findings from Abrizah Abdullah (2008) and Halida Yu et al. (2011) pointed out one key issue in information literacy education, that is educators need to be aware of the effect of hidden curriculum that emerged in

the process of teaching and learning. In fact, if the teachers understand the usefulness of hidden curriculum and manipulate it in the project-based learning across curriculum, students will have lots of opportunities to engage in the research process and acquire the information literacy skills implicitly.

While most of the studies of information literacy education in Malaysia were focused on the role, limitations and problems faced by School Resource Centers and Library and Media Teachers, a study of factors affecting the implementation of information literacy education in primary schools by Saidatul Akmar Ismail (2014) indicated that the problems were associated with individual, organizational, and social and cultural factors. This qualitative case study research identified the individual factors that caused the problems such as limited information literacy training, facilities and resources, time pressures and heavy workloads. Due to these obstacles, teachers were not willing to apply the student-centered approach which is more conducive to information literacy skills acquisition. According to the study, organizational factors include three perspectives, first is the insufficient funding for facilities, equipment and maintenance, large class sizes, and limited training opportunities. Second is the training and education of information literacy for teachers and Library and Media Teachers were not seriously planned and were not systematically performed. The third finding is the lack of essential components for the implementation of information literacy education, such as the content, the structure, and the needed time allocation. The author described the social and cultural factors as implicit factors that are the hidden dimensions of local culture based on the collective values and norms.

On the whole, very limited research has been carried out in Malaysia to date to enhance information literacy education in the school level, especially from other

educational perspectives. The researcher in this study proposes that the issues surrounding it should be viewed from a broader perspective and the responsibility of promoting information literacy education should be shared among the members in school rather than limited to the concern of libraries or librarians. The issues should be the concern of everyone in the teaching process so that the students will be well prepared for the future.

In this era of information overload, information literacy is an essential skill and is a prerequisite for lifelong learning education. That is to say, the advent of Information Age requires schools to train students to become information literate lifelong learners. This idea should be recognized and shared by all the stakeholders in the school settings and it should be promoted and embedded as part of the school culture. Moreover, as Webber, Johnston, Walton, and Pope (2006) states, "Indeed personal information literacy cannot be developed fully without support from the external environment,…"(p. 42). We must allow this idea to be in the forefront of our thoughts as we examine ways to enhance students' information literacy skills. What are the characteristics of school culture that have positive effect on information literacy education and how does it work? Perhaps the suggestions by P. Brown (2015) on how school can direct the school culture through hidden curriculum will provide us some ideas. According to Brown, within the school culture, the hidden curriculum is embedded in the day-to-day operations of a school. He states that "the culture of a school helps shape the perceptions of young adolescents as they relate to their education. As educators, we must continue to be vigilant about what happens within our schools" (P. Brown, 2015, p. 8). This can be done by examining the educator's perceptions of young adolescents, the student opportunities to bridge connections, through the mission, vision, and goals of the school, the priorities of adults within the

school and the stability of school leadership. “As educators make it a priority to examine their school culture through the hidden curriculum, changes can be made that promote a positive school environment in which young adolescents have a desire to be present and learn” (P. Brown, 2015, p. 9). Similarly, if our intention is to promote information literacy education, cultivating a school information literacy culture through hidden curriculum to create a positive school environment that is conducive to teaching and learning of information literacy will be a sound approach.

During the process of schooling, students are usually engaged with two types of curriculum. One is the formal (or official, or mandatory) curriculum consisting of courses, lessons, learning activities, and knowledge and skills that teachers intentionally convey to students. It is public and meant to be explicit. In a normal situation, students will experience the learning process consciously. On the other hand, there are also some unstated outcomes of education that students experience and learn during their schooling. The outcomes are part of a curriculum known as the “hidden curriculum” (Kentli, 2009; Margolis, 2001; Martin, 1976; Nami, Marsooli, & Ashouri, 2014; Palermo, 1999; Portelli, 1993). Dewey (1998), in his book *Experience and Education*, mentioned the idea of “collateral learning,” which is very similar to the concept of hidden curriculum:

> Perhaps the greatest of all pedagogical fallacies is the notion that a person learns only the particular thing he is studying at the time. Collateral learning in the way of formation of enduring attitudes, of likes and dislikes, may be and often is much more important than the spelling lesson or lesson in geography or history that is learned. For these attitudes are fundamentally what count in the future. (Dewey, 1998, p. 49)

Bloom (1972) in his notable article, “Innocence in Education”, asserted that it is essential to understand the influences of hidden curriculum in educational practice,

for this implicit curriculum may have a superior impact on educational outcomes compared to explicit curriculum.

Educators need to understand the importance and the influence of the hidden curriculum in their own classes because effective education can only take place when the hidden curriculum is intentionally designed rather than unintentionally accepted (Shaw, 2006). One way to harness the hidden curriculum is to make it explicit and visible, "once revealed, the hidden curriculum becomes negotiable and visible to all participants including teachers, students and society in general. Exposure, in turn, allows for remediation, change, defense, and improvement ..." (Anderson, 2001, p. 30).

School culture can be defined as encompassing all aspects of school environment- the symbols, customs, values, moral, beliefs, rituals, language and knowledge of the people within the school teachers, administrators, other staff, and students, as well as the families and community adults connected to the school in some way (Anfora, Andrews, & Mertens, 2005), and normally this is the impression that we get when visiting a school. How to create a healthy and positive school culture that is conducive to the teaching and learning of information literacy? This can be done by shaping the school culture through hidden curriculum to become a school information literacy culture, for example, when the school administrators deliberately revise the existing structures and procedures in such a way that they express the importance of school to implement information literacy education. Teachers value the important of information literacy by carrying out the process of teaching and learning based on student-centered approach and reflective practices. Teachers can also motivate students to be independent learners through the way they teach and relate to others. It

is believed that if we deliberately design and shape the school culture through hidden curriculum, the positive implicit influence of hidden curriculum on student learning such as the increase of self-efficacy, the decrease of anxiety, the stimulation of the interest and motivation, the correctness of the attitude and the empowerment of students' goals in learning, all of these can enhance the students' information literacy skills.

Rationale of the Study

Table 1.1 shows the current issues, research gaps and rationale of the study of information literacy education in Malaysian schools:

Table 1.1

The Current Issues, Research Gaps and Rationale of the Study of Information Literacy Education in Malaysian Schools

Current Issues	**Research Gaps**	**Rationale of the Study**
-LMTs is mandated to lead the information literacy education in school, yet they receive limited support from various parties including Ministry of Education, schools and teachers (Shyh Mee Tan, 2014; Shyh Mei Tan & Singh, 2008). -Project-based learning approach supports information literacy education but if implemented wrongly, there is possible negative influence of hidden curriculum in the process of teaching and learning (Abrizah Abdullah, 2008; Halida Yu et al., 2011). -Individual, organizational, and social and cultural factors need to be taken into account in implementing information literacy education (Saidatul Akmar Ismail, 2014).	-Limited research explores the affective domain such as the effects of motivational beliefs on students' information literacy skills acquisition (Cahoy & Schroeder, 2012; Fourie & Julien, 2014; Julien, McKechnie, & Hart, 2005; Mariam L. Matteson, 2014). -Lack of study investigates the influence of school culture shaped by hidden curriculum on information literacy skills acquisition (Bayanfar, 2013; P. Brown, 2015; Cubukcu, 2012; Jeh-Lou & Chang, 2004; Sosu, 2016; Yaghoob Nami, 2014). -Most of the studies employed either qualitative or quantitative research design (G. T. Brown, 2005; Cahoy, 2004; Cahoy & Schroeder, 2012; Edzan, 2008; Johnston, 2003; Kathleen L. Spitzer, 1998).	-Information literacy education should be the concern of everyone in the education. -Needs to design a whole school approach model as complement of current Information literacy education. -Shaping school culture through hidden curriculum is evidenced to influence student achievement and thus worthy to investigate its relationship to information literacy skills acquisition. - Study of affective domain of information literacy skills acquisition such as motivation and self-efficacy will help to fill current literature gap. -Design and Development Research design (DDR) can fill the gap in the research design of information literacy study.

As indicates in Table 1.1, the current issue of Information literacy education in Malaysian schools is the expectation towards Library and Media Teachers (LMT) to lead the Information literacy education in the school, but in practice, they receive very limited support from various parties including Ministry of Education, school and teachers (Shyh Mee Tan, 2014; Shyh Mei Tan & Singh, 2008). This is the major obstacle to the success of Information literacy education in Malaysian schools. The government initiatives to restructure the education system by introducing project-based learning approach in various subjects especially in the secondary school level, can be seen as part of their approach to move away from relying heavily on rote learning to application of knowledge and skills. Nevertheless, if teachers are not aware of the hidden messages or intention behind it, the positive hidden curriculum may turn to negative one (Abrizah Abdullah, 2008; Halida Yu et al., 2011). Studies suggested that individual, organizational, and social and cultural factors need to be taken into consideration in implementing Information literacy education (Saidatul Akmar Ismail, 2014).

From the literature, the researcher identified two major area of gaps in Information literacy education research in Malaysian schools. Gaps from the empirical study includes limited research explores the affective domain such as the effects of motivational beliefs on students' information literacy skills acquisition (Cahoy & Schroeder, 2012; Fourie & Julien, 2014; Julien et al., 2005; Mariam L. Matteson, 2014), and to the best of the researcher's knowledge, lack of study investigates the influence of school culture shaped by hidden curriculum on information literacy skills acquisition (Bayanfar, 2013; P. Brown, 2015; Cubukcu, 2012; Jeh-Lou & Chang, 2004; Sosu, 2016; Yaghoob Nami, 2014). Another gap is from the research design perspective that most of the studies employed either qualitative or quantitative research

design (G. T. Brown, 2005; Cahoy, 2004; Cahoy & Schroeder, 2012; Edzan, 2008; Johnston, 2003; Kathleen L. Spitzer, 1998). The researcher suggests that Information literacy education should be the concern of everyone in the educational settings, and there is a need to design a whole school approach model as complement of current information literacy education. Shaping school culture through hidden curriculum is evidenced to influence student achievement and thus it is worthy to investigate its relationship to information literacy skills acquisition. Furthermore, study of affective domain of information literacy skills acquisition such as motivation and self-efficacy will help to fill current literature gap. Last but not least, the Design and Development Research (DDR) (Richey & Klein, 2007) approach where the researcher plans to utilize focus group discussion and survey in the needs analysis phase; students survey research methods in the model development phase, and Partial Least Square Structural Equation Modeling (PLS-SEM) method in the model evaluation phase, can fill up the gap in the research design of information literacy study.

Problem Statement

The goal of information literacy education is to foster students who are on their way to becoming independent and self-directed lifelong learners (Association, 1989; Breivik, 2005; Bruce, 2004; Doyle, 1992). That means, we should emphasize on how learning is understood and experienced by students themselves. Here, the affective domain of students' learning become essential. Most of the studies in information literacy emphasized on the cognitive domain of information literacy. For example, Julien et al. (2005) conducted a content analysis of articles published between 1999 and 2003, to analyze systems work in library and information science to determine the relative interest in affective issues. Their findings indicated that library and information science systems pay little attention to affective variables (Julien et al., 2005).

Recently, there is growing trend in research that proposes that it is also crucial to emphasize the affective domain in information literacy skills acquisition (Cahoy, 2004; Cahoy & Schroeder, 2012; Fourie & Julien, 2014; Miriam L Matteson, 2013; Nahl & Bilal, 2007; Schroeder & Cahoy, 2010). For instance, the American Association of School Librarians (AASL, 2008) *Standards for the 21st-Century Learner* clearly states that to be independent learners, acquire information skills alone are not sufficient, students must also need to gain "disposition" to use those skills, and able to use them in a responsible manner and have the ability to reflect on their own learning (AASL, 2008). AASL defines disposition as "the learning behaviours, attitudes, and habit of mind, that transform a learner from one who is able to learn to one who actually does learn" (AASL, 2008, p. 2). Arnone, Reynolds, and Marshall (2009) concluded that "disposition" includes students' confidence in information-

seeking abilities and students' intrinsic motivation to use these skills to engage in research for either school or personal interests"(Arnone et al., 2009).

Cahoy and Schroeder (2012) identified models for embedding affective learning outcomes within information literacy instruction, and provided strategies to help librarians discover, articulate, and address students' self-efficacy, motivation, emotions and attitudes. Crow (2007) argued that intrinsic motivation is the foundation for a desire to learn and find information independently, it is the heart of information literacy. Serap Kurbanoglu (2003) on the other hand, asserted that it is equally important to possess information literacy skills and attainment of high sense of self efficacy beliefs which enable individuals to have confidence in using information literacy skills and suggested that research should be conducted on the psychological factors that affect the development of student's perceived self-efficacy for information literacy. Nevertheless, there is still considerable ambiguity with regard to the source or factors affecting the motivation and self-efficacy in the information literacy skills acquisition.

To the best of the researcher's knowledge, it has not yet been established whether cultivating school information literacy culture through hidden curriculum plays any significant role in the information literacy skills acquisition. In this study, the researcher puts forward the claim that by cultivating a school information literacy culture through hidden curriculum, this culture can be the source of motivation and self-efficacy of students' learning and plays a significance role in information literacy skills acquisition. Therefore, this study tends to develop an information literacy education model by investigating the relationship between school information literacy culture and student's information literacy skills acquisition. In addition, motivation

and self-efficacy are introduced as mediating variables to examine if these two variables have any mediating effect on the relationship between school information literacy culture and information literacy skills acquisition.

Figure 1.1 illustrates the hypothesized relationship among school information literacy culture, motivation, self-efficacy and information literacy skills acquisition.

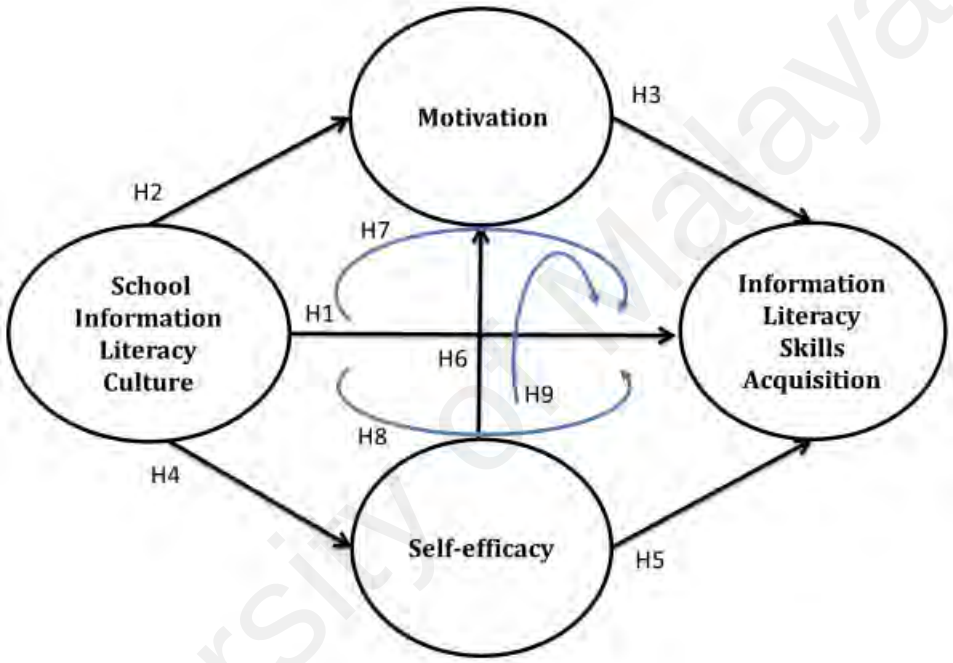


Figure 1.1. The hypothesized relationship among school information literacy culture, motivation, self-efficacy and information literacy skills acquisition

This hypothesized model of information literacy education can be developed and evaluated by using Design and Development Research (DDR) approach, and this model could serve as a support system to assist current information literacy education in Malaysian secondary schools.

Purpose of the Study

The general purpose of this study is to develop an information literacy education model based on school information literacy culture created through hidden curriculum and mediated by motivation and self-efficacy.

Objectives of the Study

The main objective of this study is to design and develop an information literacy education model based on school information literacy culture where the students' motivation and self-efficacy are taken into account. This study utilizes Design and Development Research (DDR) approach founded by Richey and Klein (2007) to design and develop the model. Based on the design of this study, there are three phases involved in a design and development research. The phases are: the needs analysis phase, the model development phase, and the model evaluation phase. The objectives of each phase are as described:

Phase 1: Needs Analysis Phase

The aim of this phase is to understand teachers' perceptions regarding whether there is a need to develop an information literacy education model, and what aspects of school culture shaped by hidden curriculum can be used to develop the information literacy education model. There are two stages in this phase. Prior to design and develop a set of instruments intended to explore teachers' perceptions, it is essential to clarify the concept and dimensions of "school culture shaped by hidden curriculum". The research objective for the first stage is:

1.1 To identify the concept of "school culture shaped by hidden curriculum".

1.2 To identify the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition.

The research objectives for second stage are as following:

1.3 To identify teachers' perceptions on their students' information literacy competence.

1.4 To identify teachers' perceptions on the problems of the implementation of information literacy education in schools.

1.5 To identify teachers' perceptions on the needs and feasibility of developing an information literacy education model based on school culture shaped by hidden curriculum.

1.6 To identify teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used to develop an information literacy education model.

Phase 2: Model Development Phase

This phase explains the process on how a conceptual or hypothesized information literacy education model is developed. The objectives of this phase are:

2.1 To identify the factors of school information literacy culture as perceived by Malaysian secondary school students.

2.2 To identify the underlying factors of information literacy skills for measure Malaysian secondary school students' information literacy competence.

2.3 To identify the factor structure of Academic Self-Regulated Questionnaire (SRQ-A) and determine whether it is reliable, valid and suitable for the use of Malaysian secondary school students.

2.4 To determine whether the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale is reliable, valid and suitable for the use of Malaysian secondary school students.

2.5 To propose a hypothesized model of information literacy education for further evaluation.

Phase 3: Model Evaluation Phase

This phase utilizes Partial Least Square Structural Equation Modeling (PLS-SEM) approach to evaluate the hypothesized information literacy education model by investigating the relationship between school information literacy culture and student's information literacy skills acquisition. In addition, motivation and self-efficacy are introduce as mediating variables to examine if these two variables have any mediating effect on the relationship between school information literacy culture and information literacy skills acquisition. The aim of this phase is to evaluate the information literacy education model based on the objectives as following:

3.1 To investigate the causal relationship between school information literacy culture and information literacy skills acquisition.

3.2 To investigate the causal relationship between school information literacy culture and motivation.

3.3 To investigate the causal relationship between motivation and information literacy skills acquisition.

3.4 To investigate the causal relationship between school information literacy culture and self-efficacy.

3.5 To investigate the causal relationship between self-efficacy and information literacy skills acquisition.

3.6 To investigate the causal relationship between self-efficacy and motivation.

3.7 To investigate the mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.

3.8 To investigate the mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.

3.9 To investigate the mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.

Research Questions

Based on the aims of the study, objectives of the study and the problem statement, the research questions for the study are formulated according to the three phases based on the Design and Development Research (DDR) approach.

For Phase 1, the needs analysis phase, the research questions for the first stage are:

1.1 What is the concept of "school culture shaped by hidden curriculum"?

1.2 From the hidden curriculum perspective, what are the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition?

The research questions for second stage are:

1.3 What are teachers' perceptions on their students' information literacy competence?

1.4 What are teachers' perceptions on the problems of implementing information literacy education in schools?

1.5 What are teachers' perceptions on the need and feasibility of developing an information literacy education model based on school culture shaped by hidden curriculum?

1.6 What are teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used in developing an information literacy education model?

Phase 2 is the model development phase. In developing the information literacy education model, the model development phase seeks to answer the following research questions:

2.1 What are the factors of school information literacy culture as perceived by Malaysian secondary school students?

2.2 What are the factors of information literacy skills for Malaysian secondary school students?

2.3 What is the factor structure of Academic Self-Regulated Questionnaire (SRQ-A) and is it reliable, valid and suitable for the use of Malaysian secondary school students?

2.4 Is the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale reliable, valid and suitable for the use of Malaysian secondary school students?

2.5 What is the hypothesized model of information literacy education for further evaluation?

Phase 3 is the evaluation phase for the proposed information literacy education model via Partial Least Square Structural Equation Modeling (PLS-SEM) approach. Thus, the evaluation phase aims to answer the following research questions:

3.1 Is there a causal relationship between school information literacy culture and information literacy skills acquisition?

3.2 Is there a causal relationship between school information literacy culture and motivation?

3.3 Is there a causal relationship between motivation and information literacy skills acquisition?

3.4 Is there a causal relationship between school information literacy culture and self-efficacy?

3.5 Is there a causal relationship between self-efficacy and information literacy skills acquisition?

3.6 Is there a causal relationship between self-efficacy and motivation?

3.7 Is there a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition?

3.8 Is there a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition?

3.9 Is there a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition?

Research Hypotheses

The formulation of the research hypotheses below is driven by the research questions 3.1 to 3.9:

H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.

H_2: There is a causal relationship between school information literacy culture and motivation.

H_3: There is a causal relationship between motivation and information literacy skills acquisition.

H_4: There is a causal relationship between school information literacy culture and self-efficacy.

H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.

H_6: There is a causal relationship between self-efficacy and motivation.

H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.

H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.

H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.

Significance of the Study

The focus of this study is to develop an information literacy education model by investigating the influence of school information literacy culture created through hidden curriculum on students' information literacy skills acquisition and determining whether motivation and self-efficacy play mediating roles on the relationship between these two variables. This study is significant because it is timely and relevant to the initiatives undertaken by Ministry of Education Malaysia to enhance Information and Communication Technologies (ICT) education and connectivity in schools. In addition, the development of this information literacy education model can play as a supporting system to support current information literacy education implementation. Furthermore, the results of this study could be highly significant and beneficial specifically to the following stakeholders:

i. The school's leaders and administrators

The information literacy education model developed in this study will benefit the school's leader and administrators by providing information as to what factors should be considered as a basis of formulating their strategy plan to promote information literacy education.

ii. The Library and Media Teachers

As discussed earlier, in Malaysian school, the Library and Media Teachers are mandated to lead the information literacy education in schools, yet they receive limited support from various parties including Ministry of Education, schools and teachers (Shyh Mee Tan, 2014; Shyh Mei Tan & Singh, 2008). The new information literacy education model requires everyone in the education sectors play their roles by focusing

on the non-academic aspects of school life and embedding the information literacy learning in the school culture, by doing this, it can minimize the constrains and problems faced by Library and Media Teachers discussed in previous studies.

iii. The students

Students will be directly involved in this study. By creating a positive school environment which is conducive to the teaching and learning of information literacy, students will have lots of opportunities to practice and engage in the path of becoming information literate and independent lifelong learners.

iv. The educational and information literacy literature

This study is significant to the education and information literacy literature by deriving a new information literacy education model which provides a mechanism to understand how to investigate a school information literacy culture through hidden curriculum, and its influences on students' motivation, self-efficacy, as well as information literacy skills. Additionally, the study also provides a new framework and different methodology for the study of information literacy education. The Design and Developmental Research (DDR) approach provides school administrators with reliable methods to measure various constructs and factors that contribute to information literacy education. With this, it also helps to bridge the research methodology gap in the information literacy literature.

Limitations of the Study

One of the limitations of this study is that the development of this model is to serve as a complement to support current information literacy education and not to replace current information literacy education implementation, therefore unlike other information literacy education model, it is not aimed to propose a model that teaches information literacy skills directly. In addition, the influence of school culture on student information literacy skills acquisition may take a longer period to assess the effectiveness.

Another limitation of this study is that 386 Independent Chinese secondary school teachers and 610 students from four states in Malaysia (Pahang, Negeri Sembilan, Selangor and Federal Territory of Kuala Lumpur) were chosen as the study's sample because this type of school is considered as private schools and is not under the jurisdiction of the public education system, thus the mandatory of Library and Media Teachers to implement information literacy may not be followed in this type of school, the response from these teachers and students may provide a bigger picture of the implementation of information literacy education in the secondary schools. Therefore, purposive sampling is used to select participants in this study. However, a limitation may occur due to the possible shortcomings in translating the results of data analysis (especially the qualitative part) into English since the data will be collected in Chinese language. The researcher uses member checking method to ensure the trustworthiness of the data.

Definition of Terms

The researcher defines a few important terms which are the keywords and these will be used frequently in this study as follows:

Information Literacy (IL)

In this study, the term "Information Literacy" refers to the ability of a person who does not just know the technology know how, he/she also has the ability to recognize what or when information is needed, and is able to initiate search strategies to locate and access necessary information appropriately in all types of media (including electronic or print sources), gather and use information ethically, and use social tools responsibly and safely.

Information Literacy Education (ILE)

According to Andretta (2005), ILE refers to a process of teaching and learning of IL based on learner centered approach and reflective practices (Andretta, 2005). In the case of Malaysia, in order to achieve national unity, the pluralistic nature of Malaysia requires all members of the society to have qualities of mutual respect and tolerance. Therefore, in this study, ILE not only refers to the kind of pedagogical approaches that nurture students' "information knowledge", "information ability" and "communication and collaboration", it also refers to the process of creating social environment that nurture students' "information consciousness", and "moral and values" in the world of information overload.

School Culture

According to Peterson and Deal (1998), school culture covers the "norms, values, beliefs, traditions, and rituals that has built up over time as people work together, solve problems, and confront challenges. This set of informal expectations

and values shapes how people think, feel, and act in schools" (Peterson & Deal, 1998, p. 28). In Bloom's Taxonomy, "values" is one of the component in the affective domain (Krathwohl, Bloom, & Masia, 1964). That is to say, school culture is what school "does" in their everyday interaction among the members in the school community. Another term which is closely related to school culture is school climate which refers to the social atmosphere of a school setting in which students have different experiences, depending upon the protocols set by the teachers and administrators (Hoy, Smith, & Sweetland, 2002). Therefore, school climate can be seen as the "feeling" of school environment that results from school cultural practices, it depends on what school "does". For the purpose of this study, these two terms are interchangeable along the writing of this study.

Hidden Curriculum

The hidden curriculum refers to the kinds of learning [that] children derive from the very nature and organizational design of the public school, as well as from the behaviors and attitudes of teachers and administrators (Longstreet & Shane, 1993). Portelli (1993) identified four major meanings of hidden curriculum in the curriculum discourse: (a) as the unofficial expectations, or implicit but expected messages; (b) as unintended learning outcomes or messages; (c) as implicit messages arising from the structure of schooling; and (d) as created by the students (Portelli, 1993, p. 345). For the purpose of this study, hidden curriculum refers to the educational experiences that students gained within the culture that every individual school created in their day-to-day operations and activities from the social cultural environment, activities and teacher-student interaction, and includes the four meanings defined by Portelli (1993).

Self-efficacy

Bandura (1986) defines self-efficacy as: 'People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances.'(Bandura, 1986). Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes (Bandura, 1994). In this study, it refers to the individual beliefs what he can do with his skills under certain conditions.

Motivation

There are many definition of motivation in the literature. According to the classification of Bloom's Taxonomy, it is one of the component in the affective domain (Krathwohl et al., 1964). In this study, the researcher will adopt the idea of motivation in Self-Determination Theory (SDT) (Deci, Vallerand, Pelletier, & Ryan, 1991). SDT takes the view that the motivation concept is not dichotomy (e.g., internal versus external) as proposed by De Charms (2013), but distinguishes it between different reasons that form impetus to or not to perform particular action. A few types of motivation have been identified in SDT according to their degree of autonomy. This ranges from intrinsic motivation, extrinsic motivation and amotivation (lack of motivation). When people are intrinsically motivated, they do things out of their interest, fun and enjoyment, and they are willing to devote their time and energy on it. In contrast, when people are extrinsically motivated, they act so because of external impetus such as awards, punishments, out of guilty or ego and etc.

Summary of Chapter 1

This chapter begins with the discussion on the importance for educators to realize that the education context has changed due to the information explosion and the fast rate of technological change, so the key focus of this 21st century education would actually be about "skills" that would enable students to become "information literate" and "independent lifelong learners". Next, based on the literature review on the information literacy education globally and the information literacy education in Malaysia, the researcher identifies the current issues, research gaps and also the rationale of this study.

The literature review indicated that there is still considerable ambiguity with regard to the sources or factors affecting the motivation and self-efficacy in the information literacy skills acquisition, and it has not yet been established whether cultivating school culture through hidden curriculum plays any significant role in the information literacy skills acquisition. In this study, the researcher puts forward the claim that a school information literacy culture can be created by cultivating the school culture through hidden curriculum which is conducive to the information literacy skills acquisition, this culture can be the factors of motivation and self-efficacy of students' learning and plays a significance role in information literacy skills acquisition. Based on this problem statement, the researcher proposes to use Design and Development Research (DDR) approach to develop an information literacy model based on school information literacy culture where the students' motivational beliefs (self-efficacy and motivation) are taken into account. This is followed by sections that focus on the construction of the objectives and research questions of this study. The researcher also declares the significance of this study, limitations of this study and operational definition of several important terms that will be used throughout this study.

CHAPTER 2: LITERATURE REVIEW

Introduction

The general purpose of this study is to develop an information literacy education model based on school information literacy culture created through hidden curriculum and mediated by motivation and self-efficacy. This model can serves as a supporting system to support current information literacy education efforts by embedding the information literacy learning into school culture and also focusing on its influence on students' motivation and self-efficacy to enhance students' information literacy skills. This chapter discusses the important relevant concepts and theories in developing the model. Hence, the review of literature related to this study is presented in the following order:

1) The theoretical framework of the study.
2) The concept of information literacy and hidden curriculum and school culture.
3) The view of self-efficacy from Social Cogntive Theory perspective and the review of the self-efficacy on student learning.
4) The view of motivation from Self-determination Theory perspective and the review of the motivation on student learning.
5) Finally, based on the above discussion, a conceptual framework for the development of the information literacy model is presented in the final part of this chapter.

Theoretical Framework of the Study

This study tends to develop an information literacy education model by investigating the relationship between school information literacy culture and student's information literacy skills acquisition. In addition, motivation and self-

efficacy are introduced as mediating variables to examine if these two variables have any mediating effect on the relationship between school information literacy culture and information literacy skills acquisition. There are four main constructs under this investigation, which are the personal factors (self-efficacy and motivation), the environment factor (school information literacy culture) and the behavioral factor (information literacy skills acquisition). One learning theory that can best describes this relationship is Social Cognitive Theory (SCT) by Albert Bandura (1986). Albert Bandura had conducted an experiment to prove how social influences have impact on children learning. According to Bandura, "People are self-organizing, proactive, self-reflecting, and self-regulating not just reactive organisms shaped and shepherded by environmental events or inner forces (Bandura, 2001)." He advocates that human functioning is a continuous interaction between the three determinants of personal, behavior and environment and uses the term "triadic reciprocal causation" in explaining this relationship (Bandura, 1986). The implication of this reciprocal nature of the causes of human functioning in social cognitive theory in education context is that, teachers are able to direct their efforts based on personal, environment, or behavioral factors in order to attain certain educational outcomes (Pajares, 2006). Thus, the researcher decided to use Social Cognitive Theory as the main theoretical framework to guide the study and to explain the relationships among the constructs under examined which can be illustrated in Figure 2.1 as follows:

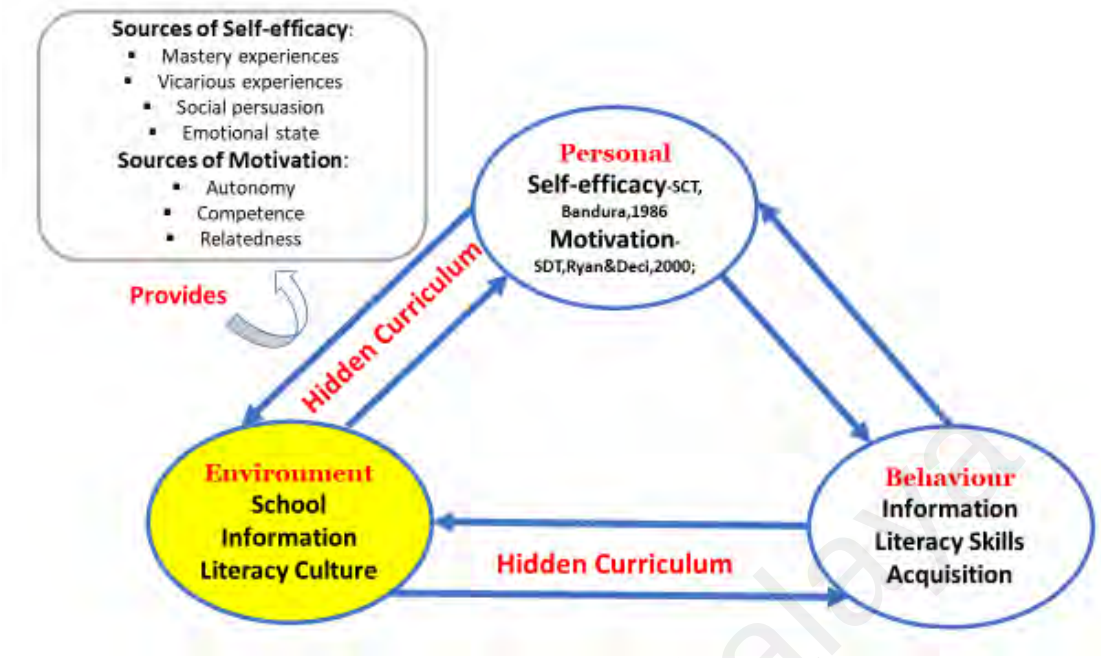


Figure 2.1. Theoretical framework of the study (adapted from Triadic Reciprocal Causation Model by Bandura, 1986)

As demonstrates in Figure 2.1., in this study, the key driven forces or enablers of information literacy skills acquisition are the creation of school information literacy culture through hidden curriculum, and students' motivational beliefs (self-efficacy and motivation). From the social cognitive theory perspective, students' information literacy skills can be fostered by improving their motivation beliefs (self-efficacy and motivation). It can also be fostered by providing a good education environment (positive school culture) which is conducive to the information literacy skills acquisition. Similarly, after students' skills have been enhanced, it will in turn raise their motivational beliefs and create a positive atmosphere to the learning environment.

For the last few decades, educational research has provided ample support for the assertion that positive and focused school culture leads to high student achievement, the betterment of students' well-being and school effectiveness (Clark & Goddard, 2016; Deal & Peterson, 1999; Elizondo, 2016; Gruenert, 2005; Herndon, 2007; MacNeil, Prater, & Busch, 2009; Maxwell, 2016; Renchler, 1992). The

definition of hidden curriculum by Longstreet and Shane (1993) that "[the hidden curriculum] refers to the kinds of learning [that] children derive from the very nature and organizational design of the public school, as well as from the behaviors and attitudes of teachers and administrators" (Longstreet & Shane, 1993, p. 46), informs us that the influence of school culture on student learning can be one form of hidden curriculum. Students learned the unspoken rules and expectations within the school based on how the stakeholders in the school settings reinforce, nurture, or transform the norms, beliefs and values of the school. Nevertheless, the hidden messages that are conveyed through school culture to students are not always a desired one if we do not examine their impact by asking "What have students actually learned from these practices?". By investigating the concept of school culture shaped by hidden curriculum which is conducive to information literacy learning, it is believed that a positive school information literacy culture that promotes information literacy education can be cultivated.

In addition to the concept of "triadic reciprocal causation", Bandura also emphasized the concept of "self-efficacy" in student learning which refers to the individual beliefs what he can do with his skills under certain conditions. According to Bandura (1977), besides learning certain skills, people should also develop confidence in the skills that they are learning. He advocates that "self-efficacy beliefs determine how people feel, think, motivate themselves and behave (Bandura, 1994)". From the social cognitive perspective, self-efficacy of students learning can be improved by focusing the influence on its four sources, they are: mastery experiences, vicarious experiences, social persuasion and emotional state (Bandura, 1994).

Another theory which is employed in this study is the Self-Determination Theory (SDT) to explain the motivation variable which is also a pivotal factor affecting the students' information literacy skills acquisition. Self-Determination Theory is chosen in this study because it not only examines environment factors that hinder or undermine self-motivation, social functioning, and personal well-being, but also addresses the issue of the energization of behavior by postulating about basic psychological needs that are inherent in human life. These innate needs are the needs for autonomy, competence, and relatedness (Deci et al., 1991). This idea is used to guide the discussion on how social environment (school information literacy culture) shaped by hidden curriculum will promote motivation on information literacy learning.

The following sections discuss on the concepts and theories of the key determinants of behavior (information literacy), environment (hidden curriculum and school culture) and personal (self-efficacy and motivation) in this theoretical framework.

Information Literacy

The term "information literacy" (IL) was first used by Paul Zurkowski in his 1974 paper, "The information service environment relationships and priorities." The term refers to the ability and skills to use a large number of information tools and resources, to search for and evaluate information, and to effectively solve a given problem, particularly in a workplace context (Zurkowski, 1974). Since then, information literacy has been of great interest to librarians and information professionals (Kay & Ahmadpour, 2015; Pinto, Cordon, & Diaz, 2010; Wen, 2008). Substantial efforts have been made, and a huge amount of literature on the topic has been produced, to analyze the concept of information literacy (Julien et al., 2005; Kay

& Ahmadpour, 2015; Pinto et al., 2010; Virkus, 2003). For instance, Rader (2002) presented literature and a Web survey of materials related to library user instruction and information literacy from 1973-2002, indicates that there has been a tremendous growth in publications related to information literacy globally; 60 percent of the publications have addressed information literacy in academic libraries and only about 20 percent are related to information literacy instruction in school media centers (Rader, 2002).

By examining key terms related to information literacy used from 1977 to 2007 in a wide range of databases, Pinto et al. (2010) successfully illustrates thirty years of information literacy evolution. According to the authors, the concept of information literacy evolved over time depends on the perspectives and the context in which it was developed. Initially, information literacy was viewed as an approach in workplace problem solving. Later, librarians and academics associated information literacy with bibliographic instruction programs in the form of short orientations on how to use library and information resources. With rapid technological change and the proliferation of information resources in the 1980s and 1990s, information literacy expanded beyond library resources to include 'information and communication technology literacy,' 'digital literacy,' 'computer literacy,' 'information and communication technology skills,' 'technological literacy,' and 'media literacy' (Pinto et al., 2010). Considering that the reviews by Pinto and others were insufficient and focused only on research and perspectives from 1973 to 2007, Kay and Ahmadpour (2015) conducted a search of 50 peer-reviewed articles dated between 2004 and 2014 to understand and evaluate the concept of information literacy in the digital era. In their study, which was based on a comprehensive review of previous literature and detailed content analysis, they developed a 4P framework (planning, picking,

processing, and producing) that helped to organize and compare different components of previous information literacy frameworks and that provided "an updated perspective incorporating the influence of digital tools and collaboration" (Robin H. Kay, 2015).

The American Library Association first defines information literacy as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (Association, 1989). Aligned with the development of information literacy, many definitions of information literacy have been proposed, for example:

i. In 1992, Doyle in her report on the *Final Report to National Forum on Information Literacy* (1992), suggests that an information literate person is one who:

- Recognizes the need for information.
- Recognizes that accurate and complete information is the basis for intelligent decision-making.
- Formulates questions based on information needs.
- Identifies potential sources of information.
- Develops successful search strategies.
- Accesses sources of information including computer-based and other technologies.
- Evaluates information.
- Organizes information for practical application.
- Integrates new information into an existing body of knowledge.
- Uses information in critical thinking and problem solving. (Doyle, 1992, p. 2)

ii. In 2003, The Prague Declaration *Towards an Information Literate Society* advocates that:

> Information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues or problems at hand; it is a prerequisite for participating effectively in the Information Society, and is part of the basic human right of lifelong learning. (UNESCO, 2003)

iii. Three main elements in information literacy are define by Bundy (2004) in *Australian and New Zealand Information Literacy Framework: Principles, Standards and Practice.* These elements are: "Generic skills include problem solving, collaboration and teamwork, communication and critical thinking. Information skills include information seeking, information use and information technology fluency. Values and beliefs include using information wisely and ethically, social responsibility and community participation" (Bundy, 2004, p. 7)

iv. The AASL (2008) *Standards for the 21st Century Learner* defines nine foundational common beliefs, acknowledged that the definition of information literacy has become more complex as resources and technologies have changed and information literacy, just like other multiple literacies (digital, visual, textual and technological), has become crucial skills for this century. Learners use skills, resources, and tools to: 1) Inquire, think critically, and gain knowledge. 2) Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge. 3) Share knowledge and participate ethically and productively as members of our democratic society. 4) Pursue personal and aesthetic growth. (AASL, 2008, p. 3)

From the literature review, the concept of information literacy evolves over time depends on the perspectives and context in which it is developed (Kay & Ahmadpour, 2015; Pinto et al., 2010), information literacy is an umbrella concept that encompasses not just traditional library skills, but also a wide range of 21st century digital literacy (Pinto et al., 2010). An information literate person is not just know the technology know how, he/she also has the ability to recognize what or when

information is needed, and is able to initiate search strategies to locate and access necessary information appropriately in all types of media (including electronic or print sources), gather and use information ethically, and use social tools responsibly and safely. Other than that, he/she is able to exercise their higher order thinking skills to analyze, evaluate, organize, synthesize, and create new knowledge from the information at hand, and is able to share and communicate the results of information problem solving efforts accurately and creatively. As such, information literacy is regarded as an essential component of critical thinking, and independent and lifelong learning (Bruce, 2008; Bundy, 2004; Kay & Ahmadpour, 2015; Lupton, 2004; Pinto et al., 2010).

One of the information literacy model that emphasized on students' affective domain of information seeking behavior is Information Search Process (ISP) model developed by Kuhlthau (1991). Through thorough research and exploration on students' reactions in the information searching process, Kuhlthau developed her model after noting that students often encountered difficulty in utilizing information to create their own style of learning. The most important in her Information Search Process model is the belief that uncertainty, which is a cognitive state that commonly causes affective symptoms of anxiety and lack of confidence, increase and decrease during the process of information seeking (Kuhlthau, 1991). She suggests that a lack of affective skills can hinder student learning and motivation:

> When students think that they are the only ones confused or unsure, they lose confidence in their own ability to accomplish the task and they lose motivation to press on. They need to learn to expect certain feelings and to develop strategies to work through each stage of the research process. (Kuhlthau, 1985, p. 23).

This model suggested that educators need to focus equally on the affective domain along with the cognitive domain to support students throughout an information seeking process.

Hidden Curriculum and School Culture

Although the term "hidden curriculum" has been discussed over fifty years, it does not have unified definition or constant theory (Anderson, 2001; Ponyatovska, 2011). From the literature review, the hidden curriculum is pervasive in education, and can be positive or negative (Shaw, 2006). Martin (1976) puts forward the view that:

> A hidden curriculum is not something one just finds, one must go hunting for it. Since a hidden curriculum is a set of learning states, ultimately one must find out what is learned as a result of practices, procedures, rules, relationship structure and physical characteristics which constitute a given setting. (Martin, 1976, p. 139)

Gordon (1982) attributes the hidden curriculum to the acquisition of nonacademic competence like attitudes, dispositions, and social skills in a physical and social environment in an unplanned manner (Gordon, 1982). Portelli (1993) distinguishes the difference between formal curriculum, actual curriculum and hidden curriculum. According to Portelli (1993), actual curriculum refers to what is actually carried out and could be identical to the formal curriculum. On the contrary, hidden curriculum is usually contrasted to formal curriculum and may form part of actual curriculum (Portelli, 1993). He identifies four major meaning of hidden curriculum in the curriculum discourse: (a) as the unofficial expectations, or implicit but expected messages; (b) as unintended learning outcomes or messages; (c) as implicit messages arising from the structure of schooling; and (d) as created by the students (Portelli, 1993, p. 345). Through the discussion on the logic of the hidden curriculum, he argues that there are different forms and levels which hiddenness can take and hidden

curriculum research should not only concern about "what is hidden" but also "by whom", "from whom" and "how" questions (Portelli, 1993, p. 347).

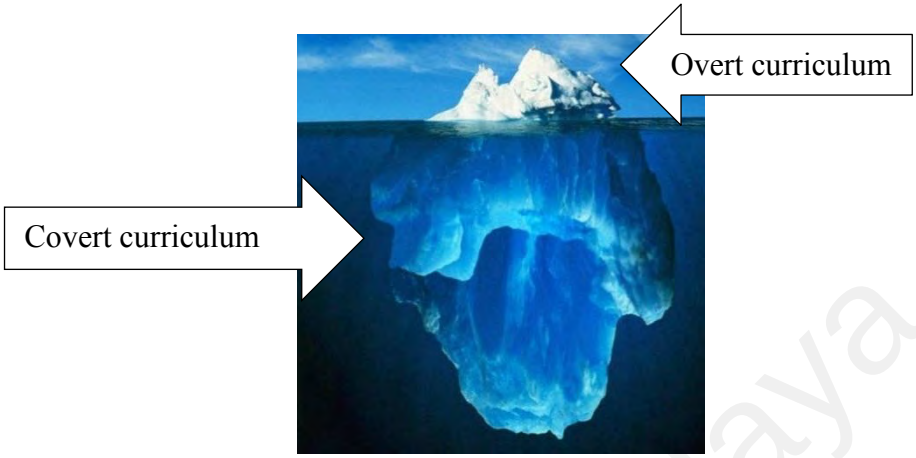


Figure 2.2. **The metaphor of "curriculum" as an "iceberg" (Palermo, 1999)**

Palermo (1999) demonstrates that school curriculum is like an iceberg as shown in Figure 2.2, the "overt" part of curriculum is something we can see and hear and talk about, which refers to the objectives, subjects, timetables, syllabuses, standards and technologies. At the bottom part of an iceberg is the hidden or "covert" curriculum, which all the stakeholders in the education environment bring to it, in terms of their beliefs, attitudes, expectations and motivations (Palermo, 1999).

Some researchers associate the concept of hidden curriculum to the concept of school culture. For example, Longstreet and Shane (1993) says, "[the hidden curriculum] refers to the kinds of learning [that] children derive from the very nature and organizational design of the public school, as well as from the behaviors and attitudes of teachers and administrators" (Longstreet & Shane, 1993, p. 46). Similarly, Sari and Doganay (2009) defines the concept of hidden curriculum as consciously and deliberately organizing school environment, life, programs, and policies in such a way that they carry out school's aims, and refers it to school culture which includes values, attitudes, believes, and communication styles of the individuals in the schools (Sari & Doganay, 2009). Wren (1999) presents a check list to examine the symbolic aspect of school environment. He encourages teachers and administrators to gain a complete picture of school environment via exploring the symbolic nature of the hidden curriculum and reminded us that a good understanding of hidden curriculum will help achieve the goal of providing effective school in this 21st century (Wren, 1999).

There are some similarities between the concept of hidden curriculum and school culture. According to Peterson and Deal (1998), school culture covers the "norms, values, beliefs, traditions, and rituals that has built up over time as people work together, solve problems, and confront challenges. This set of informal expectations and values shapes how people think, feel, and act in schools" (Peterson & Deal, 1998, p. 28). This is very similar with the concept of hidden curriculum which emphasizes on the nonacademic aspect of schooling. Furthermore, like the hidden curriculum, the impact of school culture on student learning and development is pervasive and implicit. It can be positive or negative depending on how the school leader as well as the school community work on it. Nevertheless, this does not mean that the school culture is identical to hidden curriculum. There are also some

differences between both. The hidden curriculum emphasizes on "What have students actually learned in the process of schooling", while school culture reflects the cultural phenomenon through school as the medium. The school culture impacts on students learning through some kinds of educational influences, while the hidden curriculum is through some kinds of educational experiences that students gain from attending school that are not explicitly included in the instructional plans of teachers. That is to say, school culture is an important hidden resource in education, and through deliberately design and develop, this resource can be transformed to positive hidden curriculum that facilitates school effectiveness.

Researchers who study hidden curriculum acknowledged that the hidden curriculum embedded in school culture can influence on most of the aspects of students' learning. To name a few, the study by Jeh-Lou and Chang (2004) on the hidden impact of culture on developing students' technological creativity demonstrated the positive influence of cultural environment on hidden curriculum in fostering student technological creativity. The study identifies 13 factors of campus culture, they are: traits of campus culture, campus atmosphere, practices of novelty & entrepreneurship, teaching style of teachers, difference of profession between schools, interaction between teachers & students, peer relationships, leadership, student activity & automaticity, frequency of teamwork activities, evaluation of developing technique creativity, interpersonal relationships between students and teachers, and the practices of role-play curriculum (Jeh-Lou & Chang, 2004).

Using the case study research method, Cubukcu (2012), in his article, "The Effect of Hidden Curriculum on Character Education Process of Primary School Students," reveals that the supportive activities of hidden curriculum, such as social and cultural activities, free time activities and sports activities, the celebration of special days and weeks, and social club works, have great importance in the process of gaining and internalizing values (Cubukcu, 2012).

In the light of Jackson's observations about the features of hidden curriculum in classroom settings, Nami et al. (2014) undertook quantitative survey research to identify the relationship between hidden curriculum and student academic achievement at university. Survey results indicated that the student-teacher relationship, the organizational structure of the university, and the university's social climate and appearance were positively and significantly related to students' academic achievement (Nami et al., 2014).

In his 2016 study, Sosu (2016) employed an interpretative phenomenological research design to examine whether hidden curriculum should be given premium in school settings in Ghana. He concluded that teachers play an important role in the initiation of total development and the assimilation of social values in schools. These social values are communicated through the demeanor of teachers, and through their choice of language and teaching methods – all of these are considered as part of hidden curriculum in the school settings. The study suggested that teachers see hidden curriculum as another medium to educate students implicitly (Sosu, 2016).

It can be concluded from the review of previous studies that hidden curriculum refers to educational experiences that are "caught" by students rather than "taught" by teachers during the schooling process. The process of schooling conveys messages to students in the following three ways which are also the attributes of school culture:

i. Social-cultural environment

Physical and social environment (Gordon, 1982); social and cultural activities; free time and sportive activities; celebrations of special days and weeks, and social club works (Cubukcu, 2012); social climate and appearance (Nami et al., 2014); traits of campus culture, campus atmosphere, practices of novelty & entrepreneurship, teaching style of teachers, differences of profession between schools, peer relationships, leadership, student activity and automaticity, frequency of teamwork activities, evaluation of developing technique creativity, and practices of role-play curriculum (Jeh-Lou & Chang, 2004).

ii. School structure

Organizational design of school; organizational structure (Nami et al., 2014) and teaching methods (Sosu, 2016).

iii. Teacher-student interaction

Interaction between students and teachers and administrators in school; student-teacher relations (Nami et al., 2014); teachers' demeanor and the choice of language used by teachers (Sosu, 2016); interactivity between teachers and students, and interpersonal relationships between students & teachers (Jeh-Lou & Chang, 2004).

Self-efficacy: Social Cognitive Perspective

According to Social Cognitive Theory proposed by Bandura (1986), self-efficacy beliefs are crucial when people deal with decision making, it determines the choices people make, how much efforts people put forth, the persistence and perseverance they display in overcoming difficulties or failure, and resilience to adversity (Bandura, 1986). Self-efficacy beliefs also are proven to be effective predictor of students' motivation and learning (Bandura, 1993; Zimmerman, 2000). Students with weak self-efficacy beliefs hardly display passion and concentration towards learning task, they are not willing to learn, do not make efforts to overcome obstacles or easily to give up.

Bandura (1994) asserted that students' formed their self-efficacy in accordance with the information they obtain from four sources, namely mastery experiences, vicarious experiences, social persuasion and emotional or psychological state (Bandura, 1994). Among these sources, *mastery experiences* is the most influential (Bandura, 1994), it refers to the student's evaluation of his or her past experience with regard to a particular task or skill. Their successful experiences will enable them to have positive self-efficacy beliefs. On the contrary, unsuccessful experiences will lead them to have negative self-efficacy beliefs toward that particular task or skill. Students also develop their self-efficacy beliefs through the *vicarious experiences* by observing others. When students are uncertain about their own capabilities of carrying out the academic task at hand, the performances of their peers become models for them to make comparison or judgement about their own academic capabilities. Watching a similar peer succeed at an information searching task in completing a project-based learning activity, for instance, may convince other students that they too have this ability to accomplish the task. The third source of self-efficacy is *social persuasion*.

This source is important for students to gain confidence in their academic capabilities, especially when students are not yet skilled at making accurate self-appraisal, the evaluation feedback or supportive messages from teachers, peers or their parents, can serve to bolster their efforts and confidence. Finally, the student's self-efficacy beliefs are also influenced by *emotional or psychological state*, which refers to students' mental state and the effects of classroom environment on their self-efficacy. Students positive self-efficacy beliefs are most likely to develop in encouraging, motivating, moderately challenging classroom environment compared to those of threatening and humiliating classroom environment.

Review of the Self-efficacy on Student Learning

Researchers have demonstrated that self-efficacy has been found to be related to students' emotional adjustment, academic motivation, achievement, performance and lifelong learning skills such as information literacy across domains and age levels (Bedel, 2015; Husain, 2014; Komarraju & Nadler, 2013; Multon, Brown, & Lent, 1991; Rohatgi, Scherer, & Hatlevik, 2016; Ross, Perkins, & Bodey, 2016; Simmons, Fisher, Barnard, & Allen, 2017; Stajkovic, Bandura, Locke, Lee, & Sergent, 2018). For example, in a study on the relationship between self-efficacy and academic motivation, Bedel (2015) found that academic motivation was significantly related to academic self-efficacy. This result was supported by Ross et al. (2016) in a study of interrelationships between the different types of academic motivation and information literacy self-efficacy. They found that both intrinsic and extrinsic academic motivation were found to be positively related to information literacy self-efficacy, amotivation was negatively related, and the most important predictor of information literacy self-efficacy was intrinsic motivation to know. In addition, study by Komarraju and Nadler (2013) indicated that low self-efficacy students tended to believe that intelligence is

innate and unchangeable whereas high self-efficacy students pursued in mastery goals involving taking challenge and gaining new knowledge and performance goals involving good grades and outperforming others.

Self-efficacy plays crucial role on students' learning. An understanding of the factors or sources of self-efficacy is very important in proposing suggestions for teachers to organize instructional activities accordingly. Many researchers have attempted to investigate factors that can effectively increase students' self-efficacy belief (Arslan, 2013; Kudo & Mori, 2015; Loo & Choy, 2013; Reverdito et al., 2017; Stajkovic et al., 2018; Usher & Pajares, 2008). For instance, Arslan (2013) investigates the relationship between students' opinions about the sources of self-efficacy belief and their gender, academic achievement, the grade level, Socio-Economic Status (SES), and learning style, he found that there were significant relationships between students' opinions about sources of self-efficacy and the mentioned variables. Another study by Loo and Choy (2013) on the correlation of the four hypothesized sources of self-efficacy (mastery experience, vicarious experience, social persuasion, emotional arousal) with academic performance, and the prediction of the main source of self-efficacy that affects academic performance, their findings showed that self-efficacy sources were correlated with academic performance and among the four hypothesized sources of self-efficacy, mastery experience was found to be the main predictor for academic performance. In addition, recent study by Simmons et al. (2017) also found that mastery experiences significantly correlated to the higher self-efficacy belief of students. All this findings are consistent with previous studies that advocates that mastery experience is typically the most influential source of self-efficacy (Britner & Pajares, 2006; Usher & Pajares, 2008). Next, in terms of the conducive environment that provides better condition to the sources of students' self-efficacy, study by Saboor,

Arfeen, and Mohti (2015) revealed that the level of self- efficacy is high in classroom-based students than web-based students. Moreover, Reverdito et al. (2017) found that positive experience in peer interaction during the extracurricular such as sport participation fostered perceived self-efficacy and thus promotes positive youth development.

Motivation: Self-Determination Perspective

Motivation is considered as a crucial determinant of students' academic performance, adjustment and wellbeing. Many motivation theories have been proposed to help people conceptualize the function of motivation on students' learning. One of them which has received considered attention across many research context is Self-Determination Theory (SDT) (Deci et al., 1991). Self-Determination Theory takes the view that the motivation concept is not dichotomy (e.g., internal versus external) as proposed by De Charms (2013), but distinguishes it between different reasons that form impetus to or not to perform particular action. A few types of motivation have been identified in Self-Determination Theory according to their degree of autonomy. This ranges from intrinsic motivation, extrinsic motivation and amotivation (lack of motivation). Self-Determination Theory conceptualized these different types of motivation as a continuum with intrinsic motivation at one end, extrinsic motivation at the middle and amotivation at the other end (sees Figure 2.3.).

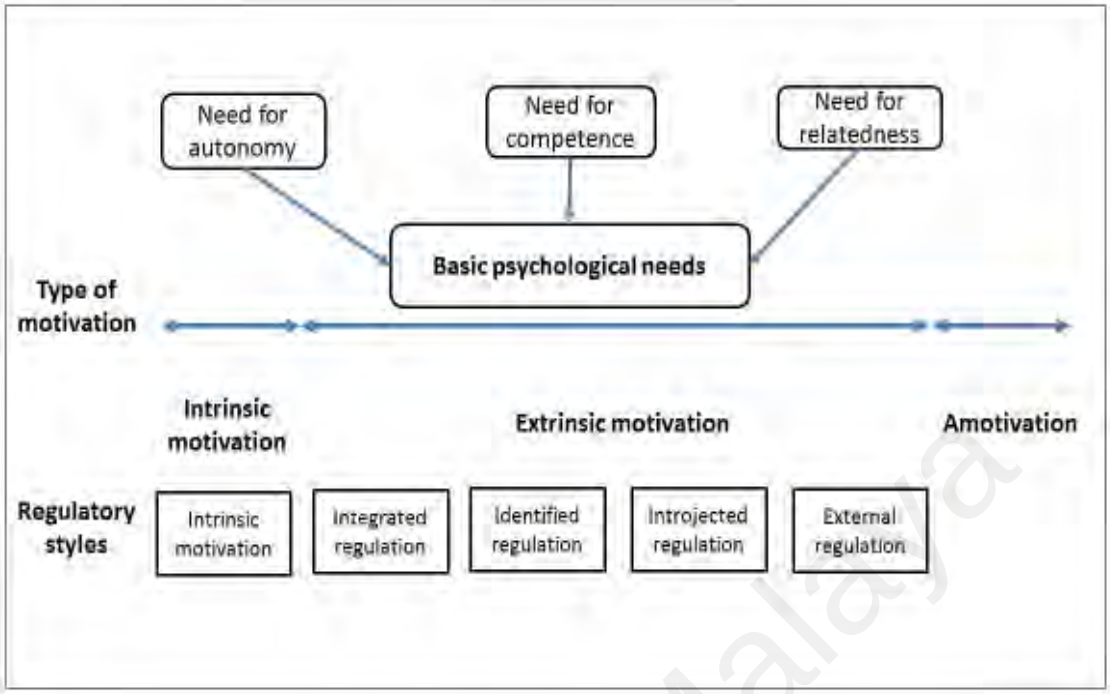


Figure 2.3. The Self-Determination Continuum [adapted from Ryan and Deci (2000b)]

Intrinsic motivation. According to Self-Determination Theory, intrinsic motivation refers to "the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000b, p. 70). When people are intrinsically motivated, they do things out of their interest, fun and enjoyment, and they are willing to devote their time and energy on it. In contrast, when people are extrinsically motivated, they act so because of external impetus such as awards, punishments, out of guilty or ego and etc. The idea is that people need to accomplish certain basic psychological needs in order to be intrinsically motivated to do anything. These needs are: need for autonomy, competence, and relatedness (Deci & Ryan, 2008; Ryan & Deci, 2000b).

Self-Determination Theory posits that for people to sustain their intrinsic motivation, it is important to satisfy their need for autonomous and competence (Ryan & Deci, 2000a). Autonomous refers to the volition to perform a task. For example,

students are autonomous when they are engaged in a research project where they have great interest in it. One concept that is closely related to autonomous motivation is the perceived locus of causality (PLOC), this refers to the extent to which individuals perceived their actions as caused by internal or external reasons (Ryan & Connell, 1989). Autonomous motivated people will have an internal PLOC, but when a person feels that he is forced to do something that initially he/she was interested it, his/her PLOC will shift from internal to external. The second component of intrinsic motivation is perceived competence, which refers to the beliefs that one can accomplish a task effectively. For example, students have perceived competence when they feel that they are able to overcome the obstacles in a given task. People may have competence to do any task, but if they do not have the beliefs that they are able to do it, that means, they do not have the perceived competence over the task, it is unlikely that they will accomplish the task efficaciously.

Self-Determination Theory is a macro theory that consists of six sub-theories, Cognitive Evaluation Theory (CET) is one of them. According to CET, interpersonal events and structures (e.g., rewards, communications, feedbacks) that support *feelings of competence* and accompany by sense of autonomy will enhance intrinsic motivation (Deci et al., 1991; Ryan & Deci, 2000a). To be specific, *feelings of competence* alone is not sufficient to enhance intrinsic motivation, unless they also experience their behavior with internal perceived locus of causality. That is to say, social environment plays a crucial role on students' intrinsic motivation. Social context such as positive, healthy and supportive school culture that supports the individual's experience of autonomy and competence will foster intrinsic motivation and engagement for activities, including enhanced performance, persistence, and creativity. On the other

hand, social context that does not support any of these psychological needs will undermine intrinsic motivation.

Extrinsic motivation. Although intrinsic motivation is important for learning, but in reality, not every learning related activity is intrinsically motivated. In fact, it is very obvious to find out that the students' intrinsic motivation becomes weaker when they advance to each higher level of learning stage. One of the possible reasons is that teachers are unintentionally used to introduce external controls, such as close supervision, rewards and punishments, sometimes threatening and humiliating into learning climate to ensure that learning occur. This is where negative hidden curriculum takes place without the awareness of teachers and the actual goal of learning become fuzzy.

Self-Determination Theory argues that extrinsic motivation varies to the degree to which it is autonomous (Ryan & Deci, 2000a) and not every extrinsic motivation is undesired. Since most of the learning activities are not designed to be intrinsically motivated, how to help students value and self-regulate such activities becomes essential. Self-Determination Theory addresses this issue in term of fostering the internalization and integration of values and behavior regulations (Deci et al., 1991) as shown in Figure 2.4.

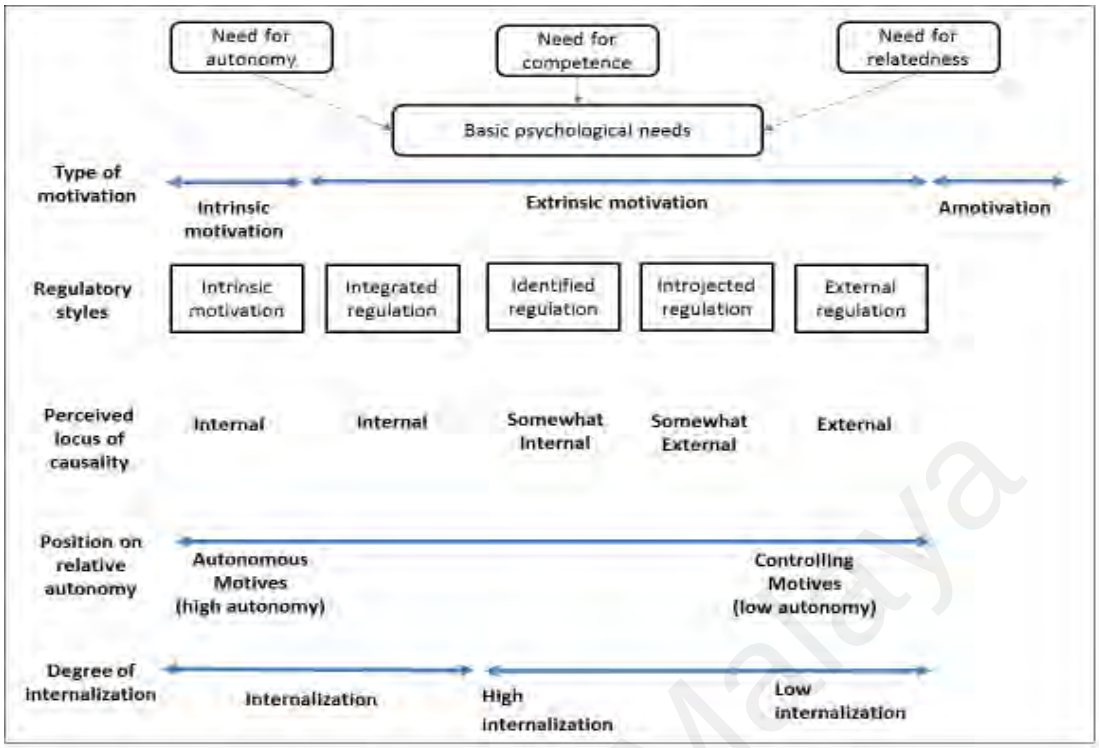


Figure 2.4. The internalization continuum depicting the various types of extrinsic motivation posited within self-determination theory [adapted from Niemiec and Ryan (2009)]

Another sub-theory of Self-Determination Theory, Organismic Integration Theory (OIT) was introduced to explain different forms of extrinsic motivation and the contextual factors that promote or hinder internalization and integration of regulation of these behaviors (Ryan & Deci, 2000a). Internalization refers to "a proactive process through which people transform regulation by external contingencies into regulation by internal processes" (Deci et al., 1991, p. 328). For example, students who initially are not interested in participating in an outdoor survey activity and their participation would need external contingencies such as punishment for those who are not participating, they would be very happy to do so when they discover that this activity is actually organized by one of their beloved teachers.

There are four different types of extrinsic motivation that high degree of autonomy to low degree of autonomy, namely integrated regulation, identified regulation, introjected regulated and external regulated. The least autonomous type of extrinsic motivation is external regulated. *External regulated* refers to "behaviours for which the locus of initiation is external to the person"(Deci et al., 1991, p. 329), whereby behaviours are enacted due to external reinforcement such as gaining rewards or avoiding punishment. *Introjected regulated*, whereby behaviours are enacted in order to satisfy internal contingencies, such as guilt or self-aggrandizement. *Identified regulation* refers to the behaviors that occur because of personal held values, such as learning a new skill and is internally referenced contingency. The most autonomous type of extrinsic motivation is integrated regulation where by "integration occur when identified regulations have been fully assimilated into the self" (Ryan & Deci, 2000a, p. 62).

According to Self-Determination Theory, other than autonomy and competence supportive contexts, internalization also can be facilitated in a condition that provides a sense of belongingness and connectedness to the person, group, or culture disseminating a goal. In other words, context that satisfies basic psychology need of "relatedness" will facilitate internalization (Ryan & Deci, 2000a).

Review of Motivation on Student Learning

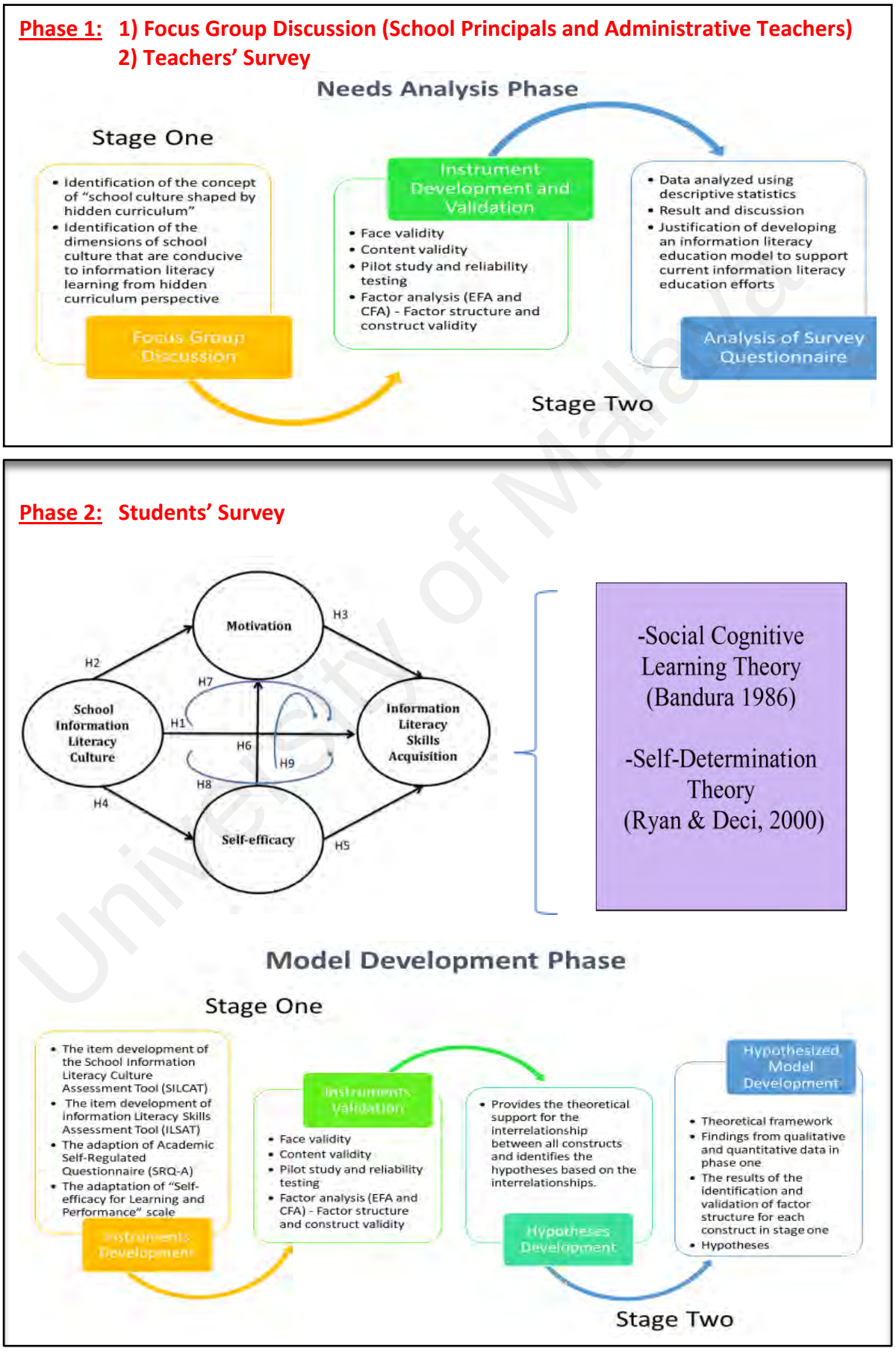
In recent years, there is a growing body of literature that applied the Self-Determination Theory framework to motivation in education context. Niemiec and Ryan (2009) presented an overview of Self-Determination Theory and reviewed its application to education practices. They concluded that both intrinsic motivation and autonomous type of extrinsic motivation are conducive to engagement and optimal

learning in educational context. Furthermore, evidence suggests that teacher supports for students' basic psychology needs for autonomy, competence, and relatedness facilitates students' autonomous self-regulation for learning, academic performance and well-being. For instance, Guay, Ratelle, Larose, Vallerand, and Vitaro (2013) tested the hypothesis proposes by Self-Determination Theory that autonomy support by significant others contributes to variables such as perceived competence, autonomous regulation, and achievement. Their findings indicated that students who perceived their mother, father, and teacher as autonomy-supportive were more motivated by autonomous regulations, perceived themselves as more competent, and showed higher achievement. In addition, they also found that outcomes were more strongly correlated with autonomy support by the teacher than by mother and father. Another study by Tian, Chen, and Huebner (2014) also supports the assumption of Self-Determination Theory that the satisfaction of needs for autonomy, competence, and relatedness contributes to human wellbeing. They found that among these three basic psychological needs, satisfaction of competence need was found to be a particularly strong predictor of adolescents' school-related subjective wellbeing over time in their study. On the other hand, contrary to above mentioned studies, study by Trenshaw, Revelo, Earl, and Herman (2016) revealed a lesser salience of competence and autonomy in their study on students' motivation toward learning in a second-year engineering course. They found that while autonomy support within classroom environments does affect students' motivation within the course context, relatedness, rather than autonomy, was most salient. From these studies, we can conclude that other than the important role plays by teachers in enhancing student's motivation towards learning, the type of basic psychological needs whether it is more autonomy salient, competence salient or relatedness salient is very much depending on the social and

cultural environment of that particular context. Therefore, in order to motivate students' learning and positive wellbeing, we should also focus on the social and cultural environment that can encourage satisfaction of these basic psychological needs.

Other than the teacher-student's interaction, factors of school culture such as extra-curricular activities or leisure activities and physical environment also are evidenced to have significant impact on students' basic psychological needs (Badri, Amani-Saribaglou, Ahrari, Jahadi, & Mahmoudi, 2014; Leversen, Danielsen, Birkeland, & Samdal, 2012; Sjöblom, Mälkki, Sandström, & Lonka, 2016). For example, study by Leversen et al. (2012) on the extent to which satisfaction of the three basic psychological needs explained the relationship between participation in leisure activities and life satisfaction revealed that competence and relatedness satisfaction fully mediated the association between participation in activities and life satisfaction. They concluded that positive processes of psychological need satisfaction, and especially the need for competence and relatedness, experienced in the leisure activity domain seem to be beneficial for adolescents' wellbeing. Another study by Sjöblom et al. (2016) reminds us that although Self-Determination Theory proposes that social and cultural environment are crucial in supporting students' basic psychology needs for autonomy, competence, and relatedness, the role of physical environment also cannot be underestimated. Their findings indicate that the physical environment can support or thwart the fulfillment of the basic psychological needs. They argued that the physical environment was a source of procedural facilitation: It complemented and challenged the students' existing skills, contributing to their experiences of autonomy and competence.

Conceptual Framework of the Study



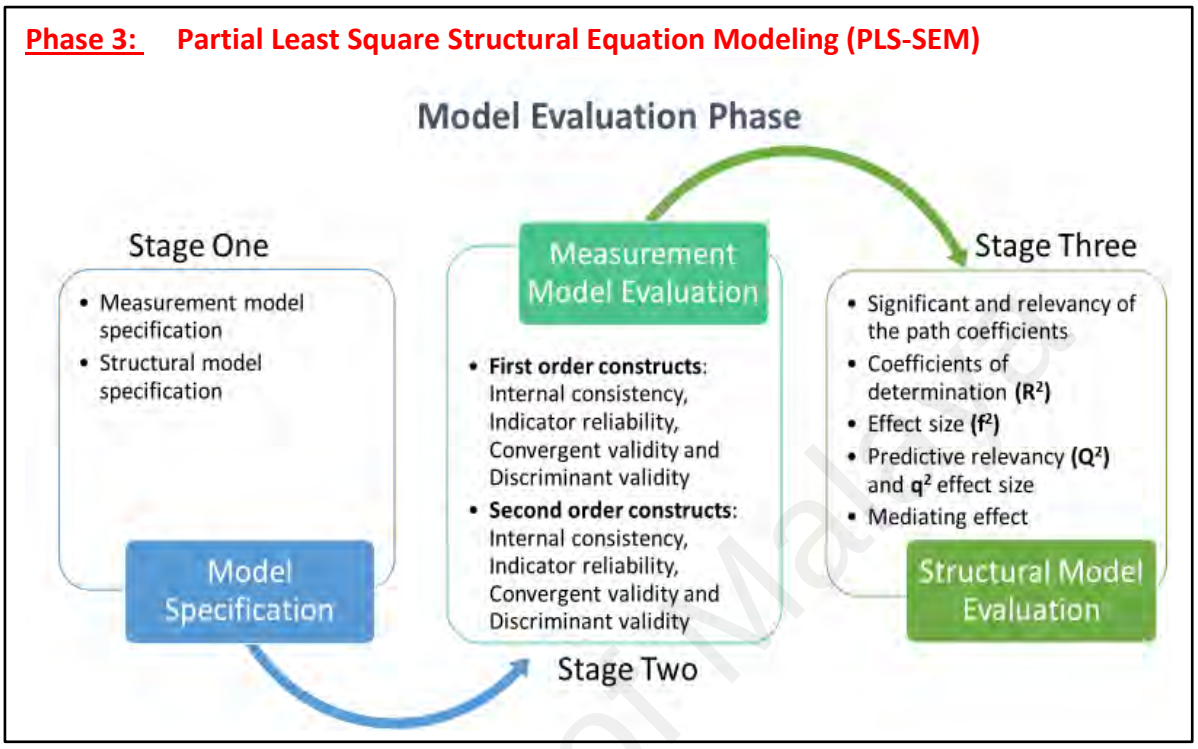


Figure 2.5. Conceptual framework of the study

Based on the review of information literacy education in Malaysia, the concept of school culture, hidden curriculum and the theoretical framework of this study, Figure 2.5 is prepared to illustrate the conceptual framework of this study which highlights the important processes and variables underpinning the development of the information literacy education model. The purpose of this conceptual framework is to demonstrate how the aim of the study and aim at each phase of the methodology (Design and Developmental Research Approach) will be fulfilled through the connection of the variables, theories and research methodology of each phase to develop the information literacy education model.

According to the Design and Developmental Research approach (Richey & Klein, 2007), there are three phases in the development process. For the needs analysis

phase, the aim of this phase is to understand teachers' perceptions regarding whether there is a need to develop an information literacy education model, and what aspects of school culture shaped by hidden curriculum can be used to develop the information literacy education model. This phase is a mixed method research design and consists of two stages. The first stage is a qualitative research design, where a focus group discussion with school's administrative teachers was carried out to identify the concept and dimensions of school culture that have positive effects on students' information literacy education from hidden curriculum perspective. Based on the output from this stage, a questionnaire was developed and validated, a pilot study was conducted to confirm the validity and reliability of the questionnaire. The data of this phase was collected through survey.

The second phase is the model development phase. This phase explains the process on how a conceptual or hypothesized information literacy education model is developed. The development process of the model was guided by Social Cognitive Theory and Self-Determination Theory. This phase also consists of two stages. The first stage is the instruments development and validation. The second stage is the hypotheses development and hypothesized model development. Through these processes, a hypothesized information literacy education model can be developed and ready for evaluation in Phase 3. Finally, the proposed model is evaluated via Partial Least Square Structural Equation Modeling (PLS-SEM) approach in model evaluation phase. This phase takes a three-stage approach where stage one is model specification, stage two is the evaluation of measurement model and stage three is the evaluation of structural model.

Summary of Chapter 2

This chapter first explains the theoretical framework of this study. Based on the idea of "triadic reciprocal causation" proposed by Albert Bandura, the researcher presents her theoretical framework which highlights the importance of the influence of personal factors (self-efficacy and motivation) and environment factors (school culture shaped by hidden curriculum) on students' information literacy skills acquisition. This study is guided by social cognitive theory, self-determination theory and conceptual model of shaping school culture through hidden curriculum. Following that, this chapter reviews the literature related to the important variables underpinning the development of this study, these variables are information literacy, hidden curriculum and school culture, self-efficacy, motivation and also the review of self-efficacy and motivation on student learning. Last but not least, the conceptual framework of the study is presented at the end of the chapter.

CHAPTER 3: METHODOLOGY

Introduction

This study focuses on the development of an information literacy education model based on school information literacy culture through hidden curriculum, and mediated by students' motivation and self-efficacy, as a complement to the current educational efforts to prepare students as lifelong learners in the Information Age. As presented in the theoretical framework, the theories underpinning the current study include Social Cognitive Theory and Self-Determination Theory.

According to Richey and Klein (2007), design and development research is "the systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that govern their development" (Richey & Klein, 2007, p. 1). Since the development of this information literacy education model is meant to support the current information literacy education, design and developmental research will be an appropriate approach for this study because as defined by Wang and Hannafin (2005), this approach is "a systematic but flexible methodology aimed to improve educational practices" (p.6). Furthermore, as identified by Richey and Klein (2005), "it is a pragmatic type of research that offers a way to test theory that has been only hypothesized and to validate practice that has been perpetuated essentially through unchallenged tradition" (Richey & Klein, 2005, p. 24).

The design and developmental research involves a "systematic study of designing, developing and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness" (Seels & Richey,

1994, p. 127). Hence, this study is conducted in three phases: the needs analysis phase, the model development phase and the model evaluation phase.

Phase 1: Needs Analysis

According to Witkin (1977), needs analysis is an essential method to identify the gap between the current situation and targeted situation. For an information literacy education to call a success in the secondary school level, apart from the school environment that facilitate the teaching and learning of information literacy, teachers' involvement in the efforts of preparing students to become information literate is essential. Therefore, the aim of this phase was to understand teachers' perceptions regarding whether there is a need to develop an information literacy education model, and what dimensions of school culture from hidden curriculum perspective that can be used to create a school information literacy culture to support the current information literacy education efforts.

Prior to design and develop a set of instruments intended to explore teachers' perceptions, it is essential to clarify the concept and dimensions of "school culture shaped by hidden curriculum". Therefore, there were two stages in this phase. For the first stage, a qualitative approach where a focus group discussion was conducted in advance to identify the concept and dimensions of school culture shaped by hidden curriculum. The research question for this stage are:

1.1 What is the concept of "school culture shaped by hidden curriculum"?

1.2 From the hidden curriculum perspective, what are the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition?

The results from this stage will then be used to develop a set of instruments that attempts to answer the research questions at the second stage. The research questions for second stage are as following:

1.3 What are teachers' perceptions on their students' information literacy competence?

1.4 What are teachers' perceptions on the problems of implementing information literacy education in schools?

1.5 What are teachers' perceptions on the need and feasibility of developing an information literacy education model based on school culture shaped by hidden curriculum?

1.6 What are teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used in developing an information literacy education model?

Stage One: Focus Group Discussion

Methods. According to Merriam (2001), qualitative research "is an umbrella concept covering several forms of inquiry that helps educators understand and explain the meaning of social phenomena such as hidden curriculum with as little disruption on the natural setting as possible." (Merriam, 2001, p. 5). One of the qualitative research method is focus group. Research indicated that focus group is an appropriate method to use before a survey is conducted for initial instrument development or to facilitate questionnaire design (Nassar-McMillan & Borders, 2002; Wolff, Knodel, & Sittitrai, 1993). The purpose of this stage is to identify the concept and dimensions of school culture shaped by hidden curriculum intended for information literacy skills

acquisition. As Morgan (1996) states, "the explicit use of group interaction to produce data and insights that would be less accessible without the interaction found in a group." In developing the instruments for this research, a focus group discussion was deemed a suitable method to apply because virtually no questionnaire had been previously developed specifically for school information literacy culture from the hidden curriculum perspective in Malaysia context.

Sample of the study. This study is bounded by the school setting. The school's leaders play a pivotal role in creating the desired school culture. Therefore, the researcher intended to have in-depth understanding of the school's principal and administrative teachers' views on this matter. So, this is a purposive sampling. This stage was undertaken qualitative research approach where the data was collected through a focus group discussion with three school principals, two library and media teachers and two administrative teachers from four Independent Chinese secondary schools in Malaysia.

Data collection procedure. The researcher visited the selected schools to explain and gain understanding and cooperation from the school principals and administrative teachers. The date and venue to carried out the discussion was confirmed during the visit. On the day of the discussion, the researcher as the facilitator of the focus group discussion explained the purpose and procedure of the discussion a priori before written consents were distributed to the participants, which clarify their rights as a participant. For instance, they are free to decide whether they want to continue at any time; their name would be kept anonymous and their data would be strictly kept confidential; they have the right to know how their data would be reported prior to publication. Qualitative data from the focus group was collected through: (1)

notes taken by facilitator, (2) notes taken by a teacher volunteer from the group and (3) audio recording were made and later transcribed.

Data analysis procedure. The qualitative data from the focus group was coded and analyzed using qualitative data analysis software, Atlas. Ti version 8, to gather the themes describing the concept and dimensions of school culture from hidden curriculum perspective intended for information literacy skills acquisition. Two types of coding were used: open coding and axial coding. Open coding involved reading through the data several times and then created tentative labels for the data that were perceived meaningful and important. On the contrary, axial coding identifies relationships among the open codes (Böhm, 2004). Finally, when all the data had been examined, units containing the codes were identified and arranged in the same category or theme. These themes were later used for survey item development.

Trustworthiness. Creswell (2009) defines the trustworthiness of a qualitative study as the extent to which the findings are accurate according to both the researcher and the participants. The researcher used member checking method to ensure the trustworthiness of this qualitative study. Member checking involves allowing participants to consider the findings of the survey and voice their opinion on the correctness of information given.

The researcher used the results from this stage as to identify key issues from which questionnaires for the second stage of this phase could be developed.

Stage Two: Survey

Methods. The survey research method is one of the most popular research methods in various fields of studies, including in the educational research. According to Chua (2012), it is especially useful in explaining attitudes, views, beliefs, feelings and behaviour. In order to understand the teachers' views on whether there is a need to develop an information literacy education model, and dimensions of school culture shaped by hidden curriculum that could be used to support the current information literacy education efforts, the researcher utilized the self-administered survey research method at this stage. Self-administered survey is a data collection technique in which the respondent reads the survey questions and records his or her own responses without the presence of the researcher (Rossi, Wright, & Anderson, 2013).

Sample of the study. For the purpose of this study, non-probability purposive sampling is used to select participants for this stage. The researcher distributed 500 survey questionnaires to six Independent Chinese secondary schools located in four states in Malaysia. These schools were one from Pahang state, one from Negeri Sembilan state, two from Selangor state and another two from Federal Territory of Kuala Lumpur. Out of these 500 questionnaires, 397 responses were collected and after deleted 11 responses which was incomplete, the actual responses were 386 cases. Independent Chinese secondary school teachers were chosen as the study's sample because this type of school is considered as private schools and is not under the jurisdiction of the public education system, thus the mandatory of Library and Media Teachers to implement information literacy may not be followed in this type of school. Teachers in Independent Chinese secondary schools may have a broader perception of the implementation of information literacy education that does not limited it to the responsibility of Library and Media Teachers. Hence, the response from these teachers

may provide a bigger picture of the implementation of information literacy education in the secondary schools.

Instrument development. The researcher designed and developed a "Needs for Information Literacy Education Model (NILEM)" survey questionnaire. The items were created based on the research questions, literature review and the data of each theme generated from focus group discussion. Initially, the questionnaire containing 53 items. The questionnaire included the following: an explanation of the purpose of the study; five questions related to teachers' demographic information (Section A); sixteen questions related to the teachers' perceptions on their students' information literacy competence (Section B), these items were created based on the three categories suggested by the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) in "Information Literacy Standard for Students Learning" (Librarians & Communications, 1998); nine questions related to the teachers' perceptions on the problems of implementing information literacy education in schools (Section C) (Saidatul Akmar Ismail, 2014; Shyh Mee Tan, 2014); three questions related to the teachers' perceptions on the need to develop an Information Literacy Education Model (Section D); and twenty questions related to the teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that could be used in developing an Information Literacy Education Model (Section E). These items were designed based on the three dimensions identified from the qualitative data, they were school culture that values: (i) information technology and student-centered teaching and learning, (ii) independent learning and autonomy support, and (iii) character development. The research questionnaire utilized a five-point Likert scale for all questions except those dealing with demographic data. The Likert scale included the following values: 1=

strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree. Respondents needed to provide a response based on their perception of each item.

Instrument validation. For the validation of the instrument, the researcher utilized three types of validity in this phase, namely: 1) Face validity, 2) Content validity and 3) Construct validity. Face validity denotes the conciseness of the items on the instrument concerning clarity, brevity, and completeness(Kelley, 1999). For the face validity, the items in the questionnaire were examined by two experts in information technology and education to ascertain that the measures can be used for assessing the intended construct under study. Initially, 53 items were developed, after examined by the experts, one item from section E was deleted. This set of questionnaires containing 52 items were then proceeded for content validation by experts.

Content validity. Content validation provides evidence about the degree to which items on the instrument relate to the subject matter and their appropriateness with regards to the objectives being addressed (Kelley, 1999). The content validity for individual items is performed by item-level content validity index (I-CVI), that is for each item, number of experts giving 3 or 4 score is counted and the proportion is calculated. For example, if four out of five experts give score 3 or 4, then the I-CVI will be equal to 0.80. In addition, the content validity for overall scale is performed by scale-level content validity index (S-CVI), it is the proportion of items on an instrument that achieved a rating of 3 or 4 by all the experts (Martuza, 1977). The entire questionnaire tool is assessed using the S-CVI/Ave computed by averaging the I-CVIs (i.e., sum of all the I-CVIs divided by the number of items). According to Lynn (1986), a minimum of three experts are needed to rate each scale item in term of its

relevance to the underlying construct and 3 to 5-point scale might be considered. Lynn (1986) develops criteria for item acceptability that incorporated the standard error of the proportion. She suggests that with a panel of "five or fewer experts, all must agree on the content validity for their rating to be considered a reasonable representation of the universe of possible ratings'' (p. 383). The questionnaire as a tool is considered to be valid if S-CVI/Ave≥0.90 as recommended by Polit and Beck (2006).

In this phase, five experts from different background of expertise were assigned to analyse and rate each item developed in the survey form to complete a content validity index (CVI), with 4-point scale (1= *not relevant*, 2=*somewhat relevant,* 3= *quite relevant* and 4=*highly relevant*). Among the five experts, two of them are expertise in information and technology field, where one of them is a professor in a private university, another one is a lecturer in the public university. The other three experts are excellent teachers with more than 15 years of teaching experience. They gave their opinion about whether the question is essential, useful or irrelevant to measuring the construct under study. The results of I-CVI and S-CVI for the NILEM questionnaire was presented in Table 3.1.

Table 3.1

Ratings on a 52-Item Scale by Five Experts: Items Rated 3 or 4 on a 4-Point Relevance Scale

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Number in Agreement	Item CVI
1	X	X	X	X	X	5	1.00
2	X	X	X	X	0	4	0.80
3	X	X	X	X	0	4	0.80
4	X	X	X	X	0	4	0.80
5	X	X	X	X	X	5	1.00
6	X	X	X	X	X	5	1.00
7	X	X	X	X	X	5	1.00
8	X	X	X	X	X	5	1.00
9	X	X	X	X	X	5	1.00
10	X	X	X	X	X	5	1.00
11	X	X	X	X	X	5	1.00
12	X	X	X	X	X	5	1.00
13	X	X	X	X	X	5	1.00
14	X	X	X	X	X	5	1.00
15	X	X	X	X	X	5	1.00
16	0	X	X	X	X	5	0.80
17	X	X	X	X	X	5	1.00
18	X	X	X	X	X	5	1.00
19	X	X	X	X	X	5	1.00
20	X	X	X	X	X	5	1.00
21	X	X	X	X	X	5	1.00
22	X	X	X	X	X	5	1.00
23	X	X	X	X	X	5	1.00
24	X	X	X	X	X	5	1.00
25	X	X	X	X	X	5	1.00
26	X	X	X	X	X	5	1.00
27	X	X	X	X	X	5	1.00
28	X	X	X	X	X	5	1.00
29	X	X	X	X	X	5	1.00
30	X	X	X	X	X	5	1.00
31	X	X	X	X	X	5	1.00
32	X	X	X	X	X	5	1.00
33	X	X	X	X	X	5	1.00
34	X	X	X	X	X	5	1.00

35	X	X	X	X	X	5	1.00
36	X	X	0	X	X	4	0.80
37	X	0	X	X	X	4	0.80
38	X	X	X	X	X	5	1.00
39	X	0	X	X	X	4	0.80
40	X	X	X	X	X	5	1.00
41	X	X	X	X	X	5	1.00
42	X	X	X	X	X	5	1.00
43	X	X	X	X	X	5	1.00
44	X	X	X	X	X	5	1.00
45	X	X	X	X	X	5	1.00
46	X	X	X	X	X	5	1.00
47	X	X	X	X	X	5	1.00
48	X	X	X	X	X	5	1.00
49	X	X	X	X	X	5	1.00
50	X	X	X	X	X	5	1.00
51	X	X	X	X	X	5	1.00
52	X	X	X	X	X	5	1.00
Proportion Relevant:	0.98	0.96	0.98	1.00	0.94	Mean I-CVI (S-CVI) =	0.972

From the feedbacks of the experts during the content validation, seven items were deleted, so a "Needs for Information Literacy Education Model" (NILEM) survey has been derived and a total of 45 items of were retaining for factor analysis. As shown in Table 3.2, these items were two questions related to teachers' demographic information (Section A); fifteen questions related to the teachers' perceptions on their students' information literacy competence (Section B) which consisted of three dimensions, namely, Information Literacy, Independent Learning and Social Responsibility; nine questions related to the teachers' perceptions on the problems of implementing information literacy education in schools (Section C); three questions related to the teachers' perceptions on the need to develop an Information Literacy Education Model (Section D); and sixteen questions related to the teachers'

perceptions on the dimensions of school culture shaped by hidden curriculum that could be used in developing an Information Literacy Education Model (Section E), which contained three dimensions, they were Environment, Activities and Teacher's Role.

Table 3.2

Dimensions and Total Items for Each Section in "Needs for Information Literacy Education Model" (NILEM) Survey Questionnaire

Section	Dimensions	Total Items
(A) Teachers' demographic information		2
(B) Teachers' perceptions on their students' information literacy competence	a) Information Literacy b) Independent Learning c) Social Responsibility	15
(C) Teachers' perceptions on the problems of implementing information literacy education in schools	Problems	9
(D) Teachers' perceptions on the need to develop an Information Literacy Education Model	Needs	3
(E) Teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that could be used in developing an Information Literacy Education Model	a) Environment b) Activities c) Teacher's Role	16

Pilot study and reliability testing. Before the actual survey was carried out at the needs analysis phase, a pilot study was conducted a priori to develop and test the adequacy of research instruments, such as the choice of words, missing items, the amount of time needed to complete, and also assess the feasibility of the survey. Data for pilot study was collected from two schools which were from separate group from the actual survey. The researcher obtained a verbal permission from the principal of each of the selected school and the survey was administered by their administrative teachers. Teacher's response time to complete the instrument was approximately 20 minutes. Out of 250 survey questionnaires distributed, 220 responses were collected,

which indicates a response rate of 88 percent. All of these responses were used to perform factor analysis procedure (where 110 cases for Exploratory Factor Analysis, EFA and another 110 cases for Confirmatory Factor Analysis, CFA) to test the validity and reliability of the questionnaire.

According to Fraenkel, Wallen, and Hyun (2015), reliability refers to the consistency of the scores obtained, that is whether an assessment instrument gives the same results each time it is used in the same setting with the same type of subjects. In this study, the Cronbach's alpha measurement of internal consistency reliability was used to determine the reliability of the instruments. According to Nunnally (1978), the instrument is deemed reliable if the Cronbach's alpha values surpasses the minimum threshold values of 0.70. The instrument reliability test was conducted on the NILEM survey questionnaire for all sections through Cronbach's alpha and the internal consistency ranged from 0.828 to 0.902 (see Table 3.3), which suggested that NILEM survey questionnaire was reliable and can be meaningful for the use in this kind of research.

Table 3.3

Reliability Testing of Needs for Information Literacy Education Model (NILEM) Questionnaire

Section	Total Items	Cronbach's Alpha
(A) Teachers' demographic information	2	-
(B) Teachers' perceptions on their students' information literacy competence	15	0.863
(C) Teachers' perceptions on the problems of implementing information literacy education in schools	9	0.828
(D) Teachers' perceptions on the need to develop an Information Literacy Education Model	3	0.829
(E) Teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that	16	0.902

Data collection procedure for NILEM survey. The data for this study was obtained by surveying teachers from six Independent Chinese schools in Malaysia. Verbal permission to administer the questionnaire was obtained from the principal of each school**.** With the help of the principals, the survey was administered by the administrative teachers in order to collect data from the teachers in each school. This procedure was used to increase the chance of obtaining a high response rate to the questionnaire. The time to answer the complete questionnaire was approximately 20 minutes.

Data analysis procedure for NILEM survey. The main aim of the results of this stage was to justify the needs for developing an information literacy education model as a complement to support the current information literacy education efforts. The data analysis procedure for this stage was divided into two parts, the first part was the validation of NILEM questionnaire. The second part was the analysis of the survey. Data collected was analyzed using one of the more commonly used statistical software packages: The Statistical Package for Social Science (SPSS) version 22 software. For the first part, the descriptive statistics of teachers' demographic variables was presented. Then, the data was screened and the normality test was conducted to identify the distribution of the data. For the normality test, the researcher followed the guideline recommended by Leech, Barrett, and Morgan (2005), where for a variable is at least approximately normal is that if the skewness is less than plus or minus one ($\leq \pm 1.0$). Next, Exploratory Factor Analysis (EFA) was performed on each section except for section A to confirm the factor structure of each construct in the NILEM

survey. The scale's reliability was assessed by calculating Cronbach's alpha internal consistency. In addition, the Confirmatory Factor Analysis (CFA) was presented for each section using AMOS (Analysis of a Moment Structures) statistical software, to know how well the hypothesized measurement model derived from the EFA fit the observed data. The factor analysis procedure was explained in the section below.

Factor analysis. Factor analysis is a multivariate statistical approach which is commonly used in the fields of psychology and education (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005). It refers to " a set of statistical procedures designed to determine the number of distinct constructs needed to account for the pattern of correlations among a set of measures"(Fabrigar & Wegener, 2011, p. 3). According to B. Williams, Onsman, and Brown (2010), factor analysis is an essential tool that can be used in the development, refinement, and evaluation of test, scales and measures, and can be divided into two main categories, namely, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). As the title suggests, EFA is used to explore the dimensionality of an instrument by entering the items into analysis without specifying any a priori factor structure. Therefore, the results of EFA provide an initial exploration of the relationships between the judgmentally developed content categories and the empirically derived constructs (B. Williams et al., 2010). On the contrary, CFA is a form of structural equation modeling applied to test a proposed theory or model by the researcher. In a CFA the researcher has the information about the number of factors, the relations among the factors, and the relationship between the factors and measured variables (Ullman, 2006), the analysis of CFA is to test whether the data fit the proposed model and to established the construct validity of the instrument. According to (Hair, Anderson, Tatham, & Black, 1998), construct validity

is the extent to which a set of measured items actually reflect the theoretical latent construct they are designed to measure.

Exploratory factor analysis (EFA). This study utilized a five-step procedure to conduct an EFA within the instrument development process which was recommended by B. Williams et al. (2010) as shown in Figure 3.1.:

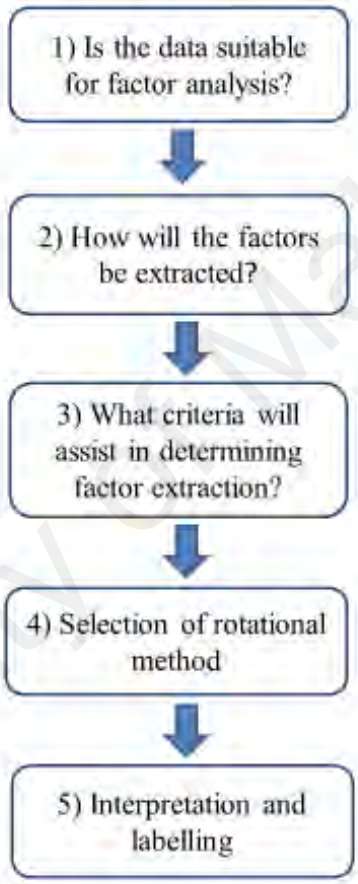


Figure 3.1. The five-step exploratory factor analysis protocol (Williams B. et al., 2010)

According to Williams B. et al., (2010), the first criteria to determine is the sample size. Hair, Black, Babin, Anderson, and Tatham (2010) suggested that the sample sizes for factor analysis should be 100 or greater. Next, in order to determine the relationships between variables, this study followed the suggestion by Davis (1971), the rules of thumb for the range of correlation coefficients are as following: negligible

= 0.00 to 0.09; low = 0.10 to 0.29; moderate = 0.30 to 0.49; substantial =0.50 to 0.69; and very strong =0.70 to 1.00. For the adequacy of sample and suitability of data for factor analysis, another two tests were conducted, they were the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's Test of Sphericity. According to Hair et al. (1998), KMO value must reach at least 0.50 and Bartlett's test of Sphericity which provides a chi-square output must also be significant. It indicates that the matrix is not an identity matrix and accordingly it should be significant for factor analysis if ($p<.05$).

In factor analysis, there are many ways to extract factors, the most commonly used methods are principal component analysis (PCA) and principal axis factoring (PAF) (McCoach, Gable, & Madura, 2013). The decision to use PCA or PAF depends upon the reason for conducting factor analysis. According to Gorsuch (1983) cited by Williams B. et al., (2010), PCA is recommended when no priori theory or model exists. Hence, this study used PCA to extract factors since the purpose of the analysis was to reduce many variables into a smaller set of variables for further analysis.

There are several criteria that can be used to determine the number of factors to extract. As indicated by Hair et al. (2010), multiple criteria was commonly used by most of the factor analysts, this study also used multiple criteria approach in assisting the decision making process for factor extraction. The criteria used in this study were: Kaiser's criterion: Eigenvalues>1 rule (using the eigenvalues>1 from PCA), the Scree Test and Parallel Analysis.

The next step is the selection of rotational method. Rotation can produce more interpretable and simplified solution by maximizing high item loading and minimizing low item loadings. The two commonly rotation techniques are orthogonal rotation and

oblique rotation. Costello and Osborne (2005) stated that orthogonal rotation produces more easily interpretable results compared to oblique rotation. Currently, the most common rotational technique used is orthogonal varimax developed by Thompson (2004). Therefore, this study also followed the orthogonal varimax technique in rotation.

The last step in EFA is interpretation and labelling. This step requires the researcher to examine the attribution of variables to a certain factor and give a name or label to this factor which should reflect the theoretical and conceptual intend.

Confirmatory factor analysis (CFA). A confirmatory factor analysis (CFA) was performed for each scale after the hypothesized model derived from EFA to evaluate the construct validity of the hypothesized model. All the analyses were conducted using the AMOS software. To confirm the construct validity, we need to assess the convergent validity and discriminant validity of the hypothesized model. Convergent validity is achieved when two measures of the same concept are highly correlated, and for the model to obtain convergent validity, the item loadings should reach 0.50 and above (Hair et al., 2010). Discriminant validity is the extent to which two conceptually similar concepts are distinct. It is measured by examining the correlation between variables. If none of the correlation coefficients exceeds 0.90, it indicates that all the variables are distinct (Hair et al., 2010).

There are a few fit indices we need to examine when performing CFA. Many researchers, such as McCoach et al. (2013) and Marsh, Balla, and Hau (1996) recommend that individuals utilize a range of fit indices to overcome the limitations of each index. The indices used in this study and their criterion for acceptance include Chi-square (χ^2), the ratio between chi-square and degree of freedom (χ^2/df) $\leq$ 3.0 or

$\chi^2/df \leq 5.0$ (Schumacker & Lomax, 2004), the Comparative fit index (CFI) ≥ 0.90, Tucker-Lewis index (TLI) ≥ 0.90 (Hu & Bentler, 1999) and the root-mean-square error of approximation (RMSEA<0.08) (Browne & Cudeck, 1993).

For the second part, the descriptive statistics were used to determine the items' mode, mean and standard deviation, to provide descriptive information about teachers' perceptions on:

(a) The teachers' perceptions on their students' information literacy competence.

(b) The teachers' perceptions on the problems of information literacy education implementation in the secondary schools.

(c) The teachers' perceptions on the need to develop an information literacy education model to enhance their students' information literacy competence.

(d) Teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used to develop an information literacy education model.

Summary of Research Methodology and Procedure for Phase 1

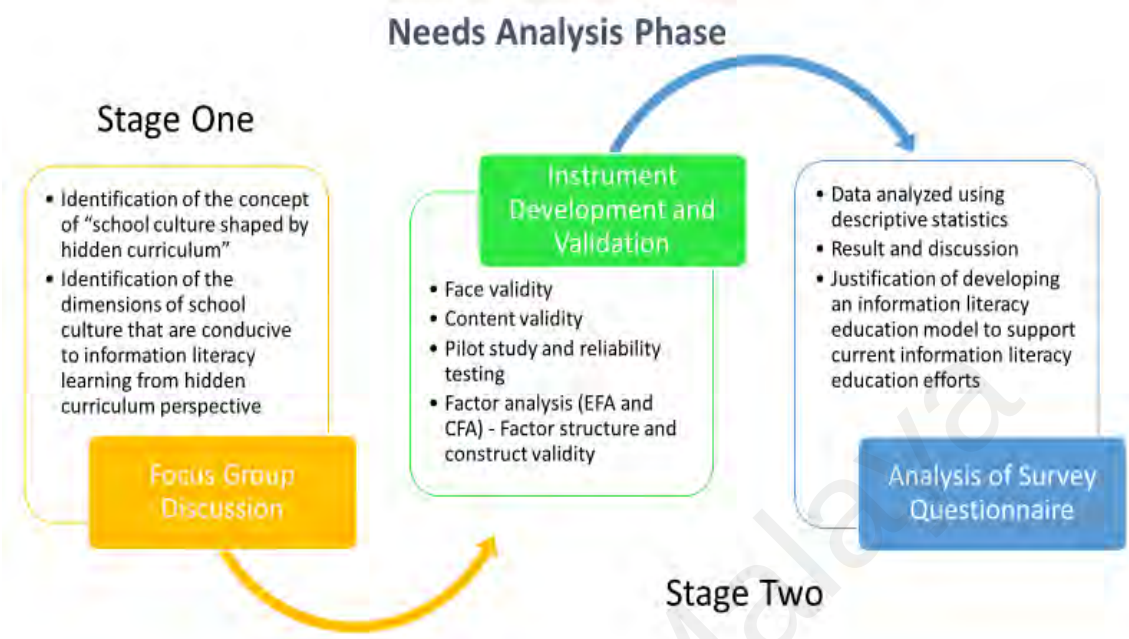


Figure 3.2. Summary of research methodology and procedure in needs analysis phase

Figure 3.2 summarizes the research methodology and procedure for the needs analysis phase. This phase consists of two stages. The first stage utilized a focus group discussion to identify the concept of school culture shaped by hidden curriculum, and the dimensions of school culture that are conducive to the learning of information literacy education from hidden curriculum perspective. The second stage divided into two parts. The first part is the instrument development and validation. The items of the instrument were created based on the research questions, literature review and the data of each theme generated from focus group discussion. This part also addressed the face validity, content validity and also construct validity of the instrument. The second part is the analysis of survey questionnaire. The analysis of this part justifies the needs of developing an information literacy education model to support current education efforts. The details of the sample, data collection, data analysis procedures and the findings of needs analysis phase were presented in Chapter 4.

Phase 2: Model Development

The second phase is the model development phase. This phase explains the process on how a conceptual or hypothesized information literacy education model is developed. As presented in Chapter 1, the preliminary hypothesized model consisted of four variables, namely, school culture, information literacy, motivation and self-efficacy. The instruments for assessing the mentioned variables needed to be validated and the factor structure needed to be verified before a hypothesized model can be developed for further evaluation in phase three. More precisely, this phase aims at achieving the following objectives:

2.1 To identify the factors of school information literacy culture as perceived by Malaysian secondary school students.

2.2 To identify the underlying factors of information literacy skills to measure Malaysian secondary school students' information literacy competence.

2.3 To identify the factor structure of Academic Self-Regulated Questionnaire (SRQ-A) and determine whether it is reliable, valid and suitable for the use of Malaysian secondary school students.

2.4 To determine whether the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale is reliable, valid and suitable for the use of Malaysian secondary school students.

2.5 To propose a hypothesized model of information literacy education for further evaluation.

The following sections explain the research procedure that would be employed in this phase.

Methods

This study intends to develop an information literacy education model by investigating the influence of school information literacy culture created through hidden curriculum on students' information literacy skills acquisition and determining whether motivation and self-efficacy play mediating roles on the relationship between these two variables. Thus, students' self-report responses will be essential to understand whether school culture impacts their motivational beliefs of learning and information literacy skills acquisition. To achieve the results mentioned above, a survey research method is most appropriate for this phase because this approach helps to provide standardized information to describe variables or to study relationships between variables (Malhotra & Grover, 1998).

Sample of the study

This phase also utilized a purposive sampling procedure by surveying 610 students from four Independent Chinese secondary schools in Malaysia. Three of these schools are from Kuala Lumpur, and one from Klang, Selangor. The rationales to select students from independent Chinese secondary schools as participants of this phase are as follows:

1) Independent Chinese secondary schools are not under the jurisdiction of the public education system, thus the mandatory of LMTs to implement information literacy education may not be followed in this type of school. It is more meaningful to probe how information literacy education is carried out in this type of schools as their information literacy education system can be additional reference for public schools.

2) The selected schools were those who have been awarded "Five Stars" in the "Standard Quality of Private Education Institution Assessment Year 2015" by Ministry of Education, Malaysia. That is to say, they are best performing schools with positive school culture.
3) Computer is a compulsory subject in Independent Chinese secondary schools and these schools normally are equipped with e-learning platform to facilitate teaching and learning. These two factors are important in promoting information literacy education.

Initially, a total number of 650 survey questionnaires were distributed, 627 were collected. The response rate was 96.46%. Among the collected questionnaires, 17 of them cannot be used due to the incomplete answer. Thus, the actual number for data analysis was 610 cases.

Stage One: Instruments Development and Validation

This stage can be divided into two parts. The first part is instruments development and the second part are instruments validation. For the school culture variable, based on the theoretical framework discussed in Chapter 2 of this study, as we need to assess the aspect of school culture with regard to information literacy education from the hidden curriculum perspective, the researcher developed a "School Information Literacy Culture Assessment Tool (SILCAT)". The domains and items for SILCAT were developed based on literature review, the findings from focus group discussion and NILEM survey from the Phase 1. For the information literacy skills variable, since there is no standardized assessment instrument to assess secondary students' information literacy skills in Malaysia, the researcher developed the ILSAT (Information Literacy Skills Assessment Tool) to measure the students' information

literacy skills acquisition. ILSAT was developed based on the guideline from "Information Literacy Standards for Student Learning" by the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) (Librarians & Communications, 1998). Another two instruments that measured students' motivation and self-efficacy were adapted from current established instruments, in which motivation was measured using Academic Self-Regulated Questionnaire(SRQ-A) (Ryan & Connell, 1989) and self-efficacy was measured through "Self-efficacy for Learning and Performance" scale, one of the subscales taken from the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich & De Groot, 1990). After the identification of the domains and the description of the items of each domain have been done, the four instruments were composed to establish an "Information Literacy Education Model for Secondary School Students Questionnaire" (ILEMSQ). The details of instrument development process were explained in Chapter 5.

The second part is the validation of instruments mentioned above. Similar to the instrument validation process discussed at Stage Two in Phase 1, this phase also addressed face validity, content validity and construct validity of all of the four instruments in Information Literacy Education Model for Secondary School Students Questionnaire. Since the details of methodology used in this part is the same as in the validation process discussed at Stage Two in Phase 1, to avoid the redundancy of the explanation of methodology, the details of instrument validation process were explained in Chapter 5.

Pilot Study. For this phase, the "Information Literacy Education Model for Secondary School Students Questionnaire" (ILEMSQ) was piloted among 386 secondary school students. These samples were excluded from the actual study. After the data screening process, 36 samples with missing data were deleted and the actual samples for pilot study were 350 samples. For the normality, as indicated in Table 3.4, the skewness of each subscale of the four instruments in Information Literacy Education Model for Secondary School Students Questionnaire ranged from -0.089 to -0.560, which were less than plus or minus one (<±1.0) as suggested by Leech et al. (2005) to be at least approximately normal.

Table 3.4

Normality Results of Each Subscale of the Four Instruments in ILEMSQ

Instrument	Dimensions/ Subscales	Mean	SD	Skewness
SILCAT	Teaching and Learning (TL)	20.3657	2.89312	-0.415
	Perceived Autonomy Support (PAS)	18.0857	3.60890	-0.243
	Moral Development (MD)	38.4514	6.42539	-0.514
	Activities (AC)	21.2257	4.35961	-0.278
ILSAT	Information Literacy (IL)	34.3314	5.37093	-0.295
	Independent Learning (IDL)	26.5771	4.75937	-0.337
	Social Responsibility (SR)	25.6629	4.35996	-0.485
SQR-A	External Regulation (ER)	27.6943	4.56481	-0.560
	Introjected Regulation (IR)	23.6686	5.27022	-0.399
	Identified Regulation (IDR)	23.0686	4.12983	-0.526
	Intrinsic Motivation (IM)	19.9571	4.05562	-0.303
SELP	Self-Efficacy (SE)	23.6114	5.21326	-0.089

Reliability of the Pilot Study Data. To determine the ability of the items to measure the intended dimensions, this study utilized Cronbach's alpha to examine

internal consistencies of items involved in the instruments. Table 3.5 shows the distribution of items according to their respective reliability.

Table 3.5

Distribution of Items According to Their Respective Reliability in ILEMSQ

Instrument	Dimensions/ Subscales	Number of items	Reliability
SILCAT	Teaching and Learning (TL)	6	0.621
	Perceived Autonomy Support (PAS)	6	0.780
	Moral Development (MD)	12	0.811
	Activities (AC)	6	0.850
ILSAT	Information Literacy (IL)	10	0.864
	Independent Learning (IDL)	8	0.809
	Social Responsibility (SR)	7	0.830
SQR-A	External Regulation (ER)	9	0.623
	Introjected Regulation (IR)	9	0.758
	Identified Regulation (IDR)	7	0.768
	Intrinsic Motivation (IM)	7	0.679
SELP	Self-Efficacy (SE)	8	0.865

The reliability test for most of the dimensions was found satisfactory as their internal consistencies ranged from 0.758 to 0.865 except for teaching and learning dimension from SILCAT and external regulation and intrinsic motivation from SQR-A which were less than the threshold values of 0.70. Hence, an exploratory factor analysis was conducted to determine if the items would cluster according to categories other than the categories outlined in the literature review and qualitative data analysis.

After the pilot study, the researcher interviewed a few teachers involved for feedback to identify ambiguities and difficult questions. It was found that all the questions can be answered, but some of the questions need to be rephrased in order to make it clearer

and more understandable. Therefore, all the questions were remained in the questionnaire for actual survey.

Data Collection Procedure for ILEMSQ Survey. To collect data for this phase, the researcher selects four schools according to the criteria of purposive sampling for this study and visited the schools to gain permission for conducting survey from the school's principal. With the help of the schools' teachers, the paper-based survey questionnaires were distributed to the students during their school lessons. Since this self-administrated survey was conducted without the presence of the researcher, a description of written consent was attached to the survey questionnaire. In the written consent, the researcher emphasized to the students that: (a) their participation is voluntarily and they have the option to withdraw from the study at any time, (b) there are no right or wrong responses to any of the items, (c) the questionnaire completed would be treated in highly confidence and only would be analyzed in terms of group responses rather than as individual responses.

Data Analysis Procedure for ILEMSQ Survey. The main purpose of instrument validation stage is to identify the factor structure of each construct in the study and to establish the construct validity. Thus, by using SPSS version 22 software, the data collected was screened to identify missing data and outliers. Then, the descriptive statistics of students' demographic variables was presented. The normality test was also conducted to identify the distribution of the data. In order to prepare the data for factor analysis, the reliability test and the correlation coefficient of summated variables in this study were analyzed. Next, exploratory factor analysis and confirmatory factor analysis were conducted on data collected for SILCAT and ILSAT. This was to identify the factor structure and obtain construct validity of school

information literacy culture and information literacy skills. For motivation and self-efficacy constructs, since they were adapted from established and widely used instruments, only confirmatory factor analysis was performed on each of them to determine their factor structure, construct validity and suitability for the use of Malaysian secondary school students.

Stage Two: Hypothesized Model Development

This stage is also divided into two parts. The first part is the hypotheses development. It provides the theoretical support for the interrelationship between all constructs and identifies the hypotheses based on the interrelationships. On the basis of the theoretical framework of this study, findings from qualitative and quantitative data in Phase 1, the results of the identification and validation of factor structure for each construct in Stage One of this phase, and also the hypotheses developed in Part One, a hypothesized model of information literacy education can be developed in Part Two. The following section presents the hypotheses development process. Moreover, the details of hypothesized model development of information literacy education were explained in Chapter 5.

Hypotheses development. Many studies revealed that school context and culture play pivotal role on students' creativity, educational technology and computer-supported collaborative learning, as well as information literacy skills acquisition (Chang, Lian, Zhang, & Wang, 2016; Lorenz, Eickelmann, & Gerick, 2015; Zhu, 2013). For instance, study by Zhu (2013) noted that cultural dimensions (openness and collaboration) and school organisational culture features (innovation orientation and structured leadership) were significant factors relating to the implementation of computer-supported collaborative learning. This is supported by Lorenz et al. (2015). By focusing on the teacher and school related factors contributing to students' acquisition of the computer and information literacy of secondary school students in 21 countries, they found that the school culture factors such as school leadership, teachers' professional development and appropriateness of IT-equipment are significantly related to students' acquisition of the computer and information literacy. On the basis of this evidence, Hypothesis 1 was defined as follows:

H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.

According to the self-determination theory, social context such as positive, healthy and supportive school culture which supports the individual's experience of autonomy and competence will foster intrinsic motivation (Deci et al., 1991). This argument is supported by many empirical research (Badri et al., 2014; Deci & Ryan, 2008; Guay & Vallerand, 1996; Leversen et al., 2012; Niemiec & Ryan, 2009; Orsini, Evans, & Jerez, 2015; Reeve & Jang, 2006; Ryan & Deci, 2000a; Standage, Duda, & Ntoumanis, 2006). For example, when examining the relation between students' perceived school culture, basic psychological needs, intrinsic motivation and academic achievement in a causal model, Badri et al. (2014) found that if school culture supports students' autonomy, they will experience fulfilment of their basic psychological needs, and attain higher intrinsic motivation and academic achievement. In addition, as part of the school culture, the physical environment and leisure activities also are evidenced to be closely related to students' basic psychological needs (Leversen et al., 2012; Sjöblom et al., 2016). Therefore, the researcher proposed the following hypothesis:

H_2: There is a causal relationship between school information literacy culture and motivation.

In the literature of motivation framed by self-determination theory, there are also few examples that examine the impact of motivation on students' information literacy skills acquisition. For example, Arnone et al. (2009) investigates the extent to which context factors inherent to the school library influence students' perceived competence in the domain of information skills, and their intrinsic motivation for research, this indicated that student perceptions of their school librarian's autonomy supportiveness

and their perceptions of the librarian's technology competence contribute significantly to perceived competence in the domain of information skills and intrinsic motivation for research. Recent study by Ross et al. (2016) on undergraduate students in an Australian higher education institution revealed that both intrinsic and extrinsic academic motivation were found to be positively related to information literacy self-efficacy, while amotivation was negatively related. The most important predictor of information literacy self-efficacy was intrinsic motivation. Therefore, this led to the formulation of Hypothesis 3 as follows:

H_3: There is a causal relationship between motivation and information literacy skills acquisition.

Numerous investigations indicated that school context also has impact on students' self-efficacy beliefs (Gafoor & Ashraf, 2012; Saboor et al., 2015; Sottile Jr, Carter, & Murphy, 2002). For instance, Sottile Jr et al. (2002) created a survey to determine a teacher's perspective of his/her school culture, as well as to measure a teacher's science achievement, math achievement, science self-efficacy, and math self-efficacy. Their findings indicated that there is a strong relationship between school culture and self-efficacy, as well as science/math achievement. A study by Gafoor and Ashraf (2012) regarding the influence of school-image on academic self-efficacy belief revealed that one eighth of secondary school students' academic self-efficacy is attributable to school image. Among the school image components, academic focus of the school, its involvement with parents and community, and leadership of the school significantly determine students' self-efficacy belief. From these studies the following hypothesis was formulated:

H_4: There is a causal relationship between school information literacy culture and self-efficacy.

Other than that, studies also indicated that there is positive relationship between self-efficacy and information literacy. For example, Serap Kurbanoglu (2003) found that the students' self-efficacy beliefs regarding information literacy and computers are correlated. Another study by Kiliç-Çakmak (2010) regarding learning strategies and motivational factors that predict information literacy self-efficacy of e-learning students found that metacognitive, effort management, elaboration and critical thinking strategies, as well as control belief, predict different dimensions of information literacy self-efficacy. As a result of above discussion, the following hypothesis was proposed:

H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.

Schunk (1995) provided evidence that self-efficacy helps to predict motivation and performance. This findings was further ascertained by Bedel (2015), who explored academic motivation, academic self-efficacy and attitudes toward teaching in pre-service early childhood education teachers and to investigate the relationships among those variables. By using regression analyses, her study revealed that academic self-efficacy was the only meaningful predictor of academic motivation. Therefore, the following hypothesis was employed:

H_6: There is a causal relationship between self-efficacy and motivation.

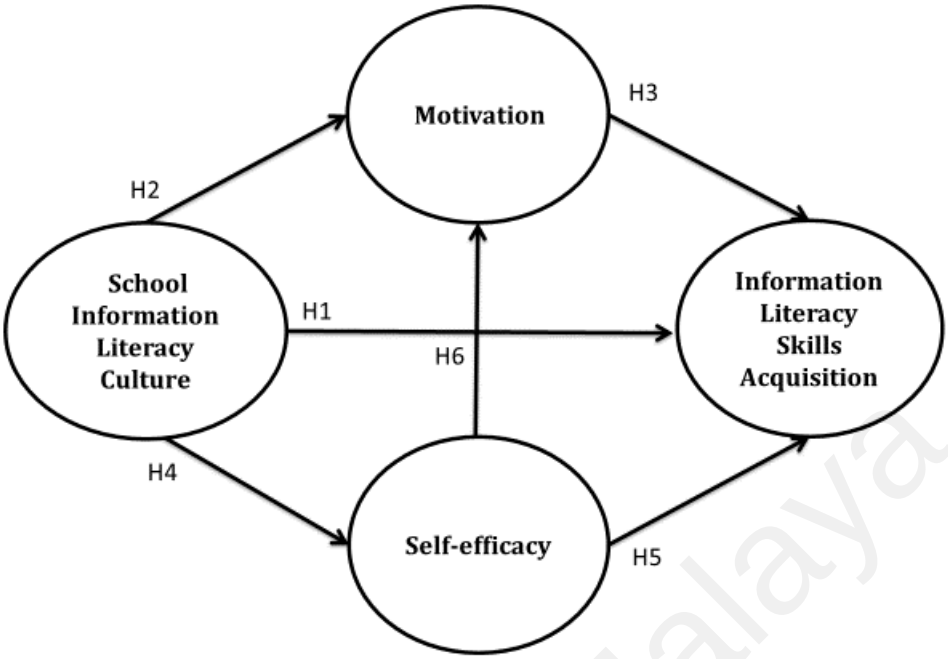


Figure 3.3. The hypothesized direct relationships among school information literacy, motivation, self-efficacy and information literacy skills

Based on the evidence of previous studies discussed above, the hypothesized direct relationships among the four variables in this study can be illustrated as in Figure 3.3. In addition, as discussed in the theoretical framework of this study, the key driven forces of information literacy skills acquisition are the creation of positive school information literacy culture through hidden curriculum and students' motivational beliefs (self-efficacy and motivation). In this case, the environment factor may also influence personal factors to exhibit desired behavior. So, other than the direct relationships, the students' information literacy skills may also be influenced by the indirect relationships. By extending this line of thinking, this study proposed and tested the following hypotheses:

H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition. (SILC→M→ILS)

H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition. (SILC→SE→ILS)

H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition. (SE→M→ILS)

Therefore, the hypothesized relationships among variables for this study is shown in Figure 3.4.

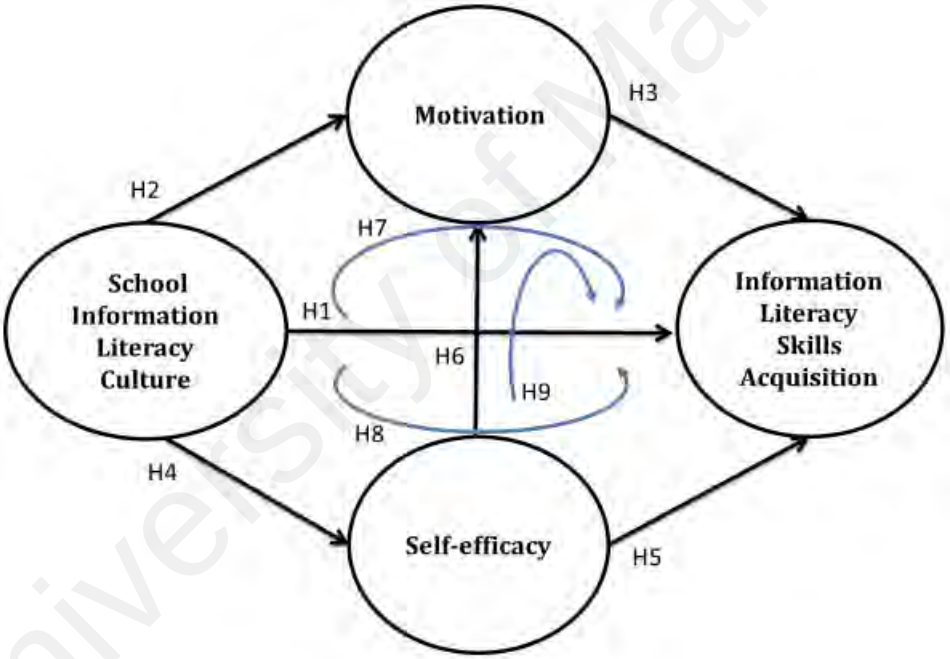


Figure 3.4. The hypothesized relationships among school information literacy, motivation, self-efficacy and information literacy skills

Summary of Research Methodology and Procedure for Phase 2

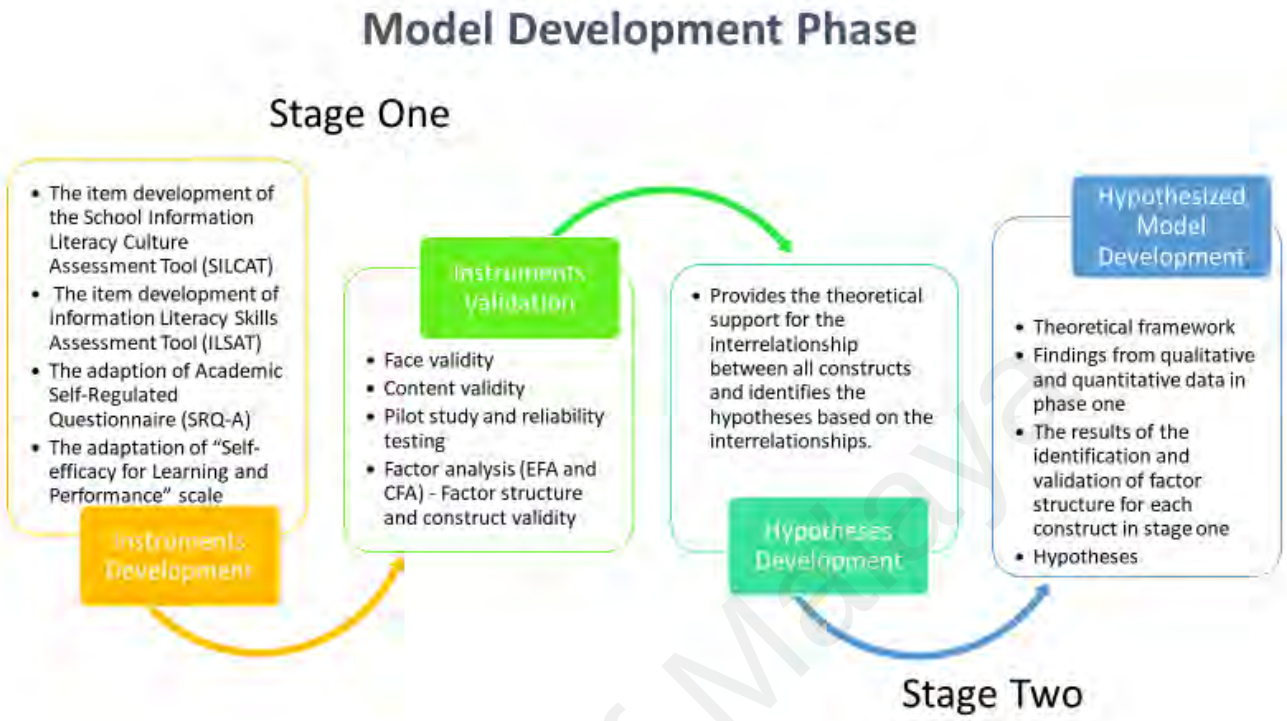


Figure 3.5. Summary of research methodology and procedure for model development phase

Figure 3.5 summarizes the research methodology and procedure for the model development phase. The process of designing and validating the instruments and the developing of the hypothesized model of this phase was a two-stage process. Stage one was the initial writing of items for the instrument of assessing school information literacy culture (from hidden curriculum perspective) and the instrument of students' information literacy skills. For the adapted instruments, Academic Self-Regulated Questionnaire (SRQ-A) and "Self-efficacy for Learning and Performance" (SELP) scale, were used as the main language of converse of the study samples is Chinese Language, translation was conducted using back-to-back translation procedure. Next, items were reviewed by a panel of experts to determine the content validity. Finally, exploratory factor analysis and confirmatory factor analysis were conducted individually on each instrument to verify the factor structure and construct validity for each instrument.

In Stage Two, the analysis can be divided into two parts. The first part provides theoretical support for the interrelationships between all constructs and identifies the hypotheses based on the interrelationships. In Part Two, based on the findings from Stage One in this phase where the factor structure of each construct has been identified, and on the basis of hypotheses that have been identified in Part One, a hypothesized model of information literacy education can be developed. The details of data analysis process and the findings of model development phase were presented in Chapter 5.

Phase 3: Model Evaluation

This phase is the model evaluation phase. The hypothesized model of information literacy education developed in Phase 2 consists of four main constructs, namely school information literacy culture, information literacy skills, motivation and self-efficacy. This phase evaluated the hypothesized model by investigating the relationship between school information literacy culture and student's information literacy skills acquisition. In addition, motivation and self-efficacy were introduced as mediating variables to examine if these two variables have any mediating effect on the relationship between school information literacy culture and information literacy skills acquisition. As presented in hypotheses development section in Phase 2, the hypotheses of this study are as follows:

H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.

H_2: There is a causal relationship between school information literacy culture and motivation.

H_3: There is a causal relationship between motivation and information literacy skills acquisition.

H_4: There is a causal relationship between school information literacy culture and self-efficacy.

H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.

H_6: There is a causal relationship between self-efficacy and motivation.

H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.

H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.

H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.

These hypothesized relationships among the study variables were examined via Structural Equation Modeling (SEM) analysis to confirm the proposed theoretical model of information literacy education. According to Kline (2010), SEM is an appropriate approach to test hypothesis about relationships among different variables in a study. It is also a methodology that takes a confirmatory approach to the analysis of a theory relating to some phenomena. Moreover, SEM also enables researchers to conduct single, systematic and comprehensive analyses by modeling relationships among multiple independent and dependent variables (Kline, 2010). There are two main approaches to SEM. The first approach is Covariance-based SEM (CB-SEM), also known as Covariance Structure Analysis (CSA). It can be carried out by using software packages such as AMOS, Mplus and LISREL. The second approach is Partial Least Square (PLS), it is a causal modelling approach which focuses on maximizing the explained variance of the dependent latent variables (Hair, Ringle, & Sarstedt, 2011), and can run on several specific software such as SmartPLS, VisualPLS or WarpPLS.

The justification of using either PLS-SEM or CB-SEM depends on the purpose why the study was conducted (Hair et al., 2011; Jörg Henseler, 2009). If the research objective is theory testing and confirmation, then the CB-SEM is more appropriate than PLS. This is because when it comes to theory testing, it requires a method that has the ability to show how well a theoretical model fits the observed data. Since the strength of CB-SEM is to minimize the co-variance matrix, therefore it is more appropriate to use in theory testing and confirmation (Barclay, 1995). On the other hand, PLS is suitable when research is in the early stage and a new model needs to be explored and validated. That is to say, the main objective of PLS is to predict the theoretical model that has been suggested based on the literature and not to test which alternate model fit the data better (Sosik, Kahai, & Piovoso, 2009). According to Hair and Lukas (2014), PLS is an appropriate approach for testing the development model. Since the general aim for this study is to develop an information literacy education model, the PLS-SEM approach is more appropriate at the model evaluation phase in this design and developmental research. Therefore, the analysis of SEM in this study will follow the PLS-SEM approach. The following sections explain the main processes of these assessments.

Stage One: PLS-SEM Model Specification

According to Hair, Hult, Ringle, and Sarstedt (2014), before a model is evaluated, it is crucial to specify the nature of the constructs of the measurement model and structural model. In Path analysis, latent variable is also called "factor" or "construct" (represented by circle or ellipse) and it is a type of variable that is not directly observed, and the observed variable is something directly measured (e.g., by a questionnaire), it is also known as "manifest", "measured variable" or "indicator" (represented by square or rectangle). Although latent variable cannot directly be

observed but it can be inferred (through a mathematical model) from other observed variables. A SEM consists of two sub-models, the inner model (structural model) and the outer model (measurement model). The structural model specifies the relationships between the independent and dependent latent variables. In PLS-SEM, only recursive relationships in the structural model is permitted, therefore, the structural paths between the latent variables can only head in a single direction (Hair et al., 2011). The measurement model specifies the unidirectional predictive relationships between each latent variable and their observed variables. Multiple relations are not permitted; hence, the observed variables are only associated with only a single latent variable.

In SEM, variable that has path arrow pointing outwards and none leading to it is called exogeneous variable, and if there is a path arrow leading to it, it is known as endogenous variable. There are two types of measurement models, reflective and formative. When changes in latent variable reflect in changes in observed variable, this is a reflective measurement model and the reflective indicators are represented as single headed arrows pointing from the latent variable outward to the observed variables; the associated coefficients for these relationships are called *outer loadings* in PLS‐SEM. On the other hand, when changes in observed variable determine changes in latent variable, this is a formative measurement model and formative indicators are represented by single-headed arrows pointing toward the latent construct inward from the indicator variables; the associated coefficients for these formative relationships are called *outer weights* in PLS‐SEM (Hair et al., 2011). All these relationships can be illustrated in Figure 3.6.

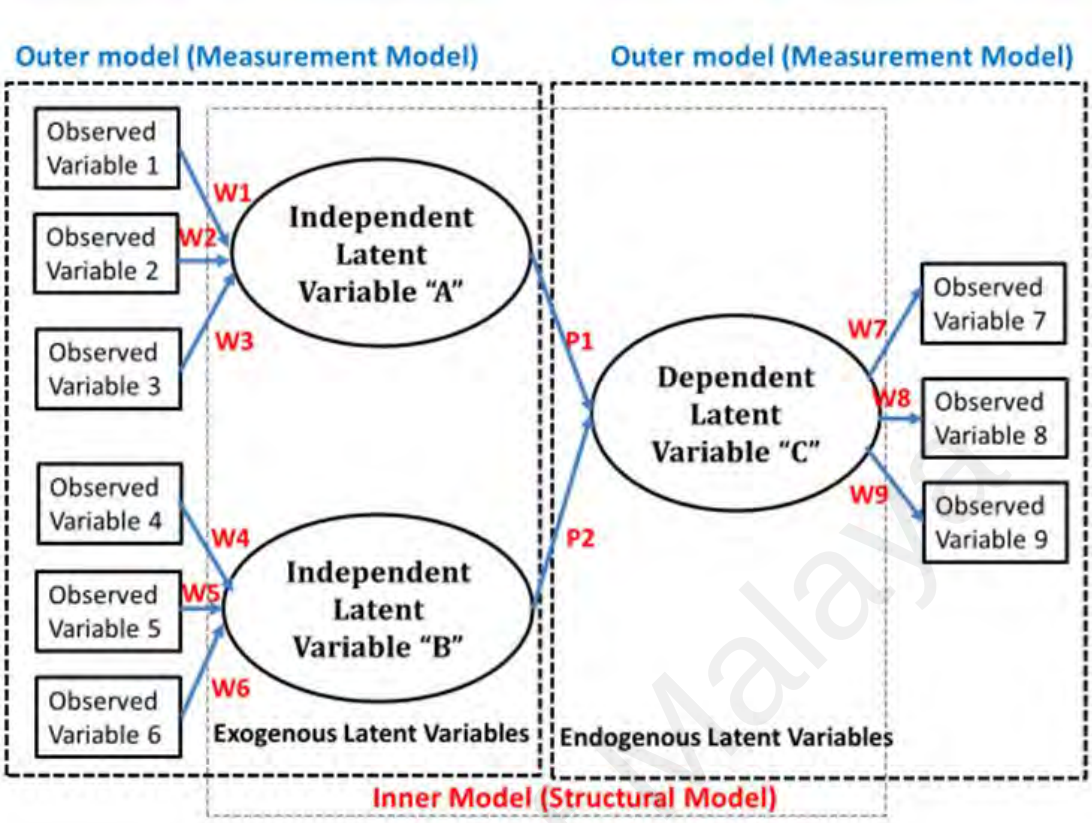


Figure 3.6. Path model example

Therefore, for the measurement model specification, we need to specify the relationship between latent variable and observed variable either it is reflective or formative based on the assumption of their relationship. Moreover, structural model can be divided into first-order model and the higher-order model. Jarvis, MacKenzie, and Podsakoff (2003) identified four types of higher-order models dependent on the relationship among the first order construct and their indicators and second order construct and the first order construct. These four types are; reflective-reflective type, reflective-formative type, formative-reflective type, and formative-formative type. Thus, the structural model also can be specified according to the assumption of the relationship among the first order construct and their indicators and second order construct and the first order construct. The details and findings of model specification

for this study were presented in Chapter 6 which indicated that the hypothesized model of this information literacy education is a reflective-reflective type higher-order model.

Stage Two: PLS-SEM Measurement Model Evaluation

In PLS-SEM assessment, the evaluation of the measurement model is to establish the reliability and validity of the latent variable. The first step is to examine the measures' reliability and validity of the first order construct according to certain criteria associated with formative and reflective measurement model specification. For the reflective measurement model, we need to check:

i. Internal Consistency Reliability- Traditionally, "Cronbach's alpha" is used to measure internal consistency reliability in social science research but it tends to provide a conservative measurement in PLS-SEM. Prior literature has suggested the use of "Composite Reliability" as a replacement (Hair, Sarstedt, Ringle, & Mena, 2012). Bagozzi and Yi (1988) suggest that the Composite reliability should be 0.7 or higher. If it is an exploratory research, 0.6 or higher is acceptable.

ii. Indicator reliability- To consider an item loading to be reliable, it has to exceed the threshold of 0.70 and the square loading (i.e., the variances explained for the indicator has to be higher than 0.5). According to Hulland (1999) 0.70 or higher is preferred. If it is an exploratory research, 0.4 or higher is acceptable.

iii. Convergent validity-The average variance extracted (AVE) number should be 0.5 or higher as suggested by Bagozzi and Yi (1988).

iv. Discriminant validity- Fornell and Larcker (1981) suggest that the "square root" of AVE of each latent variable should be greater than the correlations among the latent variables.

Next is the assessment of measurement model of the higher-order constructs. According to Hair et al. (2011), the procedure for assessing the second-order construct is similar to the assessment of first-order construct. In the assessment, the second-order construct is regarded as the latent variable, and the first-order construct is served as indicators. Hence, this study also checked the internal consistency reliability, indicator reliability, convergent validity and discriminant validity for the second order constructs based on the same rules of thumb as in first order construct.

Stage Three: PLS-SEM Structural Model Evaluation

In PLS-SEM, structural model assessment includes the weights or path coefficients to evaluate the significance and relevance of the structural model relationships, their significance was tested through *t*-values obtained from the bootstrapping method. Also, the coefficient of determination, R^2 value to evaluate the model predictive accuracy, Q^2 to evaluate the model's predictive relevance and the effect size f^2 to evaluate the impact of the exogenous variable on an endogenous variable (Hair et al., 2014). Other than the examination of the direct effect relationship, this study also investigates the mediating effect of motivation and self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition. The details and findings of the model evaluation for this study are explained and presented in Chapter 6.

Summary of Research Methodology and Procedure for Phase 3

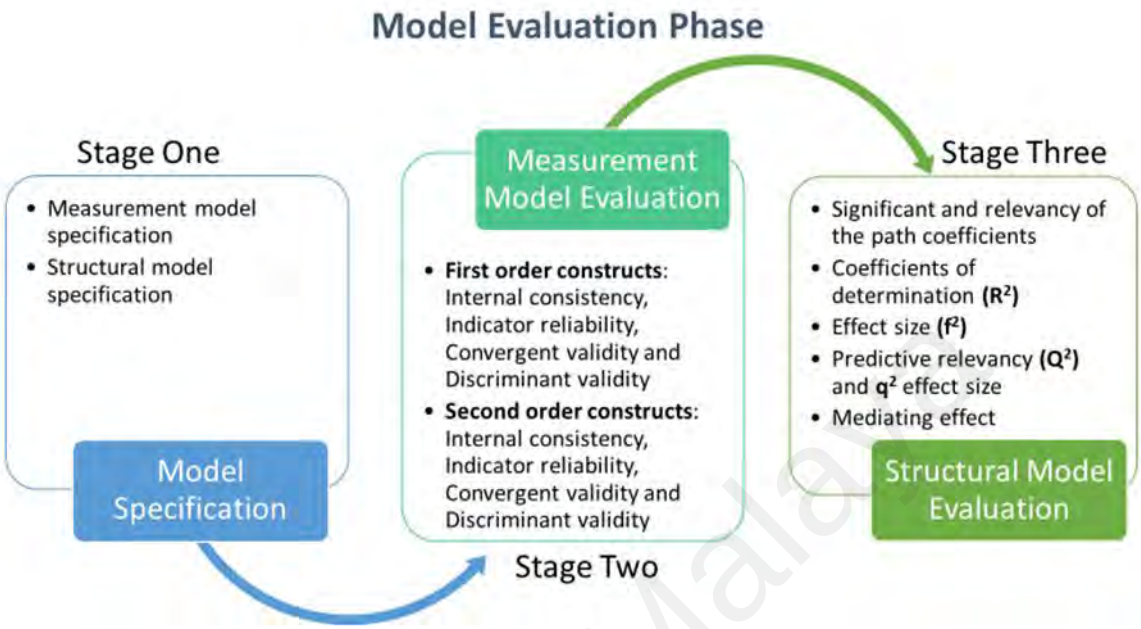


Figure 3.7. Summary of research methodology and procedure of model evaluation phase

In Phase 3, the Partial Least Square Structural Equation Modeling (PLS-SEM) analysis was carried out using the software SmartPLS version 2.0. to evaluate the hypothesized model of information literacy education. The model evaluation in this study is a three-stage process. The first stage is the specification of measurement model and structural model based on the guideline for choosing model mode recommended by Hair et al. (2014). The second stage is the measurement model evaluation. The assessment of measurement model in this study is divided into two parts. The first part is the assessment of first-order constructs and the second part is the assessment of second-order constructs. The analyses include internal consistency reliability, indicator reliability, convergent validity and discriminant validity. The third stage is the structural model evaluation. The research questions for this phase can be answered by performing the analyses on the structural model, which include the path coefficients to evaluate the significance and relevance of the structural model relationships, *t*-

values, the coefficient of determination (R^2), the effect size (f^2), the model's predictive relevance (Q^2) and its effect size (q^2), and also the mediating effects.

The Matrix of Methodology

Table 3.6 presents the matrix of the development of information literacy education model based on school information literacy culture and mediated by motivation and self-efficacy.

Table 3.6

Matrix of the Development of Information Literacy Education Model Based on School Information Literacy Culture and Mediated by Motivation and Self-efficacy

Phase	Method	Participants	Research Questions
I: Needs Analysis	*Stage 1: Focus Group Discussion*	3 principals; 2 library and media teachers and 2 administrative teachers	1.1 What is the concept of "school culture shaped by hidden curriculum"
			1.2 From the hidden curriculum perspective, what are the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition?
			1.3 What are teachers' perceptions on their students' information literacy competence?
	Stage 2: Survey	386 teachers	1.4 What are teachers' perceptions on the problems of implementing information literacy education in schools?
			1.5 What are teachers' perceptions on the need and feasibility of developing an information literacy education model based on school culture shaped by hidden curriculum?
			1.6 What are teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used in developing an information literacy education model?
II: Model Development	*Survey*	610 secondary school students	2.1 What are the factors of school information literacy culture as perceived by Malaysian secondary school students?
			2.2 What are the underlying factors of information literacy skills to measure Malaysian secondary school students' information literacy competence?
			2.3 What is the factor structure of Academic Self-Regulated Questionnaire (SRQ-A) and is it reliable, valid and suitable for the use of Malaysian secondary school students?
			2.4 Is the single factor structure of "Self-efficacy for Learning and Performance"

		(SELP) scale reliable, valid and suitable for the use of Malaysian secondary school students? 2.5 What is the hypothesized model of information literacy education for further evaluation?
III: Model Evaluation	*Structural Equation Modeling*	3.1 Is there a causal relationship between school information literacy culture and information literacy skills acquisition? 3.2 Is there a causal relationship between school information literacy culture and motivation? 3.3 Is there a causal relationship between motivation and information literacy skills acquisition? 3.4 Is there a causal relationship between school information literacy culture and self-efficacy? 3.5 Is there a causal relationship between self-efficacy and information literacy skills acquisition? 3.6 Is there a causal relationship between self-efficacy and motivation? 3.7 Is there a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition? 3.8 Is there a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition? 3.9 Is there a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition?

Summary of Chapter 3

This study adopts the design and development research approach to develop an information literacy education model based on school information literacy culture and mediated by motivation and self-efficacy. There are three phases in this approach. Phase 1 is the needs analysis phase which contains two stages. For the first stage, a qualitative approach where a focus group discussion was conducted to identify the concept and dimensions of school culture shaped by hidden curriculum. The findings from this stage were used to identify the key issues for questionnaire development before a survey was conducted in the second stage. For the second stage, the researcher utilized self-administered survey research method to understand the teachers' views on whether there is a need to develop an information literacy education model, and dimensions of school culture shaped by hidden curriculum that could be used to support the current information literacy education efforts.

Phase two is the model evaluation phase. This study tends to develop an information literacy education model which investigates the influence of school information literacy culture created through hidden curriculum on students' information literacy skills acquisition, and whether motivation and self-efficacy play mediating roles on the relationship between these two variables. Thus, this phase also used survey to collect data for the investigation. The model development phase explains the process on how a conceptual or hypothesized information literacy education model is developed. There were also two stages in this phase. The first stage was the instruments development and validation. The second stage was the hypotheses development and hypothesized model development.

The third phase is the model evaluation phase. A Partial Least Square Structural Equation Modeling (PLS-SEM) analysis was conducted to evaluate the hypothesized model of information literacy education. The model evaluation is a three-stage process. The first stage is the specification of measurement model and structural model. The second stage is the measurement model evaluation, and third stage is the structural model evaluation. Furthermore, the researcher also explains the sample, instruments, data collection and also data analysis procedures clearly in this chapter.

CHAPTER 4: FINDINGS OF NEEDS ANALYSIS PHASE

Introduction

This chapter presents the results of the qualitative (focus group discussion) and quantitative data (NILEM survey) for the needs analysis phase. The results from this phase justified the needs for developing an information literacy education model as a complement to support the current information literacy education efforts.

Stage One: Focus Group Discussion

There are two stages in this phase. First, a focus group discussion with seven school principals, library and media teachers and school administrators was conducted. The researcher grounded her guiding questions for the focus group based on the literature review on information literacy, hidden curriculum and school culture. Since the school leadership's role is as a catalyst in creating desired school culture for every individual school, the researcher intended to have in-depth understanding of the school's principal and administrative teachers' views on this matter.

Results of Analysis for Research Question 1.1 and 1.2

1.1 What is the concept of "school culture shaped by hidden curriculum"?

1.2 From the hidden curriculum perspective, what are the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition?

At first, to identify the concept of "school culture shaped by hidden curriculum", the participants were asked to give their opinions on the concept of "school culture shaped by hidden curriculum". There was a consensus among the participants that this concept should refer to the educational experiences that students

gained within the culture that every individual school created in their day-to-day operations and activities.

> "Just think of one, because if the hidden curriculum is understood as an educational experience, and then it is difficult to quantify, it becomes a very permeable kind of thing. The so-called permeability, it is infiltrated in every day of the campus life, that penetrates into the formal curriculum, and also penetrated into the informal curriculum. It is very, because it is very subtle, … that the penetration is very strong, that we can actually extract its educational function in every school activity…what I am trying to say is that the extraction of education element of school activity itself, which in fact becomes a school culture." (24.4.17, Q1:110-116, P2)

The participants also agreed that we need to pay more attention to the hidden curriculum that exists and can use it to shape the desired school culture which is intended for information literacy education.

> "We may not be aware of this part, we just think that it is an activity. But today, if we pay more attention to every single activity in the school, it is a way to shape the school culture, then it is integrated, I think it is more suitable to say, it exists in every corner of the school. This includes every movement of the teachers, everything that school does, from this point of view, it is more able to have a holistic view to shape a school culture and information literacy…." (24.4.17, Q1: 125-133, P7)

Three themes describing the characteristics and dimensions of school culture from hidden curriculum perspective intended for information literacy skills acquisition were identified from the qualitative data, they were:

Table 4.1

School Culture that Values Information Technology and Students-Centered Teaching and Learning

Themes	Subthemes
Information Technology	(i) e-learning platform • "For the e-learning platform, some departments use it as extension learning, some update their learning materials and let students do their self-learning in the platform …" (24.4.17, Q2: 211-215, P3) (ii) Computer aided instruction • "Teachers normally will use computer to assist their teaching …" (24.4.17, Q2: 219, P5)
Student Centered	(i) Interaction and inspiration • (student-centered teaching) we all agreed that the interaction and inspiration are important, but there is a problem of time constraint." (24.4.17, Q4: 711-712, P1) (ii) Multivariate evaluation • "This year the principal has done some changes, especially in our small test… the principal is actually changing our teaching model, she wants more on progressive evaluation…, you can even use oral evaluation…multivariate evaluation." (24.4.17, Q3: 441-444, P6) (iii) Experiencing Information • "I think sometimes learning must combine with life experience, …an inexperienced people won't know how sweet the orange is until he really ate it. So, we need to create environment for the students to experience information. (24.4.17, Q3: 487-491, P4) (iv) Opportunity to perform • "For example, our teacher lets students to do teaching in the class, she just guided them by side, we found that the students performed even better than the teacher! I think it is really good to let them do, they have this opportunity to show their talents and abilities…" (24.4.17, Q3: 522-526, P4) (v) Higher order thinking, critical thinking • "inquiry-based learning, project-based…and others, now all talk about higher order thinking, critical thinking…" (24.4.17, Q3: 579-580, P3)

Table 4.2

School Culture that Values Independent Learning and Autonomy Support

Themes	Subthemes
Independent Learning and Autonomy Support	(i) Independent Learning • "I think that the concept of information literacy is very broad, as long as the culture that can inspire students to self-study, or independent learning, or inspires him to be creative, all these are counted ... I believe that every school will have…" (24.4.17, Q3: 307-309, P2) • "In the activity, teacher only plays as facilitator or helper to promote learning, students are the owner, they decide what they want to learn…" (24.4.17, Q3: 318-320, P4) • "I think some teachers felt that students do not have this ability (self-learning). In fact, students have this potential, just they do not have the chance to express…" (24.4.17, Q3: 508-510, P5) (ii) Autonomy support • "…here the students are autonomous, the school only provides an environment and conditions…" (24.4.17, Q3: 339-340, P2) • "That is to say, students have the autonomy (when participating in the activity). In fact, they hoped that they can do something great through their own creativity, ability and leadership…" (24.4.17, Q3: 350-352, P1) • "here immerged the school culture, created by students themselves…the formation of the culture is unknowingly, but from our perspective, this is one kind of hidden curriculum" (24.4.17, Q3: 359-361, P2)

Table 4.3

School Culture that Values Character Development

Themes	Subthemes
Character Development	(i) Role model • "It is also important for teachers to show respect to their students, students will learn from us." (24.4.17, Q4: 657, P3) • "Because of your encouragement, you talked something good about the school in front of the students, then the students will follow you, because we are their model." (24.4.17, Q4: 673-675, P4)
	(ii) Moral education • "… our principal always reminds us that the school is a place where students can make mistakes, and then the focus is that we want the students to know where he is wrong, and then let him know very clearly what he can do…" (24.4.17, Q4: 645-647, P1) • "…I think the affective domain, the computer cannot teach him, his peers have no way to teach him, most of the times this have to rely on school education. In fact, it is a part of moral education, I think, but this part is very subtle, it must rely on a long period of cultural influence, and is the most difficult, but also the most important part of school education." (24.4.17, Q4: 690-695, P2) • "This part (information ethics), teachers are really important, they also need training in information literacy, our teachers are lacking of this kind of awareness…" (24.4.17, Q4: 703-704, P4) • "…the same thing with regard to ethical aspect of information literacy, although students attended lesson in this topic, the most efficient way is nurturing through school culture" (24.4.17, Q4: 704-705, P4) • "We need to be fair when dealing with displinary problems, students will observe how we make judgement, if they feel that we are fair, we can easily gain their cooperation." (24.4.17, Q1: 03-31, P3) • "Kindness cannot be taught, students learn this value through the school culture…" (24.4.17, Q4: 723, P2)

Summary of the Answer for Research Question 1.1 and 1.2

The findings from the focus group discussion revealed that the concept "school culture shaped by hidden curriculum" should refer to the educational experiences that students gained within the culture that every individual school created in their day-to-day operations and activities. From the hidden curriculum perspective, the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition can be categorized into three main themes, namely (a) School culture that values information technology and student-centered teaching and learning. (b) School culture that values independent learning and autonomy support, and (c) School culture that values character development.

Stage Two: The NILEM Survey

This phase was conducted using "Needs for Information Literacy Education Model (NILEM)" survey questionnaire distributed among teachers from secondary schools in Malaysia. The main aim of the results of this stage was to justify the needs for developing an information literacy education model as a complement to support the current information literacy education efforts. The data analysis procedure for this stage was divided into two parts, the first part was the analysis and findings of NILEM questionnaire validation. The second part was the findings of the survey.

Descriptive Statistics

Initially, out of 500 survey questionnaires distributed, 397 responses were collected, resulting in 79.4% response rate. After deleting 11 responses with missing values, the number of complete responses that can be used for data analysis were 386. Among these samples, 121 (31.3%) were male and 265 (68.7%) were female teachers. Out of 386 teachers, 298 (77.2%) of them were subject teachers, 47 (12.2%) of them were head of departments and 41 (10.6) of them were administrative teachers. Table 4.4 illustrates the descriptive statistics of the sample.

Table 4.4
Descriptive Statistics of Teachers' Demographic Variables

		Frequency (n)	Percent (%)
Sex	Male	121	31.3
	Female	265	68.7
Position	Administrative Teacher	41	10.6
	Head of Department	47	12.2
	Subject Teacher	298	77.2

Instrument Validation

As discussed in Chapter 3, the researcher designed and developed a "Needs for Information Literacy Education Model (NILEM)" survey questionnaire. The items were created based on the research questions, literature review and the data of each theme generated from focus group discussion. After the face validity and content validity procedures, 45 questions were retained for factor analysis to further confirm the construct validity. A pilot study has been conducted on this NILEM questionnaire and the results of the instrument reliability test indicated that the internal consistency were 0.863, 0.828, 0.829 and 0.902 for section B, C, D and E respectively, which suggested that NILEM survey questionnaire was reliable and can be meaningful for use in this kind of research. This section presents the findings from the instrument validation process.

For the preparation of data analysis, the data collected were screened to identify the distribution of data or normality. There are many ways to test the normality, such as Shapiro-Wilk test, Kolmogorov-Smirnov test or divide the skewness by its standard error, but these methods may be used for small to medium sized samples (e.g., n<300) but may be unreliable for large samples (Kim, 2013). According to Leech et al. (2005), a simpler guideline for a variable to be at least approximately normal is that the skewness is less than plus or minus one (<±1.0). Table 4.5 shows the values of skewness for each of the subscales /dimensions in NILEM questionnaire where all values of skewness are <±1.0.

Table 4.5

Normality Results of Each Subscale/Dimension in NILEM Questionnaire

Subscale/ Dimension	Skewness
1) Information Literacy (IL)	-0.059
2) Independent Learning (IDL)	-0.113
3) Social Responsibility (SR)	-0.145
4) Problem (P)	-0.335
5) Needs (N)	-0.425
6) Environment (EV)	-0.215
7) Activities (AC)	-0.755
8) Teacher's Role (TR)	-0.173

Factor and reliability analyses of Section B in NILEM questionnaire. Initially, 15 items from section B in NILEM Questionnaire were subjected to factor analysis. The items were created based on the three categories suggested by the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) in "Information Literacy Standard for Students Learning", namely information literacy, independent learning and social responsibility (Librarians & Communications, 1998). Prior to conducting principal component analysis (PCA) in EFA, bivariate correlation matrix was used to visually inspect the inter-item correlation. According to Davis (1971), the rules of thumb for the range of correlation coefficients are as follows: negligible = 0.00 to 0.09; low = 0.10 to 0.29; moderate = 0.30 to 0.49; substantial =0.50 to 0.69; and very strong =0.70 to 1.00. Table 4.6 presents the correlation coefficient of summated variables in section B. The result indicated that the correlation coefficients range from 0.360 to 0.535

(moderate to substantial), indicated that the items in section B were suitable for factor analysis.

Table 4.6

Correlation Coefficient of the Summated Variables in Section B

	IL	IDL	SR
Information Literacy (IL)	1		
Independent Learning (IDL)	0.535**	1	
Social responsibility (SR)	0.360**	0.524**	1

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

Next, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlette's test of sphericity were calculated to further confirm the adequacy of sample and suitability of data for factor analysis. According to Hair et al. (1998), KMO value must reach at least 0.50 and Bartlett's test of Sphericity which provides a chi-square output must also be significant (p-value < 0.05). For this section, the KMO was equal to 0.845 and Bartlett's Test [$\chi^2(105) = 1948.831$; $p<.001$] was significant, this further confirmed that the inter-item correlation matrix was suitable for factor analysis.

There are two criteria that need to be fulfilled in determining on which items to retain in each factor : (a) to determine the meaningfulness of the instrument, item loading must be greater than 0.50 (Hair et al., 2010), and (b) at least three significant loading is required to identify a factor (Zwick & Velicer, 1986).

By performing PCA and followed by a varimax rotation, initial results indicated that there were three factors with eigenvalues greater than 1 that accounted for 54.52% of total variance. One item (B12) has been deleted due to factor loading less than 0.50. Upon inspection of the scree plot and parallel analysis (see Figure 4.1.), three factors were retained.

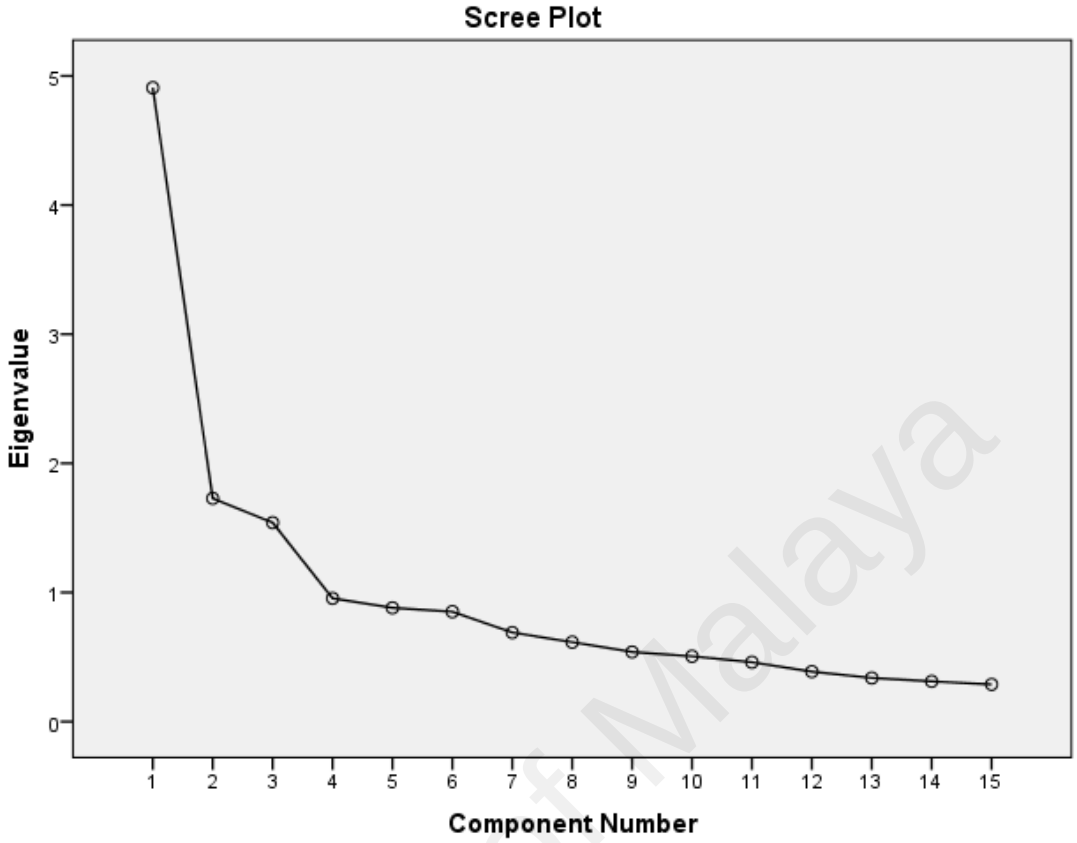


Figure 4.1. Scree plot for section B for 15 items

The second PCA was conducted using an extraction to three factors components followed by a varimax rotation after deleting the one item.The three-factor structure explained 55.71% of the total variance, with factor 1 contributed to 32.43% factor 2 contributed to 12.34% and factor 3 contributed to 10.94% (see Table 4.7). Table 4.6 shows the factor loading and communalities, and reliability coefficient for Section B.

Table 4.7

Factor Loadings and Communalities, and Reliability Coefficients for Section B

Item	Factor Loading			Communality	Reliability
	1	2	3		
B6	0.781			0.673	0.806
B5	0.770			0.665	
B14	0.682			0.517	
B8	0.673			0.506	
B7	0.627			0.440	
B9	0.595			0.427	
B10		0.737		0.603	0.697
B11		0.692		0.623	
B13		0.655		0.469	
B15		0.612		0.450	
B2			0.826	0.731	0.692
B3			0.768	0.637	
B1			0.638	0.459	

In addition, according to Reckase (1979), if there is a percentage of 20% or more of the total variance explained by the first principle component, the data can be viewed as unidimensional. In this case, the first eigenvalue (λ=4.540) accounted for 32.43% of the total variance, and the ratio of the first to the second eigenvalue was 4.540/1.728=2.627, both indicated index of unidimensionality. To evaluate the unidimensionality, the data were reanalyzed by conducting PCA to each subscale individually. Corresponding items of each factor were added and the calculation was re-run for three factors.

Table 4.8

Correlation Coefficient of the Three Factors in Section B After EFA

	F1	F2	F3
Factor 1 (F1)	1		
Factor 2 (F2)	0.397**	1	
Factor 3 (F3)	0.304**	0.354**	1

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

Table 4.8 shows that the correlation coefficients of the factors range from 0.304 to 0.397 (moderate). The *KMO* value of 0.638 and Bartlett's Test [χ^2=131.058; p<0.001] were significant, which revealed that the conducted factor analysis was appropriate. This has resulted into only one factor explaining 56.82 % variance of the total variance. A varimax rotation with factor loading of 0.50 has been considered. Both the Kaiser Criterion and scree plot supported a single factor (λ=1.705) that accounted for 56.82 % of the total variance. The hierarchical factor was interpreted as "Perceptions of Students Information Literacy Competence" and the three dimensions were labeled as "Independent Learning and Ethics", "Skills and Share" and "Cognitive". The detail is provided in Table 4.9. Scree plot was also used to estimate the number of factors to extract. The scree plot appeared to support only one factor solution (Figure 4.2).

Table 4.9

Factor Loadings and Other Values of Perceptions of Students Information Literacy Competence

Factor	Dimensions	Factor loading	Communality	Eigen values	% of variance
Perceptions of Students Information Literacy Competence	Independent Learning and Ethics	0.754	0.568	1.705	56.82
	Skills and Share	0.786	0.618		
	Cognitive	0.720	0.519		

Figure 4.2. Scree plot for section B for three-factors structure

From the results analysis of EFA, section B contains three dimensions; they are "Independent Learning and Ethics", "Skills and Share" and "Cognitive". However, this three-factor structure needs further analysis to confirm the convergent validity and discriminant validity. For this purpose, a confirmation factor analysis (CFA) was conducted on section B using AMOS software. For a model to obtain convergent validity, the item loadings should reach 0.50 and above (Hair et al., 2010). In addition, discriminant validity is measured by examining the correlation between variables. If none of the correlation coefficients exceeds 0.90, it indicates that all the variables are distinct (Hair et al., 2010). A model is considered perfect fit if the chi-square value would be zero while model fit would be obtained from a not significant chi-square. However, due to the sensitivity of chi-square to the sample size, statisticians suggest that researchers to use multiple indices to evaluate the model fit (Hair et al., 2010).

Therefore, in this study, other than Chi-square (χ^2), the model fit was justified with several goodness-of-fit indices, these include the ratio between chi-square and degree of freedom (χ^2/df) =3.0 or χ^2/df = 5.0 (Schumacker & Lomax, 2004), the Comparative fit index (CFI) ≥ 0.90, Tucker-Lewis index (TLI) ≥ 0.90 (Hu & Bentler, 1999), and the root-mean-square error of approximation (RMSEA<0.08) (Browne & Cudeck, 1993).

After conducting the exploratory factor analysis, a confirmatory factor analysis for section B was performed to confirm the construct validity for the three-factor model emerged from EFA. The results of CFA were not a good fit, with Chi-square χ^2(df=62, p=.000) =232.791, the degree of freedom (χ^2/df) =3.755, Comparative fit index (CFI)=0.878, Tucker-Lewis index (TLI)=0.843 and the root-mean-square error of approximation (RMSEA)=0.085. Six items (B1, 7, 8, 9, 13 and 15) with factor loading less than 0.5 were deleted after several attempts to improve the model. Figure 4.3 shows the final CFA results [i.e., χ^2 (df=11, p=.133) =16.273, χ^2/ df = 1.476, TLI=.987, CFI= 0.993, RMSEA= 0.035], the model was finally adjusted to the data.

The factor loading of each item on the related subscale was ranged from 0.539 to 0.963, and none of the correlation coefficients exceeds 0.90, these indicated that the construct validity has achieved. Furthermore, all parameters were found to be significant which indicated that each item contributes significantly to the corresponding subscale. Table 4.10 shows the *t*-values (CR), factor loading estimate, and regression estimates of the items and their respective subscales.

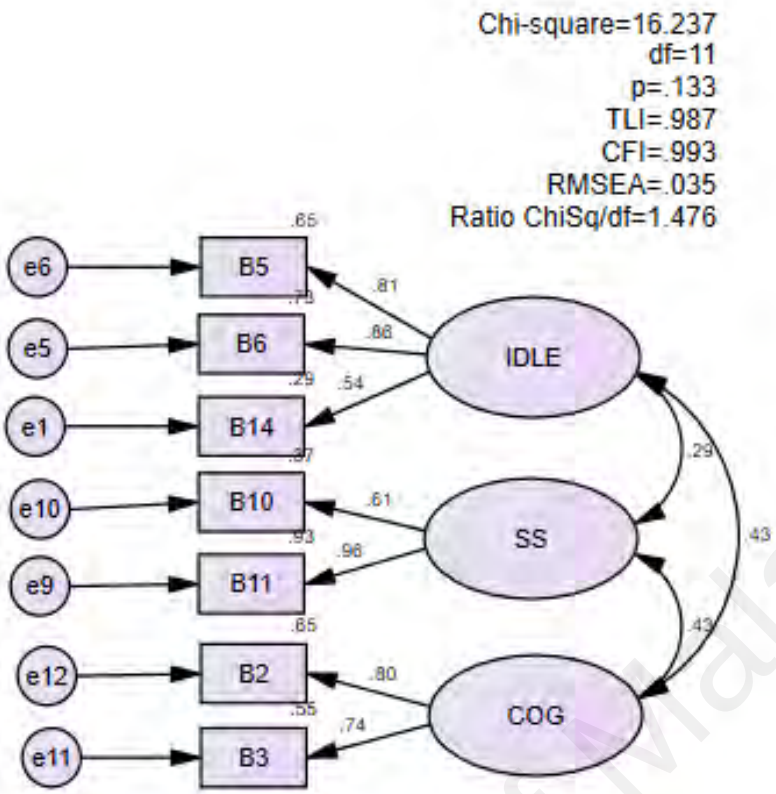


Figure 4.3. CFA results for section B (Perceptions of Students' Information Literacy Competency)

Table 4.10

Results of Confirmatory Factor Analysis for Perceptions of Students' Information Literacy Competency

	Item	Estimate (Factor Loading)	SE	(CR)	*p*-value
Independent Learning and Ethics (IDLE)	B14	0.539			
	B6	0.857	0.161	9.796	***
	B5	0.805	0.151	9.903	***
Skills and Share (SS)	B11	0.963	0.274	5.898	***
	B10	0.606			
Cognitive (COG)	B3	0.739			
	B2	0.804	0.144	8.55	***

Factor and reliability analyses of section C in NILEM questionnaire. For section C in NILEM Questionnaire, nine items were subjected to factor analysis. After conducting the inter-item correlation assessment, all correlation coefficients ranged from 0.156 to 0.678 (low to substantial), indicated that the items in section C were fairly independent (see Table 4.11). For section C, the KMO was equal to 0.816 and Bartlett's Test [$\chi 2$ (110) = 355.956; $p<.001$] was significant, this indicated that the inter-item correlation matrix was suitable for factor analysis.

Table 4.11

Correlation Coefficient of the Items in Section C

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1								
C2	0.450**	1							
C3	0.323**	0.653**	1						
C4	0.362**	0.607**	0.678**	1					
C5	0.215**	0.345**	0.344**	0.414**	1				
C6	0.200**	0.425**	0.388**	0.388**	0.466**	1			
C7	0.259**	0.450**	0.477**	0.481**	0.406**	0.558**	1		
C8	0.308**	0.333**	0.433**	0.385**	0.375**	0.393**	0.488**	1	
C9	0.156**	0.336**	0.420**	0.402**	0.321**	0.356**	0.409**	0.397**	1

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

By performing PCA and followed by a varimax rotation, initial results indicated that there were two factors with eigenvalues greater than 1 that accounted for 58.79% of total variance. The scree plot and parallel analysis appeared to support 1 factor solution (see Figure 4.4). Hence,1 factor was retained.

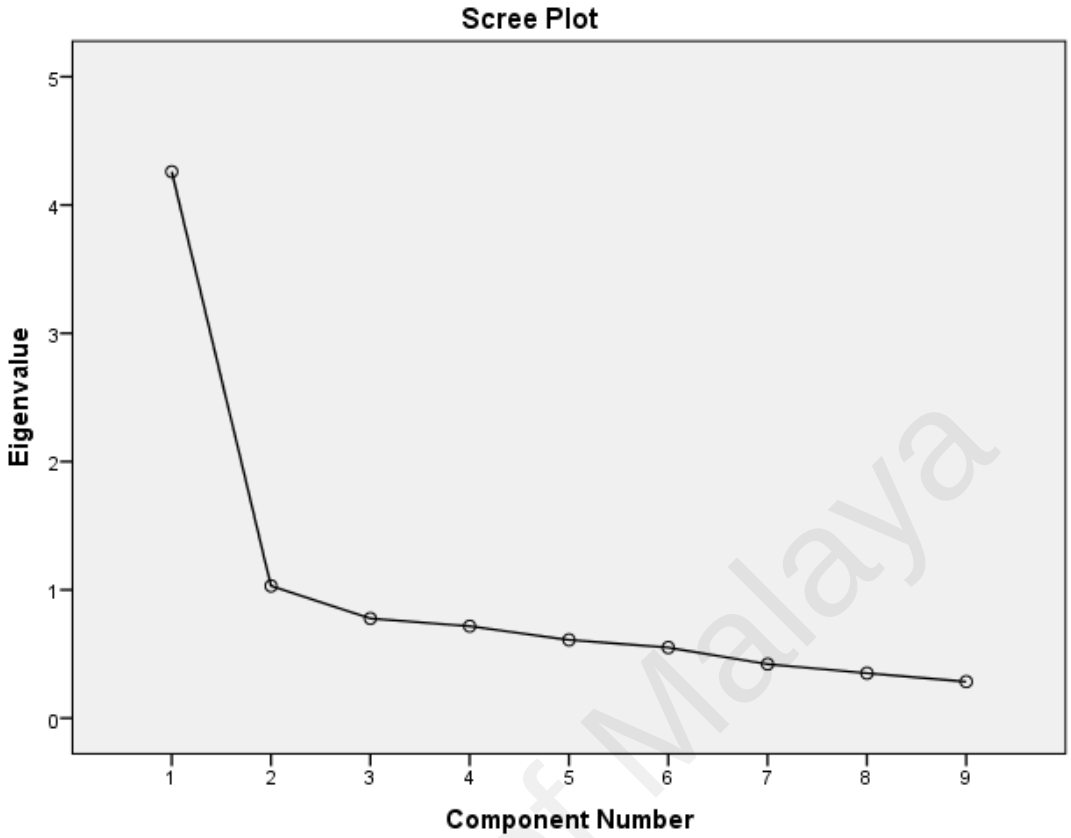


Figure 4.4. Scree Plot for Section C for 9 items

The second PCA followed by varimax roatation was conducted using an extraction of one factor components. The single-factor structure explained 47.34% of the total variance. One item (C1) has been deleted due to communality lower than 0.3. Table 4.12 shows the factor loading and communalities, and reliability coefficient for Section C.

Table 4.12

Factor Loadings and Communalities, and Reliability Coefficients for Section C

Item	Factor Loading	Communality	Reliability
C3	0.785	0.617	0.859
C4	0.782	0.612	
C2	0.759	0.576	
C7	0.743	0.552	
C6	0.678	0.460	
C8	0.660	0.436	
C5	0.621	0.385	
C9	0.608	0.370	

Confirmatory factor analysis for section C was performed to confirm the single-factor model emerged from EFA. Results revealed that the single-factor model was not a good fit with Chi-square χ^2(df=20, p=.000) =136.130, the degree of freedom (χ^2/df) =6.806, Comparative fit index (CFI)=0.900, Tucker-Lewis index (TLI)=0.860 and the root-mean-square error of approximation (RMSEA)=0.123. 2 items (C2 and 3) with were deleted after several attempts to improve the model and the final CFA results indicated that the model was correctly adjusted to the data [i.e., χ^2 (df=9, p=.101) =14.649, χ^2/ df = 1.628, TLI=.984, CFI= 0.991, RMSEA= 0.040] (see Figure 4.5)

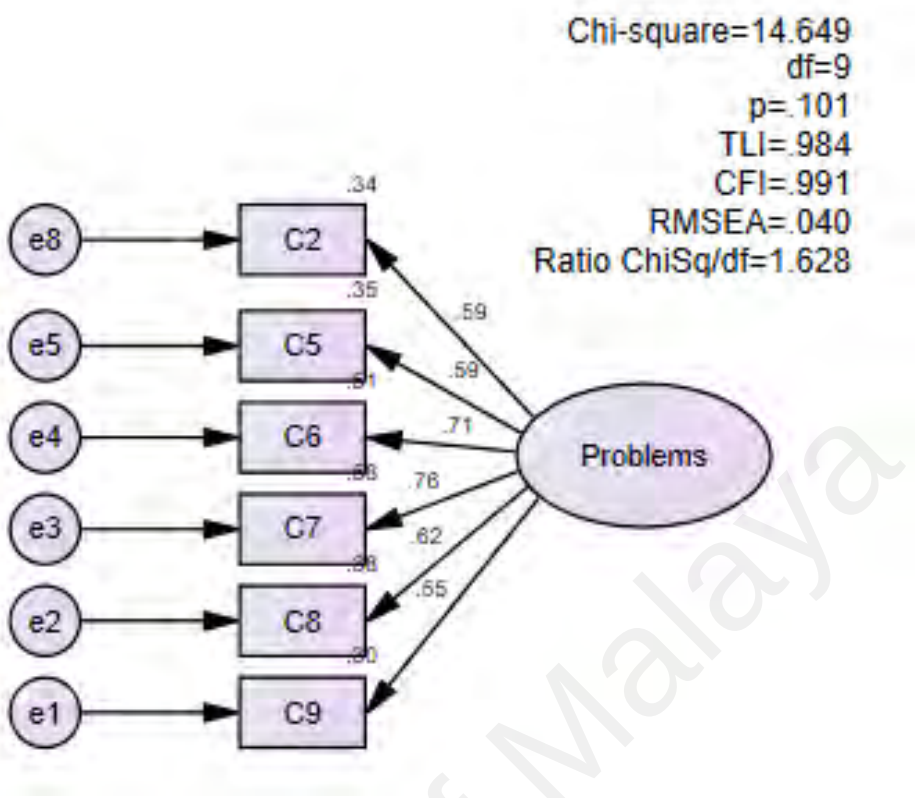


Figure 4.5. CFA results for section C (Problems)

The factor loadings of each item were ranged from 0.55 to 0.76, indicated that the convergent validity of the construct was established. Furthermore, all parameters were found to be significant which indicated that each item contributes significantly to the factor. Table 4.13 shows the *t*-values (CR), factor loading estimate, and regression estimates of the items.

Table 4.13

Results of Confirmatory Factor Analysis for Section C

Factor	Item	Estimate (Factor Loading)	SE	(CR)	*p*-value
Problems	C9	0.549			
	C8	0.616	0.143	8.701	***
	C7	0.760	0.143	9.734	***
	C6	0.714	0.150	9.457	***
	C5	0.589	0.134	8.461	***
	C2	0.586	0.132	8.434	***

Factor and reliability analyses of Section D in NILEM questionnaire. Three items from section D were subjected to factor analysis. After conducting the inter-item correlation assessment, all correlation coefficients range from 0.577 to 0.644 (substantial) which can be seen in Table 4.14, indicated that the items in section D were fairly independent. For section D, the KMO was equal to 0.718 and Bartlett's Test [$\chi 2$ (3) = 429.688; p<.001] was significant, this indicated that the inter-item correlation matrix was suitable for factor analysis.

Table 4.14

Correlation Coefficient of the Three Factors in Section D

	D1	D2	D3
D1	1		
D2	0.644**	1	
D3	0.577**	0.625**	1

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

By performing PCA and followed by a varimax rotation, initial results indicated that there was a single factor with eigenvalues greater than 1 that accounted for 74.39% of total variance. The scree plot and parallel analysis also supported the single factor solution (see Figure 4.6).

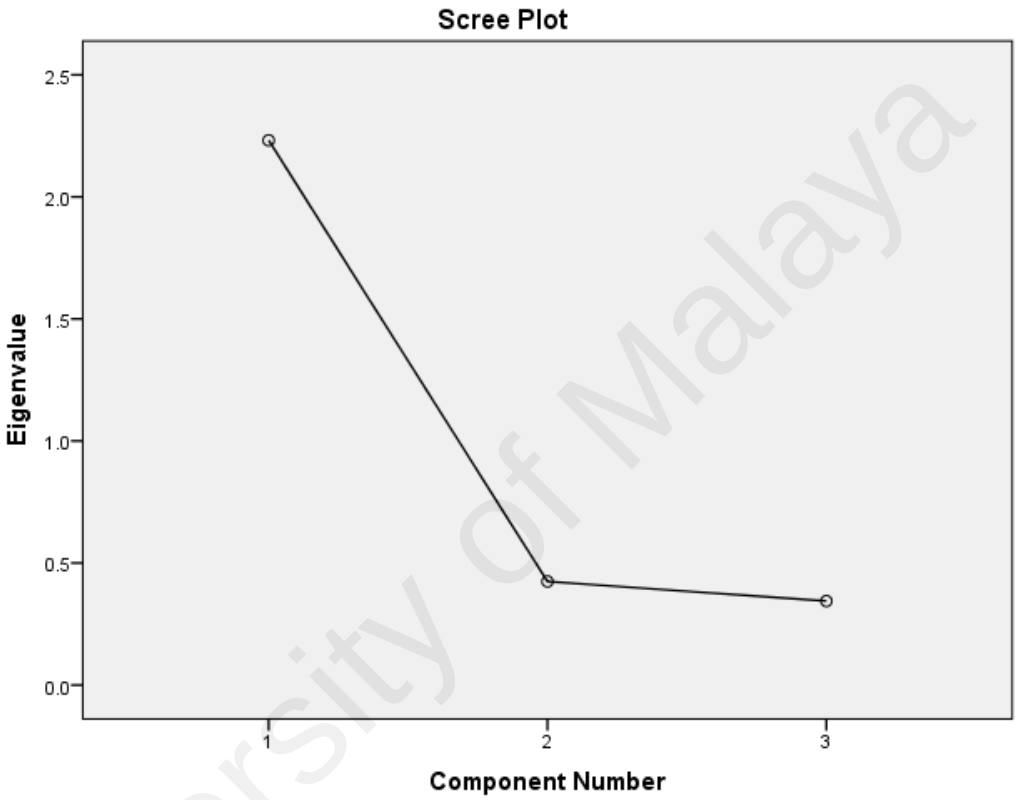


Figure 4.6. Scree plot for section D for 3 items

Table 4.15 shows the factor loadings and communalities, and reliability coefficient for Section D.

Table 4.15

Factor Loadings and Communalities, and Reliability Coefficient for Section D

Item	Factor Loading	Communality	Reliability
D2	0.880	0.774	
D1	0.858	0.737	0.828
D3	0.849	0.721	

Confirmatory factor analysis for section D was performed to confirm the single-factor model emerged from EFA. Results revealed that the single-factor model was a perfect fit (see Figure 4.7). The factor loadings of each item on the related subscale were ranged from .642 to .953. Furthermore, all parameters were found to be significant which indicated that each item contributes significantly to the factor. Table 4.16 shows the *t*-values (CR), factor loading estimate, and regression estimates of the items and their respective subscales.

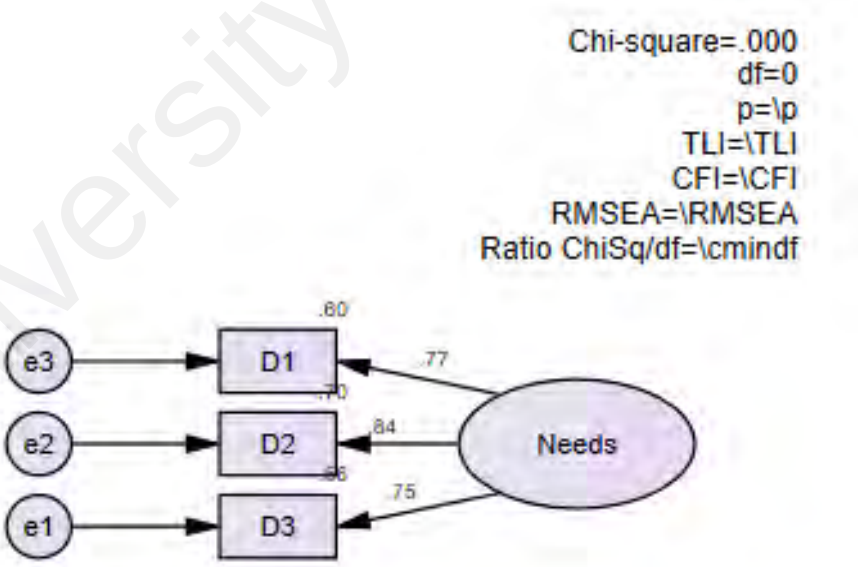


Figure 4.7. CFA results for section D (Needs)

Table 4.16

Results of Confirmatory Factor Analysis for Section D

Factor	Item	Estimate (Factor Loading)	SE	(CR)	*p*-value
	D3	0.748			
Needs	D2	0.835	0.085	13.711	***
	D1	0.772	0.081	13.537	***

Factor and reliability analyses of section E in NILEM questionnaire. At first, 16 items from section E in the NILEM questionnaire were subjected to factor analysis. As shown in Table 4.17 the correlation coefficients range from 0.393 to 0.570 (moderate to substantial), indicated that the items in section E were fairly independent. The KMO for this section was equal to 0.904 and Bartlett's Test [$\chi 2$ (120) = 2897.362; p<.001] was significant, this indicated that the inter-item correlation matrix was suitable for factor analysis.

Table 4.17

Correlation Coefficient of the Three Factors in Section E

	EV	AC	TR
Environment (EV)	1		
Activities (AC)	0.570**	1	
Teacher's Role (TR)	0.393**	0.486**	1

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

By performing PCA and followed by a varimax rotation, initial results indicated that there were three factors with eigenvalues greater than 1 that accounted for 60.32% of total variance. The scree plot and parallel analysis appeared to support three factors solution (see Figure 4.8). The factor loadings for all items exceeded 0.5. Hence, three factors with all items were retained. The three-factor structure explained 60.32% of

the total variance, with factor 1 contributed to 40.48%, factor 2 contributed to 11.74% and factor 3 contributed to 8.10%. Table 4.18 shows the factor loading and communalities, and reliability coefficient for Section E.

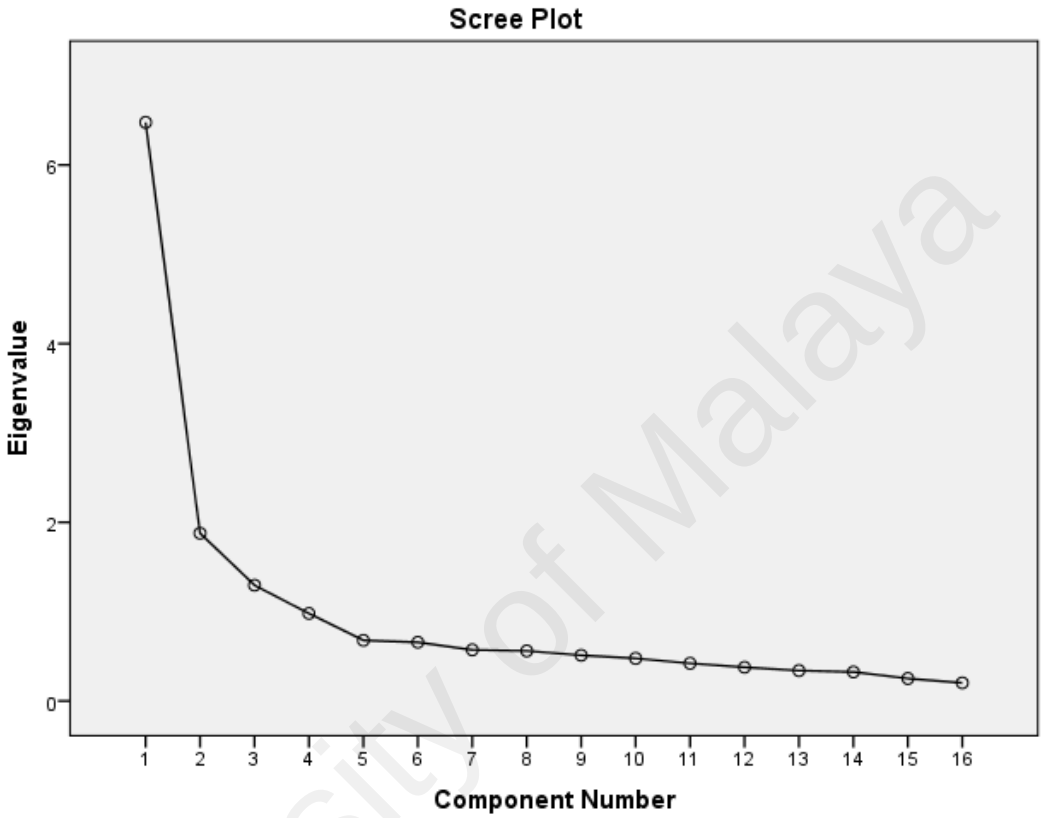


Figure 4.8. Scree plot for section E for 16 items

Table 4.18

Factor Loadings and Communalities, and Reliability Coefficient for Section E

Item	Factor Loading			Communality	Reliability
	1	2	3		
HC4	0.766			0.654	0.853
HC2	0.723			0.589	
HC5	0.671			0.507	
HC6	0.666			0.568	
HC1	0.647			0.426	
HC3	0.626			0.422	
HC8	0.625			0.517	
HC7	0.622			0.493	
HC11		0.757		0.676	0.831
HC10		0.749		0.648	
HC13		0.717		0.590	
HC12		0.710		0.587	
HC9		0.657		0.524	
HC15			0.878	0.833	0.896
HC14			0.869	0.823	
HC16			0.833	0.786	

Moreover, the first eigenvalue (λ=6.477) accounted for 40.48% of the total variance, and the ratio of the first to the second eigenvalue was 6.477/1.878=3.449, indicated that there was a doubt of unidimensionality. To evaluate the unidimensionality, the data were reanalyzed by conducting PCA to each subscale individually. Corresponding items of each factor were added and the calculation was re-run for three factors.

Table 4.19 shows that the correlation coefficients ranged from 0.493 to 0.570 (moderate to substantial). The *KMO* value of 0.660 and Bartlett 's Test [χ^2=264.348; p<0.001] was significant, which revealed that the conducted factor analysis was

appropriate. This has resulted into only one factor explaining 65.68 % variance of the total variance. A varimax rotation with factor loading of 0.50 has been considered. Both the Kaiser Criterion and scree plot supported a single factor (λ=1.970) that accounted for 65.68 % of the total variance. The hierarchical factor was interpreted as "Perceptions of School Culture Shaped by Hidden Curriculum". The three dimensions were labeled as "Environment", "Activities" and "Teacher's Role".

Table 4.19

Correlation Coefficient of the Three Factors in Section E

	F1	F2	F3
F1	1		
F2	0.570**	1	
F3	0.393**	0.486**	1

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

The detail has been provided in Table 4.20. Scree plot was also used to estimate the number of factors to extract. The scree plot appeared to support only one factor solution (Figure 4.9).

Table 4.20

Factor Loadings and Other Values of Perceptions of School Culture Shaped by Hidden Curriculum

Factor	Dimensions	Factor loading	Communality	Eigen values	% of variance
Perceptions of School Culture Shaped by Hidden Curriculum	Activities	0.858	0.735	1.970	65.68
	Environment	0.812	0.659		
	Teacher's Role	0.759	0.576		

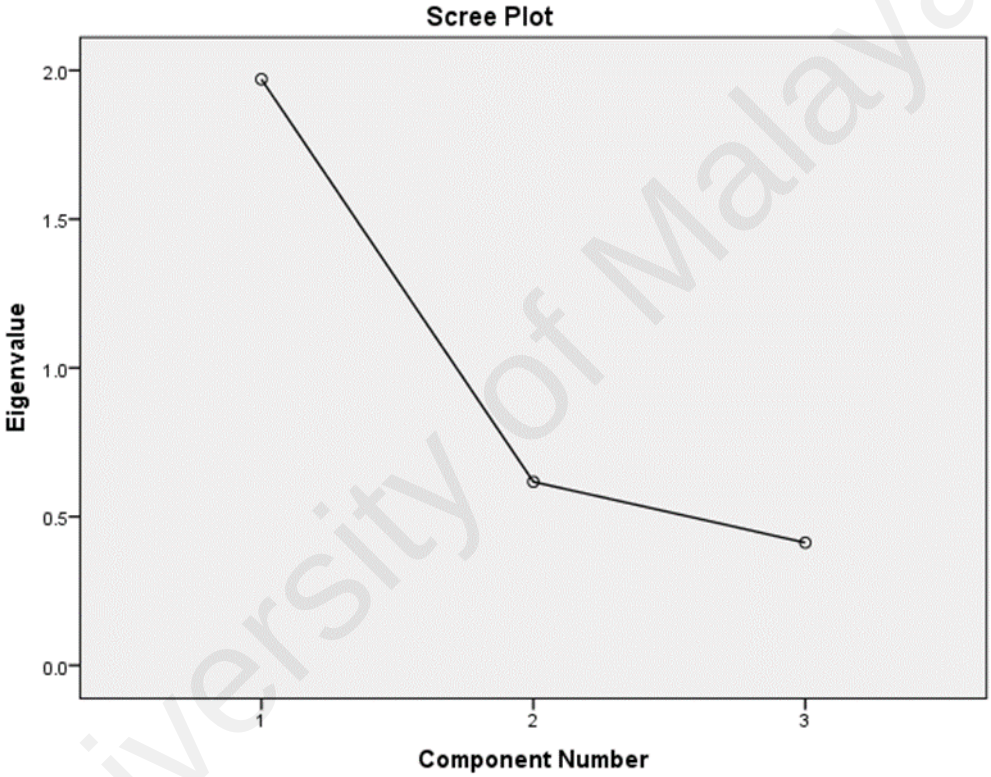


Figure 4.9. Scree plot for section E for 3 factors

Confirmatory factor analysis for section E was performed to confirm the three-factor model emerged from EFA. Results revealed that the three-factor model was correctly adjusted to the data [i.e., Chi-square χ^2(df=101, p=.000) =267.421, the degree of freedom (χ^2/df) =2.648, Comparative fit index (CFI)=0.941, Tucker-Lewis index (TLI)=0.930 and the root-mean-square error of approximation (RMSEA)=0.065] (see Figure 4.10). The construct validity was established by the factor loadings of each item

on the related subscale were ranged from 0.526 to 0.877, and the correlation coefficient of the three factors were lower than 0.90. Furthermore, all parameters were found to be significant which indicated that each item contributes significantly to the corresponding subscale. Table 4.21 shows the *t*-values (CR), factor loading estimate, and regression estimates of the items and their respective subscales.

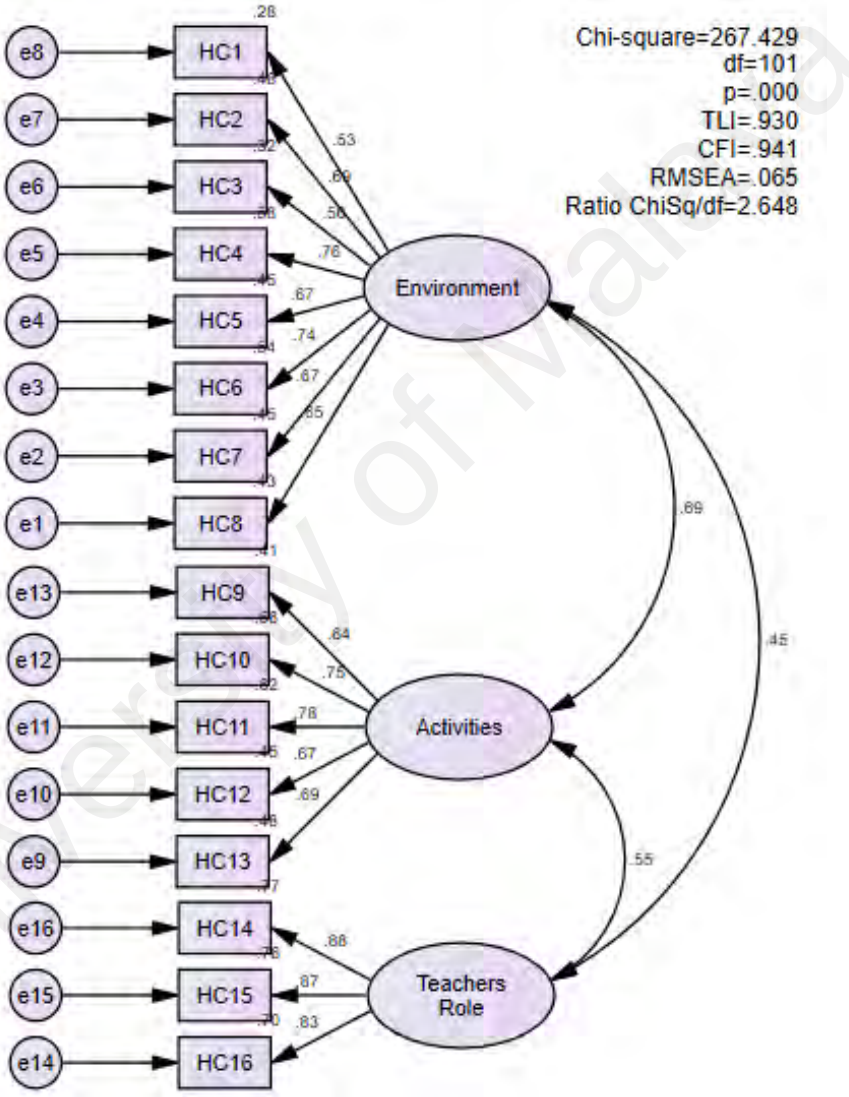


Figure 4.10. CFA Results for Section E (Perceptions of School Culture Shaped by Hidden Curriculum)

Table 4.21

Results of Confirmatory Factor Analysis for Perceptions of School Culture Shaped by Hidden Curriculum

	Item	Estimate (Factor Loading)	SE	(CR)	*p*-value
Environment	HC8	0.654			
	HC7	0.672	0.091	11.352	***
	HC6	0.735	0.082	12.218	***
	HC5	0.670	0.092	11.323	***
	HC4	0.761	0.098	12.547	***
	HC3	0.564	0.098	9.773	***
	HC2	0.691	0.113	11.618	***
	HC1	0.526	0.123	9.18	***
Activities	HC13	0.693			
	HC12	0.670	0.093	11.69	***
	HC11	0.785	0.083	13.379	***
	HC10	0.749	0.085	12.888	***
	HC9	0.643	0.091	11.259	***
Teacher's Role	HC16	0.834			
	HC15	0.874	0.052	20.161	***
	HC14	0.877	0.054	20.24	***

Summary of the Instrument Validation

After conducting the factor analysis and reliability test, a validated "Needs of Information Literacy Education Model (NILEM)" survey questionnaire with 34 items has been developed (Table 4.22). These items were two questions related to teachers' demographic information (Section A); seven questions related to the teachers' perceptions on their students' information literacy competence (Section B); six questions related to the teachers' perceptions on the problems of implementing information literacy education in schools (Section C); three questions related to the teachers' perceptions on the need to develop an Information Literacy Education Model (Section D); and sixteen questions related to the teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that could be used in developing an Information Literacy Education Model (Section E).

Table 4.22

The NILEM Survey Questionnaire

Section	Total Items	Contents
A) Teachers' demographic information	2	A1: Sex A2: Position
B) Teachers' perceptions on their students' information literacy competence	7	B2: Students know what information they need in order to solve a problem. B3: Students know what method to use in searching for information they need. B5: Students can use information for critical thinking. B6: Students can find the interconnection between information in order to make proper inferences and conclusions B10: Students are able to use computer and internet systems in the learning process. B11: Students are able to use information technology (such as multimedia and other forms) to present their learning outcomes. B14: Students will pay attention to the social etiquette and responsibility when using information technology to communicate with others.
C) Teachers' perceptions on the problems of implementing information literacy education in schools	6	C2: School leaders are lacking awareness of information literacy education. C5: Unable to focus on the instruction of information literacy due to the insufficient time for teaching. C6: As information literacy is not an examination subject, teachers, students, and parents are not concerned with subjects that are not related to the examinations. C7: Teachers are lacking interdisciplinary cooperation awareness, and have difficulty integrating information literacy education in the various disciplines. C8: Teachers perceive that information literacy is an area of concern of the Information Technology Department or the School Resource Center and has nothing to do with other subjects. C9: Teachers are more used to the traditional teacher-centered teaching approach.

D) Teachers' perceptions on the need to develop an Information Literacy Education Model	3	D1: Our students need to have information literacy education. D2: Schools need to have a more comprehensive information literacy education model to enhance students' information literacy skills. D3: It is feasible to construct a more comprehensive information literacy education model based on school culture shaped by hidden curriculum to enhance students' information literacy skills.
E) Teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that could be used in developing an Information Literacy Education Model	16	HC1: The school has enough computer and multi-media teaching equipment to support computer-aided teaching, such as a campus network, multi-media classrooms, computer science and technology classrooms, digital library and so on. HC2: The school establishes an Information Literacy Education committee or group responsible for planning strategies and activities to promote the information literacy. HC3: The school attaches great importance to the teaching of computer and information technology, and regards this as one of the compulsory subjects. HC4: Teachers are willing to integrate information literacy in their teaching processes, and use student-centered teaching approach. HC5: In addition to consolidating the content knowledge, teachers also focus on cultivating student's higher order and critical thinking skills. HC6: Teachers utilize the information technology and learning resources to design learning activities in order to help students to become active participants. HC7: Teachers are willing to cooperate with other subject teachers to help students construct collaborative learning. HC8: Teachers use wide range of assessments to evaluate students authentic learning outcome. HC9: The school's website offers space for the administrative departments, the various disciplines, and societies and clubs, to provide all sorts of activities for students to participate in. HC10: Under the guidance of teachers, the school provides opportunities for talented students to participate in school website construction and maintenance. HC11: Provide students with information learning experiences and nurture students' information literacy skills through various extra-curricular activities. HC12: The school invites experts or scholars to share about the latest developments in information

	technology with teachers and students to enhance their information awareness. HC13: The school intentionally links the formal curriculum activities with social practice activities, organizes outdoor information learning activities to widen students' scope and enhance their experience about information technology environment. HC14: Teaching by example: Teachers always pay attention to his demeanor, ethical etiquette and social norms, improve their own information literacy skills, and play as a role model in learning the skills. HC15: Teachers' expectations: Teachers always pay attention to the students' character development, cultivate good students' values and moral judgment, and thus enhance students' information ethics. HC 16: Teachers' motivations: Teachers always give positive encouragement to their students in learning information literacy and inspire students to become a learner who "knows how to learn" and practices "lifelong learning".

Findings of NILEM Survey

The following findings reported on the teachers' perceptions on their students' information literacy competence, their perceptions on the problem of the implementation of information literacy education in school, their perceptions on the needs to develop an information literacy education model based on school culture shaped by hidden curriculum and the dimensions of school culture shaped by hidden curriculum that can be used to develop the model. The report justified the needs to develop an information literacy education model as complement of current information literacy education. In this report, the terms, respondents, and teachers are used interchangeably.

Results of Analysis for Research Question 1.3-1.6

The aim of this phase was to explore teachers' perceptions regarding whether there is a need to develop an information literacy education model, and what dimensions of school culture shaped by hidden curriculum can be used to develop an information literacy education model. Therefore, it was crucial to probe the teachers' views on their students' information literacy competence to identify the needs. This answer the research question 1.3.

According to the "Information Literacy Standard for Students Learning" for a student to be information literate, he needs the competence to access information efficiently and effectively; evaluate information critically and competently and use information accurately and creatively, and also practice ethical behavior in regard to information and information technology (Librarians & Communications, 1998). Therefore, a few key competencies were highlighted in section B of the NILEM questionnaire, such as "information need", "search" "critical thinking", "inferences", "social etiquette and responsibility", "information technology skills" and "independent problem solving". The results of teachers' perceptions on their students' mentioned competencies were presented in Table 4.23.

Table 4.23

Item, Mean, Mode and Standard Deviation for Teachers' Perceptions on their students information literacy competence (Section B)

Items	Mean	Mode	Std. Deviation
1) Identifying information need.	3.168	4.0	1.0091
2) Establishing information search.	3.544	4.0	0.8941

3) Use information for critical thinking.	2.469	2.0	0.9004
4) Find the interconnection between information to make proper inferences and conclusions.	2.541	2.0	0.8913
5) Use IT in the learning process.	3.622	4.0	0.9128
6) Use IT to present learning outcomes.	3.438	4.0	0.9272
7) Pay attention to the social etiquette and responsibility when using IT	2.539	2.0	0.8972

The overall findings for Section B indicated that although students possess the competence in using information technology tools, most teachers still perceived their students as lacking of required information literacy competence. For example, most of them claimed their that students are not able to use information for critical thinking (mode=2), making proper inferences and conclusions from information (mode=2), more importantly, students are lacking awareness of social etiquette and responsibility when using information technology to communicate with others (mode=2). The lack of information literacy competence of students needed to be addressed as information literacy is the prerequisite skills to success in this information age. Thus, the proposal of developing an information literacy education model to support current information literacy education should be considered.

However, prior to considering a new approach of information literacy education, it is also essential to understand the problems of current information literacy

education implementation. Table 4.24 demonstrates the answer for research question 1.4.

Table 4.24

Item Mean, Mode and Standard Deviation for Teachers' Perceptions of the Problems of Implementing Information Literacy Education in Schools (Section C)

Items	Mean	Mode	Std. Deviation
1) School leaders are lacking awareness of IL education.	3.070	3.0	0.9413
2) Insufficient time for teaching IL.	3.510	4.0	0.9541
3) As IL is not an examination subject.	3.518	4.0	0.9808
4) Teachers are lacking interdisciplinary cooperation awareness.	3.469	4.0	0.9033
5) IL is an area of concern of the IT Department or the School Resource Center only.	3.111	4.0	1.0016
6) Teachers are more used to teacher-centered teaching approach.	3.425	4.0	0.9007

In short, the overall findings of Section C revealed several key issues in information literacy education implementation. Problems in implementing information literacy education in schools are: lack of information literacy education consciousness of the school leaders (mode=3), insufficient time (mode=4), information literacy is not an examination subject (mode=4), teachers are lacking interdisciplinary cooperation awareness (mode=4), the perception of information literacy concern party is limited to information technology department and school resource center (mode=4), and teachers are more used to the traditional teacher-centered teaching approach (mode=4). Therefore, a whole school approach of information literacy education model which emphasized on creating a school

information literacy culture through hidden curriculum was proposed and the research question 1.5 attempted to explore teachers' perceptions on the need to develop such model.

Table 4.25

Item Mean, Mode and Standard Deviation for Teachers' Perceptions of the Need to Develop an Information Literacy Education Model (Section D)

Items	Mean	Mode	Std. Deviation
1) Our students need to have IL education.	3.922	4.0	0.6755
2) Schools need to have a more comprehensive IL education model.	3.990	4.0	0.6605
3) It is feasible to have IL education model based on school culture shaped by hidden curriculum.	3.902	4.0	0.6330

As presents in Table 4.25, the overall results indicate that most teachers agreed that their students need to have information literacy education, and that their schools need to have a more comprehensive information literacy education model to enhance students' information literacy skills. The results also confirm that most teachers perceived it is feasible to develop a more comprehensive information literacy education model based on school culture shaped by hidden curriculum to enhance students' information literacy skills (mode=4 for all items). However, prior to develop the model, we need to identify the aspects of school culture shaped by hidden curriculum that have positive effects on students' information literacy skills acquisition. The answer for research question 1.6 is presented in Table 4.26.

Table 4.26

Item Mean, Mode and Standard Deviation for Teachers' Perceptions of the Aspects of School Culture Shaped by Hidden Curriculum that support Information Literacy Education (Section E)

	Items	Mean	Mode	Std. Deviation
	Environment:			
1)	The school has enough IT equipment to support computer-aided teaching.	3.500	4.0	0.9994
2)	The school establishes an Information Literacy Education committee or group responsible for planning strategies and activities.	3.560	4.0	0.8815
3)	The school attaches great importance to the teaching of ICT and regards this as one of the compulsory subjects.	3.575	4.0	0.7916
4)	Teachers are willing to integrate IL and use student-centered teaching approach.	3.552	4.0	0.7516
5)	Teachers focus on cultivating student's higher order and critical thinking skills.	3.858	4.0	0.6325
6)	Teachers utilize the IT and help students to become active participants.	3.790	4.0	0.6325
7)	Teachers are willing to help students construct collaborative learning.	3.860	4.0	0.7107
8)	Teachers using multi-variate assessments.	3.674	4.0	0.7114

	Activities:			
9)	The school's website offers columns to provide all sorts of activities for students to participate in.	3.793	4.0	0.7269
10)	Provides opportunities for talented students to participate in school website construction and maintenance.	3.870	4.0	0.6675
11)	Provides students with information learning experiences through extra-curricular activities.	3.870	4.0	0.6517
12)	Invites experts or scholars to share about the latest developments in IT with teachers and students to enhance their information awareness.	3.759	4.0	0.7396
13)	Links the formal curriculum activities with social practice activities, organized outdoor information learning activities.	3.881	4.0	0.6616
	Teacher's Role			
14)	Teacher as role model	4.145	4.0	0.6404
15)	Teachers' expectations	4.142	4.0	0.6140
16)	Teachers' motivations	4.181	4.0	0.6186

For the "Environment" dimension, it can be concluded a school information literacy culture can be created from the physical environment that has sufficient facilities for teaching and learning of information technology and computer (mode=4).

In addition, it is better for a school to have Information Literacy Education committee or group responsible for planning strategies and activities to promote information literacy (mode=4). Another aspect is to promote information technology and computer as a compulsory subject (mode=4). Furthermore, a school information literacy culture also can be provided by teachers who recognize the importance of information literacy education (mode=4), who are willing to create an efficient use of information technology in the teaching-learning environment (mode=4), who are willing to use student-centered teaching approaches and multivariate assessments (mode=4), and who want to emphasize higher order thinking teaching to enhance students' critical thinking skills and strengthen their information literacy competence (mode=4).

Next, majority of the teachers also agreed that school activities related to information technology learning can enhance students' information literacy skills implicitly (mode=4). These activities can carry out through activities in the school's website and extra-curricular activities (mode=4), inviting experts or scholars to share about their knowledge of latest development in information world (mode=4), and links the formal curriculum activities with social practice activities (mode=4).

Finally, for the "Teacher's Roles" dimension, teachers as role models (mode=4), the expectations of teachers towards their students (mode=4), and the motivations of teachers (mode=4), always create some kind of implicit psychological influence on student beliefs, values, and attitudes. As such, teacher's roles are perceived as being essential for the development of students' information literacy competence.

Summary of Findings of The Needs Analysis Phase

This chapter has presented the findings on the needs analysis, where it consisted of two stages. For the first stage, based on the research questions, findings from the focus group discussion have identified the concept of "school culture shaped by hidden curriculum" and also three themes describing the characteristics and dimensions of school culture from hidden curriculum perspective intended for information literacy skills acquisition. The concept of "school culture shaped by hidden curriculum" should refer to the educational experiences that students gained within the culture that every individual school created in their day-to-day operations and activities. From the hidden curriculum perspective, the aspects and characteristics of such school culture with regards to students' information literacy skills acquisition can be categorized into three main themes, namely (a) School culture that values information technology and students centered teaching and learning. (b) School culture that values independent learning and autonomy support, and (c) School culture that values character development. These themes were used in the questionnaire design and development for the second stage.

This chapter also presented the findings from the second stage. Based on the research questions of this phase, the findings revealed the teachers' perception on their students' information literacy competence. The findings as presented had conclusively revealed that most teachers were not satisfied with the current level of their students' information literacy competence. Next, this chapter presented the findings of the problems of information literacy education implementation in the secondary schools. It is essential to understand the current problems before a more comprehensive information literacy education model can be proposed. These problems included the lack of information literacy education consciousness of the school leaders, insufficient

time, information literacy is not an examination subject, teachers are lacking interdisciplinary cooperation awareness, the perception of information literacy concerned party is limited to information technology department and school resource center, and teachers are more used to the traditional teacher-centered teaching approach. The findings also presented the need for a more comprehensive information literacy education model to enhance their students' information literacy competence, and that developing such a model based on school culture shaped by hidden curriculum was feasible as perceived by teachers.

Based on the findings from the qualitative data from stage one, three validated factors or dimensions emerged. For the "Environment" dimension, it can be concluded that a school information literacy culture can be created from the physical environment that has sufficient facilities for teaching and learning of information technology and computer. In addition, it is better for a school to have Information Literacy Education committee or group responsible for planning strategies and activities to promote information literacy. Another aspect is to promote information technology and computer as a compulsory subject. Furthermore, a school information literacy culture also can be provided by teachers who recognize the importance of information literacy education, who are willing to create an efficient use of information technology in the teaching-learning environment, who are willing to use student-centered teaching approaches and multivariate assessments, and who want to emphasize higher order thinking teaching to enhance students' critical thinking skills and strengthen their information literacy competence.

Next, majority of the teachers also agreed that school activities related to information technology learning can enhance students' information literacy skills

implicitly. These activities can carry out through activities in the school's website and extra-curricular activities, inviting experts or scholars to share about their knowledge of latest development in information world, and links the formal curriculum activities with social practice and activities.

Last but not least, for the "Teacher's Roles" dimension, items such as teachers as a role models, the expectations of teachers towards their students, and the motivations of teachers, always create some kind of implicit psychological influence on student beliefs, values, and attitudes. As such, teacher's roles are perceived as being essential for the development of students' information literacy competence.

In short, the overall findings of needs analysis phase justified the needs to develop a more comprehensive information literacy education model to support the current information education efforts. The following chapter discusses the findings for the development of the information literacy education model.

CHAPTER 5: FINDINGS OF MODEL DEVELOPMENT PHASE

Introduction

This chapter reports the findings of the model development phase. The purpose of this model development phase is to develop a conceptual information literacy education model based on the literature review and findings from Phase 1. More precisely, this phase is first to investigate the factor structure of the four key variables in the model, namely, school information literacy culture (from hidden curriculum perspective), information literacy skills, motivation and self-efficacy. After the factor structure of each variable has been verified, a hypothesized information literacy education model can be developed and can be evaluated using partial least square technique in Phase Three. Hence, there are two stages in model development phase, Stage One is the instruments development and validation, Stage Two is the conceptual model development. This chapter presents the results of the analysis of quantitative data collected from 610 secondary school students.

Stage One: Instruments Development and Validation

Instruments Development

In this study, two instruments were needed to develop and validate, namely, SILCAT (School Information Literacy Culture Assessment Tool) and ILSAT (Information Literacy Skills Acquisition Tool). Another two instruments which measured students' motivation and self-efficacy were adapted from current established instrument, in which motivation was measured using Academic Self-Regulated Questionnaire (SRQ-A) (Ryan & Connell, 1989) and self-efficacy was measured through "Self-efficacy for Learning and Performance" scale, one of the subscales taken

from Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich & De Groot, 1990).

The item development of the School Information Literacy Culture Assessment Tool (SILCAT). The SILCAT was intended to measure the school information literacy culture, an aspect of culture with regard to information literacy education from the hidden curriculum perspective as perceived by secondary school students. The items to be considered for SILCAT were initially developed based on literature review and the findings from focus group discussion and NILEM survey from the Phase 1. Initially, four domains which consisted of 31 items in regard to information literacy culture had been generated, the domains and their descriptions are illustrated in Table 5.1.

Table 5.1

Domains and Descriptions of SILCAT

Domains	Descriptions	Numbers of items
1) Teaching & Learning	The teaching and learning activities which emphasized on information technology and students-centered teaching approach.	7
2) Perceived Autonomy Support	Items adapted from "The Learning Climate Questionnaire" (LCQ) (G. C. Williams, Grow, Freedman, Ryan, & Deci, 1996) to assess the degree to which the students perceived the teachers supported their autonomy in the class or in school.	6
3) Moral Development	The moral aspects of the school environment which emphasized on kindness, respect, responsibility and fairness.	12
4) Activities	The study support such as extracurricular activities or after school hour activities which emphasized on independent learning.	6

The item development of Information Literacy Skills Assessment Tool (ILSAT). Considering the absence of standardized assessment instrument to assess secondary students' information literacy skills in Malaysia, the researcher developed the ILSAT (Information Literacy Skills Assessment Tool) to measure the students' information literacy skills acquisition. These 28 items of ILSAT were initially developed based on the guideline from "Information Literacy Standards for Student Learning" by the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) (Librarians & Communications, 1998). According to the characteristics of primary and secondary students, the set of standards describes three main domains, namely, information literacy, independent learning and social responsibility. Table 5.2. presents the domains and descriptions of ILSAT.

Table 5.2

Domains and Descriptions of ILSAT

Domains	Descriptions	Numbers of items
1) Information Literacy	Access information efficiently and effectively; evaluate information critically and competently; use information accurately and creatively	12
2) Independent Learning	Pursue information related to personal interests; appreciate literature and other creative expressions of information; strive for excellence in information seeking and knowledge generation.	9
3) Social Responsibility	Recognize the importance of information to a democratic society; practice ethical behaviour in regard to information and information technology; participate effectively in groups to pursue and generate information.	7

Source: Librarians and Communications (1998)

The adaption of Academic Self-Regulated Questionnaire (SRQ-A). To assess the students' motivation, this study adapted the SRQ-A. The SRQ-A is an instrument developed by Ryan and Connell (1989) which focuses on the motivational styles based on self-determination theory (SDT). It has been developed for school children in primary and secondary schools. The SRQ-A is a widely used questionnaire to assess individual differences in motivational or behavioral regulation by asking the reasons as to why children complete their school work. The questionnaire consisted of 32 items and was divided into four parts which ask the reason why the respondent display certain behavior. For each question, it also provides various preselected answers that represent different motivational styles, for example, intrinsic motivation, identified regulation, introjected regulation and external regulation. The authors reported the internal consistency for the four subscales ranging from 0.62 to 0.82 (Ryan & Connell, 1989).

The adaptation of "Self-efficacy for Learning and Performance" scale from Motivated Strategies for Learning Questionnaire (MSLQ). To assess students' self-efficacy on learning, the researcher adapted the "Self-efficacy for Learning and Performance" (SELP) scale, one of the subscales taken from Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich & De Groot, 1990). The MSLQ consists of self-report items which are categorised into motivation section and learning strategies section. The "Self-efficacy for Learning and Performance" is a subscale under motivation section and comprises eight self-report items (Pintrich, Smith, Garcia, & McKeachie, 1991). The authors reported that the Cronbach's alpha of this subscale was 0.93. According to Artino Jr (2005). MSLQ has been used extensively by hundreds of researchers and has been translated into more than 20 languages (Artino Jr, 2005).

After the identification of the domains and the description of the items of each domain have been done, the four instruments were composed to establish an "Information Literacy Education Model for Secondary School Students Questionnaire" (ILEMSQ). For the ease of secondary school students to answer the questionnaire of all four mentioned instruments, the researcher standardized the number of response alternative to a five-point Likert scales (coded 1-5) across all items. The agreement scale options were "strongly disagree" (1), "disagree" (2), "neutral" (3), "agree" (4) and strongly agree" (5); thus, higher score indicates a higher degree of agreement. Furthermore, as Chinese language is the mother tongue of the target group, the original SILCAT and ILSAT were written in Chinese language and the SQR-A and SELP were translated into Chinese language. The systematic back- translation technique was used to ensure that the original meaning of these instruments was not altered. The Chinese version of SILCAT and ILSAT were translated into English independently by two bilingual speakers. Similarly, the English version of SQR-A and SELP were translated into Chinese language. The primary translations were then evaluated for authenticity by two language teachers well versed in both languages. The Chinese version of the SQR-A and SELP were then translated back to English, whereas the English version of SILCAT and ILSAT were translated back to Chinese language by two different bilingual speakers, to ensure the conceptual equivalency to the original version. Subsequently, the primary translators, the language teachers and also the researcher compared the back-translation with the original version to identify any questions that were not equivalent and problematic and to ensure the consistency of these versions.

Instrument Validation

Similar to the validation process discussed at Stage Two in Phase 1, this phase also addressed face validity, content validity and construct validity of all of the four instruments in ILEMSQ. For this phase, the researcher examined the face validity of the ILEMSQ by selecting 5 students from one of the Independent Chinese secondary schools in Kuala Lumpur. The students were asked to identify any confusing, ambiguous, complex and incomprehensible questionnaire items. The researcher interviewed the students after the exercise and adjustments were made based on the comments from the students to ensure that all items were clear, simple and understandable.

For the content validity, the researcher invited the same group of experts at Phase 1 to participate again in this phase. The same procedure has been explained in section Stage Two (Phase 1). The details of the validation process are shown in Figure 5.1. Initially, there were 103 items composed from the four instruments either developed from literature review, findings from Phase 1, or adapted from existing validated scales. The five experts were requested to rate each item using four-point Likert rating scales quantized as 1=not relevant, 2=somewhat relevant, 3=quite relevant and 4=highly relevant. The scale was dichotomised into agreed (rating of 3 and 4) and not agreed (rating of 1 and 2) and item level content validity (I-CVI) was determined as the number of experts giving a rating of 3 or 4 (agreed) divided by the total number of experts. Whereas the scale level content validity (S-CVI) was calculated as the mean of I-CVI. According to Lynn (1986), for item to be retained if number of expert less than five, all of the experts must rate either 3 or 4. After the validation process, 6 items in which the I-CVI less than 1.00 were discarded and the

S-CVI for this scale was 0.98 which indicated that the ILEMSQ is a valid tool in terms of the content validity.

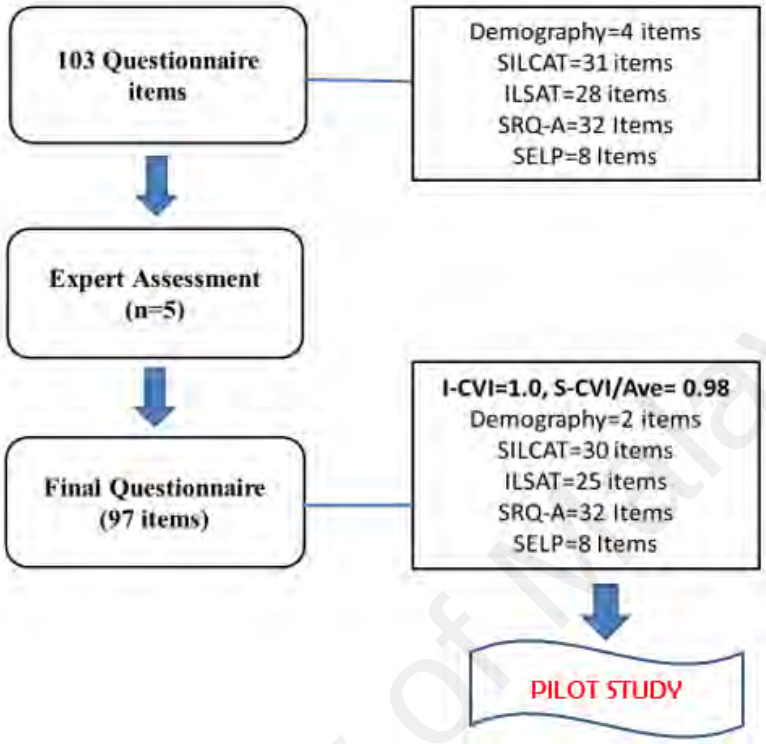


Figure 5.1. The content validation process of ILEMSQ

Data screening. Initially, the total numbers of respondents of the study were 627 from four independent Chinese secondary schools in Malaysia. After checking the collected questionnaires, it was discovered that 17 questionnaires could not be used due to incomplete answer; consequently, 610 responses were selected for further analysis. The data analysis was conducted using SPSS and AMOS software. After careful analysis, no missing data was detected but there were a few outliers in the data set. Removal of the outliers did not significantly improve skewness and kurtosis values, so they were left in the data set.

Descriptive analysis of the respondents' background. Among 610 respondents, 42.6% (n=260) of them were male and 57.4% (n=350) were female. Their ages were in the range of 16-17 years. Table 5.3 illustrates the descriptive statistics of sample.

Table 5.3

Descriptive Statistics of Demographic Variables

Variables	Categories	Frequency	Percent
Sex	Males	260	42.6
	Females	350	57.4
Age	16 years old	568	93.1
	17 years old	42	6.9

Normality test. Table 5.4 shows the assessment of normality for the four instruments in ILEMSQ. According to Leech et al. (2005), a simpler guideline for a variable is at least approximately normal is that if the skewness is less than plus or minus one (<±1.0). In this study, the skewness values for all subscales in ILEMSQ were in the range of less than ±1.0. This implied that the sample was at least approximately normal distributed.

Table 5.4

Normality Results of Each Subscale of the Four Instruments in ILEMSQ

Instrument	Dimensions/ Subscales	Mean	SD	Skewness
SILCAT	Teaching and Learning (TL)	3.5352	0.53057	-0.276
	Perceived Autonomy Support (PAS)	3.1044	0.62627	-0.454
	Moral Development (MD)	3.3731	0.54169	-0.300
	Activities (AC)	3.8279	0.71389	-0.584
ILSAT	Information Literacy (IL)	3.7715	0.52978	-0.080
	Independent Learning (IDL)	3.5039	0.62482	0.560
	Social Responsibility (SR)	4.0667	0.57113	-0.356
SQR-A	External Regulation (ER)	3.1304	0.54785	-0.260
	Introjected Regulation (IJR)	2.7776	0.65226	-0.135
	Identified Regulation (IDR)	3.5604	0.60475	-0.745
	Intrinsic Motivation (IM)	3.1326	0.64005	-0.324
SELP	Self-Efficacy (SE)	3.2498	0.68355	-0.164

Reliability of factors. For the instrument's reliability, Nunnally (1978) suggested that the Cronbach's alpha values must surpass the minimum threshold values of 0.70. Table 5.5 indicates the reliability test of the variables in this study. Most of the values of internal consistency for each factor achieved 0.70 except for factor teaching and learning from SILCAT and factor external regulation from SRQ-A. This results therefore indicated that the respondents' answers to most of the items in the scales were consistent. This also hinted that the items may cluster differently from the categories outlines in the literature review and qualitative data analysis. So, the next step was to conduct factor analysis to determine the factor structure of the instruments.

Table 5.5

Reliability Tests of Each Subscale of the Four Instruments in ILEMSQ

Instrument	Dimensions/ Subscales	Number of items	Cronbach's Alpha
SILCAT	Teaching and Learning (TL)	6	0.666
	Perceived Autonomy Support (PAS)	6	0.797
	Moral Development (MD)	12	0.838
	Activities (AC)	6	0.867
ILSAT	Information Literacy (IL)	10	0.867
	Independent Learning (IDL)	8	0.830
	Social Responsibility (SR)	7	0.828
SQR-A	External Regulation (ER)	9	0.661
	Introjected Regulation (IJR)	9	0.786
	Identified Regulation (IDR)	7	0.796
	Intrinsic Motivation (IM)	7	0.732
SELP	Self-Efficacy (SE)	8	0.880

Prior to running the EFA using Principal Component Analysis (PCA), the bivariate correlation was tested to examine the relationships among independent variables, mediators and dependent variable. As demonstrated in Table 5.6, the results of the analysis as displayed in the table suggested that factor analysis can be meaningfully performed due to the weight of the relationships among variables.

Table 5.6

Correlation Coefficient of the Summated Variable in the Study

	TL	PAS	MD	AC	IL	IDL	SR	ER	IJR	IDR	IM	SE
TL	1											
PAS	0.490**	1										
MD	0.421**	0.567**	1									
AC	0.350**	0.386**	0.466**	1								
IL	0.251**	0.221**	0.268**	0.374**	1							
IDL	0.188**	0.206**	0.189**	0.237**	0.545**	1						
SR	0.240**	0.189**	0.314**	0.326**	0.449**	0.415**	1					
ER	0.187**	0.185**	0.225**	0.065	0.107**	0.126**	0.076	1				
IJR	0.261**	0.327**	0.282**	0.176**	0.127**	0.208**	0.079	0.662**	1			
IDR	0.335**	0.434**	0.484**	0.469**	0.368**	0.351**	0.325**	0.356**	0.459**	1		
IM	0.293**	0.469**	0.453**	0.396**	0.276**	0.311**	0.252**	0.369**	0.554**	0.715**	1	
SE	0.217**	0.406**	0.366**	0.278**	0.332**	0.309**	0.200**	0.212**	0.273**	0.463**	0.459**	1

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

Results of Analysis for Research Question 2.1

Research question 2.1: "What are the factors of school information literacy culture as perceived by Malaysian secondary school students?"

Factor Analysis of School Information Literacy Culture Assessment Tool (SILCAT). To answer the research question 2.1, an Exploratory Factor Analysis (EFA) was conducted using SPSS to explore the preliminary factor structure, followed by Confirmatory Factor Analysis (CFA) using AMOS to confirm the construct validity of the instrument, and to know how well the hypothesized measurement model fit the observed data. The sample size used in this study (n=610) is more than the required sample size for factor analysis as suggested by Tabachnick and Fidell (2007) (at least 300 cases) and Hair et al. (2010) (more than 100 cases). For the inter-item correlation assessment, Table 5.7 shows the correlation coefficients were ranged from 0.350 to

0.567 (moderate to substantial) (Davis, 1971), the result indicates that the all the items are fairly independent.

Table 5.7

Correlation Coefficient of the Summated Variable in SILCAT

	TL	PAS	MD	AC
Teaching and Learning (TL)	1			
Perceived Autonomy Support (PAS)	0.490**	1		
Model Development (MD)	0.421**	0.567**	1	
Activities (AC)	0.350**	0.386**	0.466**	1

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

To assess the suitability of the respondent data for factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's Test of Sphericity were performed. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.899 and Bartlett's Test [χ^2 (435) = 6380.478; p<.001] was significant, again confirmed that SILCAT was appropriate for factor analysis. The recommended value for KMO is 0.5 or higher to proceed with factor analysis (Hair et al., 2010).

For the factor extraction, this study utilized Principal Component Analysis (PCA) to reduce the items into factors. PCA was used because there was no prior theoretical basis or model exists (Gorsuch, 1983) in this study. For the determination of the number of factors to be extracted, multiple criteria were used, they were: Kaiser's criterion: Eigenvalues>1 rule (using the eigenvalues>1 from PCA), the Scree Test and Parallel Analysis. Furthermore, according to Hair et al. (2010), factor loading greater than 0.50 is significant to determine the meaningfulness of the instruments. Therefore, in this study, all items with factor loading of 0.50 have been considered. Initial results

revealed that the communalities ranging from 0.302 to 0.721, eight factors with eigen values greater than 1.00, accounted for 57.32% of the total variance. Three items (SILCAT 6, 7, 13) with factor loading less than 0.50 have been discarded. After investigating the scree plots (Figure 5.2) and parallel analysis, five factors were retained.

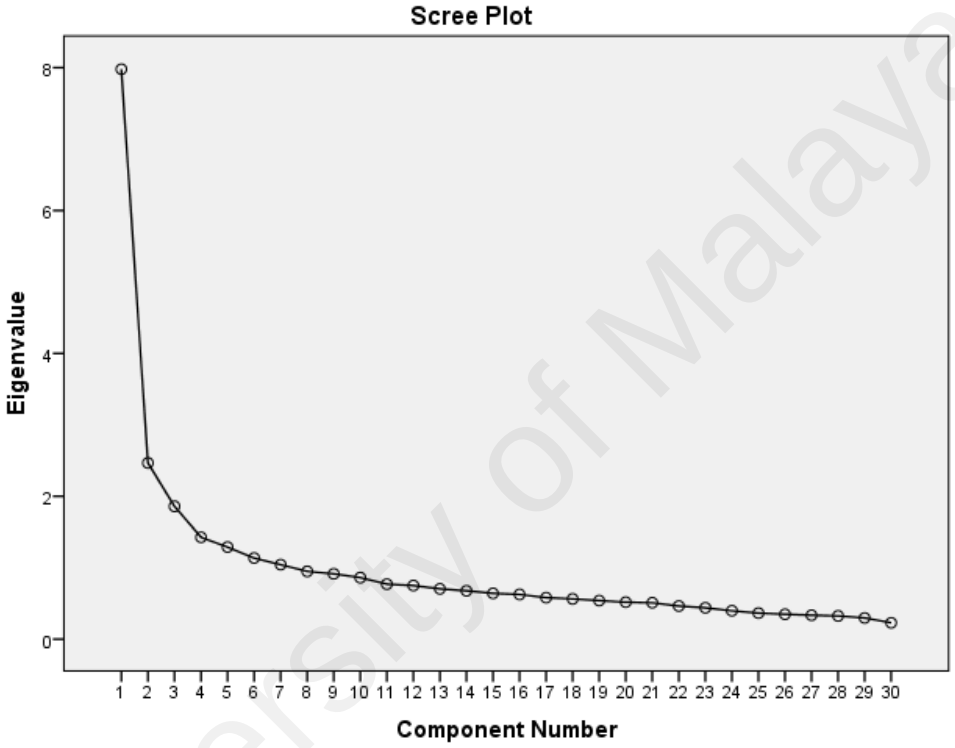


Figure 5.2. Scree plot of factor analysis for 30 SILCAT items

After deleting the three items where their factor loadings were below the threshold value of 0.50, a PCA was conducted using an extraction to five factors components followed by a varimax rotation. The five-factor structure explained 52.75% of the total variance, with factor 1 contributed to 27.44%, factor 2 contributed to 9.03%, factor 3 contributed to 6.34%, factor 4 contributed to 5.20% and factor 5 contributed to 4.72%. Four items (SILCAT 4, 14, 18, and 19) with factor loading less than 0.50 were deleted. The factors of the five-factor structure were labeled as Activities (AC), Perceived Autonomy Support (PAS), Respect (RP), Fairness (FN) and Student-Centered (SD).

Furthermore, the reliability coefficient for each factor was calculated. It was found that the internal coefficient for factor Student-Centered was 0.57, which was lower than the threshold value of 0.7; hence, this factor was deleted for further CFA analysis. Table 5.8 shows the factor loading, communality and reliability coefficient for SILCAT.

Table 5.8

Factor Loading, Communality, and Reliability Coefficient for SILCAT

	Items	Factor Loadings					Communality	Reliability
		1	2	3	4	5		
AC	SILCAT28	0.828					0.718	0.867
	SILCAT29	0.820					0.720	
	SILCAT27	0.783					0.667	
	SILCAT30	0.783					0.654	
	SILCAT26	0.682					0.533	
	SILCAT25	0.519					0.400	
PAS	SILCAT12		0.696				0.570	0.792
	SILCAT11		0.687				0.559	
	SILCAT9		0.670				0.507	
	SILCAT8		0.636				0.506	
	SILCAT10		0.627				0.462	
FN	SILCAT21			0.726			0.600	0.752
	SILCAT23			0.680			0.519	
	SILCAT20			0.648			0.481	
	SILCAT22			0.612			0.571	
RP	SILCAT16				0.797		0.706	0.767
	SILCAT17				0.754		0.643	
	SILCAT15				0.720		0.610	

Furthermore, as recommended by Reckase (1979), if there is a percentage of 20% or more of the total variance explained by the first principle component, the data

can be viewed as unidimensional. In the present case, the first eigenvalue (λ=7.408) accounted for 27.44% of the total variance, and the ratio of the first to the second eigenvalue was 7.408/2.439=3.037, this led to the hypothesis that the data may be characterized by a general factor. Hence, the data were reanalyzed by conducting PCA to each subscale individually. The result of the PCA for each subscale revealed a single factor solution for each of the subscales. As such, corresponding items of each factor were added and the calculation was re-run for four factors.

Table 5.9

Correlation Coefficient of the Summated Variable in SILCAT After EFA

	AC	PAS	FN	RP
Activities (AC)	1			
Perceived Autonomy Support (PAS)	0.372**	1		
Fairness (FN)	0.339**	0.459**	1	
Respect (RP)	0.363**	0.370**	0.427**	1

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

For the inter-item correlation assessment, the correlation coefficients were ranged from 0.339 to 0.459 (moderate) (Davis, 1971). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.746 and Bartlett's Test [χ^2 (6) = 438.586; p<.001] was significant, which revealed that the conducted factor analysis was appropriate. This has resulted into only one factor explaining 54.17 % variance of the total variance. A varimax rotation with factor loading of 0.50 has been considered. Both the Kaiser Criterion and scree plot supported a single factor (λ=2.176) that accounted for 54.17 % of the total variance. The hierarchical factor was interpreted as "School Information Literacy Culture". Scree plot was also used to estimate the number of factors to extract. The scree plot appeared to support only one factor solution (Figure 5.3). The detail is provided in Table 5.10.

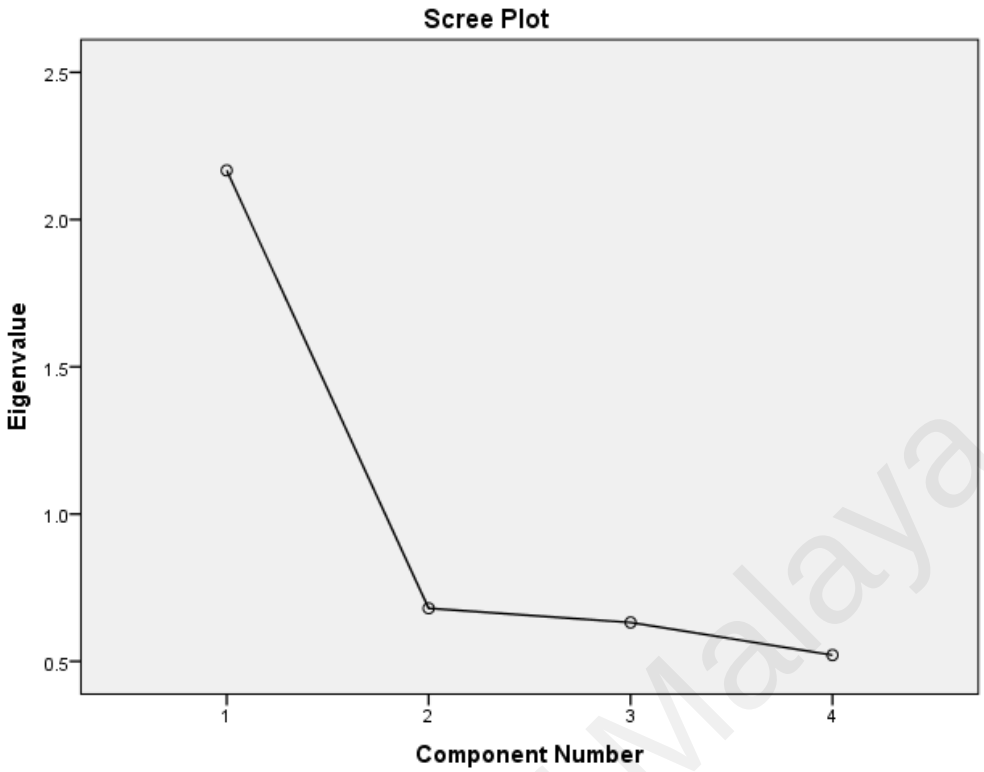


Figure 5.3. Scree plot of factor analysis for school information literacy culture

Table 5.10

Factor Loading and Communality, Eigen Values and % Variance Explained by School Information Literacy Culture with Four Dimensions

Factor	Dimension	Factor Loading	Communality	Eigen values	% of Variance
School Information Literacy Culture	FN	0.765	0.585	2.167	54.17%
	PAS	0.753	0.567		
	RP	0.733	0.538		
	AC	0.690	0.476		

From the results analysis of EFA, the school information literacy culture contains four factors; they are Fairness (FN), Perceived Autonomy Support (PAS), Respect (RP) and Activities (AC). However, this four-factor structure needs further analysis to confirm the convergent validity and discriminant validity. For this purpose, a Confirmatory Factor Analysis (CFA) was conducted on school information literacy

culture using AMOS software. For a model to obtain convergent validity, the item loadings should reach 0.50 and above (Hair et al., 2010). On the other hand, discriminant validity is measured by examining the correlation between variables. If none of the correlation coefficients exceeds 0.90, it indicates that all the variables are distinct (Hair et al., 2010). A model is considered perfect fit if the chi-square value would be zero while model fit would be obtained from a not significant chi-square. However, due to the sensitivity of chi-square to the sample size, statisticians suggest that researchers to use multiple indices to evaluate the model fit (Hair et al., 2010). Therefore, in this study, other than Chi-square (χ^2), the model fit was justified with several goodness-of-fit indices, these include the ratio between chi-square and degree of freedom (χ^2/df) $\leq$ 3.0 or χ^2/df $\leq$ 5.0 (Schumacker & Lomax, 2004), the root-mean-square error of approximation (RMSEA<0.08) (Browne & Cudeck, 1993), and the Comparative fit index (CFI) $\geq$ 0.90; Tucker-Lewis index (TLI) $\geq$ 0.90 (Hu & Bentler, 1999).

The result in Figure 5.4 shows that the four-factor model was correctly adjusted to the data [i.e., χ^2 (df=98, p=0.000) =244.602; χ^2/df = 2.496; TLI = 0.952; CFI = 0.961; RMSEA= 0.05]. Although the Chi-square χ^2 (df=98, p=0.000) =244.602 is significant, the other indices such as the degree of freedom (χ^2/df=2.496), Comparative fit index (CFI=0.961), Tucker-Lewis index (TLI=0.952) and the root-mean-square error of approximation (RMSEA=0.05) all met the requirement of goodness-of-fit. These indices supported the argument that the model was well fit.

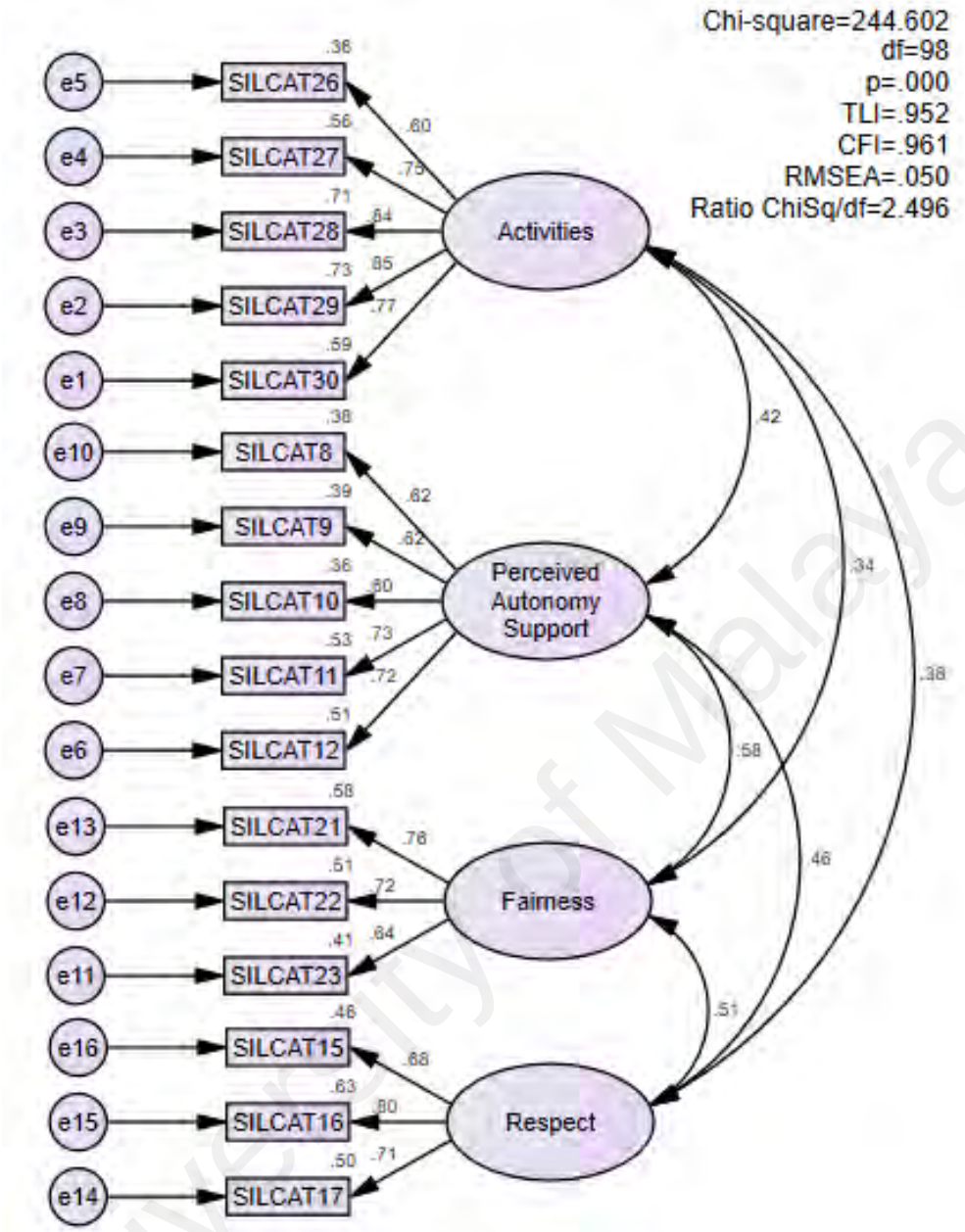


Figure 5.4. Four-factor model of school information literacy culture

Table 5.11 shows the results of the standardized regression estimates of the items, standard error (S.E.), *t*-values (C.R.) and *p*-value for for this four-factor model of school information literacy culture. Furthermore, the factor loading of each item on the related factors were ranged from 0.603 to 0.853, indicates that the model convergent validity was achieved and the covariances between variables were less than 0.90, this also revealed that all the variables were distinct. Two items (SILCAT 20 and

25) were deleted; one from fairness and one from activities. The researcher decided to delete the concerned items because their factor loadings were less than the recommended threshold value of ≥.50.

Table 5.11

Results of Confirmatory Factor Analysis for Five-factor Measurement Model of School Information Literacy Culture

Model	Item	Standardized regression estimates	Standard Error	Critical Ratio	*p*-value
Four-factor Measurement Model of School Information Literacy Culture	SILCAT30	0.771			
	SILCAT29	0.853	0.052	21.787	***
	SILCAT28	0.842	0.05	21.492	***
	SILCAT27	0.750	0.049	18.878	***
	SILCAT26	0.603	0.054	14.788	***
	SILCAT12	0.716			
	SILCAT11	0.731	0.068	15.349	***
	SILCAT10	0.604	0.066	13.04	***
	SILCAT9	0.623	0.061	13.42	***
	SILCAT8	0.617	0.065	13.305	***
	SILCAT23	0.641			
	SILCAT22	0.717	0.092	13.003	***
	SILCAT21	0.760	0.099	13.263	***
	SILCAT17	0.706			
	SILCAT16	0.796	0.081	14.732	***
	SILCAT15	0.681	0.078	13.854	***

In addition, the researcher tested the second-order of school information literacy culture due to the well fit of the first-order to determine whether there is another latent construct accounting for the factor. The hypothesized measurement model for second-order school information literacy culture was presented in Figure

5.5. The result indicated that the second-order model was also a good fit [i.e., χ^2 (df=100, p=0.000) =250.707; χ^2/df = 2.507; TLI =0.951; CFI =0.959; RMSEA=0.05]. The result of second-order confirmatory factor analysis (measurement model) provide support for the existence of four distinctive factors of the model.

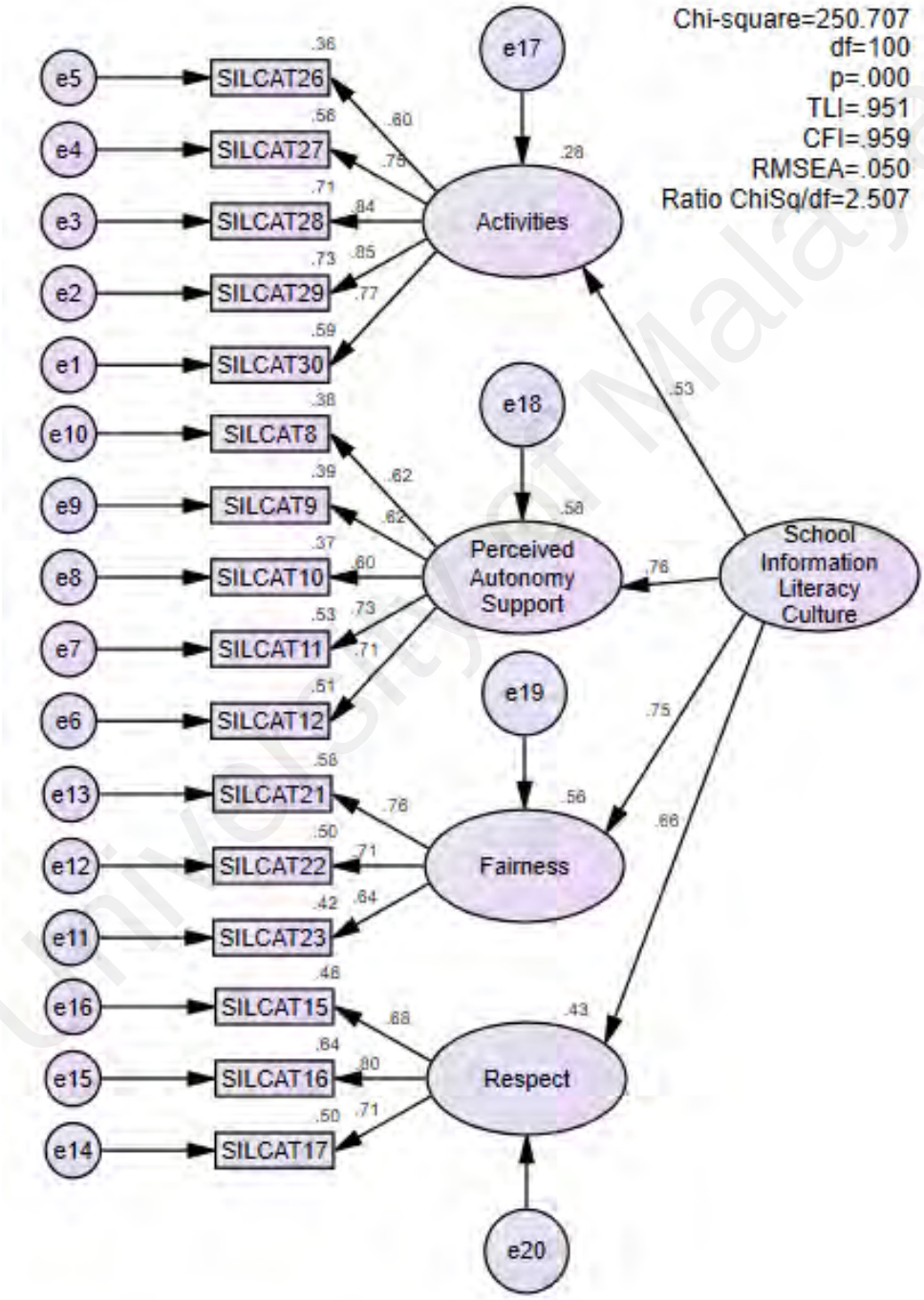


Figure 5.5. Second order four-factor model of school information literacy culture

Furthermore, the results of the standardized regression estimate of the items, standard error (S.E.), *t*-values (C.R.) and *p*-value for this second order four-factor model of school information literacy culture were examined and presented in Table 5.12.

Table 5.12

Results of Confirmatory Factor Analysis for Second Order Four-factor Measurement Model of School Information Literacy Culture

Model	Item	Standardized regression estimates	Standard Error	Critical Ratio	*p*-value
Four-factor Measurement Model of School Information Literacy Culture (second order)	Activities	0.528			
	Perceived Autonomy Support	0.761	0.158	8.252	***
	Fairness	0.748	0.145	7.911	***
	Respect	0.657	0.136	7.839	***
	SILCAT30	0.771			
	SILCAT29	0.853	0.052	21.772	***
	SILCAT28	0.842	0.05	21.478	***
	SILCAT27	0.75	0.049	18.87	***
	SILCAT26	0.603	0.054	14.779	***
	SILCAT12	0.715			
	SILCAT11	0.731	0.068	15.317	***
	SILCAT10	0.604	0.066	13.034	***
	SILCAT9	0.624	0.061	13.416	***
	SILCAT8	0.617	0.065	13.287	***
	SILCAT23	0.644			
	SILCAT22	0.71	0.091	12.99	***
	SILCAT21	0.764	0.099	13.316	***
	SILCAT17	0.706			
	SILCAT16	0.798	0.081	14.713	***
	SILCAT15	0.679	0.078	13.825	***

Summary of the Answer for Research Question 2.1

Initially, the theoretical model of school information literacy culture from hidden curriculum perspective consisted of four factors (Teaching and Learning, Perceived Autonomy Support, Moral Development and Activities) which were identified from literature review, findings from qualitative data analysis and also NILEM survey in Phase 1. After the content validation procedure and exploratory factor analysis, a four-factor structure model of school information literacy culture has been derived. The factors for this four-factor structure were Activities, Perceived Autonomy Support, Respect and Fairness. This exploratory model was further validated through confirmatory factor analysis. In summary, the findings from the confirmatory factor analysis indicated that there are four underlying factors of school information literacy culture. These factors are Activities, Perceived Autonomy Support, Respect and Fairness. The result also showed that the items of these factors were significantly loaded onto their respective factors without multicollinearity problem, indicating that the convergent and discriminant validity were achieved.

Results of Analysis for Research Question 2.2

Research question 2.2: "What are the underlying factors of information literacy skills to measure Malaysian secondary school students' information literacy competence?"

Factor Analysis of Information Literacy Skills Assessment Tool (ILSAT). To answer the research question 2.2, an Exploratory Factor Analysis (EFA) was conducted using SPSS to explore the preliminary factor structure of information literacy skills, followed by Confirmatory Factor Analysis (CFA) using AMOS to confirm the construct validity of the instrument, and to know how well the hypothesized measurement model fit the observed data. Initially, all 25 items in ILSAT were subjected to factor analysis. As shown in Table 5.13, the inter-item correlation values were ranged from 0.415 to 0.545 (moderate to substantial) (Davis, 1971). Furthermore, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.884 and Bartlett's Test [$\chi 2$ (300) = 6517.706; p<.001] was significant, indicating that items in the survey were strongly correlated enough to conduct a factor analysis.

Table 5.13

Correlation Coefficient of the Summated Variable in ILSAT

	IL	IDL	SR
Information Literacy	1		
Independent Learning	0.545**	1	
Social Responsibility	0.449**	0.415**	1

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

By performing PCA and followed by a varimax rotation, initial results indicated that the communalities ranging from 0.424 to 0.811 and there were five factors

with eigenvalues greater than 1 that accounted for 57.98% of total variance. Three items (ILSAT 9, 13 and 22) were deleted due to their factor loadings lower than 0.5. Upon inspection of the scree plot (Figure 5.6) and parallel analysis, four factors were retained.

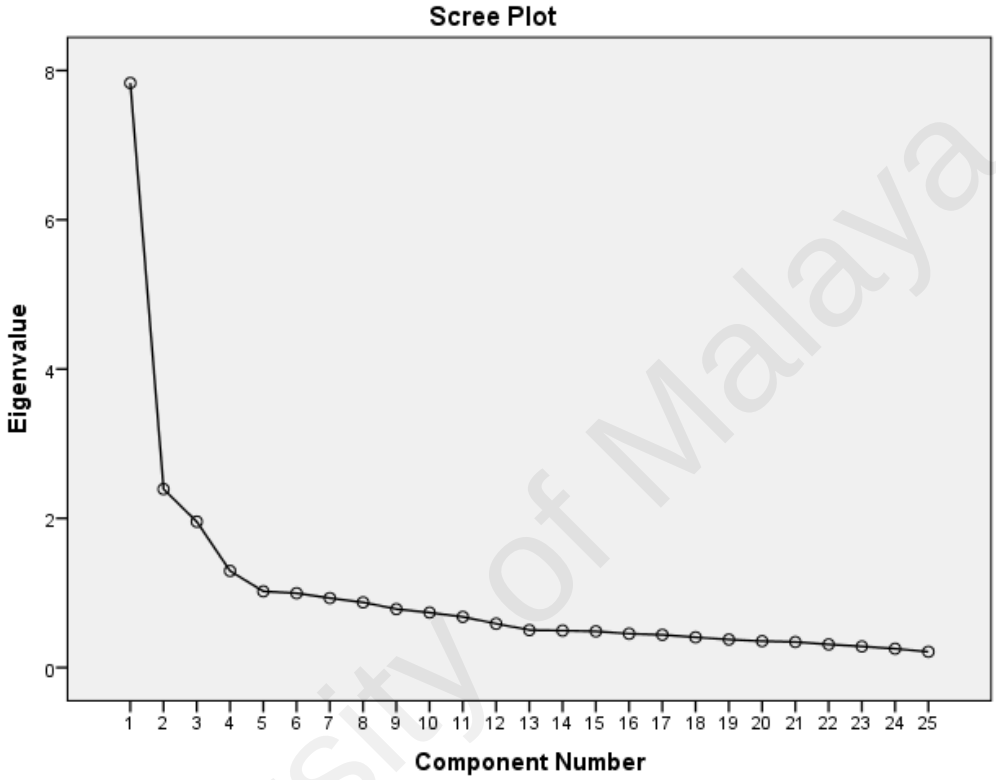


Figure 5.6. Scree Plot of factor analysis for 25 ILSAT items

The data were reanalyzed using PCA with extraction to four factors component followed by a varimax rotation after deleting the three items. The four-factor structure explained 56.52% of the total variance, with factor 1 contributed to 32.05%, factor 2 contributed to 10.14%, factor 3 contributed to 8.55% and factor 4 contributed to 5.78%. The factors of the four-factor structure were labeled as Information Literacy (IL), Independent Learning (IDL), Mutual Respect (MR) and Ethics (ET). The reliability coefficient for each factor was calculated. Table 5.14 presents the factor loading and communalities, and reliability coefficient for ILSAT.

Table 5.14

Factor Loadings and Communalities, and Reliability Coefficients for ILSAT

	Item	Factor Loading				Communality	Reliability
		1	2	3	4		
IL	ILSAT6	0.719				0.583	0.859
	ILSAT1	0.709				0.545	
	ILSAT5	0.673				0.544	
	ILSAT7	0.658				0.498	
	ILSAT3	0.655				0.472	
	ILSAT2	0.635				0.437	
	ILSAT8	0.632				0.451	
	ILSAT4	0.627				0.497	
	ILSAT10	0.536				0.464	
IDL	ILSAT15		0.763			0.624	0.804
	ILSAT16		0.754			0.601	
	ILSAT14		0.703			0.507	
	ILSAT17		0.661			0.554	
	ILSAT18		0.559			0.428	
	ILSAT12		0.557			0.433	
MR	ILSAT21			0.861		0.804	0.893
	ILSAT20			0.825		0.785	
	ILSAT19			0.825		0.779	
ET	ILSAT24				0.834	0.740	0.754
	ILSAT25				0.811	0.716	
	ILSAT23				0.651	0.542	

Likewise, the first eigenvalue of the present scale was 7.051 accounted for 32.05% of the total variance, and the ratio of the first to the second eigenvalue was 7.051/2.231=3.160, indicated that there was a doubt of uni-dimensionality. The data were reanalyzed by conducting PCA to each subscale individually. The result of the

PCA for each subscale revealed a single factor solution for each of the subscale. Hence, corresponding items of each factor were added and the calculation was re-run for four factors.

Table 5.15

Correlation Coefficient of the Summated Variable in ILSAT After EFA

	IL	IDL	MR	ET
Information Literacy (IL)	1			
Independent Learning (IDL)	0.512**	1		
Mutual Respect (MR)	0.391**	0.292**	1	
Ethics (ET)	0.337**	0.327**	0.449**	1

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

The results revealed that the correlation coefficients were ranged from 0.327 to 0.512 (moderate to substantial) (Davis, 1971). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.696 and Bartlett's Test [χ^2 (6) = 469.755; p<.001] was significant, which revealed that the conducted factor analysis was appropriate. This has resulted into only one factor explaining 53.89 % variance of the total variance. Both the Kaiser Criterion and scree plot supported a single factor (λ=2.155) that accounted for 53.89 % of the total variance. The hierarchical factor was interpreted as information literacy skills. Scree plot and parallel analysis were also used to estimate the number of factors to extract. The scree plot and parallel analysis appeared to support only one factor solution (Figure 5.7). The detail has been provided in Table 5.16.

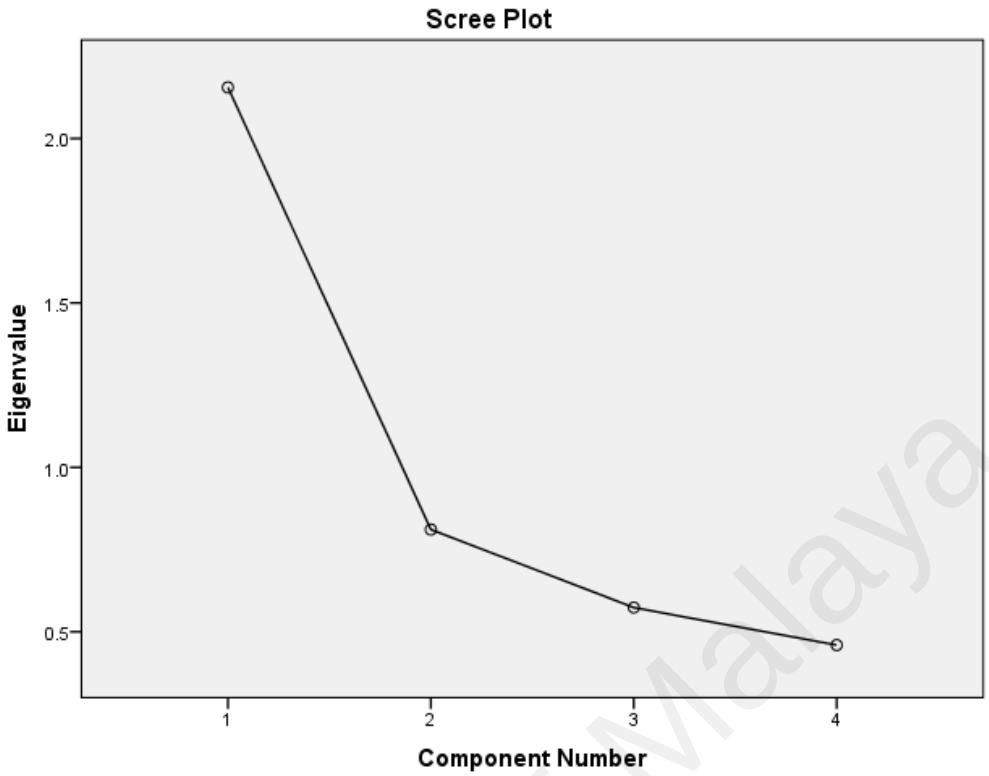


Figure 5.7. Scree plot of factor analysis for four-factor structure of ILSAT

Table 5.16

Factor Loadings and Communalities, Eigen Values and % Variances Explained by Information Literacy Skills with Four Dimensions

Factor	Dimensions	Factor Loadings	Communalities	Eigen values	% of Variance
Information Literacy Skills	IL	0.774	0.599	2.155	53.89
	IDL	0.727	0.529		
	MR	0.722	0.521		
	ET	0.712	0.507		

From the results analysis of EFA, the information literacy skills consisted of four factors; they are Information Literacy (IL), Independent Learning (IDL), Mutual Respect (MR) and Ethic (ET). The next step was to determine the construct validity.

For this purpose, a confirmatory factor analysis was conducted using AMOS software. Initially, they were four underlying factors derived from EFA. In addition to chi-square (χ^2), a number of indices were employed to examine the model fit, such as the degree of freedom (χ^2/df), Comparative fit index (CFI), Tucker-Lewis index (TLI) and the root-mean-square error of approximation (RMSEA). Figure 5.8 presents the result of this analysis. Generally, the model fit the data with chi-square χ^2 (df=98, p=0.000) =280.586. Since chi-square and its *df* is very sensitive to sample size, the researcher used other indices to determine the model fit. The results of the measurement model generated fit indices with the degree of freedom (χ^2/df) =2.863, Comparative fit index (CFI)=0.954, Tucker-Lewis index (TLI)=0.944 and the root-mean-square error of approximation (RMSEA)=0.055. All these indices met the requirement of their recommended threshold values respectively. In addition, the factor loading of each item on the related factors were ranged from 0.636 to 0.873, indicated that the model convergent validity held, and the covariances between variables which were less than 0.90 also indicated that all the variables were distinct. Five items (ILSAT 2,3,8,12,14) were deleted after the modification to improve the model fit. Furthermore, the results of the standardized regression estimate of the items, standard error (S.E.), *t*-values (C.R.) and *p*-value for this four-factor measurement model of information literacy skills were examined and presented in Table 5.17.

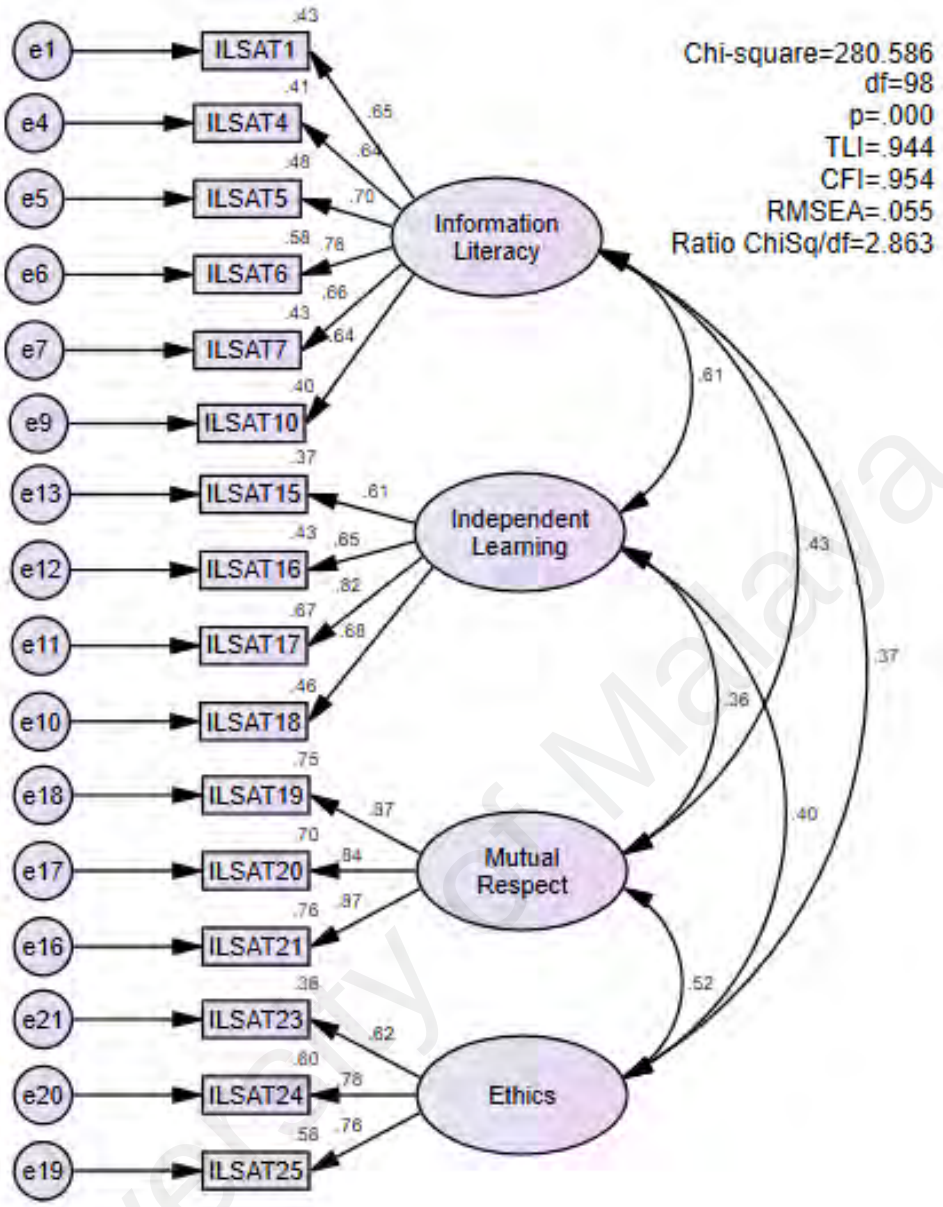


Figure 5.8. Four-factor model of information literacy skills

Table 5.17

Results of Confirmatory Factor Analysis for Four-factor Measurement Model of Information Literacy Skills

Model	Item	Standardized regression estimates	Standard Error	Critical Ratio	*p*-value
Four-factor Measurement Model of Information Literacy Skills	ILSAT1	0.652			
	ILSAT4	0.641	0.086	13.335	***
	ILSAT5	0.696	0.071	14.26	***
	ILSAT6	0.763	0.077	15.262	***
	ILSAT7	0.658	0.076	13.629	***
	ILSAT10	0.636	0.084	13.257	***
	ILSAT18	0.681			
	ILSAT17	0.821	0.077	15.776	***
	ILSAT16	0.654	0.076	13.652	***
	ILSAT15	0.612	0.077	12.908	***
	ILSAT21	0.873			
	ILSAT20	0.837	0.038	25.239	***
	ILSAT19	0.865	0.038	26.248	***
	ILSAT25	0.760			
	ILSAT24	0.777	0.071	14.93	***
	ILSAT23	0.618	0.063	13.164	***

The researcher also tested the second-order information literacy skills construct after examining the first order measurement model. The second-order measurement model for the information literacy skills with its standardized loading is presented in Figure 5.9.

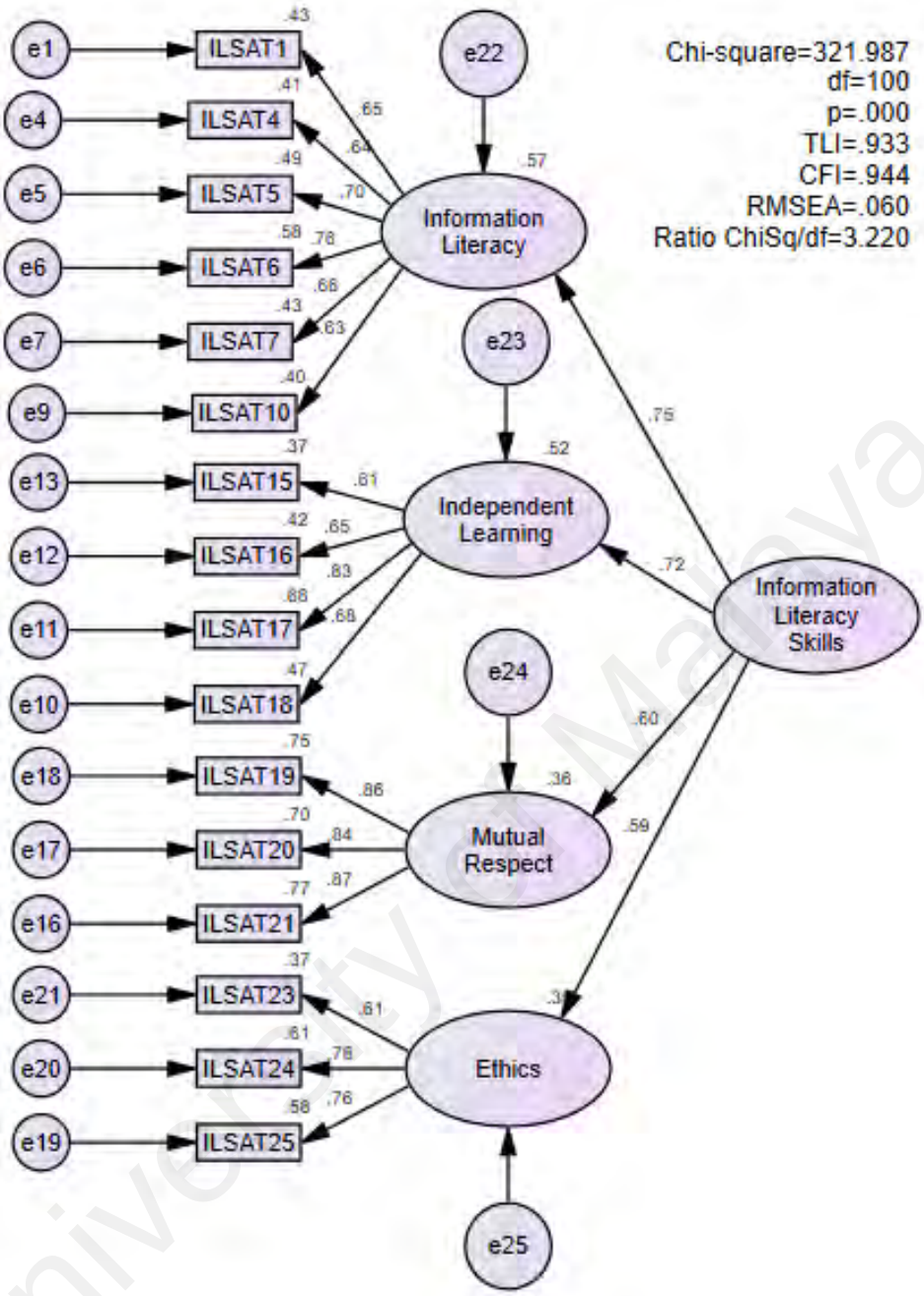


Figure 5.9. Second-order measurement model information literacy skills and its factors

As in the case for the first order, the second order also consisted of four distinctive factors; they are Information Literacy (IL), Independent Learning (IDL), Mutual Respect (MR) and Ethics (ET). The result in Figure 5.11 indicated that the model generated fit indices exceeding the recommended critical values and was correctly adjusted to the data (i.e., χ^2(df=100, p=0.000) = 321.987; χ^2/df = 3.220; TLI = 0.933;

CFI =0 .944; RMSEA= 0.060). The factor loading of the items also were very significant since they exceeded the 0.50 threshold requirement; covariance among factors was 0.75, 0.72, 0.60 and 0.59 for Information Literacy, Independent Learning, Mutual Respect and Ethic respectively. All of these supported that the model was having a well fit. The results of the standardized regression estimate of the items, standard error (S.E.), *t*-values (C.R.) and *p*-value for this second-order measurement model of information literacy skills were examined and presented in Table 5.18.

Table 5.18

Results of Confirmatory Factor Analysis for Second-order Measurement Model of Information Literacy Skills

Model	Item	Standardized regression estimates	SE	C.R.	*p*-value
Four-factor Measurement Model of Information Literacy Skills (second order)	Information Literacy	0.753			
	Independent Learning	0.721	0.136	8.668	***
	Mutual Respect	0.597	0.111	8.862	***
	Ethics	0.590	0.136	8.213	***
	ILSAT1	0.653			
	ILSAT4	0.639	0.086	13.301	***
	ILSAT5	0.699	0.071	14.286	***
	ILSAT6	0.764	0.077	15.273	***
	ILSAT7	0.658	0.076	13.630	***
	ILSAT10	0.632	0.084	13.181	
	ILSAT18	0.683			***
	ILSAT17	0.826	0.077	15.800	***
	ILSAT16	0.651	0.075	13.623	***
	ILSAT15	0.606	0.076	12.812	***
	ILSAT21	0.875			
	ILSAT20	0.838	0.038	25.220	***
	ILSAT19	0.863	0.038	26.132	***
	ILSAT25	0.765			
	ILSAT24	0.781	0.072	14.596	***
	ILSAT23	0.608	0.063	12.909	***

Summary of the Answer for Research Question 2.2

At first, the theoretical model of information literacy skills consisted of three factors (Information literacy, Independent Learning and Social Responsibility) which were developed based on the guideline from "Information Literacy Standards for Student Learning" by the American Association of School Librarians (AASL) and Association for Educational Communications and Technology (AECT) (Librarians & Communications, 1998). After the content validation procedure and exploratory factor analysis, a four-factor structure model of information literacy skills has been derived. The factors for this four-factor structure were Information literacy, Independent Learning, Mutual Respect and Ethics. This exploratory model was further validated through confirmatory factor analysis. In summary, the factor analysis revealed that there were four distinctive factors for information literacy skills which are Information Literacy (IL), Independent Learning (IDL), Mutual Respect (MR) and Ethics (ET). The items' factor loadings all exceeded the threshold values of 0.50, indicating that the convergent validity was achieved and none of the covariance between variable exceeded 0.90 also confirmed that all variables were distinct. Hence, the results suggested that there are four underlying factors of information literacy skills to measure Malaysian secondary school students' information literacy competence, these factors are Information Literacy, Independent Learning, Mutual Respect and Ethics.

Results of Analysis for Research Question 2.3

Research question 2.3: "What Is the factor structure of Academic Self-Regulated Questionnaire (SRQ-A) that are reliable, valid and suitable for the use of Malaysian secondary school students?"

Confirmatory Factor Analysis of the four-factor structure of Academic Self-Regulated Questionnaire (SRQ-A). To answer the research question 2.3, a confirmatory factor analysis was conducted on the four-factor structure of Academic Self-Regulated Questionnaire (SRQ-A). The SRQ-A contains four factors, they are external regulation (ER), introjected regulation(IR), identified regulation(IDR) and intrinsic motivation(IM). The first and second factor (ER and IR) consisted of nine items respectively and the third and the forth factor (IDR and IM) contained seven items respectively. Hence, there were 32 items subjected for CFA. The requirement for good model fit were non-significant chi-square ($\chi 2$), but since chi-square is sensitive to large sample size, other fit indices such as the ratio between chi-square and degree of freedom ($\chi 2/df$) =3.0 or $\chi 2/df$ = 5.0 (Schumacker & Lomax, 2004), the root-mean-square error of approximation (RMSEA<0.08)(Browne & Cudeck, 1993), and the Comparative fit index (CFI) = 0.90; Tucker-Lewis index (TLI) = 0.90 (Hu & Bentler, 1999) were utilized. In addition, to determine the construct validity, the factor loading more than 0.50 and covariance between variable below 0.90 were considered in this analysis.

Firstly, the goodness of fit statistics was calculated, $\chi 2$ (df=458, p=.000) =4257.474, $\chi 2/$ df = 9.296, CFI= 0.520, TLI=.480, RMSEA= 0.117. These pointed out that the model was not fit at the expected level. Furthermore, the covariance between external regulation and introjected regulation was 1.02 and covariance between identified regulation and intrinsic motivation was 0.93 that this indicated that there were

problems of discriminant validity. Considering most of the factor loadings of external regulation (ranged from 0.11 to 0.60) and intrinsic motivation (ranged from 0.44 to 0.64) were very low compared to introjected regulation (ranged from 0.38-0.66) and identified regulation (ranged from 0.51-0.72), the researcher decided to delete the two factors (external regulation and intrinsic motivation) from the model.

The CFA was conducted again to examine the construct validity. According to the results of second analyses, $\chi 2$ (df =103, p=.000) =972.340, $\chi 2$/ df =9.440, CFI= 0.707, TLI=.659, RMSEA= 0.118, these results indicated that the model doesn't fit at a satisfactory level. Six items (SRQA4,12, 17,18,29, 30) with factor loading less than 0.5 were deleted after several attempts to improve the model. The final CFA results were as follows: $\chi 2$ (df =19, p=.000) =77.814, $\chi 2$/ df = 4.095, CFI= 0.953, TLI=0.931, RMSEA= 0.071. The factor loadings of all the remained items exceeded 0.50 and this indicated that the convergent validity achieved, and the covariance between introjected regulation and identified regulation was less than 0.90 also indicated that the two variables were distinct. A diagram regarding these results is given in Figure 5.10.

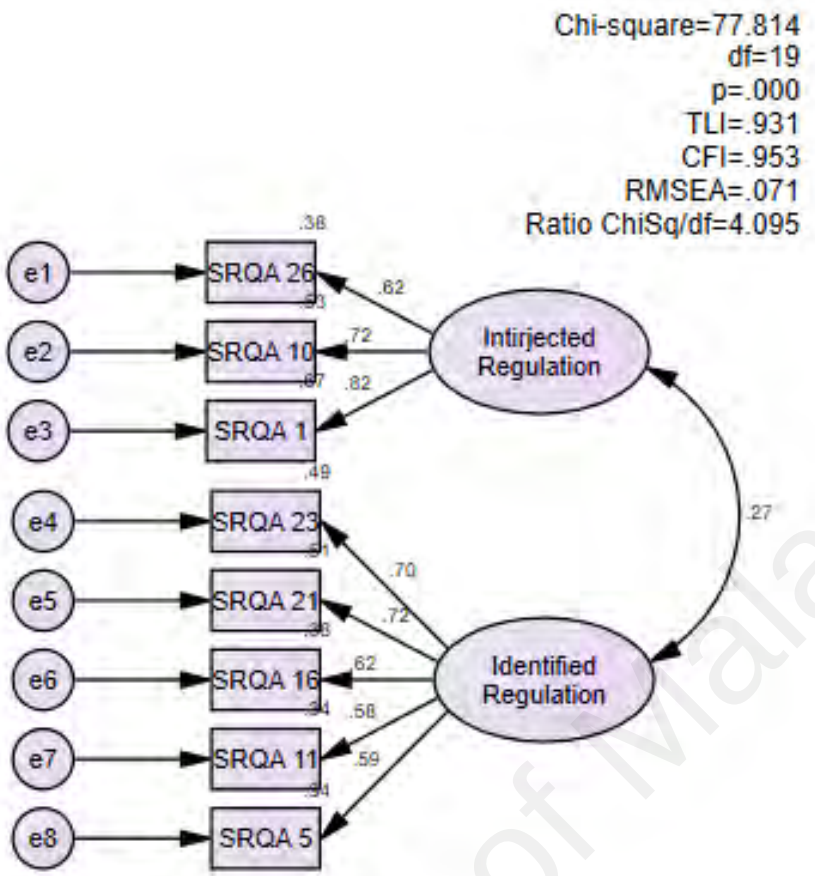


Figure 5.10. Two-factor measurement model of motivation regulation

The results of the standardized regression estimate of the items, standard error (S.E.), *t*-values (C.R.), *p*-value and Cronbach's alpha for this two-factor Measurement Model of Motivation Regulation were examined and presented in Table 5.19.

Table 5.19

Results of Confirmatory Factor Analysis and Reliability for Two-factor Measurement Model of Motivation Regulation

Model	Item	Standardized regression estimates	S.E.	C.R.	*p*-value	Cronbach's alpha
Two-factor Measurement Model of Motivation Regulation	SRQA26	0.620				
	SRQA10	0.725	0.095	12.87	***	
	SRQA1	0.821	0.113	12.604	***	
	SRQA23	0.698				
	SRQA21	0.716	0.069	13.85	***	0.742
	SRQA16	0.617	0.068	12.491	***	
	SRQA11	0.584	0.062	11.933	***	
	SRQA5	0.586	0.057	11.965	***	

Summary of the Answer for Research Question 2.3

The confirmatory factor analysis revealed that among four factors in the Academic Self-Regulated Questionnaire (SRQ-A), there were only two distinctive factors of motivation regulation construct which were fit to the data, namely, Introjected Regulation (IR) and Identified Regulation (IDR). The items' factor loadings for these two factors all exceeded the threshold values of 0.50, indicating that the convergent validity achieved and the covariance between variables was less than 0.90 also confirmed that the two variables were distinct. In addition, the Cronbach's alpha for this two-factor structure was 0.742. Hence, the results suggesting that motivation regulation construct was reliable and valid with two-factor-structure and suitable for the use of Malaysian secondary school students.

Results of Analysis for Research Question 2.4

Research question 2.4: "Is the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale reliable, valid and suitable for the use of Malaysian secondary school students?"

Confirmatory Factor Analysis of the single factor structure of "Self-efficacy for Learning and Performance" (SELP). To answer the research question 2.4, a confirmatory factor analysis was conducted on the eight items of Self-efficacy for Learning and Performance (SELP) scale which was adapted from Motivated Strategies for Learning Questionnaire (MSLQ). Initially, the CFA results indicated that χ^2 (df =20, p=0.000) =200.090, χ^2/ df = 10.005, CFI= 0.912, TLI=0.882, RMSEA= 0.122, indicating that the model was not fit to the data. After inspecting the modification indices, two problematic items (SELP 1and 4) were deleted in order to improve the model. The final CFA results were presented in Figure 5.11. The results showed that the model was perfectly fit to the data [i.e., χ^2 (df =9, p=.000) =43.699, χ^2/ df = 4.855, CFI= 0.974, TLI=0.957, RMSEA= 0.08]. The factor loading of all items exceeded 0.5 and this indicated that the convergent validity achieved. The Cronbach's alpha of the model was also calculated and the results was 0.849 showing that the model was reliable. Table 5.20 shows the standardized regression estimates of the items, standard error (S.E.), *t*-values (C.R.), *p*-value and Cronbach's alpha for the model.

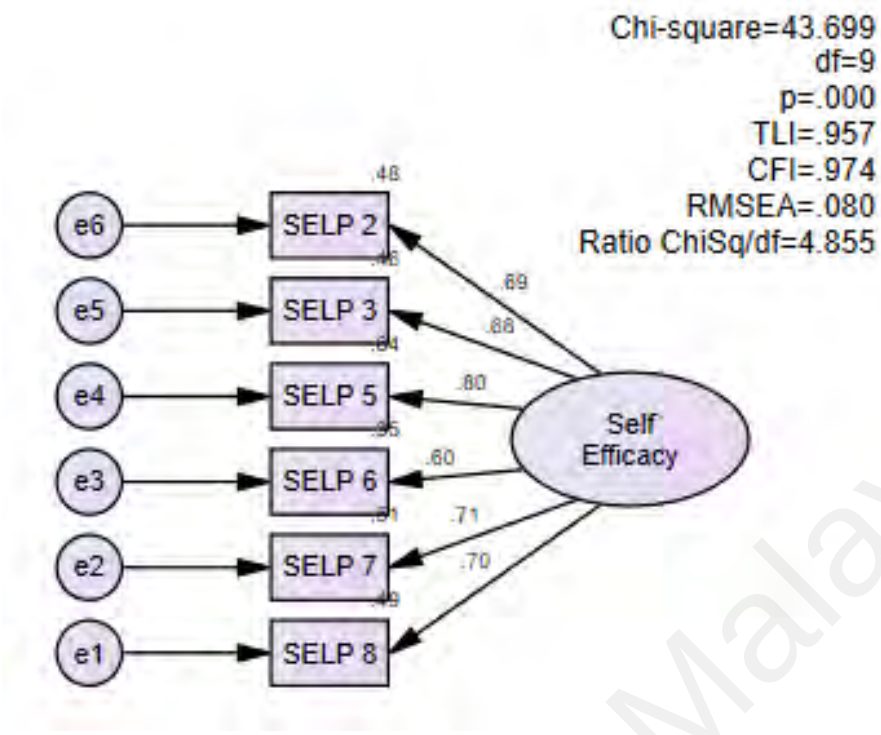


Figure 5.11. Single factor measurement model of self-efficacy

Table 5.20

Results of Confirmatory Factor Analysis and Reliability for Self-Efficacy

Model	Item	Standardized	SE	(CR)	*p*-value	Cronbach's alpha
Self-Efficacy	SELP8	0.698				
	SELP7	0.713	0.062	15.583	***	
	SELP6	0.596	0.059	13.222	***	0.849
	SELP5	0.799	0.068	17.103	***	
	SELP3	0.676	0.057	14.856	***	
	SELP2	0.695	0.07	15.229	***	

Summary of the Answer for Research Question 2.4

In summary, the confirmatory factor analysis revealed the six-items self-efficacy scale was perfectly adjusted to the data. The factor loading of all items exceeded 0.50 also confirmed that the model was valid in term of convergent validity and the internal consistency result also proved that it was reliable. Hence, the results from the CFA and Cronbach's alpha suggested that the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale with six items was reliable, valid and suitable for the use of Malaysian secondary school students.

Stage Two: Hypothesized Model Development

Results of Analysis for Research Question 2.5

Research question 2.5: "What is the hypothesized model of information literacy education for further evaluation?"

Hypotheses Development

This study investigated the relationship between school information literacy culture from hidden curriculum perspective and student's information literacy skills acquisition. In addition, motivation and self-efficacy were introduced as mediating variables to examine if these two variables have any mediating effect on the relationship between school information literacy culture and information literacy skills acquisition. Hence, in this study, the structural model of Smart PLS (Partial Least Square) was employed in Phase 3 to test the hypotheses below:

H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.

H_2: There is a causal relationship between school information literacy culture and motivation.

H_3: There is a causal relationship between motivation and information literacy skills acquisition.

H_4: There is a causal relationship between school information literacy culture and self-efficacy.

H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.

H_6: There is a causal relationship between self-efficacy and motivation.

$H_{7:}$ There is a mediating effect of motivation in the relationship between school information literacy culture and information literacy skills acquisition.

$H_{8:}$ There is a mediating effect of self-efficacy in the relationship between school information literacy culture and information literacy skills acquisition.

H_9: There is a mediating effect of motivation in the relationship between elf-efficacy and information literacy skills acquisition.

Hypothesized Model Development

Initially, based on the literature review and findings from Phase 1, the theoretical model of information literacy education consisted of four constructs. For the school information literacy culture, the factors or dimensions identified from Phase 1 were Teaching and Learning, Perceived Autonomy Support, Moral Development and Activities. The four-factored motivation construct was operationalized by 32 items. The factors or dimensions were External Regulation, Introjected Regulation, Identified Regulation and Intrinsic motivation. The factors for students' information literacy skills were Information Literacy, Independent Learning and Social Responsibility. Meanwhile, self-efficacy was assessed using 8 items. The theoretical model of information literacy education was depicted in Figure 5.12.

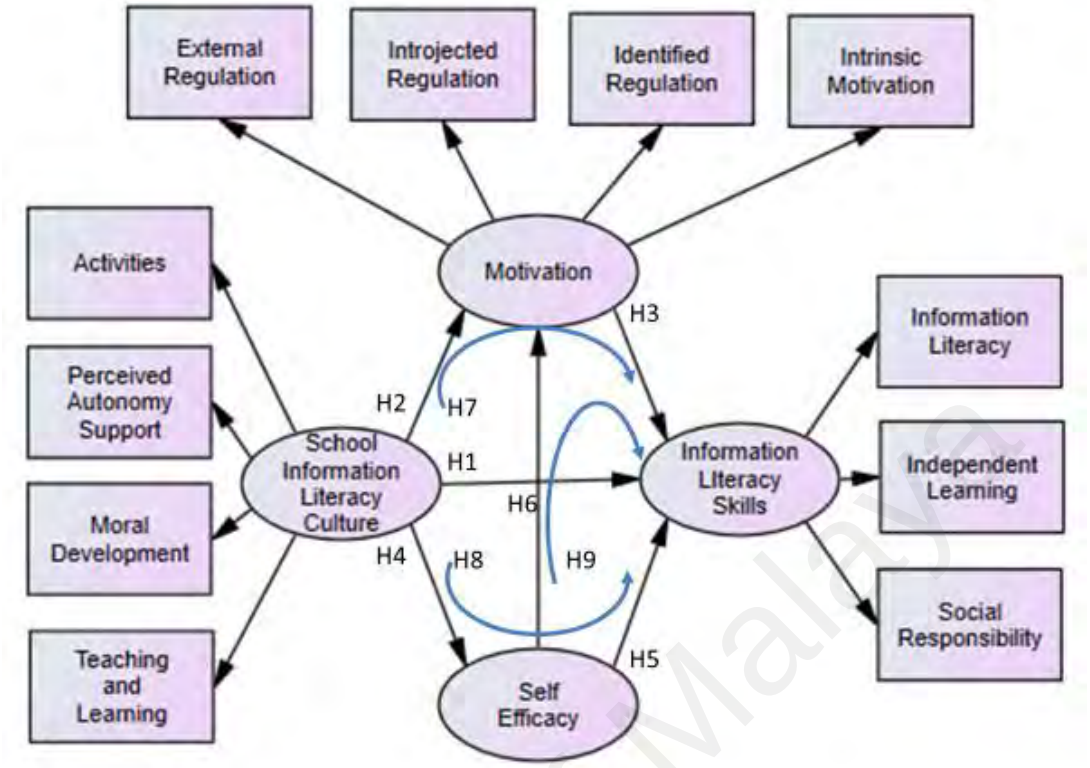


Figure 5.12. Theoretical model of information literacy education

After the instrument validation process in the Stage One, the findings from the confirmatory factor analysis revealed that there were four underlying factors of school information literacy culture. These factors were Activities, Perceived Autonomy Support, Respect and Fairness. For the information literacy skills construct, four factors have been verified. They were Information Literacy, Independent Learning, Mutual Respect and Ethics. On the other hand, the factor of motivation regulation construct has been reduced from four factors to two factors after confirmatory factor analysis was conducted on Academic Self-Regulation Questionnaire. The two factors were Introjected Regulation and Identified Regulation. In addition, the self-efficacy construct was operationalized through six items instead of eight items. Hence the hypothesized model of information literacy education has been developed (see Figure 5.13.) and was ready for model evaluation in Phase 3.

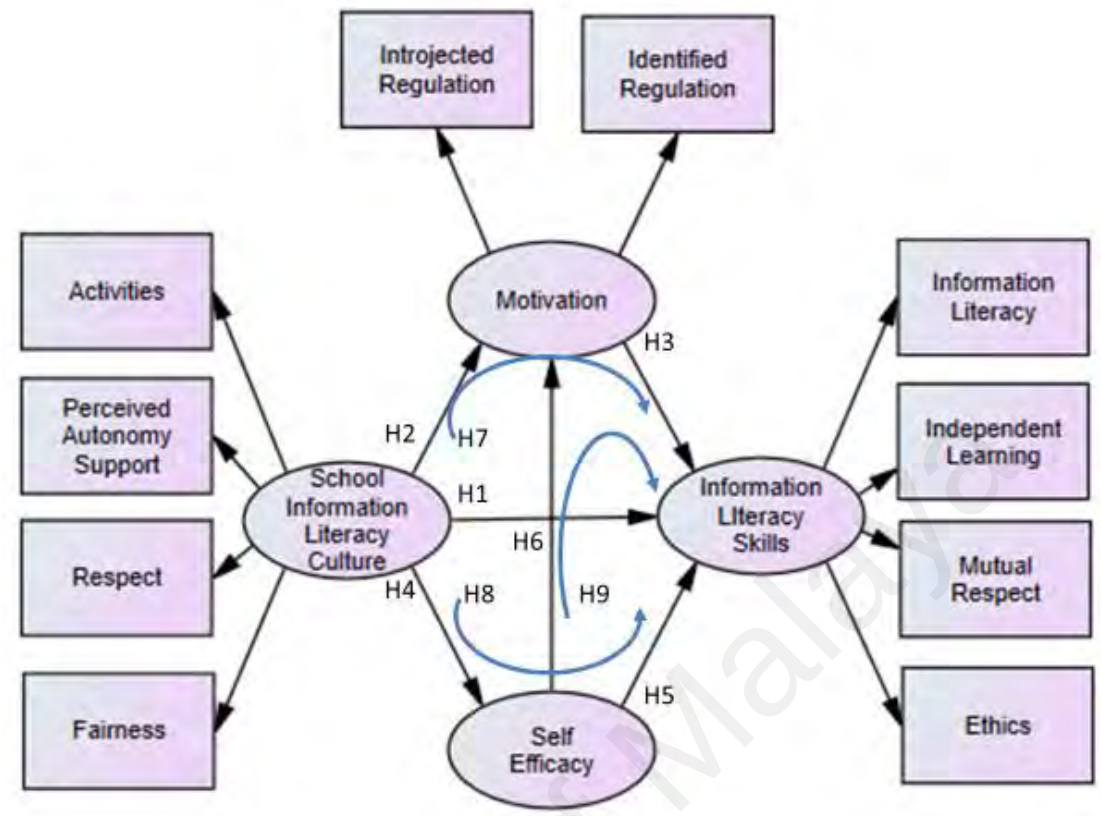


Figure 5.13. The hypothesized model of information literacy education

Summary of the Answer for Research Question 2.5

In Summary, in this model development phase, the selected 610 responses were initially analyzed using SPSS to calculate descriptive statistics, normality, reliability and exploratory factor analysis. In addition, confirmatory factor analysis was conducted using AMOS to identify and validate the underlying factors of each construct and a hypothesized model of information literacy education has been proposed for further evaluation. The hypothesized model of information literacy education consisted of four main constructs, namely school information literacy culture, information literacy skills, motivation and self-efficacy. The school information literacy culture consisted of four factors. These factors were Activities, Perceived Autonomy Support, Respect and Fairness. For the information literacy skills construct, four factors have been verified. They were Information Literacy,

Independent Learning, Mutual Respect and Ethics. Moreover, the motivation was explained by two factors, which were the Introjected Regulation and Identified Regulation. Finally, the self-efficacy construct was operationalized through six items. Hence, the hypothesized model of information literacy education has been developed and was ready for evaluation at the model evaluation phase.

Summary of Findings of The Model Development Phase

This chapter presents the findings on the model development phase. The findings are presented in two stages in order to answer respective research question. The first stage is the instruments development and validation stage. This stage answered the research questions 2.1, 2.2, 2.3 and 2.4. The findings from this stage revealed that there were four underlying factors of school information literacy culture. These factors were Activities, Perceived Autonomy Support, Respect and Fairness. For the information literacy skills construct, four factors have been verified. They were Information Literacy, Independent Learning, Mutual Respect and Ethics. On the other hand, the factor of motivation regulation construct has been reduced from four factors to two factors after confirmatory factor analysis was conducted on Academic Self-Regulation Questionnaire. The two factors were Introjected Regulation and Identified Regulation. In addition, the self-efficacy construct was operationalized through six items instead of eight items.

The second stage is the hypothesized model development stage. The hypothesized model of information literacy education has been developed based on the hypotheses of this study and also findings from stage one of this model development phase. This stage successfully answered the research question 2.5. The whole hypothesized model of information literacy education is illustrated in Figure 5.17 and ready for model evaluation using Partial Least Square Structural Equation Modeling (PLS-SEM) approach in the model evaluation phase.

CHAPTER 6: FINDINGS OF MODEL EVALUATION PHASE

Introduction

This chapter reports the findings of the model evaluation phase. The hypothesized model of information literacy education was evaluated using the Partial Least Square Structural Equation Modeling (PLS-SEM) approach. This model evaluation phase seeks to answer the following research questions:

3.1 Is there a causal relationship between school information literacy culture and information literacy skills acquisition?

3.2 Is there a causal relationship between school information literacy culture and motivation?

3.3 Is there a causal relationship between motivation and information literacy skills acquisition?

3.4 Is there a causal relationship between school information literacy culture and self-efficacy?

3.5 Is there a causal relationship between self-efficacy and information literacy skills acquisition?

3.6 Is there a causal relationship between self-efficacy and motivation?

3.7 Is there a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition?

3.8 Is there a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition?

3.9 Is there a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition?

This chapter presents the actual process of the hypothesized model evaluation, where the collected data have been used in the statistical analysis and the results have been obtained and presented. The overall procedure of model evaluation using PLS-SEM is summarized in Figure 6.1.

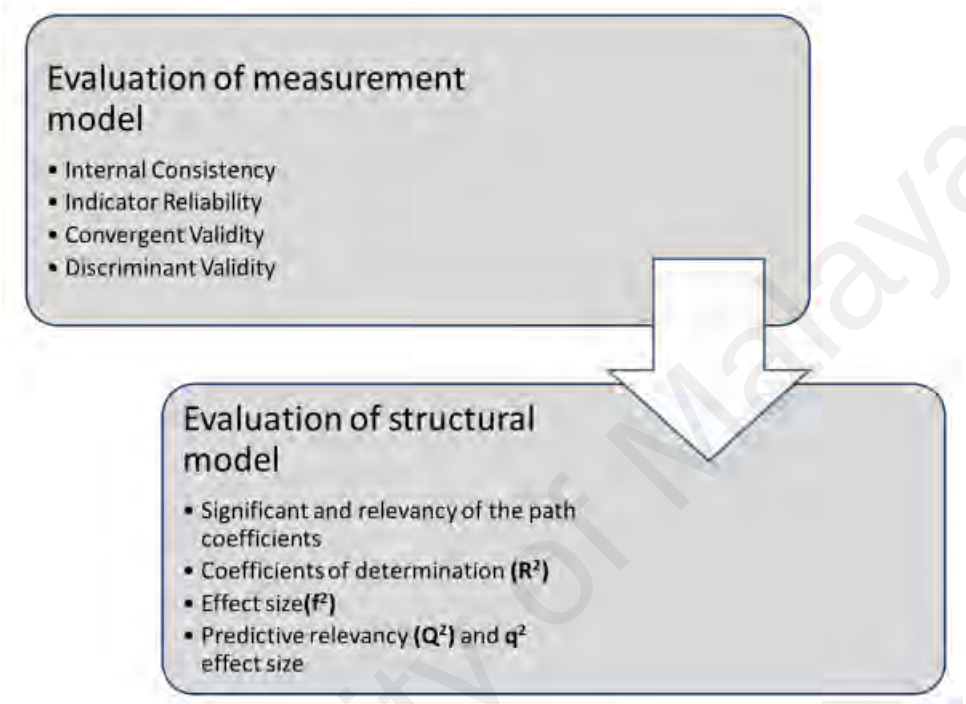


Figure 6.1. Systematic model evaluation of PLS-SEM results (Chin, 2010)

The first stage presented the evaluation of measurement model (outer model) the reliability and the validity of the item measures used. In the second stage, the proposed hypotheses and structural model are validated, including the analysis of the mediation effect of motivation and self-efficacy.

Furthermore, as recommended by Hair et al. (2014), we need to specify the nature of the constructs of the measurement model and structural model a priori before model evaluation. The specifications of the nature of the constructs of the measurement model and structural model are explained as follows.

Specifying the Measurement Model and Structural Model

In PLS-path modeling analysis, there are two types of models, namely the outer (measurement) model and inner (structural) model. An outer or measurement model reflects the relationship between the 'indicators' or 'observed measurement items' and their related 'unobserved' construct or 'latent variable' (LV). Whereas, an inner or structural model reflects the relationship between latent variables or constructs (Jörg Henseler, 2009).

The measurement model could be one of two types: a reflective or a formative model. These two types of model can be distinguished by investigating their related assumptions. If the assumption suggests that the indicators cause the construct, therefore the arrows are pointing from the indicators to the construct, then it is a formative model. Conversely, if the assumption suggests that indicators are caused by the construct, thus the arrows are pointing from the construct to indicators, then it is a reflective model. That is to say, to decide whether the indicators should be formative or reflective is very much dependent on the nature of the causal relationship between the indicator and the constructs (Hulland, 1999; Jörg Henseler, 2009). A few guidelines have been recommended by researchers for choosing the measurement model mode. Table 6.1. presents the guidelines adopted from Joseph F Hair et al. (2014). Based on these guidelines the researcher made a decision about the mode of the measurement models in this study.

Table 6.1

Guidelines for Choosing the Measurement Model Mode (Hair et al., 2014)

Criterion	Decision
Causal priority between the indicator and the construct	• From the construct to the indicators: reflective • From the indicators to the construct: formative
Is the construct at trait explaining the indicators or rather a combination of the indicators?	• If trait: reflective • If combination: formative
Do the indicators represent consequences or causes of the construct?	• If consequences: reflective • If causes: formative
Is it necessarily true that if the assessment of the trait changes, all items will change in similar manner (assuming they are equally coded)?	• If yes: reflective • If no: formative
Are the items mutually interchangeable?	• If yes: reflective • If no: formative

In current study, from the results of the factor analysis, the school information literacy culture construct consisted of four factors or dimensions, these factors were Perceived Autonomy Support, Respect, Fairness and Activities. To confirm the uni-dimensionality of this construct, factor analysis was re-conducted. Results showed that the school information literacy culture was a second order hierarchical construct. Based on the guidelines in Table 6.1 and factor analysis, the current study hypothesized that school information literacy culture is a second-order reflective construct comprising of four factors or dimensions, these dimensions were Perceived Autonomy Support (PAS), Respect (RP), Fairness (FN) and Activities (AC).

For the information literacy skills construct, the similar investigation was carried out. From the results of the factor analysis and also based on model mode guidelines, information literacy skills construct was also considered as a second-order reflective construct consisted of four dimensions, namely Information Literacy (IL), Independent Learning (IDL), Mutual Respect (MR) and Ethics (ET).

For the motivation construct, it was adapted from the Academic Self-Regulation Questionnaire (SRQA). The original SRQA consisted of four dimensions, after conducting the factor analysis, only two dimensions fit the observed data. Therefore, based on the same criteria, motivation construct is considered a second-order reflective construct with two dimensions, Introjected Regulation (IJR) and Identified Regulation (IDR). Furthermore, the self-efficacy was a single-factor first-order reflective construct adapted from Self-efficacy for Learning and Performance (SELP) scale.

The second step in the specification was to identify the nature of constructs in the structural model. There are two types of structural model, the first-order model and the higher-order model. The first-order model is operationalized by a single layer of construct, while the higher-order model or hierarchical component model can be operationalized at higher levels of abstraction (Hair et al., 2014; Jarvis et al., 2003). According to Jarvis et al. (2003), there are four types of higher-order models dependent on the relationship among the first order construct and their indicators and second order construct and the first order construct. These four types are; reflective-reflective type, reflective-formative type, formative-reflective type, and formative-formative type.

According to the results of factor analysis, the current study is a reflective-reflective type. Table 6.2 summarizes each construct type and the hierarchical order along with number of items remaining after the factor analysis.

Table 6.2

Measurement of Constructs of the Hypothesized Model

First order	No of items	Type	Second order	Type
Perceived Autonomy Support (PAS)	5	Reflective	School Information Literacy Culture (SILC)	Reflective
Respect (RP)	3	Reflective		
Fairness (FN)	3	Reflective		
Activities (AC)	5	Reflective		
Introjected Regulation (IJR)	3	Reflective	Motivation (M)	Reflective
Identified Regulation (IDR)	4	Reflective		
Information Literacy (IL)	6	Reflective		
Independent Learning (IDL)	4	Reflective	Information Literacy Skills (ILS)	Reflective
Mutual Respect (MR)	3	Reflective		
Ethics (ET)	3	Reflective		
Self-Efficacy (SE)	6	Reflective		

Furthermore, the hypothesized model of information literacy education with higher-order constructs in PLS path is illustrated in Figure 6.2.

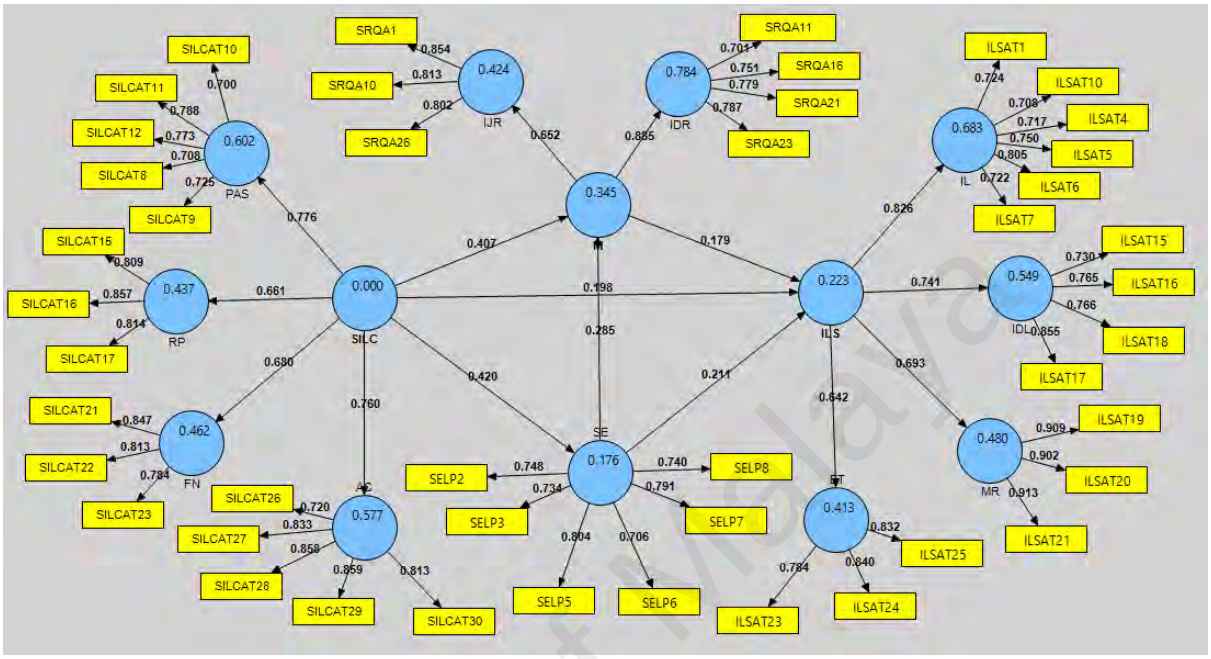


Figure 6.2. The hypothesized model of information literacy education in PLS path

To estimate model consisting higher-order constructs, this study followed the repeated indicator approach, where the indicators of the first-order constructs are reused for the second-order construct (van Riel, Henseler, Kemény, & Sasovova, 2017). This procedure to model second order constructs with PLS is based on the hierarchical components approach suggested by Wold (1982). The hierarchical model was estimated for the first-order loadings, second-order loadings and the structural parameters using PLS path modeling. A nonparametric bootstrapping procedure was used to obtain standard error and calculate t statistics for inferential purposes.

Model Evaluation: Measurement Model Results

As discussed in Chapter 3, in PLS-SEM, the assessment of the measurement model (also referred to as outer model) includes the following analyses: internal consistency reliability, indicator reliability, convergent validity and discriminant validity. The following subsections present the findings for each of the analyses used to evaluate the reliability and validity of the measurement model for this study.

Internal Consistency Reliability

This is a form of reliability that is used to access the consistency of results across items of the same variables (Hair et al., 2014). A measurement model has satisfactory internal consistency reliability when the composite reliability (CR) of each construct exceeds the threshold value of 0.7 (Bagozzi & Yi, 1988). Table 6.3 shows the CR values of each of the construct for this study ranging from 0.840 to 0.934, these values were found to exceed the threshold value of 0.70 which establishes internal consistency.

Indicator Reliability

The indicator reliability represents how much of the variation in an item is explained by a variable (Hair et al., 2014). It can be examined using the outer loadings or items loadings. A measurement model is said to have satisfactory indicator reliability when each of the outer loading is at least 0.70 (Hulland, 1999). Based on the analysis, all items in the measurement model exhibited loadings that exceeded 0.70; ranging from 0.747 to 0.893 (see Table 6.3). Hence, it can be concluded that this study has demonstrated satisfactory indicator reliability.

Table 6.3

Construct Reliability and Validity of the First-order Constructs

First Order Constructs	Items	Loadings	Cronbach's Alpha	CR	AVE
1) Perceived Autonomy Support (PAS)	SILCAT 8	0.708	0.792	0.858	0.547
	SILCAT 9	0.725			
	SILCAT 10	0.700			
	SILCAT 11	0.788			
	SILCAT 12	0.773			
2) Respect (RP)	SILCAT 15	0.809	0.769	0.867	0.684
	SILCAT 16	0.857			
	SILCAT 17	0.814			
3) Fairness (FN)	SILCAT 21	0.847	0.747	0.856	0.664
	SILCAT 22	0.813			
	SILCAT 23	0.784			
4) Activities (AC)	SILCAT 26	0.720	0.875	0.910	0.669
	SILCAT 27	0.833			
	SILCAT 28	0.858			
	SILCAT 29	0.859			
	SILCAT 30	0.813			
5) Introjected Regulation (IJR)	SRQA 1	0.854	0.762	0.863	0.678
	SRQA 10	0.813			
	SRQA 16	0.802			
6) Identified Regulation (IDR)	SRQA 11	0.701	0.748	0.840	0.570
	SRQA 16	0.751			
	SRQA 21	0.779			
	SRQA 23	0.787			
7) Information Literacy (IL)	ILSAT 1	0.724	0.833	0.878	0.545
	ILSAT 4	0.717			
	ILSAT 5	0.750			
	ILSAT 6	0.805			
	ILSAT 7	0.722			

	ILSAT 10	0.708			
8) Independent Learning (IDL)	ILSAT 15	0.730	0.785	0.861	0.609
	ILSAT 16	0.765			
	ILSAT 17	0.855			
	ILSAT 18	0.766			
9) Mutual Respect (MR)	ILSAT 19	0.909	0.893	0.934	0.824
	ILSAT 20	0.902			
	ILSAT 21	0.913			
10) Ethics (ET)	ILSAT 23	0.784	0.754	0.859	0.671
	ILSAT 24	0.840			
	ILSAT 25	0.832			
11) Self-Efficacy (SE)	SELP 2	0.748	0.849	0.888	0.569
	SELP 3	0.735			
	SELP 5	0.804			
	SELP 6	0.706			
	SELP 7	0.791			
	SELP 8	0.740			

Convergent Validity

Convergent validity refers to the extent to which a measure correlates positively with alternative measures of the same variable (Hair et al., 2014). The convergent validity in this study is assessed by examining its Average Variance Extracted (AVE) where it should exceed the recommended threshold value of 0.50 (Bagozzi & Yi, 1988), which means that 50% or more variance of the indicators should be accounted for. As shows in Table 6.3, the AVE of all measures compellingly exceeds the cut-off values of 0.50. The lowest AVE is 0.545 in the model. This result indicated that the study measurement model has established an adequate convergent validity.

Discriminant Validity

Discriminant Validity is the extent to which a variable is truly distinct from other variables, and how much indicators represent only a single variable (Hair et al., 2014). The measurement's model discriminant validity in this study is assessed by using the Fornell and Larcker (1981) criterion and inspection of cross loadings. As shown in Table 6.4, the bold elements represent the square root of AVE and non-bolded values represent the intercorrelation value between constructs. The square root of the AVE exceeds the intercorrelation of the construct with the other constructs in the model (Fornell & Larcker, 1981; Hulland, 1999). Hence the result confirmed that the Fornell and Larcker (1981) criterion is met.

Table 6.4

Intercorrelations of the Latent Variables for First-order Constructs

First-order Constructs	AC	ET	FN	IDR	IDL	IJR	IL	MR	PAS	RP	SE
Activities (AC)	**0.818**										
Ethics (ET)	0.252	**0.819**									
Fairness (FN)	0.296	0.154	**0.815**								
Independent Learning (IDL)	0.218	0.338	0.168	**0.780**							
Identified Regulation (IDR)	0.464	0.292	0.305	0.330	**0.755**						
Introjected Regulation (IJR)	0.122	0.053	0.209	0.129	0.224	**0.823**					
Information Literacy (IL)	0.355	0.314	0.174	0.512	0.331	0.098	**0.738**				
Mutual Respect (MR)	0.269	0.451	0.141	0.296	0.272	0.036	0.374	**0.907**			
Perceived Autonomy Support (PAS)	0.360	0.184	0.457	0.191	0.384	0.267	0.212	0.137	**0.740**		
Respect (RP)	0.339	0.207	0.396	0.123	0.277	0.187	0.129	0.166	0.371	**0.827**	
Self-Efficacy (SE)	0.284	0.158	0.295	0.329	0.460	0.204	0.361	0.197	0.405	0.202	**0.754**

Notes: Square root of the AVE on the diagonal bold

Table 6.5

The Cross-Loadings of the Indicators and Constructs

	PAS	RP	FN	AC	IJR	IDR	IL	IDL	MR	ET	SE
SILCAT8	**0.708**	0.285	0.386	0.216	0.194	0.242	0.132	0.140	0.059	0.135	0.312
SILCAT9	**0.725**	0.284	0.314	0.278	0.194	0.264	0.178	0.112	0.084	0.124	0.358
SILCAT10	**0.700**	0.234	0.273	0.230	0.191	0.306	0.157	0.115	0.159	0.145	0.290
SILCAT11	**0.788**	0.289	0.337	0.320	0.186	0.296	0.158	0.134	0.092	0.149	0.258
SILCAT12	**0.773**	0.279	0.376	0.280	0.222	0.312	0.159	0.201	0.116	0.129	0.285
SILCAT15	0.301	**0.809**	0.324	0.307	0.116	0.194	0.092	0.082	0.126	0.133	0.133
SILCAT16	0.323	**0.857**	0.341	0.274	0.151	0.250	0.137	0.115	0.145	0.182	0.187
SILCAT17	0.296	**0.814**	0.317	0.259	0.199	0.243	0.090	0.107	0.142	0.199	0.183
SILCAT21	0.378	0.322	**0.847**	0.262	0.167	0.233	0.126	0.144	0.123	0.142	0.215
SILCAT22	0.415	0.372	**0.813**	0.205	0.151	0.274	0.099	0.130	0.094	0.155	0.241
SILCAT23	0.320	0.271	**0.784**	0.257	0.196	0.241	0.207	0.137	0.129	0.076	0.269
SILCAT26	0.260	0.307	0.254	**0.720**	0.094	0.356	0.228	0.161	0.220	0.230	0.258
SILCAT27	0.312	0.297	0.274	**0.833**	0.093	0.378	0.307	0.172	0.301	0.248	0.200
SILCAT28	0.281	0.281	0.235	**0.858**	0.111	0.368	0.297	0.193	0.206	0.211	0.232
SILCAT29	0.320	0.265	0.245	**0.859**	0.127	0.389	0.308	0.169	0.170	0.181	0.246
SILCAT30	0.299	0.237	0.199	**0.813**	0.071	0.405	0.309	0.196	0.199	0.160	0.230
SRQA1	0.170	0.171	0.169	0.119	**0.854**	0.178	0.122	0.104	0.063	0.042	0.137
SRQA10	0.200	0.134	0.119	0.078	**0.813**	0.140	0.029	0.103	0.051	0.071	0.116
SRQA26	0.285	0.155	0.222	0.101	**0.802**	0.229	0.086	0.112	0.021	0.022	0.245
SRQA11	0.271	0.254	0.206	0.417	0.099	**0.701**	0.203	0.204	0.216	0.254	0.262
SRQA16	0.273	0.244	0.231	0.398	0.156	**0.751**	0.289	0.274	0.197	0.237	0.379
SRQA21	0.306	0.165	0.249	0.319	0.176	**0.779**	0.234	0.223	0.221	0.188	0.353
SRQA23	0.308	0.184	0.234	0.283	0.234	**0.787**	0.270	0.292	0.192	0.211	0.386
ILSAT1	0.183	0.104	0.178	0.247	0.076	0.260	**0.724**	0.353	0.287	0.223	0.299
ILSAT4	0.147	0.117	0.085	0.281	0.082	0.144	**0.717**	0.371	0.157	0.199	0.214
ILSAT5	0.121	0.094	0.126	0.287	0.121	0.262	**0.750**	0.351	0.369	0.245	0.197
ILSAT6	0.128	0.049	0.086	0.238	0.024	0.204	**0.805**	0.364	0.294	0.218	0.272
ILSAT7	0.207	0.096	0.138	0.257	0.048	0.298	**0.722**	0.372	0.281	0.245	0.319
ILSAT10	0.156	0.116	0.158	0.267	0.085	0.290	**0.708**	0.459	0.254	0.259	0.299
ILSAT15	0.186	0.132	0.108	0.161	0.099	0.243	0.361	**0.730**	0.134	0.243	0.277
ILSAT16	0.138	0.066	0.104	0.140	0.083	0.228	0.357	**0.765**	0.187	0.243	0.218
ILSAT17	0.181	0.123	0.178	0.220	0.131	0.316	0.454	**0.855**	0.296	0.290	0.294

ILSAT18	0.094	0.063	0.124	0.152	0.087	0.237	0.419	**0.766**	0.286	0.274	0.236
ILSAT19	0.142	0.174	0.146	0.285	0.040	0.261	0.338	0.266	**0.909**	0.428	0.189
ILSAT20	0.110	0.138	0.126	0.199	0.004	0.227	0.356	0.292	**0.902**	0.413	0.165
ILSAT21	0.120	0.141	0.111	0.248	0.055	0.255	0.324	0.248	**0.913**	0.385	0.182
ILSAT23	0.119	0.161	0.083	0.232	0.024	0.257	0.270	0.320	0.399	**0.784**	0.151
ILSAT24	0.185	0.161	0.148	0.196	0.056	0.241	0.220	0.249	0.339	**0.840**	0.123
ILSAT25	0.151	0.185	0.150	0.190	0.052	0.219	0.279	0.257	0.365	**0.832**	0.113
SELP2	0.294	0.129	0.226	0.194	0.101	0.360	0.229	0.286	0.114	0.133	**0.748**
SELP3	0.261	0.103	0.185	0.210	0.081	0.361	0.258	0.246	0.173	0.125	**0.735**
SELP5	0.274	0.135	0.188	0.172	0.179	0.289	0.224	0.204	0.083	0.058	**0.804**
SELP6	0.323	0.190	0.244	0.260	0.205	0.392	0.309	0.201	0.219	0.095	**0.706**
SELP7	0.326	0.200	0.289	0.264	0.132	0.395	0.329	0.294	0.178	0.174	**0.791**
SELP8	0.342	0.137	0.176	0.155	0.226	0.252	0.256	0.251	0.092	0.114	**0.740**

Furthermore, this study also investigates the indicator's loadings with respect to all constructs correlation in order to further support the model's discriminant validity. Table 6.5. shows that all measurement items loaded higher against their respective intended latent variable compared to other variables. In addition, the table also shows that the loading of each block is higher than any other block in the same rows and columns. Based on the results from the Fornell and Larcker criterion and the inspection of cross loadings, it can be concluded that the measurement model has established its discriminant validity.

Assessment of Higher-order Constructs

The procedure for assessing the second-order constructs is similar to the assessment of first-order construct. In the assessment, the second-order construct is regarded as the latent variable, and the first-order construct is served as indicators (Hair et al., 2011). Since the School Information Literacy Culture (SILC), Motivation (M) and Information Literacy Skills (ILS) all have reflective relationship with their respective factors, these three second-order constructs should be assessed in the same process as the one employed for reflective measurement model. Table 6.6 shows all the composite reliabilities (CRs) for three second-order constructs are greater than threshold value of 0.7. Hence, the internal consistency reliability for the higher-order constructs was established. In addition, the lowest loadings of the first-order constructs on the second-order factors is 0.642, according to Hulland (1999) although the preferred value for indicator reliability is 0.7, a value of 0.4 and greater is acceptable for exploratory purposes.

Table 6.6

Construct Reliability and Validity of the Second-order Constructs

Second Order Constructs	Dimensions	Loadings	Cronbach's Alpha	CR	AVE
School Information Literacy Culture (SILC)	Perceived Autonomy Support (PAS)	0.776	0.868	0.890	0.520
	Respect (RP)	0.661			
	Fairness (FN)	0.680			
	Activities (AC)	0.760			
Motivation (M)	Introjected Regulation (IJR)	0.652	0.724	0.807	0.604
	Identified Regulation (IDR)	0.885			
Information Literacy Skills (ILS)	Information Literacy (IL)	0.826	0.874	0.895	0.531
	Independent Learning (IDL)	0.741			
	Mutual Respect (MR)	0.693			
	Ethics (ET)	0.642			

Regarding the convergent validity of second-order constructs, Table 6.6 also demonstrates that all the AVE values exceed 0.5, which reflect that on average, the second-order constructs are able to explain more than half of the variance of their respected indicators (Jörg Henseler, 2009). Thus, the convergent validity of the second-order constructs was acceptable.

For the discriminant validity, it can be clearly observed from Table 6.7 that the AVE of each second-order construct exceeds the squared correlations with all other second-order constructs. This means that each of the second-order constructs shares more variance with its own block of factors than any other second-order construct (Jörg Henseler, 2009).

Table 6.7

Intercorrelations of the Variables for Second-order Constructs

Second-order Constructs	SILC	M	ILS
School Information Literacy Culture (SILC)	**0.721**		
Motivation (M)	0.527	**0.777**	
Information Literacy Skills (ILS)	0.382	0.380	**0.728**

Next, as presented in Table 6.8, the loadings of the first-order constructs on their assigned second-order constructs are the highest compared to the loadings of the other first-order constructs on this particular second-order constructs, this further supported the discriminant validity.

Table 6.8

The Cross-Loadings for the Second-order Constructs

	School Information Literacy Culture (SILC)	Motivation (M)	Information Literacy Skills (ILS)
Perceived Autonomy Support (PAS)	**0.776**	0.426	0.249
Respect (RP)	**0.661**	0.305	0.203
Fairness (FN)	**0.680**	0.338	0.218
Activities (AC)	**0.760**	0.420	0.382
Introjected Regulation (IJR)	0.264	**0.652**	0.113
Identified Regulation (IDR)	0.514	**0.885**	0.419
Information Literacy (IL)	0.324	0.305	**0.826**
Independent Learning (IDL)	0.250	0.319	**0.741**
Mutual Respect (MR)	0.256	0.229	**0.693**
Ethics (ET)	0.281	0.253	**0.642**

In short, the reliability and validity tests conducted on the measurement model are satisfactory. It can be concluded that the measurement model for this study is valid

and fit to be used to estimate parameters in the structural model. The overall outer model assessment is illustrated in Figure 6.3.

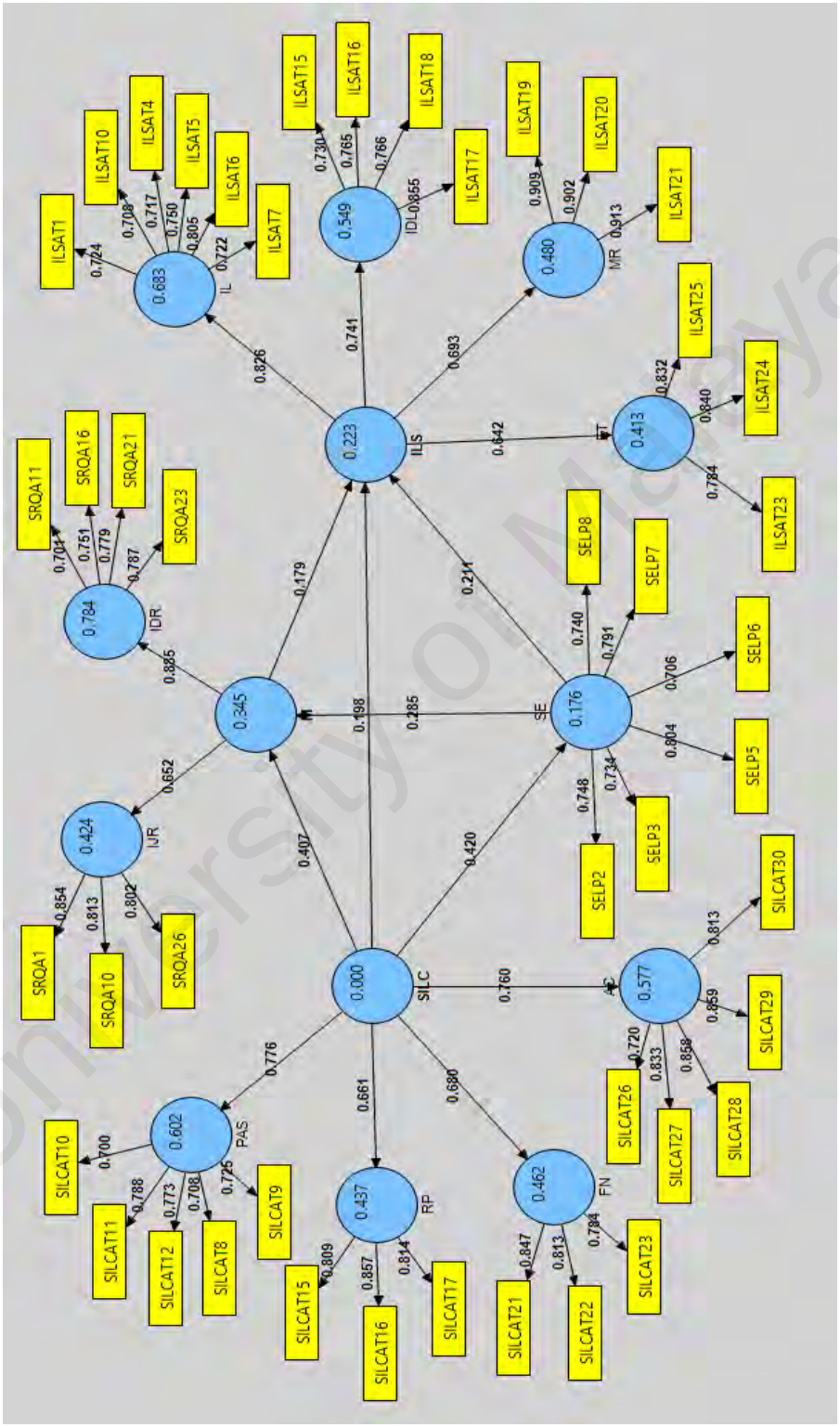


Figure 6.3. The overall measurement model of information literacy education

Model Evaluation: Structural Model Results

After ascertaining the validity and reliability of the measurement model, the following step is the assessment of the structural (inner) model for examining the hypothesized relationships between constructs to answer research questions 3.1 to 3.9. In PLS-SEM, structural model assessment includes the weights or path coefficients to evaluate the significance and relevance of the structural model relationships, their significance was tested through *t*-values obtained from the bootstrapping method. Also, the model predictive accuracy was evaluated through the coefficient of determination, R^2 value, the model's predictive relevance was evaluated through Q^2 and the impact of the exogenous variable on an endogenous variable was evaluated through the effect size f^2 (Hair et al., 2014).

Results of Analysis for Research Question 3.1-3.6

3.1 Is there a causal relationship between school information literacy culture and information literacy skills acquisition?

3.2 Is there a causal relationship between school information literacy culture and motivation?

3.3 Is there a causal relationship between motivation and information literacy skills acquisition?

3.4 Is there a causal relationship between school information literacy culture and self-efficacy?

3.5 Is there a causal relationship between self-efficacy and information literacy skills acquisition?

3.6 Is there a causal relationship between self-efficacy and motivation?

Significance and the Relevance of the Structural Model Path Coefficients

In a structural model, each path connecting to two latent variables represents a hypothesis. The fundamental objective of structural model is to test the hypothesized relationship among latent variables. Using the SmartPLS algorithm output, the relationships between independents variables and dependent variables are determined. In this study, the testing of the significance for the regression weights were achieved by running 5000 bootstrapped samples from the 610 cases. Based on the results of the *t*-value, the significance level of each relationship is determined. Figure 6.4 shows the graphical representation of the inner model after the bootstrapping procedure (*n*=5000 bootstrapped samples) and Table 6.9 presents the results of paths coefficient, *t*-value and the significance level for all direct relationships.

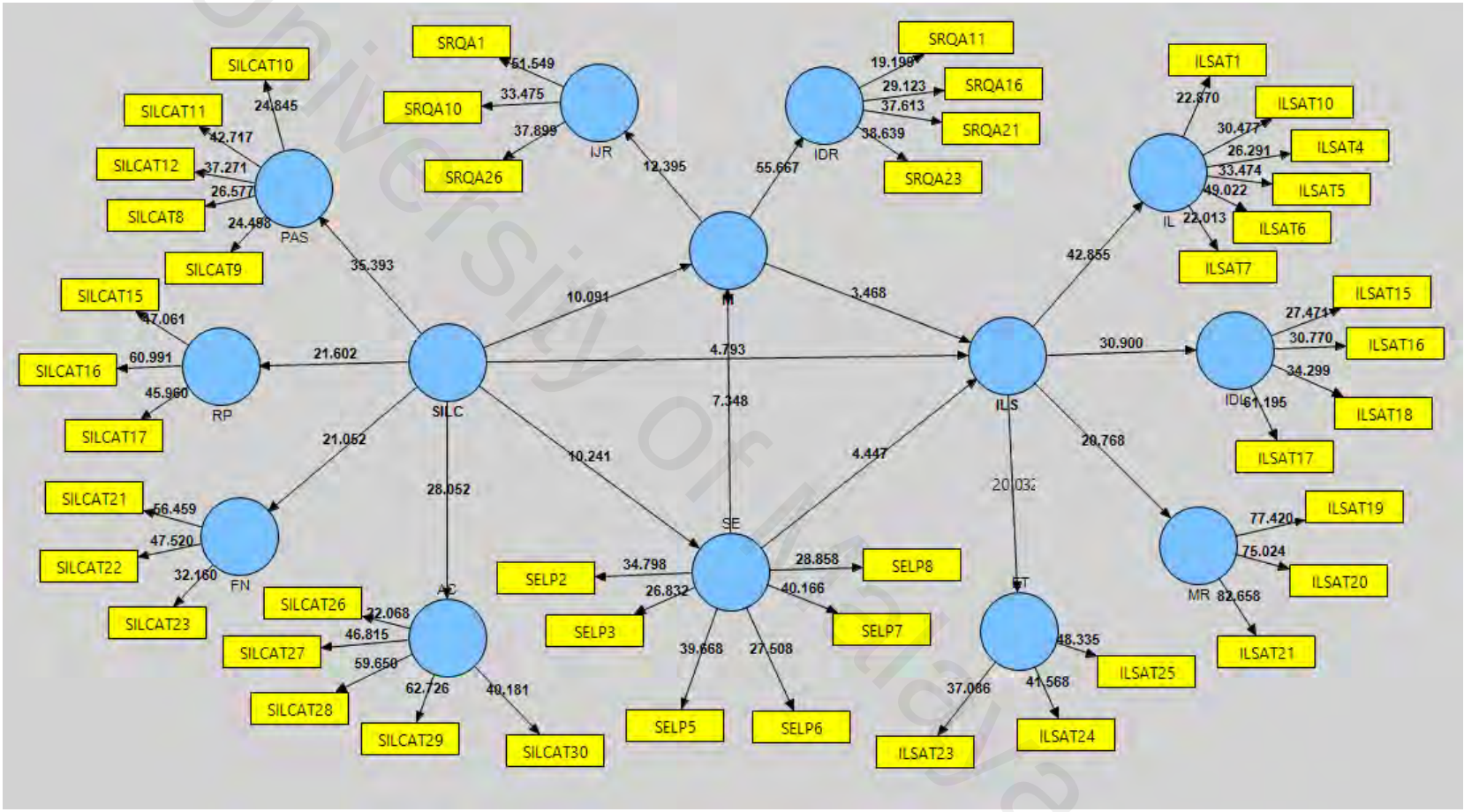


Figure 6.4. Graphical representation of inner model after the bootstrapping Procedure

Table 6.9

Significance Testing Results of the Structural Model Path Coefficients for Direct Relationship

Hypothesis	Path	Path coefficients (β)	Standard Error	*t*-value	Significance level	Decision
H_1	SILC → ILS	0.198	0.041	4.793	p<0.01	Supported
H_2	SILC → M	0.407	0.040	10.091	p<0.01	Supported
H_3	M → ILS	0.179	0.052	3.468	p<0.01	Supported
H_4	SILC → SE	0.420	0.041	10.242	p<0.01	Supported
H_5	SE → ILS	0.211	0.048	4.447	p<0.01	Supported
H_6	SE → M	0.285	0.039	7.348	p<0.01	Supported

The results show that School Information Literacy Culture (SILC) (β=0.198, t=4.793, p<0.01), Motivation (M) (β=0.179, t=3.468, p<0.01), and Self-efficacy (SE) (β=0.211, t=4.447, p<0.01) all show positive significant causal relationships toward information literacy skills (ILS) acquisition. Thus, Hypotheses H_1, H_3 and H_5 are supported. Moreover, School Information Literacy Culture (β=0.407, t=10.091, p<0.01) and Self-efficacy (β=0.285, t=7.348, p<0.01) have positive significant causal relationships toward Motivation. In addition, School Information Literacy Culture (β=0.420, t=10.242, p<0.01) also has positive significant causal relationship on Self-efficacy. Hence, Hypotheses H_2, H_4 and H_6 are also supported. The significant path suggested that all Hypotheses for direct relationship are supported.

Assessing Coefficient of Determination (R^2) Values

The R^2 values represent the exogenous variables' combined effects on the endogenous variable. In addition, it also represents the amount of variance in the endogenous variables that is explained by the exogenous variables (Hair et al., 2014). As shown in Figure 6.5, the R^2 values for the endogenous variable, Information Literacy Skills is 0.223, which implies that 22.3% of Information Literacy Skills is explained by School Information Literacy Culture, Motivation and Self-efficacy. Also, R^2 values for Motivation is 0.345, which means that 34.5% of motivation is explained by School Information Literacy Culture and Self-efficacy. In addition, 17.6% of Self-efficacy is explained by School Information Literacy Culture.

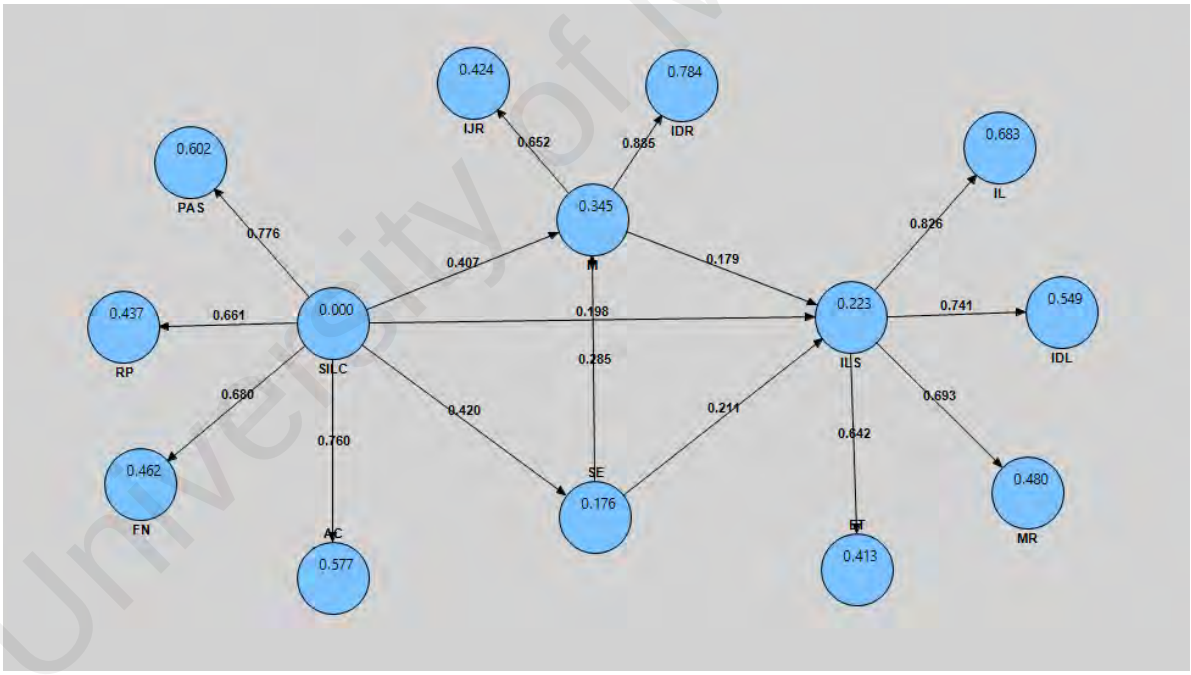


Figure 6.5. The Result of Structural Model Showing Path Coefficients and R^2 Values

Assessing Effect Size (f^2) Values

The effect size (f^2) is used to measure the changes in R^2 in the attempt to understand whether or not each specific exogenous construct and endogenous construct has a practical impact (Cohen, 1988). According to Vinzi, Chin, Henseler, and Wang (2010), the effect size (f^2) of a construct can be calculated as follows:

$$f^2 = \frac{R^2 \text{ included} - R^2 \text{ excluded}}{1 - R^2 \text{ included}}$$

where R^2 included and R^2 excluded are R^2 given for the endogenous construct when the exogenous construct is used or omitted in the structural model, respectively. To interpret the impact of f^2 at the structural level, it has been suggested that the f^2 values of 0.02, 0.15 and 0.35 indicate an exogenous construct's small, medium, or large effect, respectively, on an endogenous construct (Cohen, 1988).

Table 6.10

Results of the Effect Size (f^2) for R^2

Exogenous construct	R^2 included	R^2 excluded	f^2
SILC	0.223 (ILS)	0.196	0.035
M		0.202	0.027
SE		0.189	0.044
SILC	0.338(M)	0.202	0.205
SE		0.207	0.103
SILC	0.177(SE)	0.00	0.215

From Table 6.10, it indicates that School Information Literacy Culture, Motivation and Self-efficacy have small effect on the Information Literacy Skills acquisition. In addition, School Information Literacy Culture has medium effect on Motivation and Self-efficacy, whereas Self-efficacy has small effect on Motivation.

Assessing Predictive Relevance (Q^2) Values

According to Vinzi et al. (2010), the predictive relevance (Q^2) represents a measure of how well observed values are reconstructed by the model and its parameter estimates. The Q^2 test was developed for the purpose of measuring the predictive relevance of the endogenous variable (Stone, 1974). According to Fornell and Larcker (1981), for a model to have predictive relevance, the Q^2 value must be greater than zero. Moreover, to interpret the effect size (q^2) of the predictive relevance Q^2 , it has been suggested that the q^2 values of 0.02, 0.15 and 0.35 indicate an exogenous construct's small, medium, or large predictive relevance, respectively, on an endogenous construct (Cohen, 1988). The effect size (q^2) of a predictive relevance Q^2 can be calculated as follows:

$$q^2 = \frac{Q^2_{\text{included}} - Q^2_{\text{excluded}}}{1 - Q^2_{\text{included}}}$$

In this study, the Q^2 test was performed by the blindfolding procedure in SmartPLS with an omission distance of 7. As shown in Table 6.11, the cross-validated redundancy Q^2 values for all the endogenous constructs were 0.072, 0.126 and 0.095 for Information Literacy Skills, Motivation and Self-efficacy respectively. Since all the Q^2 values are greater than zero (Vinzi et al., 2010), this means that the structural model is able to provide the prediction of the endogenous construct indicators. Moreover, the effect size of the school information literacy culture on motivation and self-efficacy is at the small scale. A summary of overall results of f^2 and q^2 are presented in Table 6.12.

Table 6.11

Results of the Effect Size (q^2) for Predictive Relevance (Q^2)

Exogenous construct	Q^2 included	Q^2 excluded	q^2
SILC	0.072 (ILS)	0.068	0.010
M		0.070	0.008
SE		0.065	0.013
SILC	0.126 (M)	0.075	0.058
SE		0.101	0.027
SILC	0.095 (SE)	0.000	0.105

Table 6.12

Summary Results of the Path Coefficient (β), f^2 effect size and q^2 effect size

	ILS			M			SE		
	Path Coefficient (β)	f^2 effect size	q^2 effect size	Path Coefficient (β)	f^2 effect size	q^2 effect size	Path Coefficient (β)	f^2 effect size	q^2 effect size
SILC	0.198	0.035	0.100	0.407	0.205	0.058	0.420	0.215	0.105
M	0.179	0.027	0.008						
SE	0.211	0.044	0.130	0.285	0.103	0.027			

Summary of the Answer for Research Question 3.1-3.6

The summary of hypotheses testing for all the direct relationship are listed in Table 6.13.

Table 6.13

Summary of Hypothesis Testing for Direct Relationship

Hypothesis Statement	Research Question	Result
H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.	3.1	Supported
H_2: There is a causal relationship between school information literacy culture and motivation.	3.2	Supported
H_3: There is a causal relationship between motivation and information literacy skills acquisition.	3.3	Supported
H_4: There is a causal relationship between school information literacy culture and self-efficacy.	3.4	Supported
H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.	3.5	Supported
H_6: There is a causal relationship between self-efficacy and motivation.	3.6	Supported

The results of analysis for the research questions 3.1 to 3.6 confirmed that school information literacy culture has positive significant causal relationship with information literacy skills acquisition, motivation as well as self-efficacy. The analysis also indicates that there is positive significant causal relationship between self-efficacy and motivation as well as information literacy skills acquisition. Finally, motivation also has positive significant causal relationship with information literacy skills acquisition.

Mediating Analysis

After confirming the causal structural relationship between exogenous constructs (School Information Literacy Culture, Motivation and Self-efficacy) and endogenous construct (Information Literacy Skills), the researcher also assessed the significance of the mediating relationship in the model. This is based on the theoretical reasoning that suggests motivation and self-efficacy as two key mediating factors that influence information literacy skills acquisition (Cahoy & Schroeder, 2012; Crow, 2007; Serap Kurbanoglu, 2003).

According to Hair et al. (2014), mediating analysis is carried out to examine the causal relationship between an exogenous variable and an endogenous variable by the inclusion of a third explanatory mediator variable. The mediating analysis of this study was conducted based on the guideline for mediation analysis in PLS-SEM proposed by Hair et al. (2014). The evaluation process is demonstrated in Figure 6.8.

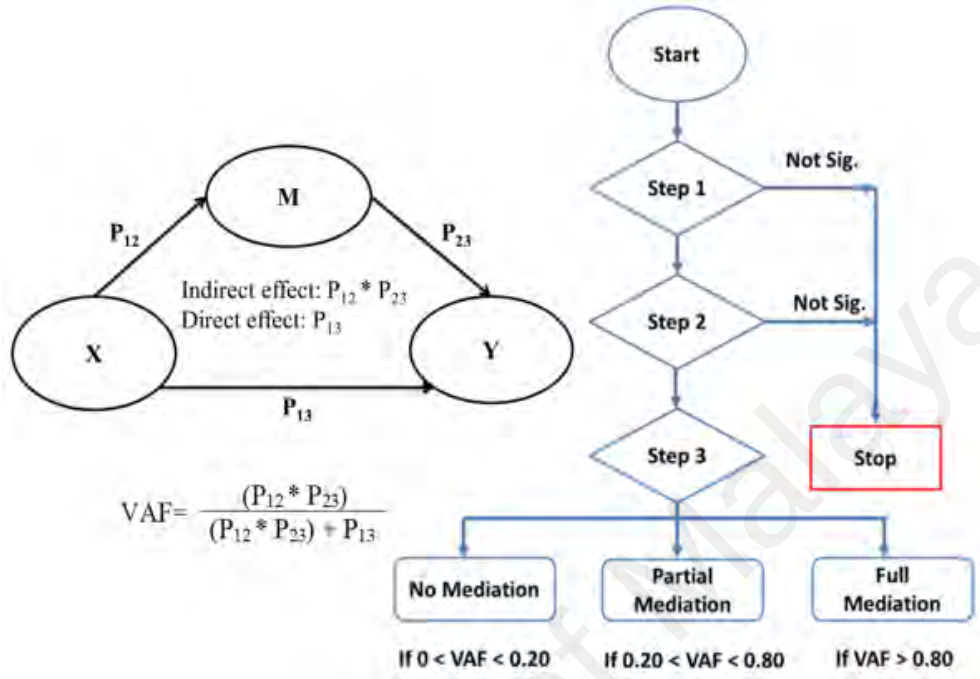


Figure 6.6. The guideline for mediation analysis in PLS-SEM proposed by Hair et al. (2014)

In Figure 6.6, X is the independent variable, Y is the dependent variable and M is the mediating variable. The process of mediation model evaluation begins with step 1, where the significant of the direct Path (P_{13}) is identified by conducting bootstrapping procedure. If the direct effect is not significant, there is no mediation. If the direct path is significant, we further examine the significance of indirect path P_{12} and P_{23} (step 2). If the indirect path is not significant, there is no mediation; In step 3, if the indirect path is significant, we calculate the Variance Accounted For (VAF). According to Hair et al. (2014), a Variance Accounted For value of greater than 80% is full mediation, a value between 20% and 80% is partial mediation, and a value less than 20% means there is no mediation.

In this study, the following mediating models have been considered and evaluated in order to answer research question 3.7, 3.8 and 3.9.

1. School information literacy culture ⟶ Motivation ⟶Information Literacy Skills.
2. School information literacy culture ⟶ Self-efficacy ⟶ Information Literacy Skills.
3. Self-efficacy⟶ Motivation ⟶ Information Literacy Skills.

Results of Analysis for Research Question 3.7

3.7 Is there a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition?

Mediation Model 1

In order to answer research question 3.7, the path model 1 was estimated via bootstrapping. The result revealed that the direct path (SILC→ILS) and indirect paths (SILC→M and M→ILS) were statistically significant (see Figure 6.7.). The path coefficient value for direct effect was 0.253. In addition, there was an indirect effect between SILC and ILS via mediating variable M. The indirect effect can be calculated as the product of the two effects SILC→M and M→ILS (Indirect effect: 0.526* 0.245=0.129). The total effect of the model can be calculated as direct effect plus indirect effect (Total effect: 0.253+0.129=0.382). The strength of mediation was computed via variance accounted for (VAF). The Variance Accounted For value can be obtained by using the indirect effect divided by the total effect, which was 0.337 in this case (see Table 6.14). The Variance Accounted For value was between 0.20 and 0.80 that this suggests that the direct relationship from School Information Literacy Culture to Information Literacy Skills is partially mediated by Motivation.

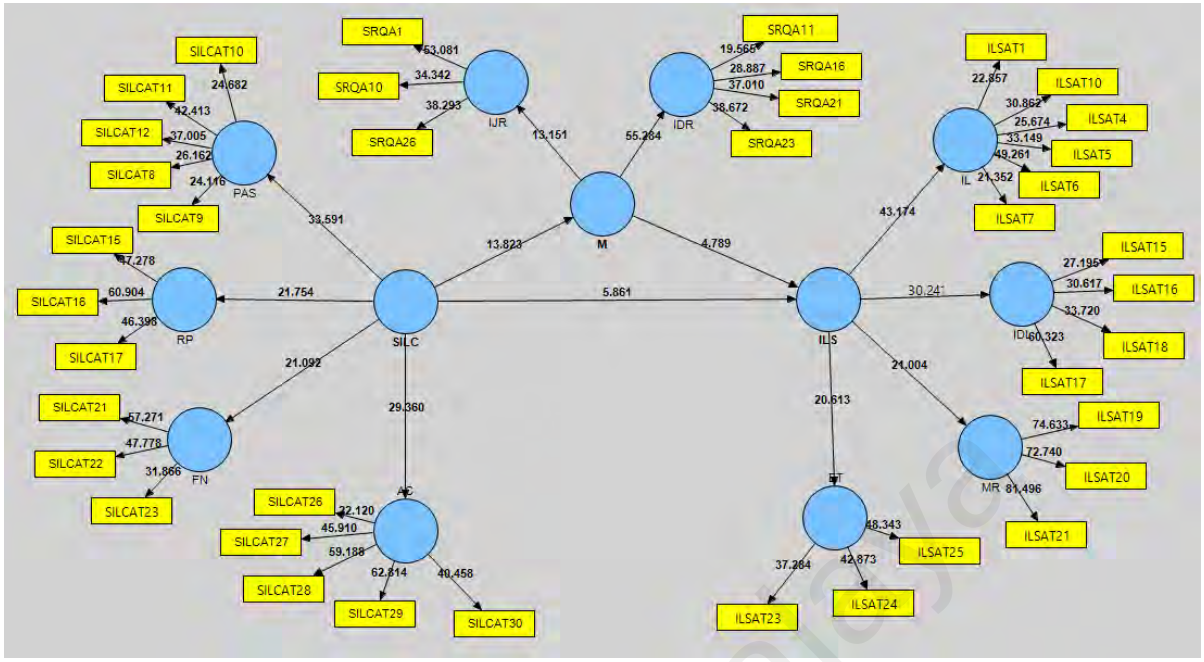


Figure 6.7. The mediating effect of mediation model 1 after bootstrapping

Table 6.14

The Mediating Analysis of Mediation Model 1

Path	Path coefficients (β)	*t*-value	Significance level	Decision	VAF	Mediation
Direct Effect:						
SILC → ILS	0.253	5.861	p<0.01	Supported		
Indirect Effect:					0.337	Partial
SILC → M	0.526	13.823	p<0.01	Supported		
M → ILS	0.245	4.789	p<0.01	Supported		

Results of Analysis for Research Question 3.8

3.8 Is there a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition?

Mediation Model 2

To identify the mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition, the bootstrapping procedure is conducted on the mediation model 2. The result revealed that the direct path (SILC→ILS) and indirect paths (SILC→SE and SE→ILS) were statistically significant (see Figure 6.8). The path coefficient value for direct effect was 0.270. In addition, the indirect effect can be calculated as the product of the two effects SILC→ SE and SE →ILS (Indirect effect: 0.420*0.264=0.111). The total effect of the model can be calculated as direct effect plus indirect effect (Total effect: 0.270+0.111=0.381). Thus, as presented in Table 6.15, the Variance Accounted For value of this model can be obtained as indirect effect divided by total effect, which was 0.291. The Variance Accounted For value was between 0.20 and 0.80 and this suggested that the direct relationship from school information literacy culture to information literacy skills is partially mediated by self-efficacy.

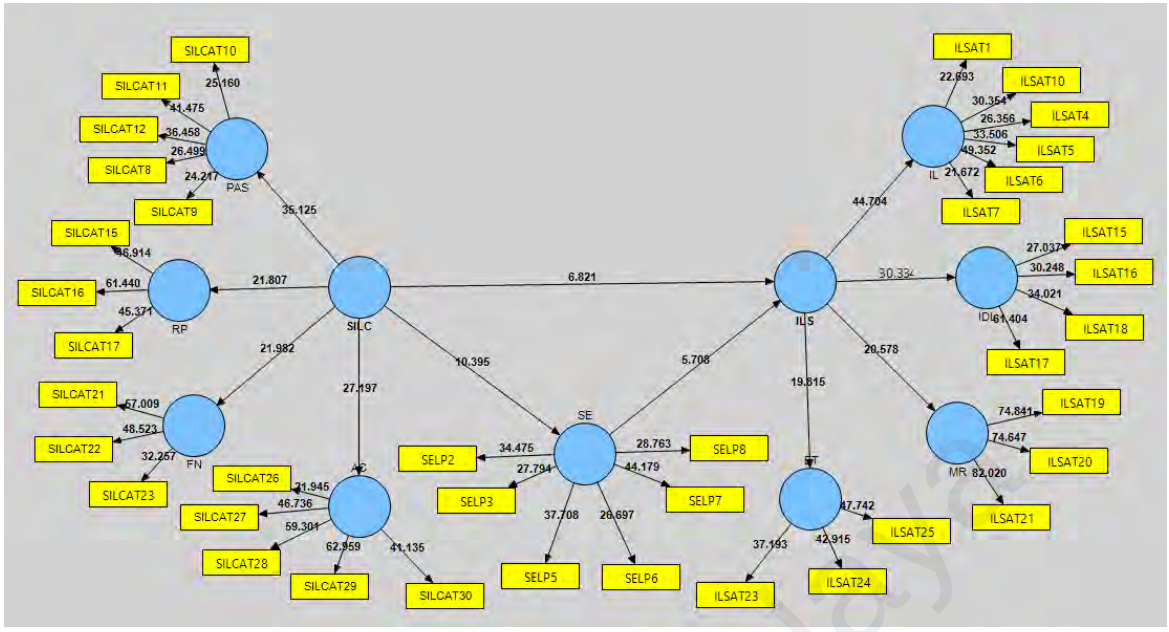


Figure 6.8. The mediating effect of mediation model 2 after bootstrapping

Table 6.15

The Mediating Analysis of Mediation Model 2

Path	Path coefficients (β)	*t*-value	Significance level	Decision	VAF	Mediation
Direct Effect:						
SILC → ILS	0.270	6.821	p<0.01	Supported		
Indirect Effect:					0.291	Partial
SILC → SE	0.420	10.395	p<0.01	Supported		
SE → ILS	0.264	5.708	p<0.01	Supported		

Results of Analysis for Research Question 3.9

3.9 Is there a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition?

Mediation Model 3

To estimate the magnitude of indirect effect of motivation on the relationship between self-efficacy and information literacy skills acquisition, the similar procedure was conducted where the path model 3 was estimated via bootstrapping. The result revealed that the direct path (SE → ILS) and indirect paths (SE → M and M → ILS) were statistically significant (see Figure 6.9.). The path coefficient value for direct effect was 0.258. In addition, the indirect effect can be calculated as the product of the two effects SE → M and M →ILS (Indirect effect: 0.455 * 0.261=0.119). The total effect of the model can be calculated as direct effect plus indirect effect (Total effect: 0.258+0.119=0.377). Table 6.16 revealed that the Variance Accounted For value for this model was 0.316, this means that 31.6% of the effect of self-efficacy on information literacy skills acquisition is explained by motivation. The Variance Accounted For value was between 0.20 and 0.80, motivation and partially mediated the relationship between self-efficacy and information literacy skills acquisition.

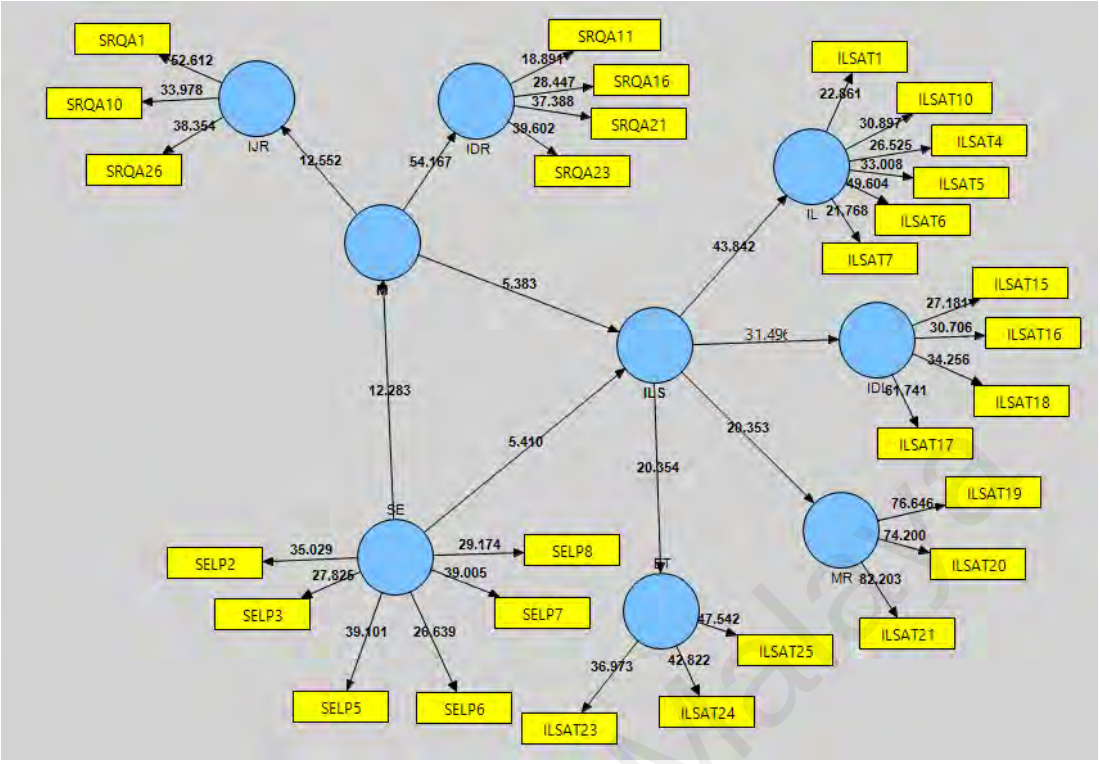


Figure 6.9. The mediating effect of mediation model 3 after bootstrapping

Table 6.16

The Mediating Analysis of Mediation Model 3

Path	Path coefficients (β)	*t*-value	Significance level	Decision	VAF	Mediation
Direct Effect:						
SE → ILS	0.258	5.410	p<0.01	Supported		
Indirect Effect:					0.316	Partial
SE → M	0.455	12.283	p<0.01	Supported		
M → ILS	0.261	5.383	p<0.01	Supported		

Summary of the Answer for Research Question 3.7-3.9

The summary of hypotheses testing for all the mediation models are listed in Table 6.17. As shown in Table 6.17, motivation and self-efficacy play a pivotal role in mediating between school information literacy culture and information literacy skills acquisition; moreover, the results also prove that motivation has mediating effect on self-efficacy and information literacy skills acquisition.

Table 6.17

Summary of Hypothesis Testing for Mediation Models

Hypothesis Statement	Research Question	Result
H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.	3.7	Supported
H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.	3.8	Supported
H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.	3.9	Supported

Summary of Findings of The Model Evaluation Phase

Chapter 6 presents the findings of the model evaluation phase. The researcher performed measurement model and structural model tests on the collected data using SmartPLS version 2.0. This phase aimed at evaluating the hypothesized model of information literacy education developed from the model development phase. Hence, this phase investigated the relationship between school information literacy culture and information literacy skills acquisition. It also attempted to examine the role of the mediator variables (motivation and self-efficacy) in the linkage between school information literacy culture and information literacy skills acquisition.

The analysis was performed in two stages. The measurement model was assessed on internal consistency reliability, indicator reliability, convergent validity and discriminant validity in two levels. The first level were the first-order constructs and second level were the higher-level constructs. The result of analysis indicated that both levels of measurement models fit the data properly. The hypothesized structural model was examined in the second stage including six direct paths representing the Hypotheses H_1, H_2, H_3, H_4, H_5 and H_6. Furthermore, three indirect paths representing the Hypotheses H_7, H_8 and H_9 were also evaluated in this stage. The significant path suggested that all hypotheses for direct relationships and indirect relationships were supported. These findings suggested that the school information literacy culture can positively influence students' motivation, self-efficacy and also information literacy skills acquisition. It also indicated that mediator variables (motivation and self-efficacy) play essential roles on students' information literacy skills acquisition.

Finally, it can be concluded that a valid and reliable information literacy education model has been evaluated and developed in this phase. The next chapter

provides the discussion on the findings of Chapter 4, 5 and 6 and also conclusions of this study.

CHAPTER 7: DISCUSSION AND CONCLUSION

Introduction

As discussed in Chapter 3, this study adopts the Design and Development Research (DDR) approach to develop an information literacy education model based on school information literacy culture and mediated by motivation and self-efficacy. Chapter 4, 5 and 6 presented the findings of the study in three phases. In this final chapter, the findings of each phase are summarized and discussed. The chapter concludes with the discussion of the ways in which the research findings contributed to the body of research on information literacy education and the recommendations for future research.

Discussion of Findings from Phase 1: The Needs Analysis Phase

As presented in Chapter 1, this study focuses on the development of an information literacy education model by creating a school information literacy culture through hidden curriculum. The school information literacy culture is hypothesized to influence students' motivation and self-efficacy and has impact on students' information literacy skills acquisition. This model serves as a complement to the current information literacy education efforts in preparing students to become information literate lifelong learners in the Information Age. Based on the Design and Development Research approach of this study, prior to developing the model, the needs of developing a model based on school culture shaped by hidden curriculum where the information literacy learning is supported has to be identified beforehand. This phase utilized a mixed method research approach and was presented in two stages. Stage One was undertaken qualitative research approach where the data was collected

through a focus group discussion, while Stage Two was a quantitative approach by using self-administered survey to collect data.

School culture can be defined by many different ways depending on which perspective the research is focusing on. While the overall culture of the school may be well defined, it may be hypothesized that a school has multiple aspects of its culture with specific applications to particular areas, such as culture of respect, humanity culture or creative culture. In order to identify the characteristic of school information literacy culture from hidden curriculum perspective, a focus group discussion was conducted at the first stage.

The qualitative data analysis from focus group discussion indicated that the concept of "school culture shaped by hidden curriculum" should refer to the educational experiences that students gained within the culture that every individual school created in their day-to-day operations and activities. The school culture is about how that environment affects the education of those in it. It is something that can be controlled. In terms of information literacy education, the hidden curriculum will help to guide effective choices on how schools can emit a clear and constant message through their school culture to support students' information literacy skills acquisition.

Three main categories of themes have been identified. The first category is the school culture that values information and communication technologies (ICT) and student-centered teaching and learning. The subthemes under information and communication technologies are e-learning platform and computer aided instruction; and the subthemes under student-centered teaching and learning are: interaction and inspiration, multivariate evaluation, experiencing information, opportunity to perform, higher order thinking as well as critical thinking. The second category is the school

culture that values independent learning and autonomy support, and the third category is the school culture that values character development. For the third category, the subthemes emerged from this category are role model and moral education. The following sections will discuss these findings accordingly.

(1) School culture that values Information and Communication Technologies (ICT) and student-centered teaching and learning. As part of the school culture, the physical environment and infrastructure of a school can convey both intentional and unintentional messages to students on what the school values most. In the case of information literacy education, the analyses revealed that the regular use of information and communication technologies by teachers and students within a school (for example, the use of e-learning platform and computer aided instruction) was essential to enhance students' information literacy skills. In a school where the use of information and communication technologies is pervasive, students may learn that the information and communication technologies is important in preparing them for their future. More importantly, schools also must prepare students to be responsible citizens, to understand the use of technology and to participate fully in the information age. Therefore, by making the technology more accessible to the students, the students have the opportunities in learning to use the technology tools wisely and responsibly in an imperceptible manner. This result is consistent with previous study that examined the relationship between students use of information and communication technologies and information literacy (Alkan & Meinck, 2016; Fraillon, Ainley, Schulz, Friedman, & Gebhardt, 2014). For instance, "The International Computer and Information Literacy Study (ICILS) 2013" carried out by the International Association for the Evaluation of Educational Achievement (IEA), has shed some light on students' knowledge and abilities in the key areas of

information and technology literacy (Fraillon et al., 2014). ICILS 2013 was the first cross-national study because it was the first international comparative assessment to focus on students' acquisition of computer and information literacy as well as the ICT learning environment in schools from 21 education systems around the world. The main purpose of ICILS was to examine the outcomes of student computer and information literacy in and across countries, and it investigated to what extent other factors such as student characteristics and school contexts influence differences in computer and information literacy achievement. One of their findings indicated that on average, students from countries with better student to computer ratios gained higher scores on the computer and information literacy assessment (Fraillon et al., 2014).

21st century is an information-based and technology driven era where technology has altered the way we learn, teach and communicate. If information literacy is the key requirement to keep pace with technology breakthroughs, the school should use information and communication technologies that is consistent to its values, at the same time, the information and communication technologies should bring the school closer to its vision, mission and goals. Therefore, the schools and teachers have the responsibility to effectively integrate technology into curricula and instruction, so that this practice can become part of their school culture, eventually enhances students' information literacy skills.

Moreover, based on the analyses of the qualitative data, besides ICT infrastructure, the way that schools and teachers choose to educate students also convey both intentional and unintentional messages. Instructional strategies that emphasized more on student-centered teaching and learning approach may communicate specific messages. For

example, by changing the role of teacher from 'sage on the stage' to 'guide on the side', teacher will become orchestrator of learning and the ownership of learning will be returning to students. This type of learning will release some important messages to students that learning is no longer about remembering and repeating information, but about knowledge construction. Therefore, they need to be able to locate, evaluate and use information effectively. They also learned to understand that skills such as critical thinking, higher order thinking, collaboration, communication and problem solving are needed, and attributes such as respectfulness, patience, persistence and self-motivation are valued.

(2) School culture that values independent learning and autonomy support. The second category is the school culture that values independent learning and autonomy support. The data analyses from the focus group discussion demonstrated that for students to become information literate, the school and teachers need to be intentional in their efforts to help students engage in their own learning and see themselves as independent learners. The journey from dependent to independent learning requires students to be actively engaged in the learning process, and this will only happen in an environment that students believe they have this capacity to learn and develop the skills to learn independently. This kind of learning atmosphere can only be created in an autonomy supportive learning environment where the students can take the ownership of their own learning.

The findings from the data analyses revealed that other than instructional strategies that emphasized more on student-centered and independent learning approach, the study support such as extracurricular activities and others learning activities which is taking place outside school hours also will help to build students' conceptions of

themselves as independent learners. This is because this kind of activities will provide students with choices about learning tasks that are meaningful and applicable to their current interest and needs. Students will be motivated and more likely to invest efforts in the learning tasks that they see value and take pride in the task they produce. The findings are aligned with the previous studies that examined the ways to promote independent learning (Ros, Keo, & Sophal, 2012; Sharp, Pocklington, & Weindling, 2002). For instance, the British writers Sharp et al. (2002) suggest that there is a strong connection between independent learning and study support. According to these authors, study support leads to students acquiring knowledge and skills, and also leads to their personal development. In addition, study by Ros et al. (2012) regarding the factors promoting independent learning among foundation year students in Cambodia, also shows that extra-curricular activity is a significant school factor that contributes to independent learning as the students believe that it helps them become creative, imaginative and independent in their learning process. As stated in the final report of American Library Association Presidential Committee on Information Literacy (Association, 1989), "Ultimately, information literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information, and how to use information in such a way that others can learn from them." The provision of study support creates an opportunity for the process of "learning how to learn" to occur, without changing the structure of ordinary lesson.

Therefore, to promote information literacy education, the school should focus on creating a culture that students are empowered to engage themselves to become more self-directed, and to assume greater autonomy over their own learning.

(3) School culture that values character development. When discussing about the ethical issue related to information literacy, all of the participants in the focus group showed deep concern about the current status of information literacy education in the schools. Their discussion was revolving around the connection between moral education and ethical information behavior, and how to promote moral education through school culture to further enhance the ethical aspect of students' information literacy. Consequently, the third category of the aspect of school culture which is conducive to information literacy skills acquisition has been identified from the qualitative data analyses, this category is the school culture that values character development. The subthemes emerged from this category are role model and moral education.

The fundamental purpose of education is to cultivate people in order to promote the all-round development of human personality. As what the former President of the United State, Theodore Roosevelt once said, "To educate a man in mind and not in morals is to educate a menace to society". Education in the 21st century should meet the challenge of information society in one hand, and also to assist students in developing ethical behaviors that help guide them in utilizing information and communication technologies in the other hand. As Willard (1998) states, "…ultimately decisions about information sent or received and the activities engaged in through the use of information technologies will largely be controlled by individual choice." Therefore, a character development-focused culture is essential for information literacy education. In this respect, the data analyses (refer to Chapter 4) indicated that the important elements were the teachers as role models and moral education that embedded inextricably in school and classroom life as part of school's hidden curriculum. The importance of teacher's role in the character development of students

is well documented in the literature (Campbell, 2008; Hansen, 1993; Narvaez, 2006). For example, Deci and Ryan (1985) find that teachers with positive attitudes about students are more likely to help students meet their basic needs, such as autonomy, competence and belonging, thus foster students achievement and ethical behavior. In addition to this, the qualitative data analyses from this focus group discussion also revealed that the level of information literacy skills of teachers, and the moral values such as respectfulness, fairness, responsibility and kindness were exceptionally important to information literacy education in schools.

After the concept and characteristics of school culture where information literacy education is supported have been identified, the information from this qualitative data was used as the basis for survey items development at stage two and also the model development phase. Stage Two at the needs analysis phase was further divided into two parts. The first part was the instrument development and validation, the second part was the needs analysis of survey questionnaire. For the instrument development, the items of the instrument were created based on research questions 1.3 to 1.6 from Stage Two, the information from the qualitative data, and also the literature review. For the instrument validation, a series of instrument validation process were conducted, such as face validity, content validity, pilot study and reliability testing, exploratory factor analysis as well as confirmatory factor analysis. Consequently, a valid and reliable "Needs for Information Literacy Education Model (NILEM)" survey questionnaire was generated. The NILEM survey questionnaire consisted of 34 items probing into five aspects:

1) Teachers' demographic information (Section A);

2) Teachers' perceptions on their students' information literacy competence (Section B);
3) Teachers' perceptions on the problems of implementing information literacy education in school (Section C);
4) Teachers' perceptions on the need to develop an Information Literacy Education Model (Section D);
5) The teachers' perceptions on the dimensions of school culture shaped by hidden curriculum that can be used in developing an Information Literacy Education Model (Section E).

The questionnaire was conducted on 500 teachers from six Independent Chinese secondary schools in Malaysia, and 397 responded to the questionnaire. After deleting 11 incomplete responses, the actual responses were 386. In the second part of Stage Two, the data were analyzed using descriptive statistics via the Statistical Package for Social Science (SPSS).

In response to the research question 1.3, most of the teachers either agreed or strongly agreed that their students possess the abilities in identifying information they need and know what method to use in searching for information they need. They also perceived that their students are able to use computer and internet systems in the learning process and to use information technology to present their learning outcomes . As the digital natives who live in a world where technology is omnipresent, there is no doubt that most of the students today are technology savvy, because for most of them technology has become part of their life. However, technology savvy does not ensure that the students are able to use technology critically and responsibly. This was evident through the findings that indicated that most of the teachers were not satisfied with the level of their students' higher order thinking skills. Majority of them either

disagreed or strongly disagreed that their students can use information for critical thinking and can find the interconnection between information in order to make proper inferences and conclusions. More seriously, the findings indicated that most teachers perceived their students are lacking awareness of social etiquette and responsibility when using information technology to communicate with others. This result is aligned with the findings by Chang et al. (2016) which highlighted that computer operation as an information skill may not necessarily benefit overall information literacy and traditional literacy. They suggested that the improvement of information literacy competency cannot be simply dependent on digital media operation literacy, but also other aspects.

Since the teachers generally were not satisfied with some of the aspects of their students' information literacy competence, it was meaningful to probe into their perceptions of the problems of information literacy education implementation in school. For the research question 1.4, the findings revealed that the teachers either agreed or strongly agreed that the problems of information literacy education implementation in school were as follows:

1) School leaders are lacking awareness of information literacy education.
2) Unable to focus on the instruction of information literacy due to insufficient time for teaching.
3) As information literacy is not an examination subject, teachers, students, and parents are not concerned with subject that is not related to the examinations.

4) Teachers are lacking interdisciplinary cooperation awareness, and have difficulty integrating information literacy education in the various disciplines.
5) Teachers perceived information literacy is an area of concern of the Information Technology Department or the School Resource Center and has nothing to do with other subjects.
6) Teachers are more used to the traditional teacher-centered teaching approach.

It is obvious that majority of the teachers either agreed or strongly agreed to the statements that their students need to have information literacy education ; schools need to have a more comprehensive information literacy education model to enhance students' information literacy skills; and it is feasible to construct a more comprehensive information literacy education model based on school culture shaped by hidden curriculum to enhance students' information literacy skills.

The findings for the research questions 1.3, 1.4 and 1.5 have clearly justified the need to undertake a whole school approach model to support current information literacy education. To address this shortcoming, the researcher proposes a school culture approach and this school information literacy culture needs to be created through the hidden curriculum so that it can reflect what students have actually experienced or learned in enhancing their information literacy skills. Consequently, research question 1.6 inspects the teachers' perceptions on the aspects of school culture shaped by hidden curriculum that can be used to develop the information literacy education model.

Regarding the aspects of school culture shaped by hidden curriculum that can be used in developing an information literacy education model, the results of teachers' perception showed that such culture can be created from three dimensions, namely Environment, Activities and Teacher's role. For the environment dimension, the findings indicated that a high percentage of teachers considered that the school support systems should include the following:

- The school has enough computer and multi-media teaching equipment to support computer-aided teaching, such as campus network, multi-media classrooms, computer science and technology classrooms, digital library and so on.
- The school establishes an Information Literacy Education committee or group that is responsible for planning strategies and activities to promote the information literacy.
- The school attaches great importance to the teaching of computer and information technology and regards this as one of the compulsory subjects.

Other than these, it can be concluded that the implicit learning experience is provided by teachers who recognize the importance of information literacy education when:

- Teachers are willing to integrate information literacy in their teaching processes, and use student-centered teaching approach.
- Other than consolidating the content knowledge, teachers also focus on cultivating student's higher order and critical thinking skills.

- Teachers utilize the information technology and learning resources to design learning activities in order to help students to become active participants.
- Teachers are willing to cooperate with other subject teachers to help students construct collaborative learning.
- Teachers are using wide range of assessments to evaluate students learning outcome.

Next, through various information activities, students will be exposed to information and opportunities for training to enhance their various abilities with regard to information. For example, the school's website offers space for the administrative departments, the various disciplines, and societies and clubs, to provide all sorts of activities for students to participate in; Under the guidance of teachers, the school provides opportunities for talented students to participate in school website construction and maintenance; the school provides students with information learning experiences and nurture students' information literacy skills through various extracurricular activities; the school invites experts or scholars to share about the latest developments in information technology with teachers and students to enhance their information awareness, and the school intentionally linked the formal curriculum activities with social practice activities, organized outdoor information learning activities.

In addition, most of the teachers agreed that as teachers are role models, the expectations of teachers towards their students, and the motivations of teachers, always create some kind of implicit psychological influence on students' beliefs, values, and attitudes. This was reflected by a very high percentage of teachers who agreed upon

the following statements: teachers always pay attention to his demeanor ethical etiquette and social norms, and improve their own information literacy skills, play as a role model in learning the skills; teachers always pay attention to the students' character development, cultivate students' proper values and moral judgment, and thus enhance students' information ethics; and lastly, teachers always give positive encouragement to their students in learning information literacy, inspire students to become a learner of "know how to learn" and "lifelong learning". As such, teachers' psychological influences are perceived as being essential for the development of students' information literacy competencies.

As a whole, the needs analysis phase justified the need to develop a more comprehensive information literacy education model based on school culture approach. The following section elaborates the findings of the development process of such model to support current information literacy education needs.

Discussion of Findings from Phase 2: The Model Development Phase

The model development phase explains the process on how the conceptual or hypothesized information literacy education model is developed. The model development processes were completed in two stages. Stage One consisted of a) instruments development, and b) instruments validation. The main task of this stage was to identify and validate the underlying factor structure of the four main constructs, namely School Information Literacy Culture, Information Literacy Skills, Motivation and Self-efficacy, as perceived by secondary school students. This was followed by hypotheses development and hypothesized model development in Stage Two.

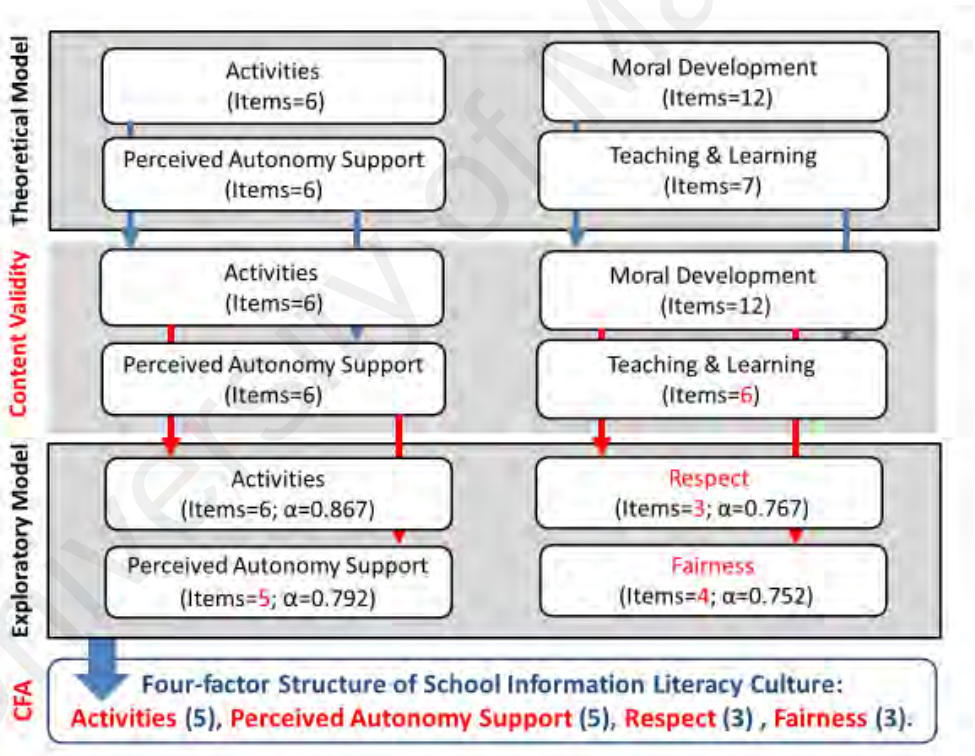


Figure 7.1. The identification and validation of four-factor structure of school information literacy culture

As demonstrates in Figure 7.1., through the instrument development process, initially the theoretical model of school information literacy culture was defined as Activities, Perceived Autonomy Support, Moral Development and Teaching and Learning. Through the instrument validation process where content validity and the

exploratory factor analysis were conducted, the results indicated that there were four underlying factors of school information literacy culture as perceived by secondary school students. These factors were Activities, Perceived Autonomy Support, Respect and Fairness. The reliability of the factor was measured by internal consistency using Cronbach's Alpha. The four factors were found to have significant Cronbach's Alpha values with Activities (α=0.867), Perceived Autonomy Support (α=0.792), Respect (α=0.767) and Fairness (α= 0.752) respectively. To confirm the uni-dimensionality of this construct, exploratory factor analysis was re-conducted on which corresponding items of each factor were added and the calculation was re-run for four factors. The result of analysis as presented in Chapter 5 showed that school information literacy culture was a second order hierarchical construct. Additionally, the researcher validated the "School Information Literacy Culture Assessment Tool (SILCAT)" by using confirmatory factor analysis. The result (refer to Figure 5.5) indicated that the four-factor model was correctly adjusted to the data [i.e., χ^2 (df=98, p=0.000) =244.602; χ^2/df = 2.496; TLI = 0.952; CFI = 0.961; RMSEA= 0.05]. The factor loading of each item on the related factors were ranged from 0.603 to 0.853, indicated that the model convergent validity was achieved and the covariances between variables were less than 0.90 also revealed that all the variables were distinct. Next, the researcher tested the second-order of school information literacy culture, the result (refer to Figure 5.6) indicated that the second-order model was also a good fit [i.e., χ^2 (df=100, p=0.000) =250.707; χ^2/df=2.507; TLI=0.951; CFI=0.959; RMSEA=0.05]. Furthermore, the standardized regression of Perceived Autonomy Support (0.761), Fairness (0.748), Respect (0.657) and Activities (0.528), respectively were determined, reflecting the high contribution of each factor to the school information literacy culture construct. Hence, the result of second-order confirmatory factor

analysis provides support for the existence of four distinctive factors of school information literacy culture as perceived by Malaysian secondary school students.

The findings from this quantitative data analysis highlighted the important of extracting underlying factors of school information literacy culture and how they represent the construct under study. Based on the factor loading of the analysis, it was found that Perceived Autonomy Support factor was the most significant factor of school information literacy culture, following by Fairness, Respect and Activities. This result suggested the importance of these four factors as perceived by students which was slightly different to the theoretical model which was developed based on the perceptions of adults in the schools. The factor "Teaching and Learning" which refers to "the teaching and learning activities which emphasized on information technology and students-centered teaching approach" in the theoretical model, was not recognized as reliable factor after the exploratory factor analysis. In addition, only the items regarding Fairness and Respect were extracted from the "Moral Development" factor and were identified as significant factors in the factor analysis.

Perceived autonomy support. The result of this study revealed that students perceived autonomy supportive learning environment is the most significant factor in measuring school information literacy culture.

The American Association of School Librarian' *Standards for the 21st-Century Learner* make clear that to be independent learners, acquiring information skills alone is not sufficient, students must also need to gain "dispositions" to use those skills, and be able to use them in a responsible manner and have the ability to reflect on their own learning (AASL, 2008). In the school context, teacher plays an important role in supporting students' dispositions such as the intrinsic motivation in the activities

engaging information behaviour. Self-determination theory (Ryan & Deci, 2000b), suggests that the most effective way to intrinsically motivate students is to support their feeling of having choice and control over their own learning, that is to support students' feeling of autonomy. This view is supported by Reeve and Jang (2006), as they define autonomy support as "the interpersonal behaviour one person provides to involve and nurture another person's internally locused, volitional intentions to act, such as when a teacher supports a student's psychological needs (e.g., autonomy, competence, relatedness), interests, preferences, and values."

As discussed in Chapter 2, a considerable amount of literature has shown that other than intrinsic motivation, autonomy supportive environment also promotes students' positive functioning such as emotionality, creativity, psychological well-being, classroom engagement and also academic achievement (Deci & Ryan, 2008; Deci et al., 1991; Niemiec & Ryan, 2009; Noels, Clément, & Pelletier, 1999; Reeve & Jang, 2006; N. Way, Reddy, & Rhodes, 2007). For instance, study by Reeve, Jang, Carrell, Jeon, and Barch (2004) revealed that autonomy support significantly predicts students' engagement in learning, the more teachers display autonomy supportive instruction, the more students are engaged in learning, thus enabling more effective learning. As suggested by Dewey (1998), children are unique, full of spontaneity and imagination, their minds are active and naturally inquisitive. Dewey's philosophy of education encouraged questioning and testing to discover truth. Therefore, children must be actively involved in the learning process and given a degree of control over their own learning, but their interest are not simply to be freely explored without direction. Teacher should be that of facilitator or mentor in students' process of discovery. That is to say, the autonomy supportive environment is student-centered. The activities in student-centered learning environment emphasize more on what the

students do rather then what the teacher does. Student choice is the cornerstone of more autonomous student-centered instruction. In the student-centered classroom, teacher often offer students with choice, students have choice in planning their learning, analysing problems, engaging in research process, discussing ways of solving problems with peers, and also have the autonomy in making decision on how their findings and knowledge are going to present (Buchanan et al., 2016). The learning processes of this type of inquiry-based approach (e.g., project-based learning, problem-based learning, design-based learning and research-based learning etc.) is also highlighted by American Association of School Librarians (AASL, 2008) and Partnership for 21st Century Skills (Skills), as necessary higher order thinking skills for today students. In addition, it is also the most effective approach to enhance students' information literacy skills as suggested by many researchers (Bruce, 1997; Buchanan et al., 2016; Kuhlthau, 1991; Maybee, 2013; McKinney, 2010; Molina & Sales, 2008).

Fairness and Respect. In addition to Perceived Autonomy Support, Fairness and Respect were another two dimensions that contribute significantly to the school information literacy culture based on the result of confirmatory factor analysis. The concept of fairness and respect in school are always interrelated, for instance, when we talk about fairness, we always refer to treating all people with honesty and respect, making sure everyone is treated respectfully and not treated badly, giving everyone equal opportunities to succeed, cooperating with one another and respect the uniqueness and value of everyone. Often, they are also important features in the research of positive and healthy school climate or culture (Haynes, Emmons, & Comer, 1993; Higgins-D'Alessandro & Sadh, 1998; Johnson, Johnson, Gott, & Zimmerman, 1997; N. Way et al., 2007).

Students are not born with the values and behaviours that we desire them to behave, such as the quality of fairness and respectfulness. It is derived through a process of cultural socialization, some kind of hidden curriculum influences from family, school and society at large. Study by S. M. Way (2011), who examines the relationship between school discipline and student classroom behaviour revealed that school factors, such as strict displinary rules, are significant in impacting student perceptions of fairness, and students who perceive school authority as legitimate and teacher-student relations as positive are rated as less disruptive. Furthermore, in discussion on the ethical issue of information behaviour in the information age, Willard (1998) reminds us that preparation for success in the information age must include:

- Respect for the laws and standards that society has agreed upon for governing behaviour related to the use of information technologies, including appropriate ways to work with others to change laws that are not in the best interests of society.
- Ability to engage in moral reasoning and decision making, especially when there are conflicts in values and interests.
- Moral motivation and self-control to engage in appropriate and ethical behaviour, even in situations where there is the freedom to do otherwise (Willard, 1998, p. 215).

The findings from this study informed us that fairness and respectfulness must be embbeded in the school culture to create a positive environment which can help in promoting students' information literacy skills, especially the ethical aspect of information behaviour.

Activities. Activities were found to be the forth underlying factor of school information literacy culture. A growing body of research works have found that extracurricular activities provide additional experiences in supporting positive youth development and can serve as a mechanism to promote a positive school climate (Martinez, Coker, McMahon, Cohen, & Thapa, 2016; Ramey & Rose-Krasnor, 2012).

As discussed earlier, study support such as extracurricular activities contributes significantly to independent learning (Ros et al., 2012; Sharp et al., 2002), which is also one of the important features as categorized in "Information Literacy Standards for Student Learning" (Librarians & Communications, 1998).

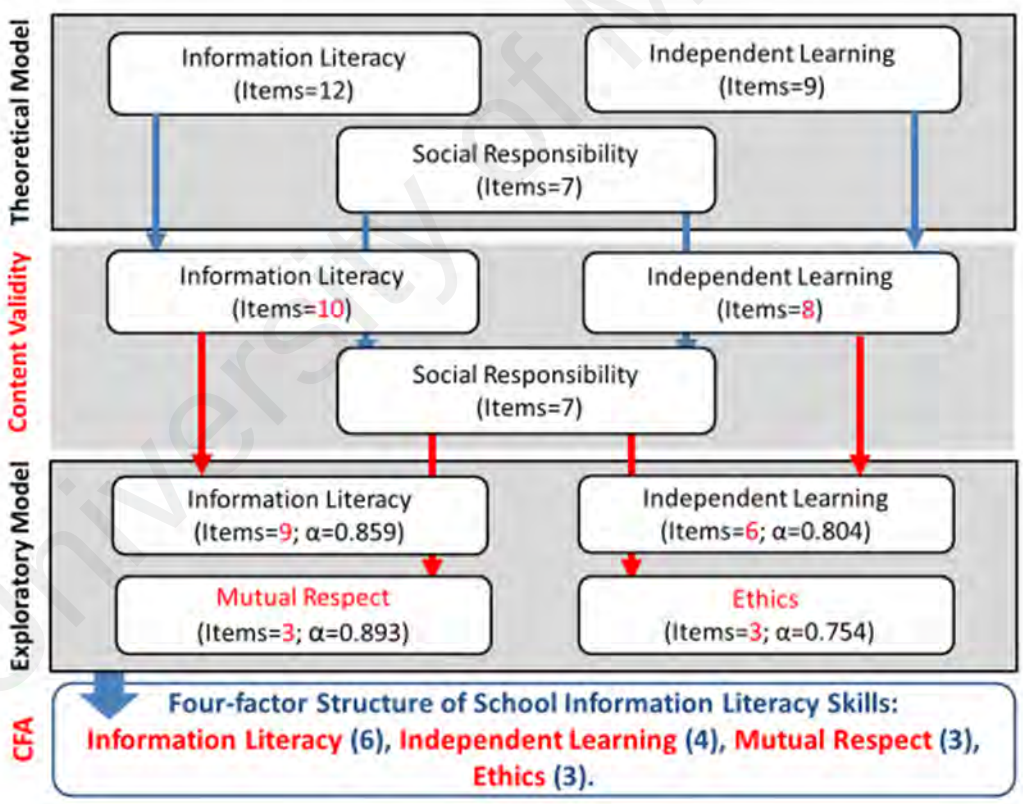


Figure 7.2. The identification and validation of four-factor structure of information literacy skills

A questionnaire (Information Literacy Skills Assessment Tool, ILSAT) to measure students' information literacy skills was developed based on the guideline

from "Information Literacy Standards for Student Learning" (Librarians & Communications, 1998). As indicates in Figure 7.2, the theoretical model of information literacy skills consists of three factors, namely Information Literacy, Independent Learning and Social Responsibility. After the content validation and exploratory factor analysis (EFA) procedures, it was found that the EFA resulted in a different factor model (the exploratory model) than the model that was theoretically specified. The major difference was the underlying factors "Mutual Respect" and "Ethics" were extracted from the "Social Responsibility" factor. The internal consistency, estimated by the Cronbach's alpha index, was considered adequate for each of the factors with Information Literacy (α=0.859), Independent Learning (α=0.804), Mutual Respect (α=0.893) and Ethics (α=0.754) respectively. The researcher also tested the uni-dimensionality of the construct. The statistical analysis confirmed that information literacy skills was a second order hierarchical construct.

A confirmatory factor analysis was conducted to validate the "Information Literacy Skills Assessment Tool, ILSAT". The findings (refer to Figure 5.10) indicated that the four-factor model was fit to the data [i.e., χ^2 (df=98, p=0.000) =280.586; χ^2/df = 2.863; TLI = 0.944; CFI = 0.954; RMSEA= 0.055]. The factor loading of each item on the related factors were ranged from 0.636 to 0.873, this indicated that the model convergent validity was achieved and the covariances between variables were less than 0.90 also revealed that all the variables were distinct. To test the second-order of information literacy skills construct, another confirmatory factor analysis was performed. The analysis (refer to Figure 5.11) revealed that the second-order model was also a good fit **[**i.e., χ^2(df=100, p=0.000) = 321.987; χ^2/df = 3.220; TLI = 0.933; CFI = 0.944; RMSEA= 0.060**]**. The factor loading of the items also were very significant since they exceeded the 0.50 threshold requirement; covariance among

factors was 0.75, 0.72, 0.60 and 0.59 for Information Literacy, Independent Learning, Mutual Respect and Ethics respectively.

From the findings of second-order confirmatory factor analysis, it can be concluded that there are four underlying factors of information literacy skills to measure Malaysian secondary school students' information literacy competence, namely Information Literacy, Independent Learning, Mutual Respect and Ethics.

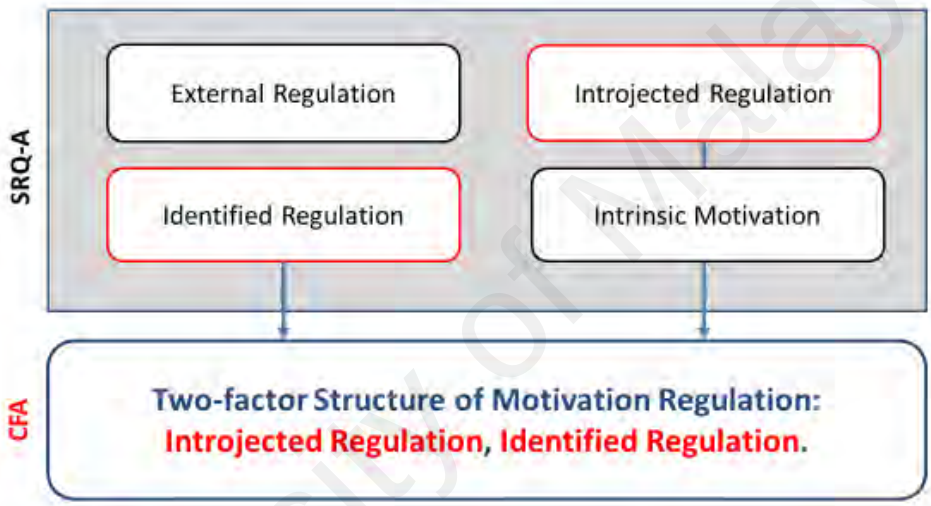


Figure 7.3. The identification and validation of two-factor structure of motivation regulation

Based on the research question 2.3, the task was to examine the factorial structure of Academic Self-Regulated Questionnaire on the Malaysian secondary school student sample, therefore, a confirmatory factor analysis was conducted to identify the factor structure. Unlike the results found in the previous studies (Alivernini, Lucidi, & Manganelli, 2011), the fit indices in this study showed that the four-factor model was not appropriate to explain the Malaysian data. Although the adaptation showed satisfactory psychometric characteristic, it failed to prove the four-factor structure as mentioned by its authors (Ryan & Connell, 1989). Two factors were assumed to be the best factorial solution for Malaysian secondary schools, these two

factors were introjected regulation and identified regulation. The final confirmatory factor analysis results of Academic Self-Regulated Questionnaire (Malaysian version) were as follows (refer to Figure 5.13): χ^2 (df =19, p=0.000) =77.814, χ^2/ df = 4.095, CFI= 0.953, TLI=.931, RMSEA= 0.071. The factor loadings of all the remained items exceeded 0.50 and this indicated that the convergent validity was achieved, and the covariance between introjected regulation and identified regulation was less than 0.90 and this also indicated that the two variables were distinct. In addition, the two-factor structure model demonstrates good internal consistency with 0.742 Cronbach's alpha values.

The findings from this analysis informed us that the four-factor structure of Academic Self-Regulated Questionnaire which has been validated in Western settings may not necessarily be applicable to Eastern context such as Malaysia. A study by Iyengar and Lepper (1999) suggests that autonomy and choice originating in Western independent societies may not be culturally applicable to Eastern collectivist societies. For example, their findings revealed that American students demonstrated less intrinsic motivation when choices are controlled by others; On the contrary, free choice may not always be desirable for motivating Asian students, but rather that respect for authority may be more culturally acceptable (Iyengar & Lepper, 1999). The argument of cultural differences may explain why motivational constructs from Western psychology present differently in Malaysian contexts. The findings of this study indicated that Malaysian students demonstrated more on introjected regulation and identified regulation types of motivation. Hence, it can be concluded that the Malaysian version of Academic Self-Regulated Questionnaire was reliable and valid with two-factor structure and suitable for the use of Malaysian secondary school students.

Confirmatory factor analysis was used to test the construct validity of "Self-efficacy for Learning and Performance" (SELP). The results showed that the single factor structure model with six items was perfectly fit to the data [i.e., χ^2 (df =9, p=0.000) =43.699, χ^2/ df = 4.855, CFI= 0.974, TLI=0.957, RMSEA= 0.08]. The factor loading of the item ranged from 0.596 to 0.799 indicated that the convergent validity was achieved. The Cronbach's alpha of the model was also calculated and the results of 0.849 showed that the model was reliable. Hence, the results from the CFA and Cronbach's alpha suggested that the single factor structure of "Self-efficacy for Learning and Performance" (SELP) scale with six items is reliable, valid and suitable for the use of Malaysian secondary school students.

The purpose of this study is to develop an information literacy education model based on school information literacy culture and mediated by motivation and self-efficacy. Based on the rigorous instrument development process and the confirmed reliability and validity of the instrument application, it can be concluded that this study provides a comprehensive instrument to measure school information literacy culture, information literacy skills, motivation and self-efficacy. The school information culture consisted of four factors, namely Activities, Perceived Autonomy Support, Fairness and Respect; the information literacy skills was defined as Information literacy, Independent Learning, Mutual Respect and Ethics; motivation was operationalized through introjected regulation and identified regulation; and self-efficacy was measured by a single factor with six items. As discussed in Chapter 3, the analysis of Stage Two at model development phase can be divided into two parts. The first part provides theoretical support for the interrelationships between all constructs and identifies the hypotheses based on the interrelationships. These hypotheses were:

H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.

H_2: There is a causal relationship between school information literacy culture and motivation.

H_3: There is a causal relationship between motivation and information literacy skills acquisition.

H_4: There is a causal relationship between school information literacy culture and self-efficacy.

H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.

H_6: There is a causal relationship between self-efficacy and motivation.

H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.

H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.

H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.

Based on the findings from Stage One at this model development phase where the factor structure of each construct has been identified, and on the basis of hypotheses that have been developed, a hypothesized model of information literacy education is developed (as depicted in Figure 7.4). The following section discusses the

findings of the model evaluation phase to further validate this hypothesized model of information literacy education.

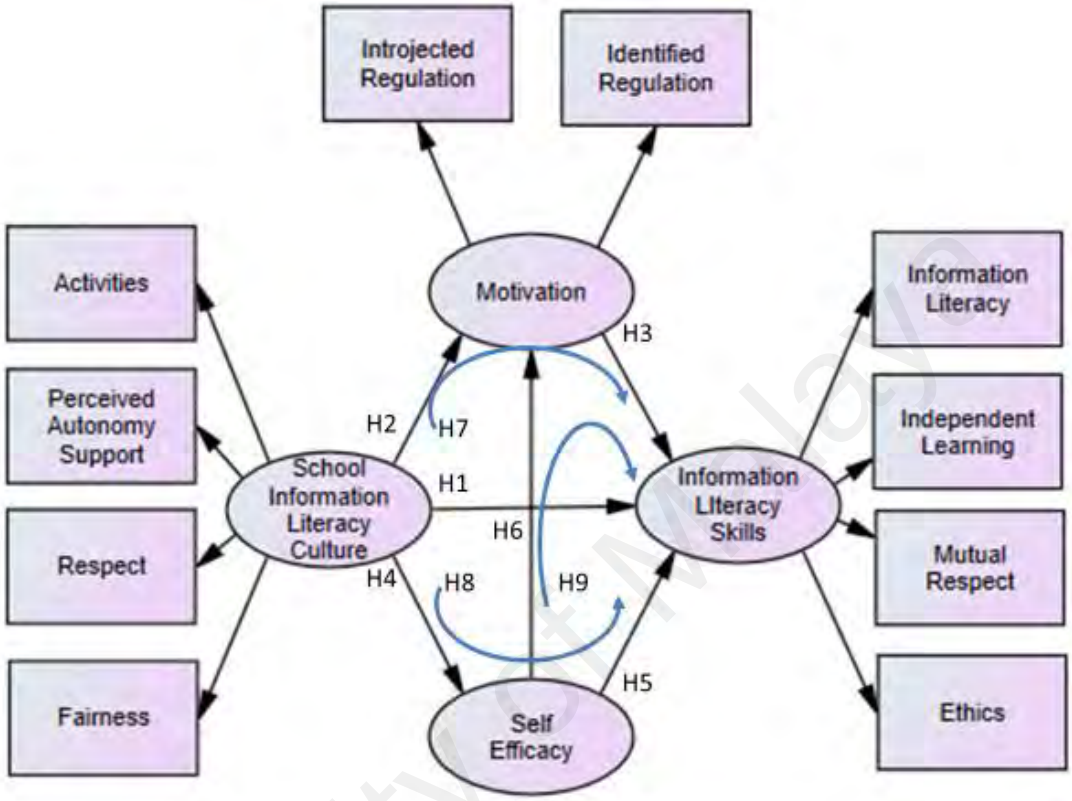


Figure 7.4. The hypothesized model of information literacy education

Discussion of Findings from Phase 3: The Model Evaluation Phase

The final phase of the study is the evaluation of information literacy education model developed in Phase 2. The ultimate goal of this study is to develop an information literacy education model by investigating the influence of school information literacy culture created through hidden curriculum on students' information literacy skills acquisition and determining whether motivation and self-efficacy play mediating roles on the relationship between these two variables.

The examination of validity is exceptionally crucial in model development, it is a process where the researcher tries to provide evidence to support the

appropriateness, meaningfulness and usefulness of the specific inferences. As suggested by Zumbo (1998), without validation, any inferences made from a measure are potentially meaningless. Therefore, this study utilized Partial Least Square Structural Equation Modeling (PLS-SEM) as an approach to evaluate or validate the development model. The results of the analyses indicated that the measurement model and structural model were both significantly and practically valid and convincingly fit the data.

For research questions 3.1, 3.2 and 3.4, this study hypothesized that there were causal relationships between school information literacy culture and information literacy skills acquisition, students' motivation and also self-efficacy, respectively. By using Partial Least Square Structural Equation Modeling (PLS-SEM), the study found that school information literacy culture has been identified to have positive influence on students' Information Literacy Skills Acquisition (β=0.198, t=4.793, $p<0.01$), Motivation (β=0.407, t=10.091, $p<0.01$) as well as Self-efficacy (β=0.420, t=10.242, $p<0.01$). Therefore, Hypothesis 1 (H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition), Hypothesis 2 (H_2: There is a causal relationship between school information literacy culture and motivation) and Hypothesis 4 (H_4: There is a causal relationship between school information literacy culture and self-efficacy) were supported. That is to say, by creating a positive school culture which is conducive to information literacy learning, this will have positive impact of students' information literacy skills acquisition, motivation, and also self-efficacy. This is in good agreement with previous studies that examined the relationship between school context and students' computer and information literacy skills acquisition (Arnone et al., 2009; Chang et al., 2016; Lorenz et al., 2015; Zhu, 2013). The findings also support previous studies that investigated

the relationship between school context and motivation (Arnone et al., 2009; Badri et al., 2014; Deci & Ryan, 2008; Guay & Vallerand, 1996; Niemiec & Ryan, 2009; Ryan & Deci, 2000a; Standage et al., 2006). In addition, this is also in line with previous studies that examined the relationship between school context and students' self-efficacy (Arnone et al., 2009; Gafoor & Ashraf, 2012; Saboor et al., 2015; Sottile Jr et al., 2002). For instance, a study by Arnone et al. (2009) on context factors inherent to the school library that influences students' perceived competence (or self-efficacy) in the domain of information skills, and their intrinsic motivation for research indicate that student perceptions of their school librarian's autonomy supportiveness and their perceptions of the librarian's technology competence contributed significantly to students' perceived competence in the domain of information skills, and their intrinsic motivation for research.

The results of this study also support the Self-determination Theory (Deci et al., 1991) which advocates that social environment plays a crucial role on students' intrinsic motivation. From the findings, it can be concluded that school information literacy culture, represented by autonomy supportive environment, fairness and respect focused practices, and independent learning opportunities created during the extra-curricular activities, all of these factors collectively form a culture that can support the students' basic psychological needs (e.g., autonomy, competence and relatedness), thus foster intrinsic motivation and engagement in their learning. In addition, the findings also support Self-efficacy Theory (Bandura, 1977, 1982) by which the information literacy culture provides a good condition where the sources of self-efficacy (e.g., mastery experiences, vicarious experiences provided by social models, social persuasion and emotion state) can grow, hence, promoting strong sense of efficacy among students.

Based on the research findings, besides school information literacy culture, students' information literacy skills have also been identified to be positively influenced by Motivation (β=0.179, t=3.468, p<0.01), and Self-efficacy (β=0.211, t=4.447, p<0.01). Thus, this supported the Hypothesis 3 (H_3: There is a causal relationship between motivation and information literacy skills acquisition) and Hypothesis 5 (H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition). These results answered research questions 3.3 and 3.5. These findings are also in line with previous studies that examined the relationships between motivational beliefs (motivation and self-efficacy) and information literacy (Arnone et al., 2009; Kiliç-Çakmak, 2010; Kurbanoglu, 2003; Ross et al., 2016). Furthermore, for research question 3.6, the data analysis indicated that Self-efficacy is found to have positive significant causal relationship towards Motivation (β=0.285, t=7.348, p<0.01). The findings supported Hypothesis 6 (H_6: There is a causal relationship between self-efficacy and motivation). The finding was also supported by many previous studies that related self-efficacy to motivation. Various studies (Bandura, 1993; Bedel, 2015; Schunk, 1995; Zimmerman, 2000) asserted that self-efficacy is a strong predictor of motivation in learning.

To answer research questions 3.7 to 3.9, three mediating analyses were conducted based on the guideline for mediation analysis in PLS-SEM proposed by Hair et al. (2014). The purpose of these mediation analyses is to determine whether motivation and self-efficacy play mediating roles on the relationship between school information literacy culture and students' information literacy skills acquisition. In addition, it also aims to determine whether motivation is a mediator between self-efficacy and information literacy skills acquisition.

For research question 3.7., the path analysis revealed that Information Literacy Skills was influenced positively by School Information Literacy Culture (β=0.253, t=5.861, p<0.01); School Information Literacy Culture was related positively to Motivation (β=0.526, t=13.823, p<0.01), and Motivation was also related significantly to Information Literacy Skills (β=0.245, t=4.789, p<0.01). The Variance Accounted For (VAF) for this model (refer to Figure 6.9, Mediation Model 1) was 0.337, which suggested that Motivation partially mediated the relationship between School Information Literacy Culture and Information Literacy Skills. Hence, supported the Hypothesis 7 (H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition).

In addition, self-efficacy is also found to have partial mediating effect (VAF=0.291) on the relationship between School Information Literacy Culture and Information Literacy Skills (refer to Figure 6.10, Mediation Model 2). According to the findings, School Information Literacy Culture is found to have positive significant direct effect on Information Literacy Skills (β=0.270, t=6.821, p<0.01); School Information Literacy Culture is positively related to Self-efficacy (β=0.420, t=10.395, p<0.01), and Self- efficacy is also positively related to Information Literacy Skills (β=0.264, t=4.789, p<0.01). The findings answered research question 3.8 where Hypothesis 8 (H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition) was supported.

Similarly, for research question 3.9., the findings also demonstrated that Motivation has partial mediating effect (VAF=0.316) on the relationship between Self-efficacy and Information Literacy Skills. In this model (refer to Figure 6.11, Mediation Model

3), Self-efficacy positively influenced Information Literacy Skills (β=0.258, t=5.410, p<0.01); In addition, Self-efficacy has positive impact on Motivation (β=0.455, t=12.283, p<0.01) and Motivation is positively related to Information Literacy Skills (β=0.261, t=5.383, p<0.01). Thus, this supports Hypothesis 9 (H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition).

As a whole, the findings for research questions 3.1 to 3.9 supported the theoretical framework of this study which is adapted from Triadic Reciprocal Causation Model by Bandura (1986). According to Bandura (1986), human functioning is an interaction of personal, behavior, and the environment factors. As suggested by the theoretical framework of this study (refer to Figure 2.1. in Chapter 2), the school information literacy culture is the environmental factor that affects students' motivation and self-efficacy (personal factors) and students' information literacy skills acquisition (behavior factor). This study confirmed that students' information literacy skills can be fostered by providing an information literacy-rich school experience, drawing upon autonomy supportive, fairness and respect-focused learning environment, this creates a school information literacy culture. The results of the analyses also indicate that the school information literacy culture can give students a more integrated and engaging learning experience, hence significantly influences students' motivation and self-efficacy. When students are motivated and have strong sense of efficacy, these will in turn impact their acquisition of information literacy skills.

Based on the idea of this reciprocal nature of the causes of human functioning and through a series of rigorous qualitative and quantitative data analysis procedures,

this study successfully developed a new information literacy education model. In this information literacy education model (refer to Figure 7.5.), the key driven force of students' information literacy learning is the creation of school information literacy culture through hidden curriculum which consist of four factors, namely Activities, Perceived Autonomy Support, Fairness and Respect. In addition, the students' motivation and self-efficacy are proven to have partial mediating effects on the relationship between school information literacy culture and students' information literacy skills acquisition.

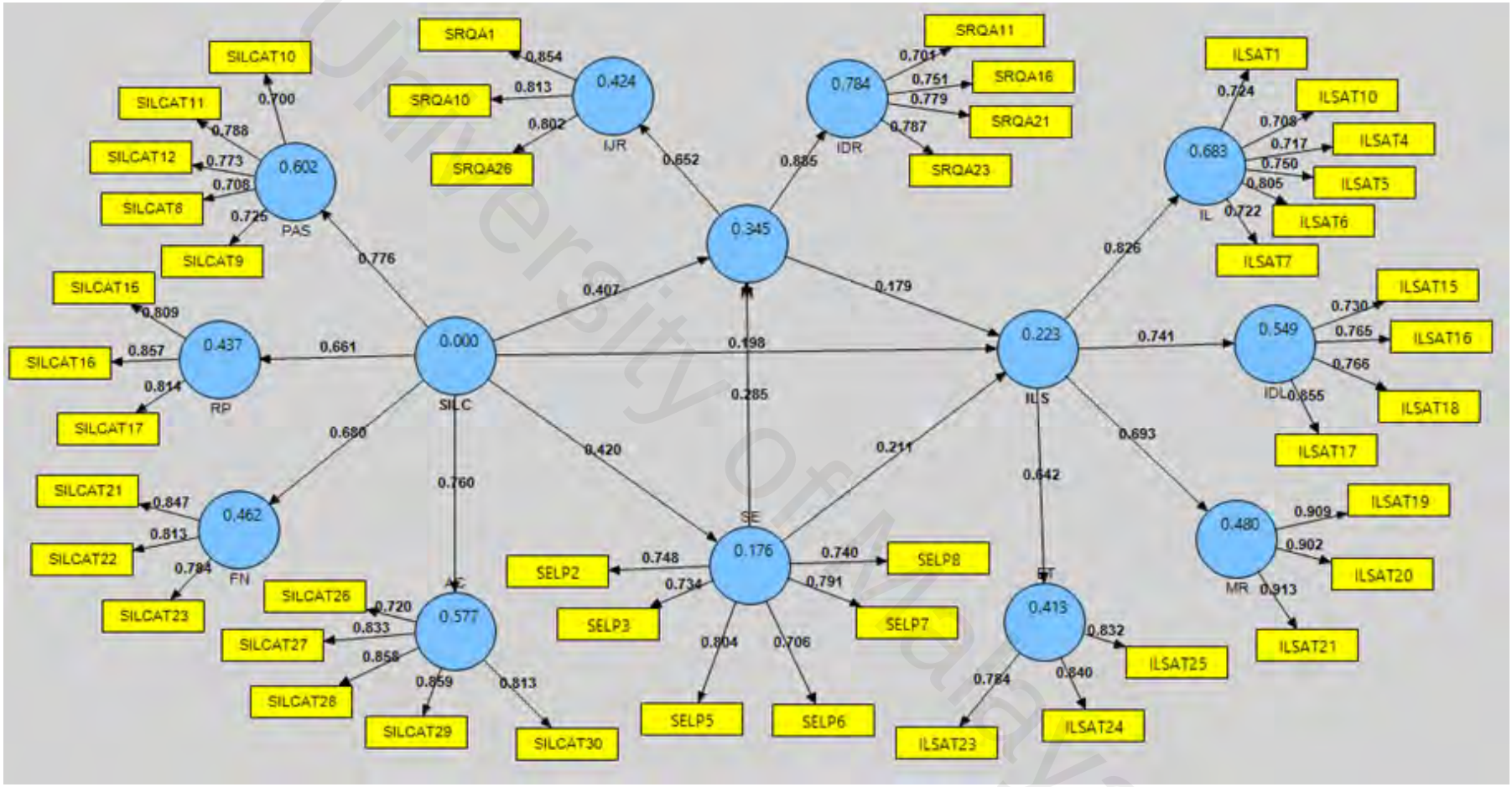


Figure 7.5. Model of Information Literacy Education

Conclusion

The aim of this study is to develop an information literacy education model based on school information literacy culture created through hidden curriculum and mediated by motivation and self-efficacy. From the literature review, the current issues of Information literacy education in Malaysian schools include: the high expectations towards library and media teachers to lead the Information literacy education in school (Shyh Mee Tan, 2014; Shyh Mei Tan & Singh, 2008); the negative effects of hidden curriculum that occurred in the instructional strategies (Abrizah Abdullah, 2008; Halida Yu et al., 2011) and lacking of consideration to include individual, organizational, and social and cultural factors in implementing information literacy education (Saidatul Akmar Ismail, 2014). The researcher has identified gaps in the information literacy education research in Malaysia. They are limited research that explores the effects of affective domain on students' information literacy skills acquisition (Cahoy & Schroeder, 2012; Fourie & Julien, 2014; Julien et al., 2005; Mariam L. Matteson, 2014), and lack of study that investigates the influence of school culture shaped by hidden curriculum on information literacy skills acquisition (Bayanfar, 2013; P. Brown, 2015; Cubukcu, 2012; Jeh-Lou & Chang, 2004; Sosu, 2016; Yaghoob Nami, 2014). Another finding is from the research design perspective that most of the studies of information literacy research employed either qualitative or quantitative research design but not through mix-method research design (G. T. Brown, 2005; Cahoy, 2004; Cahoy & Schroeder, 2012; Edzan, 2008; Johnston, 2003; Kathleen L. Spitzer, 1998). This study has successfully bridged these gaps by using the Design and Developmental Research approach (Richey & Klein, 2007) to develop an information literacy education model. This model plays as a supporting system to support current information literacy education efforts by focusing on the non-academic

aspects of school life and their influence on students' affective domain of learning such as motivation and self-efficacy, consequently, minimizing the current problems of information literacy education faced in Malaysian schools.

By utilizing the Design and Developmental Research approach (Richey & Klein, 2007), the model was developed based on the justification from the needs analysis phase. The aim of the needs analysis phase was to understand teachers' perceptions regarding whether there is a need to develop an information literacy education model, and what aspects of school culture shaped by hidden curriculum can be used to develop the information literacy education model. This phase was a mixed method research design and consisted of two stages. Stage One was a qualitative research design, where a focus group discussion with school's administrative teachers was carried out to identify the concept and dimensions of school culture that have positive effects on students' information literacy education from hidden curriculum perspective. Based on the output from this stage, a "Needs of Information Literacy Education Model (NILEM)" survey questionnaire was developed and validated in Stage Two. A pilot study was conducted to confirm the validity and reliability of the questionnaire. The data of this phase was collected through a survey from 386 secondary school teachers. Chapter 4 presents the findings of the needs analysis phase.

Next, the model was then developed at the model development phase. The development process of the model was guided by Social Cognitive Theory and Self-Determination Theory. This phase also consisted of two stages. Stage One was the instruments development and validation. Stage Two was the hypotheses development and hypothesized model development. Through these processes, a hypothesized information literacy education model was developed. Chapter 5 presents the findings

of the model development phase. This model contained of four main constructs: School Information Literacy Culture, Information Literacy Skills, Motivation and Self-efficacy. The School Information Literacy Culture consisted of four factors, namely Perceived Autonomy Support, Fairness and Respect, and Activities; the Information Literacy Skills was defined as Information literacy, Independent Learning, Mutual Respect and Ethics; Motivation was operationalized through Introjected Regulation and Identified Regulation; and Self-efficacy was measured by a single factor with six items (refer to Figure 5.17).

Finally, the hypothesized model of information literacy education was evaluated using Partial Least Square Structural Equation Modeling (PLS-SEM) approach in model evaluation phase. The aim of this phase was to investigate the influence of school information literacy culture created through hidden curriculum on students' information literacy skills acquisition and determining whether motivation and self-efficacy play mediating roles on the relationship between these two variables. This phase took a three-stage approach where Stage One was model specification, Stage Two was the evaluation of measurement model and Stage Three was the evaluation of structural model. Chapter 6 presents the findings of the model evaluation phase. The analysis was performed in two stages. The measurement model was assessed on internal consistency reliability, indicator reliability, convergent validity and discriminant validity in two levels. The first level was the first-order constructs and second level were the higher-level constructs. The results of analysis indicated that both levels of measurement models fit the data properly. The hypothesized structural model was examined in the second stage including six direct paths representing hypotheses H_1, H_2, H_3, H_4, H_5 and H_6 and three indirect paths representing hypotheses H_7, H_8 and H_9. The empirical findings indicated that all of the hypotheses were

supported. Table 7.1 presents a summary of the findings from the model evaluation phase.

Table 7.1

Summary of The Findings from Model Evaluation Phase

Hypothesis Statement	Research Question	Result
H_1: There is a causal relationship between school information literacy culture and information literacy skills acquisition.	3.1	Supported
H_2: There is a causal relationship between school information literacy culture and motivation.	3.2	Supported
H_3: There is a causal relationship between motivation and information literacy skills acquisition.	3.3	Supported
H_4: There is a causal relationship between school information literacy culture and self-efficacy.	3.4	Supported
H_5: There is a causal relationship between self-efficacy and information literacy skills acquisition.	3.5	Supported
H_6: There is a causal relationship between self-efficacy and motivation.	3.6	Supported
H_7: There is a mediating effect of motivation on the relationship between school information literacy culture and information literacy skills acquisition.	3.7	Supported
H_8: There is a mediating effect of self-efficacy on the relationship between school information literacy culture and information literacy skills acquisition.	3.8	Supported
H_9: There is a mediating effect of motivation on the relationship between self-efficacy and information literacy skills acquisition.	3.9	Supported

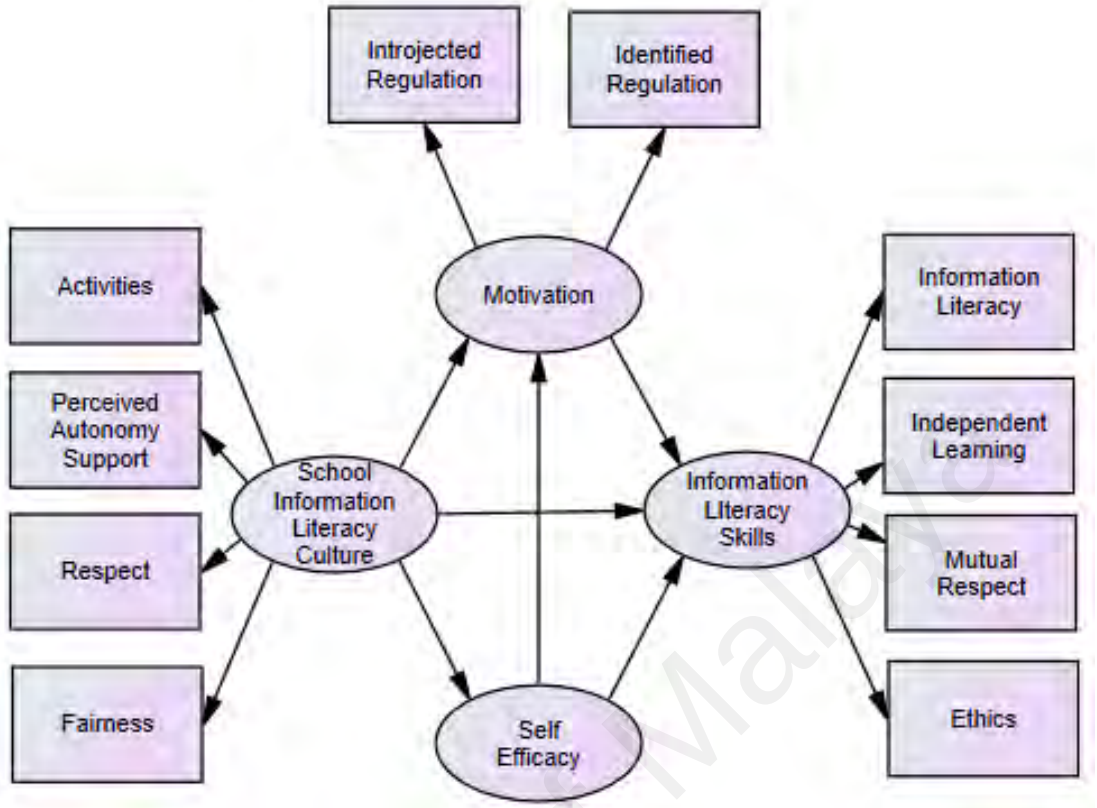


Figure 7.6. The model of information literacy education

Through the rigorous model development and the confirmed reliability and validity of the model evaluation, the information literacy education model (as shown in Figure 7.6) meets the requirement of its role as a supporting system to support current information literacy education efforts by embedding the information literacy learning into school culture and also focusing on its influence on students' motivation and self-efficacy to enhance students' information literacy skills.

The conclusion drawn from this study which was based on the analysis of the statistical procedures, suggested that students' information literacy skills were found to be influenced positively by school information literacy culture, motivation as well as self-efficacy. At the same time, the study suggested that school information literacy culture has a significant direct impact on students' motivation and self-efficacy. In

general, this study has made contributions to the education and information literacy literature by deriving a new information literacy education model which provides a mechanism to understand how to investigate a school information literacy culture through hidden curriculum, and its impacts on students' motivation, self-efficacy and most importantly, information literacy skills. This study is difference with other study where most of the studies of information literacy education in Malaysia focuses on the problems of information literacy implementation (Ismail, Dorner, & Oliver, 2011; Ismail, Tarmuchi, Shuhaimi, & Mohamed, 2016; Shyh Mee Tan, 2014), this study in turns, proposes a valid and reliable model to overcome the shortcoming of information literacy education implementation in Malaysia secondary school.

The following sections discuss on the practical, theoretical and methodology implications and contributions of this study, and last but not least, the recommendation for future research.

Research Implications and Contributions

The conclusions drawn from this study which was based on the analysis of the statistical procedures, suggested that students' information literacy skills were found to be influenced positively by school information literacy culture, motivation as well as self-efficacy. At the same time, the study suggested that school information literacy culture has a significant direct impact on students' motivation and self-efficacy. Motivation and self-efficacy were also found to have significant partial mediation effects on the relationship between school information literacy culture and students' information literacy skills. In addition, motivation was influenced by self-efficacy and played a mediating role on the relationship between self-efficacy and students' information literacy skills. Accordingly, this study presents several implications and

contributions which can be divided into practical, theoretical and methodology implications for the education communities.

Practical Implications of the Study

There are six practical implications with respect to this study:

Firstly, as indicated in the research findings, the school information literacy culture in the model has been identified to consist of four underlying factors that collectively affect students' information literacy skills acquisition. These factors are Perceived Autonomy Support, Fairness, Respect and Activities. This provides information for the school administrators about the areas of focus and direction to improve their school culture, consequently contributes to the information literacy education.

Second, an understanding of the factors contribute to the school information literacy culture also can suggest to the school administrators about the areas of focus in designing appropriate programs or projects such as teachers' professional development program.

Third, since there are many mediating factors that exist in the field of education that may contribute to certain area of school effectiveness, the findings of this study where motivation and self-efficacy have significant partial mediation effects on the relationship between school information literacy culture and students' information literacy skills, this provides empirical evidence that school administrators may focus on promoting students' motivation and self-efficacy in order to improve students' information literacy skills.

Forth, the influence of school culture and hidden curriculum on student learning and development is pervasive and implicit. What students have learned from attending school are not always positive, in fact, in some cases, can be negative. The development of information literacy education model which is based on school culture shaped by hidden curriculum may act as a vehicle for bringing the hidden curriculum and school culture to a level of consciousness, where they can be examined. This will encourage the schools' principals, administrative teachers and teachers to open up dialog about their school culture and hidden curriculum, consequently, this may lead to better understanding about their school vision and mission, their roles on students' development, as well as changes that need to be taken to enhance current information literacy education in their school.

Fifth, through the application of the instrument in the instrument validation process, three sets of reliable and valid instruments have been generated in this study, they are "Needs for Information Literacy Education Model, NILEM", "School Information Literacy Culture Assessment Tool, SILCAT" and "Information Literacy Skills Assessment Tool, ILSAT". Using different techniques such as descriptive statistics, exploratory factor analysis, confirmatory factor analysis and PLS-SEM, the researcher demonstrated that the measurement instruments have been statistically tested and confirmed to be reliable and valid and can be employed by other researchers or school administrators in the future. These tools provide more specific and detailed feedbacks to the school administrators and could be very valuable in informed decisions and developing more effective strategies to enhance students' information literacy skills.

Finally, the information literacy education model meets the requirement of its role as a supporting system to support current information literacy education efforts

by embedding the information literacy learning into school culture and also focusing on its influence on students' motivation and self-efficacy to enhance students' information literacy skills. With this information literacy education model, schools can facilitate information literacy without creating much additional course or adding content burden to school curriculum.

Theoretical Implications of the Study

This study is, to the best of the researcher's knowledge, one of the first attempts to integrate Triadic Reciprocal Causation Model (Bandura, 1986), Social Cognitive Theory (Bandura, 1977, 1982) and Self-determination Theory (Deci et al., 1991) into one research model, which raises the awareness for a more holistic conceptualisation of information literacy education in school. In this study, the Triadic Reciprocal Causation Model is adapted as a basis to understand the interaction among environmental factor (school information literacy culture), personal factors (students' motivation and self-efficacy) and behavior factor (students' information literacy skills acquisition). Self-determination Theory provides an understanding of the influence of the environment factor to students' motivation and Social Cognitive Theory explains how the environment factor can become the sources of students' self-efficacy in promoting their motivation as well as information literacy learning. The development of information literacy model also helps to overcome the lack of previous studies that usually dealt separately with the influence of school culture, motivation and self-efficacy on students' information literacy skills.

Methodology Implications of the Study

The study also contributes to the body of knowledge in the research methodology for information literacy education. This study is one of the first attempts

to explicitly use the Design and Developmental Research (DDR) approach to develop the information literacy education model. The study contributes a new framework and different methodology for the study of information literacy education with multiple research methods including qualitative and quantitative research designs. The Design and Developmental Research (DDR) approach provides school administrators with reliable methods to measure various constructs and factors that contribute to information literacy education.

Recommendations for Future Research

Besides a number of new insights, this study also has several limitations that can be explored for possible future research. This section proposes some directions for future research based on the discussion of the empirical limitations of this study.

First, unlike other information literacy model which deals with the problems of information literacy instruction, the development of this model is to play as a supporting system to support current information literacy education endeavour, with the hope to minimize the current problems of information literacy education faced in Malaysian secondary schools. Therefore, future research may try to integrate the instructional strategies of information literacy into the model to further ascertain its application.

Second, as suggested by Peterson and Deal (1998), school culture covers the "norms, values, beliefs, traditions, and rituals that has built up over time as people work together, solve problems, and confront challenges. This set of informal expectations and values shapes how people think, feel, and act in schools" (Peterson & Deal, 1998, p. 28). Therefore, the impact of school information literacy culture on student information literacy skills acquisition as suggested in this model may not be easily assessed due to the limited time frame. Thus, future research may employ the model within a longitudinal study setting to check if the constructs and their relationships are consistent over time.

Third, the participants for the three phases of this research are selected based on purposive sampling and only include teachers and students from Independent Chinese secondary schools in Malaysia. Even though purposive sampling is appropriate and suitable for this study because the research is still in the early stage for

exploratory, the findings of this study cannot be generalized to the whole population of Malaysian secondary schools without future work. Hence, this study could be replicated among a larger population of public and private secondary schools in Malaysia. Additionally, using a larger and more diverse sample as the unit of analysis could shed additional light on the impact of school culture of other group of students and their effects on students' motivation, self-efficacy and information literacy skills.

Finally, throughout the data analysis process of this study, one constant issue that has been identified from the qualitative and quantitative data is the importance of ethical aspect of information literacy. Though this aspect is counted as one of the important factors in Information Literacy Skills Assessment Tool (ILSAT), this study does not investigate this particular aspect individually. Thus, by acknowledging possible shortcoming of this early version of investigation, future research on the ethical aspect of information literacy is highly recommended.

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List of Publications and Papers Present

[1] Chua, L. L., & Saedah Siraj. (2016, February 02-04, 2016). *Exploring the Basic Elements of Information Literacy Standards for Malaysian Secondary School Students.* Paper presented at the ISTEL 2016-Winter, Bali, Indonesia.

ISTEL 2016-Winter Bali, Indonesia || February 02-04, 2016

Exploring the Basic Elements of Information Literacy Standards for Malaysian Secondary School Students

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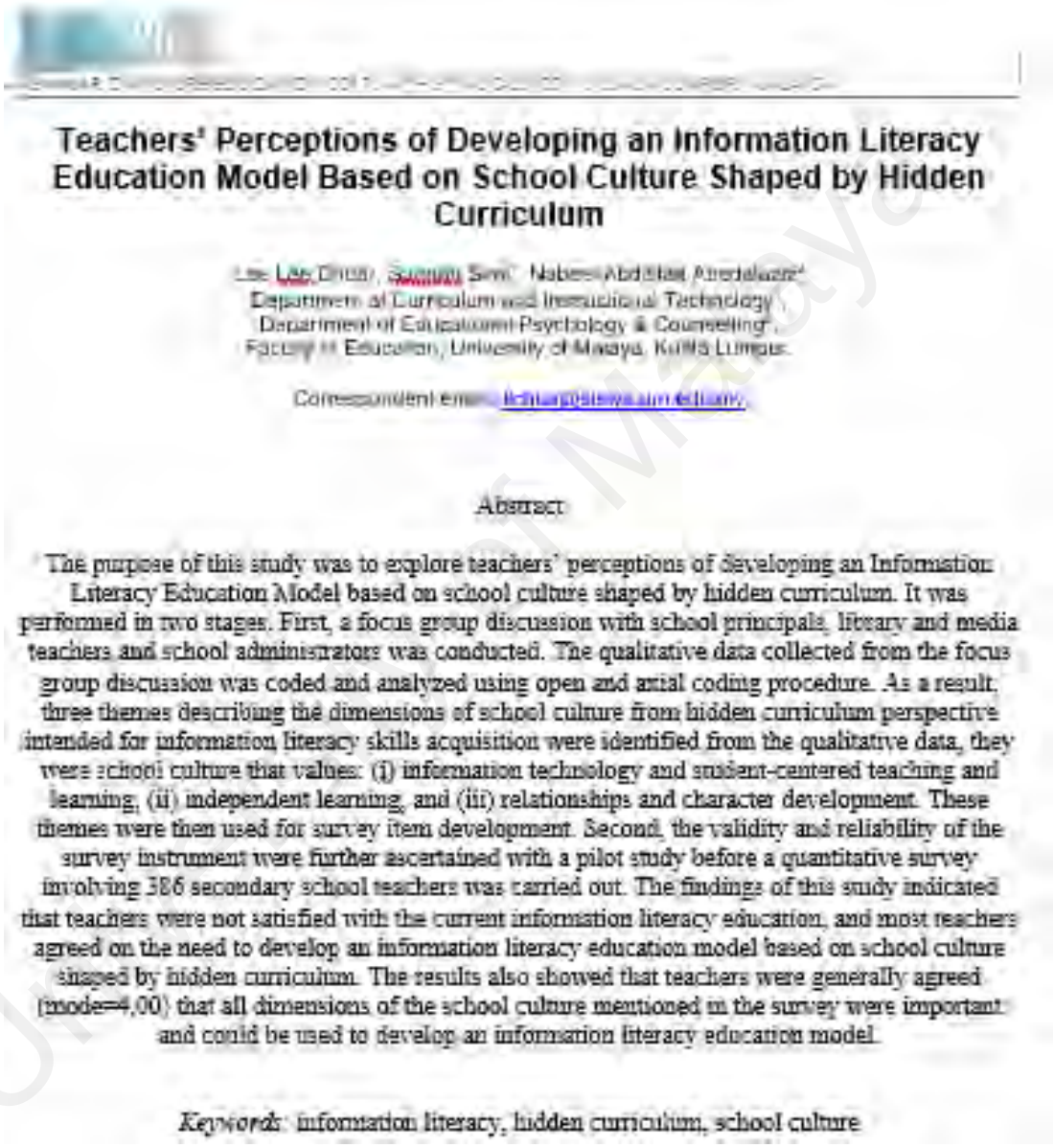
ABSTRACT

Information literacy is an essential skill and is a prerequisite for lifelong learning education. The advent of information age requires schools to train students to become information literate people because information literacy is a necessary basic condition for survival in the 21st century. The literature shows that the development and progress of information literacy education (ILE) in Malaysia face a lot of challenges and its implementation is slower than expected. To date, we still do not have a National Information Literacy Standards for secondary school students in Malaysia. This shortcoming has given rise to the research problem that has inspired this study. The main purpose of this study is to identify the basic elements of information literacy standards/indicators for Malaysian secondary school students. A content analysis was employed to identify these basic elements of information literacy standards/indicators, by taking information literacy standards of other countries such as AASL 1998, ALA/ACRL 2000, ANZIIL 2004, AASL 21st 2007, NETS.S ISTE 2007, SCONUL 2011 as references. The data analysis process was assisted by the Atlas. Ti software to code all the information literacy standards and frameworks. Five main domains of information literacy standards/indicators have been identified: Consciousness, knowledge, ability, communication and collaboration, and moral and values. Further studies could focus on establishing an evaluation system for measuring information literacy levels of Malaysian secondary school students.

Keywords: Information literacy, information literacy standards, content analysis

[2] Chua, L. L., Saedah Siraj & Abedalaziz N.A.M. (2017, August 04-05, 2017). *Teachers' Perceptions of Developing an Information Literacy Education Model Based on School Culture Shaped by Hidden Curriculum*. Paper presented at the Seminar On Future Education 2017-Kuala Lumpur, Malaysia.



Teachers' Perceptions of Developing an Information Literacy Education Model Based on School Culture Shaped by Hidden Curriculum

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Abstract

The purpose of this study was to explore teachers' perceptions of developing an Information Literacy Education Model based on school culture shaped by hidden curriculum. It was performed in two stages. First, a focus group discussion with school principals, library and media teachers and school administrators was conducted. The qualitative data collected from the focus group discussion was coded and analyzed using open and axial coding procedure. As a result, three themes describing the dimensions of school culture from hidden curriculum perspective intended for information literacy skills acquisition were identified from the qualitative data, they were school culture that values: (i) information technology and student-centered teaching and learning, (ii) independent learning, and (iii) relationships and character development. These themes were then used for survey item development. Second, the validity and reliability of the survey instrument were further ascertained with a pilot study before a quantitative survey involving 386 secondary school teachers was carried out. The findings of this study indicated that teachers were not satisfied with the current information literacy education, and most teachers agreed on the need to develop an information literacy education model based on school culture shaped by hidden curriculum. The results also showed that teachers were generally agreed (mode=4.00) that all dimensions of the school culture mentioned in the survey were important and could be used to develop an information literacy education model.

Keywords: information literacy, hidden curriculum, school culture

[3] Chua, L. L., Saedah Siraj, Nabeel Abdallah Abedalaziz, and Helmi Norman . (2018, April 18-21, 2018). *The Needs Analysis of Developing an Information Literacy Education Model Based on School Culture Shaped by Hidden Curriculum.* Paper presented for the 3rd World Conference on Blended Learning (The IABL2018 Conference) Warsaw, Poland.

The Needs Analysis of Developing an Information Literacy Education Model Based on School Culture Shaped by Hidden Curriculum

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ABSTRACT
The purpose of this study was to explore teachers' perceptions on the need to develop an Information Literacy Education Model based on school culture shaped by hidden curriculum. It was performed in two stages. First, a focus group discussion with school principals, library and media teachers and school administrators was conducted. As a result, three themes were identified from the qualitative data, they were school culture that values: (i) information technology and student-centered teaching and learning, (ii) independent learning and autonomy support, and (iii) character development. These themes were then used for survey item development. Second, the validity and reliability of the survey instrument were further ascertained with a pilot study before a quantitative survey involving 386 secondary school teachers was carried out. The findings of this needs analysis study justified the need to develop a more comprehensive information literacy education model based on school culture shaped by hidden curriculum. The results also showed that teachers were generally agreed (mode=4.00 for all items) that all aspects of the school culture mentioned in the survey were important to support information literacy education.

Keywords: information literacy, hidden curriculum, school culture