

DEVELOPMENT OF AN INSTRUMENT OF LEARNING STRATEGIES
FOR UPPER ELEMENTARY SCHOOL STUDENTS

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ABSTRACT

The aim of this study was to develop a self-report inventory of learning strategies for use with elementary school students. A review of previous research on learning strategies was conducted in order to establish how this concept is defined and what is known about learning strategies. A review of existing instruments on learning strategies was also conducted. This review indicated a need for a reliable and valid instrument that is appropriate for elementary school children. Through a critical synthesis of previous research, a new learning-strategy assessment instrument was constructed, titled a *Scale of Learning Strategies for Upper Elementary School Students* (the SLSUESS). This instrument was composed of 74 items of learning strategies along with sixteen demographic questions. Data were collected from 376 elementary school students in 4th, 5th and 6th grade from an elementary school in Busan, South Korea. Principal component analyses (PCA) were performed to identify the underlying structure of the SLSUESS. The results of the PCA were used to create a final instrument with 42 items organized into six subscales assessing the following learning-strategy components: a) *Study Skills & Effort*, b) *Neglect*, c) *Test Anxiety*, d) *Self-Efficacy & Extrinsic Motivation*, e) *Organization*, and f) *Scheduling & Prioritizing*. The internal consistency of the SLSUESS indicated high reliability ($\alpha = .93$). Group differences were examined by several *t*-tests and ANOVAs, all conducted with a Bonferroni adjustment. The results of these statistical comparisons supported the hypotheses that good learning strategies are used more often by (a) those who report themselves to be high academic performers, (b) motivated students, (c) wealthy students, and girls rather than boys. To increase confidence in these findings, additional studies are needed.

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CHAPTER 1

INTRODUCTION

Learning strategies are known to be one of the most important contributors to academic success (OECD, 2012). Learners who adopt effective learning strategies usually perform better than those who do not (Carrier, 2003; Fuchs et al., 1997; Liu et al., 2010; Miri et al., 2007; OECD, 2012; Schumaker & Deshler, 2006; Zimmerman & Pons, 1990). The positive outcomes associated with learning strategies are known to exist cross-culturally, across most ages, and in almost all abilities groups (Clarke, 2008; Liu et al., 2010; OECD, 2010). Given the significance of learning strategies for academic success, it is important for educators to begin emphasizing and tracking the development of learning strategies at an early age.

Oxford (1990) indicated that a good learning strategy “makes learning easier, faster, more enjoyable, more self-directed, more effective, and more transferable to new situations” (p. 8). Strategic learners adopt a diverse range of effective learning strategies (Zimmerman & Ponz, 1990). Such learners are autonomous and active lifelong learners (Oxford, 1990). However, young students are not usually aware of the potential of learning strategies.

Valid instruments designed to diagnose elementary school students’ uses of learning strategies can help spur young students’ development of effective learning strategies. Using such instruments to identify young students’ strengths and weaknesses, teachers can stimulate students’ awareness of effective learning strategies, thereby ultimately leading students to be more successful learners.

The aim of this study is to develop a new instrument for assessing learning strategies in elementary school students, one that captures the full spectrum of mental qualities and behaviors associated with this concept. This new instrument is intended for use with children who are in

upper elementary school levels. As will be shown in a subsequent portion of this dissertation proposal, no such instrument currently exists that is inexpensive, easy to administer, amenable to translation, and psychometrically sound.

Overview of Learning Strategies

The study of learning strategies came into a focus during the 1970's and was widely researched during the 1980's and 1990's (Božinović & Sindik 2011). The emphasis in much of this research has been to identify a series of processes by which our knowledge is established in our brains (Mayer, 1996; O'Malley & Chamot, 1990). Consequently, the concept of learning strategies has been deeply connected to the notions of declarative versus procedural knowledge and novice versus expert knowledge (Carrier, 2003). In addition, researchers of learning strategies have attempted to identify the study tactics used by successful learners so that these can be taught to other students (Zimmerman & Pons, 1986).

Concepts of Learning Strategies

The concept of "learning strategies" has been broadly defined as sequential mental/behavioral activities for acquiring learning (Brown et al, 1983; Nisbet & Shucksmith, 1986; Schmeck, 1988; Derry & Murphy 1986). Weinstein and Mayer (1986) suggest that learning strategies are "behaviors and thoughts that a learner engages in during learning that are intended to influence the learner's encoding process" (p. 316). Wade et al. (1990) define learning strategies as "a configuration of different tactics, deliberately selected and carefully monitored for particular purpose effectiveness" (p. 150).

With all these definitions, researchers are making a similar point: that learning strategies can be characterized as effortful, purposeful, self-initiated, and comprised of a sequence of activities (Gu, 2012; Mayer, 1996; Derry & Murphy, 1986; Nisbet & Shucksmith, 1986; Pressley

et al., 1985; Schmeck, 1988; Wade et al., 1990, Weinsein & Mayer, 1990; Gu, 2012). More importantly, learning strategies can become automatic when learners practice a series of tactical activities (Gu, 2012; Weinsein & Mayer, 1990).

The concept of learning strategies is different from the concepts of “cognitive style” and “learning styles.” The term “cognitive style” generally refers to a learner’s inborn, static, and habitual characteristics (Riding & Rayner, 1998) and relates to issues of perception, cognition, mental imagery and personality constructs (Riding & Rayer, 1998). Research on cognitive style typically addresses concerns such as dependence/independence, leveler/sharpeners, and impulsive/reflective (Riding & Rayer, 1998).

The term “learning style,” in turn, refers to individual preferences regarding modes of instruction (Pashler et al, 2008). In this arena of study, learning style assessments are widely adopted for the purpose of diagnosing individual propensities for different kinds of learning processes (Pashler et al., 2008) and classifying learners’ sensory preferences such as visual, auditory, kinesthetic or tactile to obtain new information (Oxford, 2003).

While discussions of cognitive styles and learning styles tend to focus on learners’ generic and habitual tendencies, research regarding learning strategies focuses on the mental and behavioral apparatus that learners need in order to achieve their learning goals.

Taxonomy of Learning Strategies

The concept of “learning strategies” encompasses a broad spectrum of cognitive and behavioral characteristics. To impose order on this broad range of characteristics, researchers have devised a variety of classification schemes, each customized to the researcher’s own context of study. Although the classifications vary in their terminology and emphasis, they all address four major schemes: cognitive strategies, meta-cognitive strategies, resource

management strategies, and motivation/affective properties (Duncan & McKeachie, 2005; McKeachie et al, 1987; O'Malley & Chamot, 1990; Oxford, 2003; Pressley et al., 1987, Shannon, 2008).

The category of “cognitive strategies” relates to how learners take in and make sense of information (McKeachie et al., 1987; Pressley et al., 1987). Thus, cognitive strategies are often executed during the comprehension process. This kind of strategy includes the subcategory of operational strategies, such as rehearsing, summarizing (e.g., note-taking), imaging, deduction/induction, and resourcing (McKeachie et al, 1987; O'Malley & Chamot, 1990; Oxford, 1989; Weinstein & Mayer, 1986).

Metacognitive strategies involve the learners’ own awareness of their learning/thinking processes and their ability to manage the processes of learning (Lewalter, 2003). Strategies in this category relate to “the learner’s degree of understanding of what he/she does and does not know, and what he/she would like to know” (Flavell, 1979; p. 18). Metacognitive strategies include the subcategories of monitoring, planning, and regulating (Flavell, 1976; Lewalter, 2003; McKeachie et al, 1987; O'Malley & Chamot, 1990).

Resource management strategies can be defined as “controlling resources other than their cognition” (Duncan & McKeachie, 2004, p. 119). While Duncan and McKeachie (2005) were the first to associate the term “resource management” with this category of strategies, there is a major body of learning strategies research dedicated to the issues of time management and organization skills, which fit into this scheme (Duncan & McKeachie, 2005; Liu, 2009; Oxford, 1989; Stroud, 2006; Weinstein & Palmer, 2005; Zimmerman & Pons, 1986).

The last category of learning strategies is motivation/affective learning strategies. These strategies include attitudes, motivation, and values (Oxford, 2003; Pashler et al., 2008). Previous

research in this area has been concerned with both negative affective strategies (such as text anxiety) and positive ones (such as motivation and self-efficacy) (Oxford, 2003; Pashler et al., 2008; Weinstein & Palmer, 2005).

While existing classifications of learning strategies vary in their details depending on the researchers' contexts of study, the four major categories (i.e., cognitive, metacognitive, resource management, and motivation/affective learning strategies) run like supportive threads through all the work in this area.

Statement of the Problem

Reliable and valid instruments for assessing learning strategies provide functional information about whether and how much an individual learner utilizes various learning strategies. More specifically, these inventories provide information regarding the use of specified learning strategy components, such as note-taking, imagery, monitoring, time management, motivation, self-efficacy, and test anxiety (Duncan & McKeachie, 2005; O'Malley & Chamot, 1990; Oxford, 1989; Lio, 2009; McKeachie, 1987; Pintrich et al., 1993; Stroud, 2006; Zimmerman & Martinez-Pons, 1990). Using such instruments, educators are better able to identify students' strengths and weaknesses as learners. Also, such information can help parents and teacher who would like to assist their children in overcoming academic problems.

However, instruments for assessing the learning strategies of elementary school students are surprisingly limited. While such measurements for college students are relatively abundant, instrument to measure young students use of learning strategies are rare (Stroud 2009). It appears that only one inventory of learning strategies for young learners has been recognized as a valid instrument in the U.S. (Liu, 2009; Stroud, 2006).

Unfortunately, the one published instrument that's available is expensive and involves

complex scoring systems, making it accessible, in practice, to only a small population of students. This unfortunate situation suggests that developing a new, inexpensive, and simple instrument for assessing the learning strategies of young learners will provide widespread benefits to young learners, teachers, and parents.

Purpose of the Study

The goal of this project was to have an initial test for a newly developed self-report inventory to assess elementary school students' uses of learning strategies. More specifically, upper elementary school grades such as 4th through 6th grades. The age groups were chosen as the focus for this study because this is the age when students are first being encouraged to take control of their own learning. The demands of the school curriculum begin to be much heavier starting in 4th grade, and students in these grades are expected to progress from a guided, playful approach to learning toward a more intellectual and reflective approach.

Prior to this project, a pool of items to measure learning strategies was developed. These items were designed to evaluate young learners' learning strategies regarding cognitive strategies (e.g., note-taking, rehearsing, resourcing, elaboration, deducting/inducing, imaging, and inference), metacognitive strategies (e.g., planning, monitoring, and regulating), resources management strategies (e.g., time management and organization skills), and motivation/affective learning strategies (e.g., motivation, self-efficacy, and test anxiety).

The participants in the study were elementary school students aged 9 to 11 (4th to 6th grades) in Busan, South Korea. Unlike most elementary schools in the US, South Korean elementary schools run through sixth grades. Data was collected to assess the psychometric worth of the newly developed survey items. After the new instrument was administered to the target group in South Korea, the data were analyzed by an exploratory factor analysis,

independent *t*-tests, and one-way analyses of variance (ANOVA). These data analyses were conducted so as to identify answers to following research questions (RQ):

RQ 1: What is the underlying factor structure of the new instrument?

RQ 2: What is the reliability of the new instrument?

RQ 3: What group differences are revealed by the instrument?

Hypotheses

1. Male students' uses of learning strategies are different from those of female students.
2. Older students (upper graders) exhibit higher levels of learning strategy use than younger students (lower graders).
3. Students who are the first child or only child in their families exhibit higher levels of learning strategy use than children whose birth-order is second, third or higher.
4. High achievers exhibit the use of more effective learning strategies than low achievers.
5. Motivated learners exhibit the use of more effective learning strategies than less motivated learners.
6. Students living in wealthy¹ environments exhibit the use of more effective learning strategies than those who do not live in wealthy environments.
7. Students whose parents are highly educated exhibit the use of more effective learning strategies than those whose parents are not highly educated.

Assumptions

1. The number of participants is sufficiently obtained.
2. The amount of "missing data" is minimal.
3. Initial data analyses indicate that the data set is amenable to factor analysis.
4. The *t*-test and ANOVA assumptions of normality and homogeneity of variance are not

¹ The term wealthy means "affluent" or "high SES."

violated.

Limitations

1. The sample was collected from a convenience sample, a kind of data source that is inferior to those based on random sampling.
2. The data were collected from one school site located in Busan, South Korea.

Delimitations

1. Participation was voluntary.
2. The participants were 4rd, 5th, and 6th grade students at an elementary school in Busan, South Korea
3. IRB exempted parents' consent for this research since the participants were Korean students. The country does not require parents' consent for survey participation.
4. The principals' permission letter from the site school was obtained prior upon IRB approval (from B) for the response to the IRB request.
5. The language for the survey was written in Korean (Appendix D).
6. The survey was administered in group settings.

Definitions of Terms

Cognitive learning strategies: Mental behaviors that facilitate learning and understanding information (McKeachie et al., 1987).

Elaboration: A type of cognitive learning strategy that builds connections between new information and existing knowledge or experience (Lewalter, 2003).

Extrinsic motivation: A type of affective learning strategy in which a learner performs learning activities to obtain rewards or avoid punishments (Lepper, 1988).

Intrinsic motivation: A type of affective learning strategy in which a learner undertakes

learning activities for his/her own sake, for enjoyment, for learning itself, or for the feelings of accomplishment that learning evokes (Lepper, 1988).

Learning strategies: A sequence of mental/behavioral activities undertaken to achieve learning goals (Schmeck, 1988; Derry & Murphy 1986).

Metacognitive learning strategies: Learners' awareness of their own learning/thinking processes and their ability to manage the processes involved in learning such as planning, monitoring and regulating progress to accomplish a learning task. (Lewalter, 2003).

Motivation/affective learning strategies: Contributors (both negative and positive) to learning that concern emotional aspects of learning such as motivation, self-efficacy and test anxiety (Oxford, 23; Smith & Ragan, 1999).

Monitoring: A type of metacognitive strategy that occurs when checking one's comprehension during listening or reading.

Rehearsal: A type of cognitive learning strategy that is adopted to memorize information by recitation and recapitulation (Lewalter, 2003).

Resource management strategies: Techniques for controlling and organizing the external resources necessary for learning, such as time and materials (Duncan & McKeachie, 2004).

Organizing: A type of resource management learning strategy which involves using reference materials in controlled arrangements (Duncan & McKeachie, 2005).

Planning: A type of metacognitive strategy in which learners anticipate the sequence of behaviors necessary to accomplish learning tasks.

Regulating: A type of metacognitive strategy in which learners seek or arrange conditions

that facilitate learning.

Time management: The use of time in routinized, regular, and healthy ways (Duncan & McKeachie, 2005).

Self-efficacy: Belief in one's own capability to carry out assigned tasks or performance (Bandura, 1994).

Test anxiety: An internal emotional state in which learners worry about tests (Weinstein et al, 2002).

Organization of the Dissertation

This initial chapter has been used to delineate briefly the author's understanding of the concept of "learning strategies." This has been done via definitions, conceptualizations, and classifications from the scholarly literature. In addition, Chapter 1 contains a statement of problem and the specific purpose of the proposed research investigation, including hypotheses, assumptions, limitations, delimitations, and a definitions of terms. Chapter 2 presents the results of a thorough review of the existing literature on "learning strategies." This chapter is focused on four key questions: (a) What are learning strategies? (b) Is a teacher better able to help students if he/she knows about learning strategies? (c) Are learning strategies "culture free"? (d) What instruments exist to assess learners' learning strategies? Chapter 3 presents the methods and procedures of the proposed investigation. The source of the proposed study's data is outlined along with the planned approaches for analyzing those data. Chapters 4 and 5 will present the technical results and provide a discussion of the study, respectively.

CHAPTER 2

LITERATURE REVIEW

In previous research investigations, the concept of learning strategies has been associated with a broad spectrum of mental and behavioral qualities. Therefore, the purpose of this chapter is to synthesize the previous research in order to delineate this researcher's own understanding of the concept, which then becomes the foundation for the creation of an instrument to assess learning strategies in elementary school students. This chapter addresses four questions:

1. What are learning strategies?
2. Is a teacher better able to help students if he/she knows about learning strategies?
3. Are leaning strategies culture free?
4. What instruments exist to assess learners' learning strategies?

In the course of addressing these topics, I synthesize other researchers' perspectives on the concept of learning strategies, discuss the advantages of attending to learning strategies in educational settings, and consider cross-cultural effects on elementary school students.

To address question 1 ("What are learning strategies?"), I survey the use of this term in the scholarly literature, reporting on the origin of the term, its various definitions, the characteristics and categories associated with the term by previous researchers, and how the term differs conceptually from the concepts of cognitive style and learning style.

In addressing the second question ("Is a teacher better able to help students if he/she knows about learning strategies?"), I provide empirical evidence from previous studies about the effects of learning strategies and then illustrate a strand of research indicating certain contexts in which interventions involving learning strategies may not be very useful.

To deal with the third question 3 (“Are leaning strategies culture free?”), I briefly survey theoretical perspectives that suggest cross-cultural constants in learning processes, including universal grammar theory, Piagetian developmental stage theory, and information processing schema theory, and then I report on evidence from cross-cultural studies indicating that the positive effects of learning strategies are not limited to certain cultural domains.

In considering the fourth and last question (“What instruments exists to access learners’ learning strategies?”), I compare two existing instruments for assessing learning strategies in elementary school students: *The School Motivation and Learning Strategy Inventory* (SMALSI) and *The Assessment of Classroom Communication and Study Skills* (ACCSS), identifying the strengths and weaknesses of each instrument.

This chapter excludes research on an alternative assessment known as dynamic assessment and cognitive enrichment advantage (CEA). Although dynamic assessment and CEA - like the approaches that provide the context for this study - incorporates in-depth practical interventions to improve learning strategies, these approaches are intended to be individualized micro-levels of teaching interventions. Therefore, it is difficult to apply this approach directly to the development of a self-report inventory of learning strategies that is presented for use with a large general population of elementary school students. To be more specific, the scope of the discussion on the question “What instruments exists to access learners’ learning strategies?” is limited to instruments that rely on self-reports of learning strategies.

In addition, because the essential standards of psychometrics, such as reliability, validity, and standardized norms for data collection and analysis, are emphasized in Chapters 3 and chapter 4, this chapter does not focus on such criteria. For example, the principles for

developing a good measurement of learning strategies for elementary school students are covered in Chapter 3 methods.

To address the four main topics listed above, I have reviewed a substantial body of academic journal articles, textbooks, dictionaries, and educational psychology handbooks. Google scholar and library databases (such as the Eric database) were helpful tools in my search to find journal articles and relevant materials about learning strategies. The descriptors used to conduct the search were “learning strategies,” “cognitive learning strategies,” “metacognitive strategies,” “learning strategies effects across culture,” “resource management learning strategies,” “affective learning strategies,” “motivation” and “self-efficacy.” The next section deals with the first of my four questions, “What are learning strategies?”

What Are Learning Strategies?

The Concepts of Learning Strategies

Researchers in the field of learning strategies tend to use wide variety of terms to name the object of their study. Depending on the researchers’ emphases, learning strategy characteristics may be referred to as cognitive skills, cognitive strategies, executive control processes, learning to learn, metacognitive strategies, study skills, and self-regulated learning (Gu, 2012; Greenberg, 2005; O'Malley, & Chamot, 1990; Zimmerman & Pons, 1986). Many prominent educational psychologists have tried to capture the essential characteristics of learning strategies. For example, Schmeck (1988) identified the concept of learning strategies in this way:

The term *strategy* was originally a military term that referred to procedures for implementing the plan of a large scale military operation. The more specific steps in implementation of the plan were called *tactics*. More generally the term strategy has come to refer to the implementation of a set of procedures (tactics) for accomplishing

something. Thus a *learning strategy* is a sequence of procedures for accomplishing learning and the specific procedures within the sequence are called *learning tactics* (p.5).

Along with Schmeck's (1988) definition, six other definitions are presented in Table 1. These definitions illustrate how researchers have variously attempted to capture the distinctive features of learning strategies. Comparing these definitions, I found some important common characteristics.

First, all the definitions in Table 1 remark on the centrality of intentionality to the definition (Brown et al, 1983; Nisbet & Shucksmith, 1986; Wade et al, 1990; Weinstein & Mayer, 1986). To achieve meaningful learning, learners should be active agents of the learning process (Mayer, 1996). For example, strategic readers may use techniques such as highlighting or writing small notes in the margins of a text. The highlighted passages and memos may help the readers later, reducing the time needed to find the right pages as well as reminding learners of the ideas that occurred to them as they read. Strategic readers may select the methods that suit them best, whether highlighting or taking notes, depending on their learning contexts and goals.

All the definitions in Table 1 involve the concepts of "effortfulness" and purposefulness (Weinstein & Mayer, 1990; Gu, 2012). According to Gu (2012), any learning behavior without a purpose, "no matter how many steps it involves, and how general it is," is not strategic (p. 8). More importantly, as learning strategies are driven by self-initiation, there is a strong connection between strategies and motivation (Gu, 2012; Weinstein & Mayer, 1991). Motivation is the underlying force that powers learning strategies (Gu, 2012).

Table 1

Definitions of Learning Strategies

Authors	Descriptions
Brown et al (1983, p 85)	Systematic application of deliberate plans, routines, or activities to enhance learning
Derry and Murphy (1986, p. 2)	A collection of mental tactics employed by an individual in a particular learning situation to facilitate acquisition of knowledge or skills
Nisbet and Shucksmith (1986, p. 6)	Integrated sequences of procedures, the appropriate selection and flexible adaptation of which is to meet the needs of a specific learning situation
Pressley et al (1985, p. 4)	Composed of cognitive operations over and above the processes that are a natural consequences of carrying out [a] task
Schmeck (1988 p. 5)	A sequence of procedures for accomplishing learning
Wade et al (1990, p.150)	A configuration of different tactics, deliberately selected and carefully monitored for a particular purpose for effectiveness
Weinstein and Mayer (1986, p. 315)	Behaviors and thoughts that a learner engages in during learning that are intended to influence the learner's encoding ² process

Ultimately the sequence of activities that constitute a learning strategy becomes automatized (Gu, 2012; Schmeck, 1988; O'malley & Chamot, 1990). Developing the sequential performance of learning strategies, learners can connect “the gap between declarative knowledge and procedural knowledge” (Gu, 2012, p. 9). Along with the development of knowledge performance, the sequence of strategies also can be easily controlled (Gu, 2012). According to Gu, (2012) “strategies under conscious control are only at the beginning stage; the highest form of strategic performance is automatic” (p. 10). In sum, the key characteristics of learning strategies are intentionality, self-initiation, sequence of activities, and automaticity (Gu, 2012; Weinsein & Mayer, 1990).

² The term “encoding” is related to problem solving process. Learning strategies are useful for any learners, good or poor, in problem solving.

Having provided a comprehensive definition of learning strategies, I should now move on to discuss the internal organization of the elements that comprise this concept.

The Elements of Learning Strategies

Learning strategies fall into a number of categories. O'Malley and Chamot (1990) addressed the categories of learning strategies as follows:

“[L]earning strategies may include any of the following: focusing on selected aspects of new information, analyzing and monitoring information during acquisition, organizing or elaborating on new information during the encoding process, evaluation the learning when it is completed, or assuring oneself that the learning will be successful as a way to allay anxiety (p. 43).”

Three categorization schemes for learning strategies are shown in Table 2 on page 8. Comparing and contrasting the different approaches is helpful to understand the scope of learning strategies. O'Malley and Chamot (1990) classified learning strategies into three categories: metacognitive strategies, cognitive strategies, and social/affective strategies. Cognitive strategies are the strategies related to learning and understanding information (McKeachie et al, 1987). Rehearsal, organization, differencing, summarizing, deducing, imagery, transfer, and elaboration are examples.

O'Malley and Chamot (1990) use the concept of metacognitive strategies to refer to selective attention, planning, monitoring, and evaluation. In general use, metacognition has been defined as “awareness or analysis of one's own learning or thinking processes” (Metacognition, n.d.). The term's originator, John Flavell, explains:

Metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them e.g. the learning-relevant properties of information or data.... Metacognition refers, amongst other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects on which they bear, usually in the service of some concrete goal or objective” (Flavell, 1976, p 31).

Flavell (1979) further discusses three types of metacognition. The first dimension is an awareness of knowledge, which means the learner's degree of understanding of what he/she does and does not know, and what he/she would like to know. Second, metacognition includes an awareness of thinking (Flavell, 1979). This aspect of metacognition involves understanding one's cognitive tasks and the requirements and procedures necessary to accomplish the tasks (Flavell, 1979). Finally, metacognition involves “an awareness of thinking strategies, which describes an understanding of approaches to directed learning” (Shannon, 2008, p. 18; Flavell 1979).

O'Malley and Chamot (1990) define the category of metacognitive learning strategies mainly with reference to second language acquisition. Within this category, elective attention is defined as “focusing on special aspects of learning tasks, as in planning to listen for key words or phrases” (p. 46). Novice learners must pay full attention to understand words and phrases in a target language while advanced learners require less attention for comprehension. The metacognitive strategy, in this case, relates to how learners' awareness of difficulty levels influences their planning for listening comprehension (O'Malley & Chamot, 1990).

The third grouping in O'Malley and Chamot's (1990) scheme is the category of social/affective strategies. These strategies include cooperation, questioning for clarification, and self-talk. Self-talk refers, for example, to the strategy of "assur[ing] oneself that a learning activity will be successful to reduce anxiety about a task" (p. 46).

Table 2

Subcategories of Learning Strategies (LS)

O'Malley & Chamot (1990, p. 46)	LS include three categories: - Metacognitive strategies: Selective attention, planning, monitoring, and evaluation - Cognitive strategies: Rehearsal, organization, differencing, summarizing, deducing, imagery, transfer, and elaboration - Social/affective strategies: Cooperation, questioning for clarification, and self-talk
Duncan & McKeachie, (2005, p. 119)	LS is defined as four categories: - Cognitive strategies are used to process of information from texts and lectures (e.g. rehearsing, summarizing, paraphrasing, imaging, elaborating, outlining, and critical thinking) - Metacognitive strategies are about controlling and regulating their own cognition (e.g. planning, monitoring, and regulating) - Resource management strategies are for controlling resources other than their cognition (e.g. managing one's time and study environment, and persisting in the face of difficult or boring tasks) - Others: peer learning and help-seeking
Zimmerman & Pons (1986, p. 618).	- Self-evaluation - Organizing and transforming - Goal-setting and planning - Seeking information - Keeping records and monitoring - Environmental structuring - Self-consequences - Rehearsing and memorizing 9-11. Seeking social assistance from peers (9), teachers (10), and adults (11) 12-14. Reviewing records on <i>tests</i> (12) <i>notes</i> (13), or <i>textbooks</i> (14)

Another categorization scheme was devised by Duncan and McKeachie (2005). They grouped learning strategies into four categories: cognitive, metacognitive, resource management, and what they simply referred to as "other" strategies. Although their conceptualization of

metacognitive strategies is very similar to that of O'Malley and Chamot (1990, p. 46)'s, their perspective on cognitive strategies deserves some commentary.

To explain cognitive strategies, Duncan and McKeachie (2005) organized such strategies into a hierarchy. They identified rehearsal (i.e., simply repeating words over and over again) as the simplest cognitive strategy (Duncan & McKeachie, 2005). The next higher step of learning strategies involves “elaboration strategies (e.g., paraphrasing, summarizing) and organization strategies (e.g., outlining, creating tables)” (p. 119). The highest level of cognitive strategies is critical thinking. The meaning of critical thinking refers to learners’ assessment of their use of strategies when one applies existing knowledge to new information. Here, the learner monitors the process of learning with critical judgments on his/her performance (Duncan & McKeachie, 2005).

Duncan & McKeachie’s third category, resource management strategies, includes regulatory strategies that learners employ to control the resources required for learning, such as “managing one’s time and study environment (e.g., using one’s time well, having an appropriate place to study), as well as regulation of one’s effort (e.g., persisting in the face of difficult or boring tasks)” (Duncan & McKeachie, 2005, p. 119). Finally, “two subscales, peer learning (e.g., using a study group or friends to help learn) and help-seeking (e.g., seeking help from peers or instructors when needed)” are classified as “others” (Duncan & McKeachie, 2005, p. 119).

Zimmerman and Pons (1986) have the least abstract categorization scheme. Instead of defining subcategories, the authors list specific behaviors that learners may employ in learning. Comparing their fourteen categories, however, I could identify the same range of cognitive, metacognitive, social/affective, and resource management strategies as in the other categorization schemes.

Comparing the three classification schemes, I would argue that Duncan and McKeachie (2005)'s hierarchy of learning strategies - organized into the categories of cognitive, meta-cognitive, and resource management - provides the most useful framework for understanding the complexity of the concept. In this respect, it is superior to Zimmerman and Pons's (1986) classifications, which do not make a clear distinction about the relations among the major categories. Also, in contrast to O'Malley and Chamot (1990), whose categorization scheme is designed for use in the limited domain of second language acquisition, Duncan and McKeachie's (2005) scheme embraces the general dimensions of learning strategies most comprehensively.

The concepts of learning strategies have been refined and developed over decades. Below, a historical overview of the origin and the development of the term are provided.

When Did the Concept of Learning Strategies First Enter the Educational Literature?

It is difficult to identify exactly when the concept of learning strategies was first introduced to educational psychology. Although the term appears in the literature even before the mid-1950s, no single seminal figure is associated with its rise to prominence. One early instance: the term *strategies* in the discussion of how learning concepts are attained in Bruner et al. (1956)'s *A Study of Thinking*:

“In studying concept attainment, then, it has been our aim to externalize for observation as many of the decisions as could possibly be brought in the open in the hope that regularities in these decisions involved in learning or attaining a concept. These regularities in decision-making we shall call *strategies*” (Bruner et al, 1956. P. 54).

In the 1950s, concerns over first generation university students were prevalent in the U.S. (Nisbet & Shucksmith, 1986). The foundation of the Open University in 1969 stimulated the production of many study skills manuals (Nisbet & Shucksmith, 1986). The aim of many of these manuals was to prevent failures from senior classes in high schools and, more importantly, for students who stayed on campus beyond the age of sixteen years old (Nisbet & Shucksmith, 1986). According to Nisbet and Schucksmith (1986), the starting point of the research on learning strategies was directly related to the study skills movement that sprouted in the 1950s.

The major contributors to the study of learning strategies were cognitive psychologists (Carrier, 2003; O'malley & Chamot, 1990; O'Neil, 1978; Nisbet, & Shucksmith, 1986). Nisbet and Schucksmith (1986) noted:

“Learning to learn has become a topic of central interest in the area of cognitive psychology, though it is seldom referred to under that title. Information-processing and cybernetics gave a stimulus to this field of research in the 1950s, and significant progress has been made in recent years, especially since 1956, when Bruner, Goodnow and Austin published their seminal text, *A Study of Thinking*” (p. 12).

To identify how the term of learning strategies was used during this early period, two bibliographies and one reference section were examined: *A Study of Thinking* (Bruner et al, 1956), *Strategies of learning and efficiency of concept attainment by individuals and groups* (Klausmeier et al, 1964), and *Learning Strategies* (Nisbet & Shucksmith, 1986). Any words

using concepts similar to *learning strategies* appeared on the titles (e.g., study skills, tactics, training, and learning to learn) have been excerpted and presented in Table 3.

Table 3

References Containing Relevant Terms to Learning Strategies

<i>A Study of Thinking</i> (Bruner et al, 1956)	Austin, G. A., Bruner, J.S., & Seymour, R.V. (1953). Fixed-choice strategies in concept attainment. <i>Amer. Psychologist</i> , 8, p. 314. (Abstract)
	Bruner, J. S., Miller, G. A., & Zimmerman, C. (1955). Discriminative skill and discriminative matching in perceptual recognition. <i>Journal of Experimental Psychology</i> , 49(3), 187.
	Goodnow, J. J., & Pettigrew, T. F. (1955). Effect of prior patterns of experience upon strategies and learning sets. <i>Journal of Experimental Psychology</i> , 49(6), 381.
	Seymour, R. (1954). <i>Strategies in the utilization of information</i> (Unpublished doctoral dissertation). Harvard University.
<i>Strategies of learning and efficiency of concept attainment by individuals and groups</i> (Klausmeier et al, 1964)	Byers, J. L. (1961). Strategies and learning set in concept attainment. Unpublished Ph.D. dissertation, Madison: University of Wisconsin.
	Hendrickson, G., & Schroeder, W. H. (1941). Transfer of training in learning to hit a submerged target. <i>Journal of Educational Psychology</i> , 32(3), 205.
<i>Learning Strategies</i> (Nisbet & Shucksmith, 1986)	Monroe, W. S (1924). <i>Training in the Technique of Study</i> , Bulletin 20, Bureau of Educational Research, University of Illinois.
	Laycock, S.R & Russell, D. H (1941). An analysis of 38 how-to-study manuals, <i>School Review</i> , 49, 370-379.
	Robinson, F. P. (1946). <i>Effective study</i> . Harper & brothers.
	Maddox, H. (1963). <i>How to study</i> . London: Pan Books.
	Brown, A. L. (1974). The role of strategic behavior in retardate memory. <i>International review of research in mental retardation</i> , 7, 55-111.
	Brown, A. L., & Campione, J. C. (1977). Training strategic study time apportionment in educable retarded children. <i>Intelligence</i> , 1(1), 94-107.
	Gibbs, G. (1977). Can Students Be Taught How to Study? <i>Higher Education Bulletin</i> , 5 (2), 107-118.
	Baron, J. (1978). Intelligence and general strategies. <i>Strategies of information processing</i> , 403-450.
	Dansereau, D. F. (1978). The development of a learning strategies curriculum. <i>Learning strategies</i> , 1-29.

Among the 220 bibliographic entries in *A Study of Thinking* (Bruner et al, 1956), four titles include the word *strategies*, and one of them contains the word *skill* (Table 3). In *Strategies of Learning and Efficiency of Concept Attainment by Individuals and Groups* (Klausmeier et al, 1964, an unpublished dissertation from the Department of Educational Psychology, University of Wisconsin), 70 references were listed. Among those references, two titles include relevant words. One title includes *strategies*, and one includes *training* (Table 3).

In *Learning Strategies* (Nisbet & Shucksmith, 1986), the total number of items in the reference list was 97. Of these bibliographic entries, 48 titles were published before 1980. After 1980, the term *learning strategies* became common. For this reason, the bibliographies published in 1980s were excluded.

A diverse range of terminology can be found in Nisbet and Shucksmith (1986): *Training in the Technique of Study*, *An analysis of 38 how-to-study manuals*, *Effective study*, *How to study*, *The role of strategic behavior*, and *The development of a learning strategies curriculum*. The compound words of *learning strategies* did not appear before the 1970s, at least in the reference lists of these three books.

This analysis indicates that, before the 1950s, none of the references directly employed the term “*strategy*.” The earliest book among the references was *Training in the Technique of Study* written by Monroe in 1924. The compound word *learning strategies* does not show up before the 1970s. About this time, an academic journal appears to have been established with the name, *Learning Strategies*.

Throughout its history, the concept of *learning strategies* has developed in tandem with two other concepts that are often used to describe diversity in learners, namely *cognitive styles* and *learning styles*. Because there is a widespread tendency to equate (and confuse) these

concepts, it is important to distinguish among them here.

Learning Strategies, Cognitive Styles, and Learning Styles

The concepts of learning strategies, learning styles and cognitive styles are distinctive. A learning strategy differs from a cognitive style or a learning style in that it involves an individual's intentional accommodation to cope with the challenge of achieving learning goals, whereas cognitive styles and learning styles are expressions of learners' inherent features, manifested in their preferences regarding learning procedures (Riding & Rayner, 1998).

The term *cognitive style* generally denotes static, persistent and habitual characteristics in learning (Riding & Rayner, 1998). Research on cognitive style is related to the theoretical models of field-dependence/independence, levelers/sharpeners and impulsive/reflective approaches (Riding & Rayner, 1998). These approaches focus on perception, cognitive controls and process, mental imagery, and personality constructs (Riding & Rayner, 1998).

In comparison, the concept of *learning style* emphasizes learning processes (Riding & Rayner, 1998) - i.e. how "individuals differ in regard to what mode of instruction or study is most effective for them" (Pashler et al, 2008, p 105). The central aim of learning style research is to identify individual differences in this regard and to find the best fit for individual learners (Pashler et al, 2008). Accordingly, learning style assessments are widely conducted for the purpose of finding ideal modes of instruction. Learning style questionnaire inventories typically ask individuals for their preferences regarding learning information (e.g., texts, pictures or audios) so as to define optimal cognitive activities (Pashler et al, 2008).

Each learner represents a diverse assortment of strengths and weaknesses "according to the nature of the learning task and knowledge they hope to acquire (Riding & Rayner, 1998, p 55)." A learning style, therefore, can be defined as "an individual's preferred modes of learning"

(Riding & Rayner, 1998, p 55). More specifically, the term *learning style* refers to “individual set of differences that include not only a stated personal preference for instruction or an association with a particular form of learning activity, but also individual differences found in intellectual or personal psychology” (Riding & Rayner, 1998, p 51).

While the terms *cognitive style* and *learning style* relate to a learner’s natural tendencies, a learning strategy is something like a “tool,” a device that a learner can use to accommodate a learning environment in order to achieve one’s learning goals (Weinstein & Mayer, 1986).

According to Riding and Rayner (1998):

“Learning strategies are formed as part of a response within the individual to meet the demands of the environment. Learning strategies may thus be seen as cognitive tools which for the individual are particularly helpful for successfully completing a specific task (p 79).”

To summarize, learning strategies differ from cognitive styles and learning styles in that, while cognitive styles and learning styles emphasize learners’ inherent characteristics, learning strategies are acquired or intentionally chosen skills. Studies indicate that high academic achievers generally have a diverse range of learning strategies that they are able to select and apply effectively, adapting to their learning environments. Such learners are called strategic learners.

Is a Teacher Better Able to Help Students If He/She Knows about Learning Strategies?

The employment of learning strategies promises two main benefits. First, learners who develop effective strategies can become independent in their learning (Clarke, 2008). Independent learners display “the ability and skill to generate information actively and regulate one’s own thoughts and actions in ways that allow one to participate effectively in learning experiences” (Greenberg, 2005, p. 59). Independent learners engage their learning actively rather than passively accepting knowledge transmission from experts/teachers (Carrier, 2003). The characteristics of independent learners are “active, constructive, and planful” (Howard 1983, p. 6). High academic achievers generally exhibit a diverse range of learning strategies that they are able to select and apply effectively, adapting to their learning environments (Oxford, 1989; Zimmerman & Pons, 1990). To aid in the development of independent learners, the teaching of learning strategies is intended to help students acquire a wide repertoire of cognitive and metacognitive strategies.

A second benefit of learning strategies is the achievement of maintenance and transfer effects (Carrier, 2003, Mayer, 1988; O’malley & Chamot, 1990). Maintenance effects occur when learners apply previously acquired strategies in similar contexts (Carrier, 2003). For example, a third grader can maintain the knowledge of multiplication as she exhibits a sequence of the strategies to solve multiplication problems recurrently. Learners transfer strategies when they apply the acquired strategies to new tasks (Carrier, 2003; McComick & Pressley, 1997). In transfer, the new task usually has characteristics similar to the original task for which the learners acquired the strategy (Carrier, 2003). The strategies used to solve simple multiplication problem, for example, can be applied to more complex equation problems. The maintenance and transfer

effects of learning strategies powerfully influence students' achievements and performance (Chamot et al, 1999; Clarke, 2008; Protheroe, 2002).

Advocates of learning strategies encourage teachers to introduce strategy interventions to their classroom in a direct and explicit way (Bisland, 2004; Clarke, 2008; Duffy 1980; Fuchs et al, 1997). Duffy (2002) pointed out, "explicit teaching uses 'strategy' to mean a technique that readers learn to control as a means to better comprehend" (p.30). Those advocates encourage teachers to make a commitment to the teaching of strategies as necessary part of their curricula (Rubin, 1990). They argue that teaching learning strategies can help struggling learners move forward to "a better position to control their own comprehension" (Duffy 2002, p. 30).

Evidence Supporting the Benefits of Learning Strategies

A number of studies provide evidence supporting the teaching of learning strategies. The results from seven such studies are discussed in this section. One studies tracked the effects of a metacognitive strategy intervention for 1st grad students. Four other studies produced positive results from cognitive strategy interventions (one study with middle school students, two studies with high school students, and one study with ESL college students). The two other studies examined the effects of learning strategy interventions on students with learning difficulties.

Eilers and Pinkley (2006) showed that teaching metacognitive strategies improved young students' academic achievements in reading comprehension. In their study, three explicit instructions in metacognitive strategies were taught to 1st grade students. The identified strategies were "making text connections, predicting, and sequencing" (Eilers & Pinkley, 2006, p. 13). Two different scales were used to measure the participants' reading comprehension capacities: *The Index of Reading Awareness (IRA)*, and the *Beaver Development Reading Assessment (DRA)*. After the baseline scores were compared to the posttest scores, the researchers concluded

that the participants' achievements on reading comprehension were significantly increased (Eilers & Pinkley, 2006). The researchers suggest that an explicit approach of teaching metacognitive strategies is helpful for young students, particularly when the teaching is provided with cognitive strategies simultaneously.

Schlag and Ploetzner (2011) examined the effects on middle school students of the learning strategy of connecting texts with pictures. The researchers hypothesized that this learning strategies could enhance learning outcomes as the strategy involved "the processes of information selection, organization, integration, and transformation" (p 911). The participants were 133 sixth grade students (71 females & 62 males) from two different middle schools in south-west Germany. Students in the treatment group employed the strategies in their learning process while students in control group did not. The results indicated that the students in the strategy group obtained significantly higher posttest scores with moderate effect sizes than those in the control group on three predefined kinds of knowledge: factual, conceptual, and transfer knowledge (Schlag & Ploetzner, 2011).

Miri et al (2007) found that high school students showed increased scores on critical thinking skills after taking courses of higher-order thinking skills. The participants were 177 high school students. The participants were divided into three groups: an experimental group ($n = 57$), a science major group ($n = 41$), and a group of non-science majors ($n = 79$). The science major group and the non-science major groups were control groups. Only participants in the experimental were taught strategies to improve higher-order thinking skills. The results indicated that the experimental group showed statistically higher scores on critical thinking skills (e.g., truth-seeking, open-mindedness, self-confidence, and maturity) than both control groups.

The effects of learning strategies that Miri et al (2007) have documented in high school

students have also been clearly demonstrated to work for ESL students. Carrier (2003) investigated the effectiveness of a strategy intervention for listening comprehension. The participants were 7 high school students in an ESL class in the mid-western U.S. (6 Spanish speakers & 1 Albanian speaker; 3 females and 4 males; ages 14 to 17 years-old). The students were taught “strategies for developing discrete listening skills and video listening skills as well as effective note taking, an important academic skill associated with effective listening” (Carrier 2003, p. 390). After 15 sessions of the strategy instructions, the ESL students showed statistically significant increased scores from posttests in discrete word listening, comprehension from videos, and note-taking ability.

Liu et al (2010) examined the impact of computer-assisted concept mapping strategies. The intervention was provided to colleges students ($N = 194$) in Taiwan to help their English reading comprehension. The students were classified into two groups based on their English proficiency, a low group and a high group. After completing ten weeks (2 hours per week) of the strategy training, the lower group showed a significant improvement in reading comprehension tasks (Liu et al 2010).

In special education, strategy intervention is a prominent concern. Gersten et al. (2001) noted, “the percentage of students with learning disabilities has increased steadily so that these students now constitute 7% of the school age population and more than half of all children receiving special education service” (Gersten et al, 2001, p. 279). As educators grapple with the needs of this growing population, many view strategy interventions as a solution, a preventive measure to ameliorate the observed lack of the strategy use among students with learning difficulties. Greenberg (2005) stated, “[If a] learner does not receive an adequate amount of high quality mediated learning experiences, serious learning problems can result” (p. 34). When

mediators (e.g., teachers and parents) actively intervene to assist learners by teaching them effective strategies, such serious problems can prevented or alleviated.

Fuchs et al (1997) investigated the effects of teaching peer-assisted learning strategies (PALS) for high school students in remedial and special education. By pairing higher- and lower-performing students, the researchers “examined students’ beliefs about reading, about how hard they worked to improve their reading competence, and about how hard they worked with classroom peers” (p. 310). Nine classes were assigned to the experimental group and another nine classes constituted the control group. The intervention took place over 16 weeks, five times per two weeks at 10 different high schools. The results from the posttests showed that students in PALS classes developed higher levels of reading comprehension skills as well as greater level of belief in “working hard to improve reading” (Fuchs et al, 1997, p. 309).

In a study conducted by Schumaker and Deshler (2006), 11 students with learning disabilities were taught a *Word Identification Strategy* that was developed at the University of Kansas Center for Research on Learning (KU-CRL). The 9th grade students had been previously diagnosed to have reading abilities two or more grades below the 9th grade level. The results from the pretests indicated that the students in the experimental group showed a high-4th grade level while the average score in the comparison group was at a 6.1 grade level (Schumaker & Deshler (2006). After instruction in the *Word Identification Strategy*, the average score from the experimental group rose to a high- 8th grade level while the average score from the comparison group remained at a 6.3 grade level (Schumaker & Deshler (2006).

In the two studies by Fuchs et al (1997) and Schumaker and Deshler (2006), the effects of learning strategy interventions are clearly indicated. As these studies show, for students with learning difficulties, such interventions can promote the development of personal strategies that

help learners overcome their difficulties and, ultimately, to achieve independence from expert intervention.

The results from the studies mentioned above indicate that learning strategies are beneficial to diverse age groups (i.e., young learners such as 1st graders, and college students, too). Also those studies show supportive evidence that teaching interventions of learning strategies are beneficial to many subject areas such as reading comprehension, science and ESL. In addition, the advantages of interventions of learning strategies are shown from diverse cultures including Germany and Taiwan, as well as United States. Finally, the advantages of teaching learning strategies are also shown significantly from students with learning difficulties. As addressed above, learning strategy interventions can be broadly applied for learners in diverse age groups and diverse cultures as well as diverse levels of learning achievements.

So far, I have discussed evidence that confirms the positive effects of teaching learning strategies. Before jumping to the conclusion that interventions to teach learning strategies are always effective, it is important to point out other evidence suggesting that the sometimes, in certain conditions, learning strategy interventions do not have the desired effects.

When Should Learning Strategies Not Be Taught?

Although learning strategy interventions have been documented to bring significant learning benefits for many students, research evidence strongly suggests that these benefits do not accrue equally to all students. According to Garner (1990), students who already have a high level of conceptual knowledge do not exhibit “general strategic routines for acquiring concepts” since the “structure of knowledge and cognitive process interact” (p. 517). Garner (1990) provided an example as followings:

“[W]hen a student knows a great deal about insects, he does not need to read and reread a graphic display in a textbook that differentiates insects living alone from insects living communally; he already knows that living pattern is a distinguishing feature among insects, and he already categorizes insects by that feature (and others). When reading the science textbook, he does not need to look for lexical, graphic, or semantic signals of other important differences among insects, because he already knows that movement and camouflage are two more important distinctions. Use of general learning strategies in domains where background knowledge is low is compensatory. Learners who know a great deal about a domain do not need to compensate in this manner” (p.17).

Some research supports Garner’s claim. Chen and Cole (1986) taught reading strategy trainings to 72 students with and without learning disabilities, including 36 students, ages from 10 to 12 with learning disabilities and 36 eight-year-old students from regular classes. The students in both groups showed the same level of reading in baseline observations.

Participants in Chen and Cole’s study were assigned to one of four training group. In the first condition, students were asked to develop questions about their reading. In the second condition, students underlined two interesting words from the reading passages and then explained why they chose those words. In the third condition, both the self-questioning and underlining methods were introduced. In the fourth condition, students were provided more time to reread. The results indicated that among students with learning disabilities, the students who received the interventions achieved higher scores on reading comprehension tests than the students who did not. The students from the regular classes, however, did not show any training effects (Chen & Cole, 1986).

Wong and Jones (1982) found similar results. In their study, a reading comprehension self-monitoring training was provided to students diagnosed with learning disabilities. From the Vancouver school district, 60 students (44 males/16 females) were recruited from the 8th and 9th grades (mean age = 14.1) to participate in the learning disability group while a group of students without disabilities ($n = 60$, 31 males/29 females) were recruited from grade 6 (mean age = 12). The complex research design was “a 2(Groups) x 2(Training) x 2(Predictions) x 4(Test Days) factorial with repeated measures on the last variable” (Wong & Jones, 1982, p.229). Each cell of the research design included 15 students (Wong & Jones, 1982). Half of the participants from both groups received a 5-step self-questioning training to monitor their understanding of reading passages. The results showed that the intervention increased the reading comprehension scores of students in the learning disabilities experimental group, but the students in the group without disabilities who took the same training showed no statistically significant improvement, either in meta-comprehension or in comprehension performance (Wong & Jones, 1982).

Taken together, these two studies comparing students with and without learning difficulties suggest to this author that strategies interventions may be helpful only for students with learning difficulties. For students without learning difficulties, however, the interventions for teaching learning strategies may provide little beneficial impact.

To explain these findings of a “null impact” of learning strategies interventions on normally-achieving students, researchers point to the fact that high performers often exhibit learning strategies even if they have never been exposed to explicit learning strategy training (Gersten et al, 2001). Many students are able to generate effective strategies without overt instruction (Carrier, 2003). These students seem to acquire a set of learning strategies without instruction and then to be able to transfer them to various contexts (Carrier, 2003).

From this survey of previous research on learning strategies, I find compelling, supporting evidence that, under appropriate conditions, teaching learning strategies can enhance students' achievement. As the theory of learning strategies predicts, strategic learners acquire a diverse range of learning strategies, thereby becoming independent learners. Simultaneously, when learners acquire expert knowledge, they employ learning strategies automatically. Advocates of learning strategies, therefore, can find in previous research support for their belief in the value of instruction both in cognitive and metacognitive strategies.

On the other hand, as this literature review has shown, it is also important for educators to recognize that not all students need to be taught learning strategies. A set of studies indicates that at least some students can generate effective strategies independently, without explicit instructions. Learners are individuals, diverse in their cognitive levels, experiences, motivations, preferences and learning goals. Thus strategy instructions should be conducted only after careful considerations of learner differences.

Are Learning Strategies Culture Free?

Clarke (2008) stated, "Learning strategies can be used with a range of age groups and students of all abilities" (p.2). This statement does not include culture. Can the effectiveness of learning strategies be found across cultures? To answer to this question, we should revisit the fact that strategies are used to construct knowledge. To construct knowledge, individuals go through similar learning process regardless of living areas (e.g., an eastern culture vs. a western culture; South Korea vs. the United States). In another word, all expert knowledge requires a sufficient amount time for the learner to go through practices and experiences. In the process of learning, all learners exhibit certain categories of cognitive and meta-cognitive strategies.

Identifying how human beings construct knowledge is a major concern in cognitive

psychology. It is useful to briefly examine widely accepted theories addressing mechanisms of learning so as to understand why the human learning processes are similar across cultures.

Some popular theories are made based on the assumption that human beings acquire learning through genetically prepared functional mechanisms (Chomsky, 1965; Huitt, 2003). Language acquisition device theory (LAD) and universal grammar theory are examples. All human infants display common phenomenon when they acquire their first language. Infants initially babble and coo, next generate single words, thereafter develop telegraphic speech (e.g., “car gone”), and late exhibit overgeneralization (e.g., using “I goed to the bedroom” when they mean to say, “I went to the bedroom.”) (Huitt, 2003). These phenomena are universally observed whether children are exposed to an English spoken society or Korean spoken country (Chomsky, 1965; Huitt, 2003).

In Piaget’s development theory, four stages of human cognition developments are identified: sensory-motor stage (0-2 years old), preoperational stage (2-7 years old), concrete operational stage (7-11 years old), and formal operational stage (11 years old - adult) (Eggen & Kauchak, 2004). In this theory, “general patterns of thinking for children at different ages” are determined (Eggen & Kauchak, 2004, p. 40). The distinctive patterns are observed from all children across cultures. The quality of thinking changes gradually and steadily when children go through experiences in one stage that “form the foundation for movement in the next (Eggen & Kauchak, 2004, p. 40). All individuals “pass through each stage before progressing into a later one. No one skips a stage” (Eggen & Kauchak, 2004, p. 40). We observe that “older children and even adults process information in ways that are characteristic of young children if they lack experience in an area” (Eggen & Kauchak, 2004, p. 40). Adults’ using fingers for counting is an example.

Stage theories of memory, originally proposed by Atkinson and Shiffrin (1968), logically address how memories are processed, stored, and lost in human brains. According to this theory, information progresses through three stages: sensory motors, short term memory and long-term memory (Atkinson, & Shiffrin, 1968). Regarding stage theory, Huitt (2003) pointed out three general assumptions to understand the formation of memories. First, our memory capacity is limited. A gigantic stream of information from sensory motors gets stuck when it reaches out to our brain. This restriction is called bottleneck phenomenon (Huitt, 2003). Our brain filters out a big chunk of information from sensory motors. On top of that, the short term memory device cannot hold newly acquired knowledge. A major portion of newly acquired memories is forgotten.

The second general assumption says that executive functional mechanisms are required to monitor and execute encoding, transferring, storing, retrieving and utilizing memories (Huitt, 2003). In education, this mechanism is specified as learning strategies. Learning strategies are more frequently and intensively used when one needs to learn a new task, or he/she learns something in a new environment, rather than a recurring task or a task in a familiar environment (Huitt, 2003).

Third, a two-way flow of information exists to the function of knowledge. These are called bottom-up processing and top-down processing. Bottom up processing occurs when we use existing memories to process new information coming through our senses (Huitt, 2003). Simply put, this process is all about gaining new knowledge. Top-down processing takes place when we produce something of significance to our environment and make our connection to it (Huitt, 2003). Hypothesizing, theorizing, and generating creative works (such as composing music, poems, and art) are examples.

In order for a learner to accomplish some goal that is his or her own, how are learning strategies used across cultures? Important evidence comes from three published research articles. The first article is OECD (2010). This study examined predictable variables on mathematics achievements. Data were collected from 15 year-old students living in 31 OECD countries and 12 OECD Partner Countries. The results indicated that the effects of learning strategies were one of the most importantly predictable variables on mathematics achievements among “clusters of countries with similar backgrounds and school systems” (p. 130). This report also indicated that a positive correlation was observed, across countries, between the elaboration of meta-cognitive strategies and mathematics performance among high achievers.

Second, Chiu et al. (2007) investigated the effects of learning strategies on reading, science, and mathematics achievements. The specified learning strategies in this study were memorization, transfer through elaboration, and meta-cognition. The number of participants was 158,848. All participants were 15-year-old students from 34 countries. The data were obtained from a reading literacy test ($N = 158,848$), a science test ($N = 88,401$), a mathematics test ($N = 88,590$) and a questionnaire ($N = 158,848$). The results supported cross-cultural use and benefits of learning strategies. In most countries, students characterized by a high frequency use of memorization showed significantly lower scores in all three subjects. Across countries, students with a higher frequency of metacognitive strategies showed higher scores. The relation between transfer through elaboration and achievement scores did not show any relation to scores (Chiu et al, 2007).

Lastly, Purdie et al. (1996) supports the idea that strategy uses have similarities between students from a western culture and students from an eastern culture. These authors examined the differences in the uses of self-regulated learning strategies between Australian and Japanese high

school students. Their results indicated that Australian students showed rather narrower perspectives on learning than Japanese students. While Australian students viewed learning in the restrictive frame of school performance, Japanese students indicated a broader perspective as “a lifelong, experiential process leading to personal fulfillment” (Purdie et al, 1996, p. 87). Regarding the issue of the use of learning strategies, the two groups showed similar preferences. Both groups indicated that they use understanding strategy most frequently (Purdie et al, 1996).

In sum, just as human beings are viewed to be similar in knowledge construction, similar learning strategies are found across cultures. Three popular theories support these empirical findings. First, mechanisms of learning are viewed as being genetic among human beings. Supporting evidence for this can be found in the area of language developments. The development of first language acquisition displays similar patterns among all children in the world, regardless of location or language.

Second, the development of children’s thinking shows common features along with their maturation. A majority number of 10-year-old students, whether they are Americans or Koreans, may logically recognize that two objects on a balanced scale have the same weight even if one of them looks larger, an understanding not widely observed among 5-year-old children.

Finally, our brain has a limited capacity to store all sensory-based information. To store knowledge, individuals use a body of cognitive and metacognitive strategies to process information, especially for new information. Human beings construct knowledge by a top-down process while they generate creative works by bottom-up.

Three important articles have been discussed to show evidence that learning strategies are common across cultures. In OECD (2010), learning strategies were indicated as the most influential variable on mathematics achievements. Also, metacognitive strategies and math

scores showed a close relationship. According to Chiu et al. (2007), memorization strategies and low achievements were shown to be related to each other cross culturally; the relationship between meta-cognitive strategies and high achievement scores was also found in many countries. Purdie et al (1996) showed the similarities in the strategy uses among high school student between a western culture and an eastern culture.

What Instruments Exist to Assess Learners' Learning Strategies?

Among published inventories of learning strategies, the most widely known instrument is the *Learning and Study Strategies Inventory* (LASSI) developed by Weinstein, Zimmerman, and Palmer (1988). This popular learning strategy inventory is employed by 2,274 institutions as of Feb. 10, 2014 (H & H Publishing, 2014). According to Weinstein et al. (1988), LASSI was developed to serve three assessment functions: “(1) to predict academic performance, (2) to counsel students concerning their study practices, and (3) to screen or serve as a criterion measure for study skills courses” (Weinstein et al., 1988, p. 26). LASSI is designed for use with high school and college students.

Inventories of learning strategies aimed at younger students are rare (Stroud, 2006). Due to this problem, young students' learning strategies are often assessed by instruments originally designed for use with college students that have been modified for use with younger learners (Stroud & Reynolds, 2007). Stroud (2006) stated, “While research on learning strategies is abundant with college-age students, far fewer studies have been conducted with secondary students, and more scarce still are findings with elementary age students...Many times, the findings of research with college-age adults are used to make conclusions regarding the functioning of children” (p. 10).

After repeated searching for inventories of learning strategies developed specially for young students, I was able to find just two self-report inventories of learning strategies. They are the *School Motivation and Learning Strategies Inventory* (SMALSI) and the *Assessment of Classroom Communication and Study Skills* (ACCSS).

School Motivation and Learning Strategies Inventory (SMALSI)

Stroud and Reynolds published the SMALSI in 2006. The purpose of this measurement is to diagnose three things: learning strategies, motivation levels, and test-taking anxieties (Stroud, 2006). The SMALSI comes in two types: the so-called “Child Form” and “Teen Form.” The age range for the use of the Child Form is from 8 to 12 years old. The Teen Form is for students ages 13 to 18. In the Child Form, there are 147 items. In the Teen Form, 170 items are included. Both forms use a 3rd grade language level (Stroud & Reynolds, 2007).

The SMALSI is made up of two subscales: Study Strengths and Student Liabilities (Stroud & Reynolds, 2007). The category of “Student Strengths” is comprised of six components: *Study Strategies*, *Note-Taking/Listening*, *Writing/Research Skills*, *Test-Taking Strategies*, *Organizational Techniques* and *Time Management*, and the category of “Student Liability” includes three components: *Low Academic Motivation*, *Test Anxiety*, and *Concentration/Attention Difficulties* (Stroud & Reynolds, 2007). In the Child Form of this instrument, the components of *Time Management* and *Organizational Techniques* are combined to form the category of *Management/Organizational Techniques* (Stroud & Reynolds, 2007).

The SMALSI uses a self-report method of the measurement and requires 20-30 minutes to complete. The response options utilize a 4-point Likert scale; (N) *Never*, (S) *Sometimes*, (O) *Often*, and (A) *Almost always*. Test assistants are allowed to read items aloud to students with reading difficulties. For students whose reading level is below 3rd grade, additional test-taking

time is permitted. The test can be administered individually or in groups (Stroud & Reynolds, 2007).

Standardized test norms. The items on the SMALSI were examined by standardized test norms. For the Child Form, data from 1,821 children were analyzed (51% females vs. 49% males) (Stroud & Reynolds, 2007).

For the Teen Form, data from 1,100 students were collected (ages of 13-18, 54% female vs. 46% male). The number of participants in each age group and at each grade level ranged from 109 to 558. The participants were recruited from public schools in the Northeast, Midwest, West, and Southern regions of the U.S. (Stroud & Reynolds, 2007). More detailed information is presented in Table 4. The normative data were normally distributed (Wright, 2010).

Table 4

The Participants for SMALSI Standardization

The Child Form		The Teen Form	
Number of participants	1, 821 894 males, 916 female	Number of participants	1,100 488 males, 598 females
Ages: 8 - 12	Age 8: 8% Age 9: 23% Age 10: 29% Age 11: 25% Age 12: 15%	Ages: 13 - 18	Age 13: 13% Age 14: 18% Age 15: 18% Age 16: 23% Age 17: 18% Age 18: 10%
Ethnicity	White: 48% Black: 29% Latino: 8% Asian: 3% Native American: 5% Other: 5% Non-responders: 2%	Ethnicity	White: 41% Black: 26% Latino: 15% Asian: 2% Native American: 8% Other: 4% Non-responders: 4%
Grade	Grade 3: 21% Grade 4: 28% Grade 5: 31% Grade 6: 14% Grade 7: 6%	Grade	Grade 7: 10% Grade 8: 11% Grade 9: 17% Grade 10: 26% Grade 11: 15% Grade 12: 21%

Date information is obtained from Wright, 2010

Reliability. A reliability analysis was conducted to estimate internal-consistency reliability. The coefficient alphas of the 9 components for the Child Form ranged from .69 to .89 (Median = .79) (Novak, 2010; Wright, 2010). The coefficient alphas for the Teen Form ranged from .77 to .91 (Median = .83), indicating a slightly higher internal consistency than the Child Form (Novak, 2010; Wright, 2010). The estimates of the coefficient alphas for each component are shown in Table 5. Overall, the estimates showed the assessment's reliability to be acceptable (Novak, 2010).

Table 5

The Coefficient Alphas of Each Component on the SMALSI

	The Child Form	The Teen Form
Study Skills	.77	.86
Note-Taking Skills/Listening Skills	.81	.86
Reading / Comprehension Skills	.79	.82
Writing/Research Skills	.69	.77
Test-Taking Strategies	.76	.84
Organizational Techniques	Not relevant	.79
Time Management	.77	.81
Low Academic Motivation	.83	.83
Test Anxiety	.89	.91
Concentration/Attention Difficulties	.85	.88

Validity. Differential-group performance was examined by means of *t*-tests. From the *t*-tests, group differences in ages, grade levels, and gender were examined. Also, data for two additional categories of students - those from gifted and talented (GT) programs and from academic development programs (AD) were compared with the normative data (Wright, 2010).

The *t*-test produced non-significant results for the scores by *age* and the scores by *grade*. Female students' scores were shown to be significantly higher, on average, than male students' score on all components except the subcategory of Student Strengths on the Teen Form. On the Child form, male students' scores were shown to be significantly higher, on average, on *Study*

Skills, Reading/comprehension skills, and Time Management. Also males showed significantly higher scores, on average, on *Low Academic Motivation and Concentration/Attention Difficulties* while female scores showed significantly higher scores, on average, on *Test Anxiety* (Wright, 2010).

In the *t*-test for the comparison of the GT group and the normative group, the GT group had significantly higher mean scores. For these analyses, 23 samples of GT students' scores were examined for the Child Form and 33 for the Teen Form. The differences were observed across all sub-scales on both forms (Wright, 2010).

Finally, the AD school group showed significantly higher scores, on average, than students in the no-special intervention group. For these analyses, 32 samples were examined for the Child Form. The differences were observed in five out of six components of the Student Strengths assessment and in all three components of the Student Liabilities assessment (Wright, 2010).

To assess concurrent and construct validity, the correlation between SMALSI scores and personality-related behavior, school adjustment, and academic competence variables were computed (Wright, 2010). For those variables, the scores from the *Behavior Assessment System for Children* (BASC) and *Self-Report of Personality-Child* (SRP-C; 17:21) were used for comparison with the Child Form, and the scores from the BASC and *Self-Report of Personality-Adolescent* (SRP-A; 17:21) were used for comparison with the Teen Form. For the variable of student academic achievements, the scores of *Texas Assessment of Knowledge and Skills* (TAKS; Texas Education Agency, 2004) were used. The sample size was 23 for the Child Form and 24 for the Teen Form, respectively (Wright, 2010).

The results of the analysis showed that *student maladjustment* and *Student Strengths* were negatively correlated, while *student maladjustments* and *Student Liabilities* were positively correlated (Wright, 2010). The relationship between student achievement and Student Strengths indicated low to moderate coefficients (Wright, 2012). The scores on *Test Skills*, *Low Academic Motivation* and *Text Anxiety* averaged higher in Teen Form than in the Child Form. Based on the conceptually and psychometrically sound results from the data analysis, the reviewers expressed confidence that the SMALSI was a dependable measurement to identify learning strategies for school-aged students (Novak, 2010; Wright, 2010).

Standardized norm tests for a translated version. The SMALSI has been published in three other languages: Danish, Japanese, and Romanian (WSP Unlocking Potential, 2014). To determine whether any of the translated versions of the SMALSI had been analyzed to assess its validity and reliability, I carried out an extensive internet search. However, no academic journal articles related to the topic were found. Thus, a tentative conclusion can be drawn that the SMALSI has not yet been subjected to standardized norm tests in other languages. To be certain about this tentative claim, additional research should be conducted.

Critics on SMALSI. The advantage of SMALSI is that the instrument is supported by sound validity and reliability evidence. Internal consistency tests show appropriate reliability levels across test components both in the Child Form and the Teen Form. In addition, the instrument has been shown to have validity as a means of differentiating groups of lower and higher achievers.

On the other hand, the administration of the SMALSI instrument seems very arduous. Considering that the Child Form is intended to be administered to children ages 8 to 12, the number items (147 items) seems extremely large, and the number of items on the Teen Form is

even higher, at 170. The authors define the administration time as 20 to 30 minutes, which seems unrealistic. Simply stated, the number of items and the administration time does not seem appropriate for such young students.

Thus, while the SMALSI is comprehensive, it does not constitute a practical tool for assessing young students' learning strategies because it does not take into account the constraints on young students' attention spans. That leaves educators with just one other option for assessing learning strategies in young students: Charlann S. Simon's *Assessment of Classroom Communication and Study Skills* (ACCSS), published in 2000.

The Assessment of Classroom Communication and Study Skills (ACCSS)

The ACCSS was developed by Simon (2000) for use with students in grades 5 to 12. The major purpose of the ACCSS is to diagnose students with special needs to assess deficiencies in language, and study skills and habits. Based on students' responses to the assessment items, the instrument produces a Descriptive Summary organized according to the following categories: a) Cognition and Comprehension, (b) Language Analysis and Expression, and (c) Study Skills and Habits (Hancock, 2007). As a follow-up, instructional suggestions are also provided (Hancock, 2007).

The ACCSS comes in three forms: the Long Form, the Short Form, and the form for ELL-students. The Long Form is for students in grades 5 to 8. The Short Form is for students who have learning difficulties (grades 5-12). The ELL form is for high school students learning English as a second language. In addition to the scaled items, the assessment also includes an observational checklist. Although the assessment can be administered individually, a group administration is encouraged (Hancock, 2007).

Translated versions of the ACCSS. There is no evidence that any translated version of the ACCSS exists. The target population for the use of the instrument is all English speakers. Consequently, the items use English-exclusive grammar, vocabulary, phrasing and content, as well as Western cultural contexts, to diagnose language skills. Conducting validity and reliability tests for a translated version clearly would appear to present serious complexities. For an example, item number 7 on the ACCSS (Long Form) is presented as:

7. Word Group. Draw a line through the word that doesn't belong.
mat sat get rat cat

To solve the problem, students must be able to distinguish rhymes from each word. The examples of “mat,” “sat,” “rat” and “cat” end with “-at” while the word “get” is constructed with “-ed.” When item 7 is translated into Korean, the same question appears thus:

7. 단어 그룹. 다음 중에서 다른 단어 하나를 골라 그 단어 위에 선을 그으세요.
매트 샷샷다 얻다 쥐 고양이

The systematic word patterns shown from the four words in English are completely irrelevant to the translated version in Korean. Similar issues arise with all the items on the ACCSS. Therefore, the ACCSS does not seem appropriate for the development of translated versions in other languages.

Problems with the Standardized Norm Testing on ACCSS. No direct reference to reliability and validity tests is reported anywhere in the ACCSS manual (Hancock, 2007; Krach,

2007). Thus no information relevant to reliability can be provided (Hancock, 2007; Krach, 2007). In the manual, detailed information about the method of the administration and logistics for items and supporting literature reviews were explained. From the information, the ACCSS could achieve some levels of construct validity and content validity (Hancock, 2007). Compared with standardized statistical norms, the validity of the ACCSS appears to be weak (Hancock, 2007). An item difficulty analysis was conducted from the data with 500 students in grade 5 and 6 in Phoenix, AZ (Hancock, 2007; Krach, 2007). The results, however, were not analyzed based on a statistically sound approach since item difficulty values and the index from factor analysis appears to have included incorrectness (Hancock, 2007). Demographic information and overall statistical data were also limited (Hancock, 2007). The manual does not provide any evidence for item refinements from pilot testing (Hancock, 2007). Specifically, Krach (2007) pointed out that the results of the item difficulty analysis from the Phoenix data did not reflect the selection of the ACCSS items.

Concurrent validity was indicated. Students who performed poorly on the ACCSS (below 70 % correct) also had lower scores on the *Iowa Test of Basic Skills* (below 40th percentile) (Hancock, 2007; Krach, 2007). The manual also pointed out that students in ELL had lower scores than non-ELL students (Hancock, 2007). These assertions, however, were not supported by statistical details. The reviewers indicated that the ACCSS might work best when the assessment is used with other psychometrically rigorous assessments and teacher observations to make diagnostic decisions (Krach, 2007).

To summarize, while the ACCSS is strong in content, construct validity, and concurrent validity, and while the methods for administration and layout of items appear to be appropriate,

the ACCSS is not sufficiently supported by statistical analysis and technical methods for validation to serve as a reliable tool for assessing learning strategies in young students.

Conclusions

This chapter has addressed four questions: (a) “What are learning strategies?” (b) “Is a teacher better able to help students if he/she knows about learning strategies?” (c) “Are leaning strategies are culture-free?” and, (d) “What instruments exist to assess learners’ learning strategies?”

In addressing the first of these questions, I presented the definitions of learning strategies, the elements of learning strategies, and the origin of learning strategies, followed by distinctions among the terms of learning strategies, cognitive strategies and learning styles. This information provides a conceptual framework to guide decision-making about what items should be included and excluded in the development of an instrument to assess young students’ learning strategies. Through this review of the literature, four categories of learning strategies - cognitive, metacognitive, resource management, and affective - were identified as the framework upon which the instrument could be constructed.

In the discussion of the second question (“Is a teacher better able to help students if he/she knows about learning strategies?”), I addressed the advantages of learning strategies. Two essential advantages were identified. First, learners become independent by acquiring and practicing effective learning strategies. Independent learners are proactive, regulated, and joyful in their learning. In addition, learning strategies facilitate learning-maintenance and transfer effects. These two effects are powerful because the quality of students’ academic achievements depends on the mechanisms of maintenance and transfer effects.

Learning strategies help novice learners become more expert learners. Researchers have observed that learning-strategy-instruction can be an effective intervention to bridge gaps in learning for second language acquisition and for struggling learners - a way of transforming novice learners into expert learners. Students who are already expert learners, on the other hand, have been found to have a wide repertoire of learning strategies already and to execute the sequential activities of learning strategies automatically.

I addressed the third question (“Are learning strategies culture free?”) by examining the concept of learning strategies in the context of three influential cognitive theories: universal grammar theory, Piagetian developmental stage theory, and information processing theory. Those theories support the existence of a cross-cultural human learning mechanism, with knowledge constructs shaped by a sufficient amount time and experiences.

Supporting evidence of the cross-cultural effects on learning strategies has also been observed. OECD (2010), for example, found that learning strategies were indicated as the most influential variable on mathematics achievements. The study finding is significant regarding the facts that the size of data was enormous ($N = 158,848$) and that the study’s participants, all 15 years old, came from 34 different countries. Chiu et al (2007) provided empirical support for a theoretically-based hierarchy of learning strategies. Low function of memorization strategies correlated with low achievements while meta-cognitive strategies correlated with high achievement scores,

In the final section, I dealt with a measurement relation question (“What instruments exist to assess learners’ learning strategies?”). I discussed two instruments of learning strategies for young learners: *The School Motivation and Learning Strategy Inventory* (SMALSI) and *The Assessment of Classroom Communication and Study Skills* (ACCSS).

The ACCSS is observed to have some points of validity but lacks statistical standardized norms. The SMALSI, on the other hand, shows sound evidence of validity and reliability, with appropriate levels of internal consistency from all test components. The statistically significant differences between groups indicate that it can measure students' learning strategies. However, the SMALSI includes a painfully large number of survey items, limiting its practicality for use with young students.

In sum, there remains a need for an effective, practical, valid and statistically reliable instrument to assess learning strategies in elementary schools students. Thus, this study, which aims at developing exactly such an instrument, will provide benefits to wide range of individuals including young learners, their teachers and parents, as well as researchers and educational administrators.

CHAPTER 3

METHODOLOGY

The purpose of this proposed project was to develop an instrument for assessing elementary school students' uses of learning strategies and to conduct an initial test to assess that instrument's psychometric characteristics. This chapter addresses how specific items were developed for the instrument, how data were collected, and finally, how the data were analyzed. This last section begins with a description of the procedures for data entry and data cleaning, and addresses the detailed procedures that were used to conduct an exploratory factor analysis followed by an investigation of group differences.

Item Development

In developing the items for this instrument, I consulted a broad range of literature and other existing instruments for assessing learning strategies in other kinds of learners, (e.g., Duncan & McKeachie, 2005; O'Malley & Chamot, 1990; Oxford, 1989; Lio, 2009; McKeachie, 1987; Pintrich et al., 1993; Stroud, 2006; Zimmerman & Martinez-Pons, 1990). Three principles guided my decision-making process about what kinds of items needed to be included in my own instrument for elementary school students.

First, because this instrument was intended to be a comprehensive device to assess the uses of learning strategies, I determined that the items in the scale should reflect a broad range of learning strategies. Although the constructions and the ways of classifying learning strategies vary in the pre-existing instruments consulted for this study, all these instruments tend to cover four schemes: cognitive strategies, metacognitive strategies, resource management strategies, and motivation/affective learning strategies (Gu, 2012; Duncan & McKeachie, 2005; O'Malley & Chamot, 1990; Oxford, 1989; Lio, 2009; Pintrich et al., 1993; Zimmerman & Pons, 1990). The

instrument developed for this study likewise includes items that fit into the four major kinds of learning strategies.

Table 6

Categories/Subcategories of Items & definitions of Each Subcategory

Main categories	Subcategories & strategy definition
Cognitive strategies (O'Malley & Chamot, 1990; Oxford, 1989; Weinstein et al, 2002; Zimmerman & Pons, 1990)	Resourcing: Employing reference tools Rehearsing: Using strategies to facilitate memorization. Note-taking: recording critical ideas by oral, visual, or numerical means Elaborating: Using existing knowledge to make sense of new things Deducting/inducting: Finding patterns and using rules to grasp new ideas or complete new tasks Imaging: Creating visual schemas to grasp new information or solve problems Inference: Using context clues to guess unknown words or predict the next steps in a narrative or process.
Metacognitive strategies (Duncan & McKeachie, 2005; O'Malley & Chamot, 1990; Oxford, 1989)	Planning: Thinking through how to accomplish learning tasks; Dividing a task or problem into parts and ordering them to take control Monitoring: Questioning and confirming one's comprehension of a spoken or written text. Regulating: Finding or creating conditions that facilitate learning
Resource management strategies (Duncan & McKeachie, 2005)	Time management: Creating routine, regular and productive ways of using time Organizing: Arranging and controlling one's learning resources and reference tools in a productive way
Motivation/Affective learning strategies (O'Malley & Chamot, 1990; Oxford, 1989; Weinstein et al., 2002).	Motivation Intrinsic: Engaging in learning and practice for their own sake, for enjoyment, knowledge or a sense of accomplishment. Extrinsic: Engaging in learning and practice to earn rewards or to escape punishment Self-efficacy: Trusting in one's own ability to perform assigned tasks and to achieve learning goals Test anxiety: Worrying (or not) about tests

The second principle guiding the development of items for this instrument was that the items should correspond to the theoretical frameworks that undergird learning strategy inventories. To meet this criterion, I specified subcategories under the four major constructions (e.g., cognitive strategies, metacognitive strategies, resource management strategies and motivation/affective strategies), and defined each concept in each subcategory (Table 6).

To define the subcategories show in Table 6, I examined a variety of learning strategy taxonomies, synthesizing ideas particularly from Duncan and McKeachie (2005), O'Malley and Chamot, (1990), Oxford (1989), Lio (2009), Weinstein et al. (2002), and Zimmerman and Pons (1990). The classifications identified in Table 6 proved to be very useful for determining which items to include and exclude as I worked through repetitive cycles of drafting, organization, refinement, deletion, and reorganization required developing the contents of the instrument.

A final principle guiding the development of items for this instrument concerned the age of the children for whom it was intended: the items needed to be framed in a context appropriate for young children. To this end, the items were all formulated in terms of the contexts related to a young person's classroom, school, and home. Additionally, the survey was designed with a simple and clear structure so that young children could easily understand it, with easy wording, short sentences, and clear directions. Items were mostly phrased positively to minimize ambiguity. Negatively phrased items were placed in the later sections, and double-barreled items³ were strictly ruled out. The rating examples were created to have consistency, balanced weights, and continuous ranges.

³ A double barreled item ask "a question that touches upon more than one issue, yet allows only for one response" (Babbie & Benaquisto, 2009, p. 251)

Based on these three principles, the items of the *Scale of Learning Strategies for Upper Elementary School Students* (SLSUESS) was designed with 16 items addressing demographic characteristics and 74 items addressing learning strategies (Appendix D).

Part I Demographic Questions

In this part of the new survey, 16 demographic questions were included. The demographic questions were designed to understand the study's participants. The first four items were used to identify *gender, grade, birth order, and year of birth*. The next four questions asked students to self-report their academic achievements in four subjects: math, Korean, English, and science. The next set of four questions was designed to identify respondents' motivation levels in those same four subjects. Questions dealing with overall academic achievement, economic status, and parents' education came last.

Part II Learning Strategies

The 74 items in Part II were designed to measure upper elementary school students' use of learning strategies. The items addressed the four categories discussed above: cognitive learning strategies, metacognitive learning strategies, resource management learning strategies, and motivation/affective strategies.

Participants responded to items using a 4-point Likert scale based on "frequency." The number 1 represented "Almost never"; the number 2, "Rarely"; the number 3, "Usually"; and the number 4, "Almost always." Participants were instructed to choose, for any given item, only one number on the 4-point scale. Item categorization is presented in Table 7.

Table 7

Categories of Items and Item Examples

Categories	Subcategories	Item numbers	Item examples
Cognitive learning strategies (N = 17)	Rehearsing	1, 3	Reviewing notes
	Note-taking	4, 16	Taking notes during class
	Elaborating	2, 11	Reviewing chapter problems
	Imaging	5, 6	Looking over tables
	Differencing	7, 8	Reading titles and subtitles
	Deducting/inducting	14, 15	Making test prep questions for myself
	Resourcing	9, 10, 12, 13, 17	Asking if I don't understand
Metacognitive learning strategies (N = 19)	Monitoring	18, 19, 20	Listening well when the teacher is speaking
	Planning	21, 22, 23, 24	Preparing well for a test
	Regulating	25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	Trying hard even in classes that I don't like
Resource management learning strategies (N = 16)	Organizing	37, 38, 39, 40, 41, 42, 43	Making sure my desk area is neat
	Time management	44, 45, 46, 47, 48, 49, 50, 51, 52	Setting aside time to study
Motivation/Affective domain of learning strategies (N = 22)	Motivation		
	Intrinsic	53, 54, 55, 56, 57	Like to read books
	Extrinsic		Studying hard to please my parents
	Negative	58, 59, 60, 61, 62, 63, 64	Don't want to go to school
	Self-efficacy	65, 66, 67, 68, 69, 70	Learn faster than others
	Test anxiety	71, 72, 73, 74	Feel nervous when taking a test

Of the total number of 74 items, the first 17 items dealt with students' uses of cognitive learning strategies. The next nineteen items (18 - 37) were aimed at student uses of metacognitive learning strategies regarding monitoring, planning, and regulating. The 16 items in positions 37- 52 were focused on resource management learning strategies, such as organizing and time management skills. The last 22 items (53 - 74) targeted motivation/affective learning strategies, i.e. motivation, self-efficacy and test anxiety. Motivation itself was divided into three subscales: intrinsic motivation, extrinsic motivation and negative motivation.

The Process of Data Collection

Participants

The participants of this study were 4th, 5th and 6th graders at an elementary school in Busan, South Korea. According to information available on the school's website (as of March 1, 2014), three hundred ninety four eligible students were enrolled at this school. As the total number of actual participants was 376, the response rate reached 94%. The number of male students was 196 (52.1 %) and the number of female students was 180 (47.9 %). In terms of the participants' grade levels, 117 students were in 4th grade (31.1 %), 132 students were in 5th grade (35.1 %), and 127 students were in 6th grade (33.8 %).

Procedures of Data Collection

This study's data came from a convenience sample since the data collection was conducted only at a school whose principal had agreed to the planned data collection. Although a convenience sample is known to be less valid than a random sample when making generalizations, the adequate size of sample ($N = 376$) can reduce the problems associated with convenience samples.

This study's data collection procedures began with the identification of a willing "research assistant." The identification of the research assistant had already been arranged via phone calls and email correspondence. This initial step in the data collection plan was completed last January. All documents associated with the data collection phase of this study such as survey questionnaires (Korean version), the assent form (for students) and the survey's instructions for administration (for teachers) was sent as email attachments to the research assistant following the acquisition of IRB approval.

A letter requesting permission was sent for the school's principal in early April. This step in the permission-acquisition process was taken after the research assistant met with the principal to explain the survey's purpose and procedures. In that meeting, the principal told the research assistant that the study's data collection could be undertaken at his school. After that, a formal letter of permission was sent to the principal via email. Finally, written permission from the principal was obtained on April 16, 2014.

Upon IRB approval, the research assistant hosted a brief workshop for teachers in the target school's 4th, 5th and 6th grades. During this workshop, the teachers were given detailed information on two things: (a) why the study was important, and (b) how the teachers should administer the survey. Also, and of no small importance, teachers were told that student participation should be voluntary, that they could omit questions if they did not want to answer, and they could cease to participate at any time without penalty.

When the students finished the survey questionnaire, they returned the completed questionnaire to their teacher. The collected data from each homeroom teacher were then sent to the research assistant.

After the workshop, the survey questionnaire, the administration instructions, and the assent form were distributed to the teachers through a computer communication tool used regularly at the school. The teachers then administered the survey at a convenient time, for example, during a break or in an independent study period. Teachers were able to administer the surveys at any point during a three-week window for data collection. This period ended at the end of May. The survey was administered as a paper-and-pencil instrument. It took students approximately 15 to 20 minutes to complete the survey. After collecting all the completed

surveys, the research assistant sent the original “hard-copy” versions of the surveys to me via air mail.

Ethical Considerations

The IRB was approved on May 13, 2014 (IRB # 9508 B). Before the survey was administered, the participants’ rights were explained both orally and in a written assent form (Appendix B). The homeroom teachers informed the students that their participation was voluntary, that they could omit questions if they did not want to answer, and they could cease to participate at any time without penalty. Consent from participants’ parents was not required for the process of IRB approval since consent is not necessary for survey participation in South Korea.

Data Analysis

Data Entry

Data collected via the surveys were entered into SPSS, a statistical computer software program. The first step of data entry was to define the variables’ names and properties. Because all the data came from multiple-choice questions, responses were coded as numeric variables. The width of variables, decimal numbers, and labels of variables were determined during this process.

The next step was labeling. All data from Part II of the survey were labeled, with values assigned according to the frequency-codes explained previously (“Almost never” to “Almost always”). For the response “Almost never,” the value of 1 was assigned; for the response “Rarely,” the value was 2; for the response “Usually,” the value was 3; and for the response “Almost always,” a value 4 was assigned.

During the process of labeling, data from negatively questioned items (e.g., item 30: “Not pay attention in class”) was coded with the values in reverse order. For example, the response of “Almost never” was coded with the value of 4, and the response “Almost always” was coded with the value of 1. The total number of negatively questioned items was twenty-one (Table 8). After the data were entered, they were cleaned.

Table 8

Negatively Questioned Items

30 Not pay attention in class	50 Spend too much time on computer
31 Walk around during class	51 Spend too much time on studying
32 Daydream in class	52 Be late to class
33 Put off homework until the last minute	62 Don't want to go to school
34 Miss homework	63 Want to quit school
35 Put off homework if I do not know the answer	64 Think school isn't important in my life
36 Think about what to do after school during class	70 Feel studying becomes harder as grade level progresses
42 Forget to bring something to school	71 Forget things because of test anxiety
43 Forget to bring something home from school	72 Feel nervous when taking a test
49 Spend too much time watching TV	73 Have test anxiety days before the test
	74 Feel sick before an important test

Data Cleaning

The specifics of data cleaning included the detection of coding errors, the identification of outliers, the treatment of missing data, and examinations of normality. Frequency tables were run to detect coding errors and missing values. The frequency tables showed no coding errors or missing value. Outliers were then examined, by converting the raw scores of the data set to z-scores. The computation revealed that there was no z-score in the data set either higher than 2.5 or low than -2.5. Therefore the data set did not need outlier adjustments.

After checks were made for coding errors, missing values, and outliers, the normality of the variables in the data set was examined. First, descriptive statistics were applied to the 16

demographic variables. The range of skewness values extended from - 0.65 to 0.18, indicating small amounts of skewness.

Kurtosis indicated that the three variables of *gender*, *grade*, and *year of birth* showed values higher than -2, meaning that the data on these variables tended to be flat. That was because the subgroups of the variables (e.g., male vs. females; 4th, 5th, and 6th grade; born in 2002, 2003, and 2004) showed almost equally distributed. Thus, the negative kurtosis for those variables should not be a problem. For the variables, *father's education* (kurtosis = -1.27) and *mother's education* (kurtosis = -1.27), the kurtosis were relatively high. A histogram showed that the two variables had two peaks (In *father's education*, “graduated from college/university” ($N = 168$), “I don’t know” ($N = 123$); in *mother's education*, “graduated from college/university” ($N = 174$), “I don’t know” ($N = 128$)). In father’s education, the selected response of “a middle school or under” was so small ($N=1$) that it was merged with the “high school” group.

For the 74 variables of learning strategies, normality tests were not necessary because the variables needed to be analyzed by principal component analyses (PCA), which is “the most frequently used factor extraction method” (Thompson, 2004, p. 36). To conduct PCA, normality assumptions are not required, especially if the purpose of the analysis is data reduction or exploration (Jolliffe, 2005). When coding errors, missing values, outliers, and normality tests were completed, the data were considered ready to be analyzed by principal component analyses (PCA).

Principal Component Analyses (PCA)

The data were analyzed by principal component analyses (PCA). PCA is generally regarded as the most appropriate data analysis method when the purpose of research is to “reduce the number of items to a smaller number of representative components” (Beavers et al, 2013, p.

6). The PCA followed the guidelines established by Beavers et al. (2013), Costello & Osborne (2011), and Tabachnick & Fidell (2007), as described below.

Prior to PCA, the data were checked to determine “data appropriateness” for PCA. The primary condition for factorability is that the variables should be highly correlated (Tabachnick and Fidell, 2007). More specifically, at least some correlation coefficients should be greater than 0.3 (Tabachnick and Fidell, 2007). In this study, following these guidelines, the item correlation matrix was examined to confirm the correlations of each pair of 74 items in the learning strategies survey.

Second, sample size should be adequate. According to Thompson (2004), the necessary sample size for an exploratory factor analysis can be determined by calculating the ratio of the number of people to the number of measured variables. Gorsuch (1983) suggests that “an adequate minimum ratio is five individuals to every variable, but not less than a hundred individuals for any analysis” (p. 332). As the number of the respondents was 376, an adequate sample size was obtained.

Finally, a careful PCA requires communalities of .3 or greater (Tabachnick & Fidell, 2007). Moreover, Bartlett’s test of sphericity should also be significant (Tabachnick & Fidell, 2007). To interpret KMO, the following guideline have been suggested: If KMO is greater than .90, the factorability is “marvelous”; if KMO is between .80 and .89, the factorability is “meritorious”; if KMO is between .70 and .79, the factorability is “middling”; if KMO is between .60 and .69, the factorability is “mediocre”; if KMO is between .50 and .59, the factorability is “miserable”; if KMO is between .00 and .49, “don’t factor” (Kaiser, 1974, p. 36). The three rules, communalities of .3 or greater, KMO index, and Bartlett’s test of sphericity, were applied to determine if the data set met the conditions for factorability for PCA.

Once factor adequacy is confirmed, the number of factors (components in PCA) must be decided. The factors extracted need to explain at least 50% of the total variance (Beavers et al, 2013). In this study, Guttman-Kaiser rule⁴, Cattell's scree plot, and *total variances explained* matrix were applied to determine the number of factors (Beavers et al, 2013, Costello & Osborne, 2011, Tibachnick & Fidell 2007).

According to Costello and Osborne (2011), the Guttman-Kaiser rule tends to produce too many factors. Cattell's scree plot tests are the best alternative method when the majority of factors indicate that the eigenvalues are greater than one (Costello & Osborne, 2011). A scree plot illustrates a distinctive break point between the sharp slope of the initial factors and the smoothly declined sequential factors. The suggested number of factors from the scree plot is the number of sharply sloped points, not including the break point toward smooth sequential factors (Costello & Osborne, 2011). The authors also recommended looking below and above the numbers of factors illustrated on the scree plot and comparing all solutions to decide the one that is clearest (Costello & Osborne, 2011). For this study, all three guidelines were applied to decide the number of factors.

The next step is to determine the appropriate factor rotation. Orthogonal and oblique rotations are the two major types of factor rotation (Beavers et al, 2013; Tibachnick & Fidell, 2007). Orthogonal rotations are favored when factors are not correlated (Tibachnick & Fidell 2007). For this study, an oblique rotation was performed to check factor correlations and thereby determine factor rotation. The factors were highly correlated. Thus, the data were analyzed by an oblique factor rotation method.

⁴ Often it refers to the eigenvalues-greater-than-1 rule. The number of factors is decided by the number of factors whose eigenvalues are greater than 1 (Tibachnick & Fidell 2007).

Finally, item refinement must be carried out. This process is performed by removing problematic or weak items from the original data set. In this study, the gridlines determining which items should be removed were adopted from the literature as follows:

- Low loading items⁵ should be removed. The cut-off point of low loadings is 0.32 (Tibachnick & Fidell, 2007).
- Cross-loading items should be removed. Cross-loading items mean that items are loaded on two or more factors. Cross-loading items should be removed “if the cross-loading is greater than 0.40” (Beavers et al, 2013).
- Each component should be constructed to contain at least 3 items (Beavers et al, 2013). If a component includes fewer than 3 items, the component is generally assumed not to be sufficiently robust or stable (Beavers et al, 2013; Costello & Osborne, 2011).

After the item refinements were finished, the final solution could be obtained. To test for reliability, Cronbach’s alpha internal consistency tests were estimated for the total set of newly established items and for each subset of components. Once the reliability coefficients were obtained, and the new scale and subscales (i.e., components in PCA) were found to be reliable, the data were analyzed to examine group differences.

Independent *t*-tests & ANOVAs

To examine group differences between two groups (e.g., males and females), independent *t*-tests were conducted. To identify group differences among three or more groups (e.g., the three grade levels), analyses of variance (ANOVA) were performed. Prior to conducting any of these inferential tests, relevant assumptions (e.g., equal population variances) were checked. When the

⁵ Low loading items mean that items are not highly correlated to any of the factors (Beavers et al, 2013).

significance of the group differences was interpreted, Bonferroni adjustments were calculated to minimize the chance of Type 1 errors.

CHAPTER 4

RESULTS

The purpose of this study was to develop a new instrument to assess learning strategies of upper elementary school students. *The Scale of Learning Strategies for Upper Elementary School Students* (SLSUESS), based on a self-report method, was created for this purpose. The SLSUESS was composed of two parts: 16 demographic questions and 74 items related to learning strategies.

The data were analyzed to discern the degree of dependability of the scale as a measure of the uses of learning strategies among elementary school students. For this purpose, the SLSUESS survey was administered to 376 elementary school students. The 74 items related to learning strategies were then analyzed to identify their underlying constructions (i.e., factors or components). After the underlying constructions were identified, the reliability of the refined items was evaluated.

The data analysis process combined a sequence of statistical standards and techniques. The analyses conducted in this process included initial tests, principal component analyses (PCA), and group difference analyses (i.e., an independent *t*-test and one-way ANOVA). The initial data analyses also included descriptive statistics, frequency examinations, coding error detections, outlier examinations, data cleaning, and normality testing. The details of the methods and processes used in the initial tests have already been described in Chapter 3; no further discussion of the initial analyses is included in this chapter.

This chapter centers on the results of the main analyses, including the PCA and group difference tests, from which conclusions could be drawn regarding the research hypotheses delineated in Chapter 1:

Research hypotheses:

1. Male students' uses of learning strategies are different from those of female students.
2. Older students (upper graders) exhibit higher levels of learning strategy use than younger students (lower graders).
3. Students who are the first child or only child in their families exhibit higher levels of learning strategy use than children whose birth-order is second, third or higher.
4. High achievers exhibit the use of more effective learning strategies than low achievers.
5. Motivated learners exhibit the use of more effective learning strategies than less motivated learners.
6. Students living in wealthy environments exhibit the use of more effective learning strategies than those who do not live in wealthy environments.
7. Students whose parents are highly educated exhibit the use of more effective learning strategies than those whose parents are not highly educated.

This chapter begins with a description of the survey respondents' demographic characteristics, drawn from the information provided in responses to the 16 demographic questions on the survey. Next, the results of the principal component analyses (PCA) are presented, specifically the data adequacy tests, the principal component analysis, and the reliability estimations. Third, the results of group difference tests are presented. For these tests, the dependent variables are the scores from subscales (or components) defined by the PCA. Finally, the results are used to draw conclusions for each of the hypotheses posed in this study.

Participants

The data were collected from students attending an elementary school in Busan, South Korea. The school is located in a wealthy district in the city. All the participants were in the upper levels of elementary school (i.e. the 4th 5th and 6th grades). The participant rate was 94 %.

The first four demographic questions on the survey addressed the *gender*, *grade*, *year of birth* and *birth order* of the participants. The total number of participants was 376 { $N(\text{female}) = 180$, $N(\text{Male}) = 196$ }. The number of participants in 4th grade was 117 (31.1 %); the number of participants in 5th grade was 132 (35.1 %); the number of participants in 6th grade was 127 (33.8 %).

Table 9

Gender, Grade, Birth Year & Birth Order (N = 376)

		Frequency	Percent	Cumulative percent
Gender	Female	180	47.9	47.9
	Male	196	52.1	100.0
Grade	4th grade	117	31.1	31.1
	5th grade	132	35.1	66.2
	6th grade	127	33.8	100.0
Year of Birth	2002	124	33.0	33.0
	2003	134	35.6	68.6
	2004	117	31.1	99.7
	2005	1	.3	100.0
Birth order	Only child	56	14.9	14.9
	Fist child	130	34.6	49.5
	Second child	164	43.6	93.1
	Third child	24	6.4	99.5
	Other	2	.5	100.0

The participants' birth years were identified as 2002 ($N = 124$, 33.0 %), 2003 ($N = 134$, 35.6 %), 2004 ($N = 117$, 31.1 %), and 2005 ($N = 1$, 0.3 %). Regarding birth order, the participants born as a second child were the largest group ($N = 164$, 43.6 %), followed by first

child ($N = 130$, 34.6 %), only child ($N = 56$, 14.9 %) and third child ($N = 24$, 14.9 %). Only two students (0.5 %) indicated that they had three or more siblings.

Table 10 lays out the frequencies of participants' answers to the four demographic items assessing participants' self-reports of *math scores*, *Korean-language scores*, *English-language scores*, and *science scores*. Many of the participants perceived that their *English-language scores* were "excellent" ($N = 166$, 44.1 %). When compared to participants' self-assessment of their abilities in the three other subjects, this tendency seems distinctive. Only 90 students (23.9 % of the participants) indicated that their *math scores* were "excellent"; 84 students (22.3 %) thought that their *science scores* were "excellent." Only 78 students (20.7 %) perceived that their *Korean-language scores* were "excellent."

Table 10
Scores in Math, Korean, English and Science (N = 376)

		Frequency	Percent	Cumulative percent
Math scores	Poor	16	4.3	4.3
	Fair	123	32.7	37.0
	Good	147	39.1	76.1
	Excellent	90	23.9	100.0
Korean-language scores	Poor	8	2.1	2.1
	Fair	113	30.1	32.2
	Good	177	47.1	79.3
	Excellent	78	20.7	100.0
English-language scores	Poor	12	3.2	3.2
	Fair	75	19.9	23.1
	Good	123	32.7	55.9
	Excellent	166	44.1	100.0
Science scores	Poor	13	3.5	3.5
	Fair	113	30.1	33.5
	Good	166	44.1	77.7
	Excellent	84	22.3	100.0

Table 11 summarizes the participant's level of interest in the subjects of *math*, *Korean*, *English* and *science*. *Science* tops the list of interesting subjects for these students: the majority (278 of 73.9 %) indicated that *science* was “interesting” (N = 138, 36.7 %) or “very interesting” (N = 140, 37.2 %). *English* was another favored subject for the participants. The majority (252 of 67.0 %) indicated that it was “interesting” (N = 128, 34.0 %) or “very interesting” (N = 124, 33.0 %). Meanwhile *math* and *Korean* were most often indicated as “interesting” or “not so interesting”

Table 11

Students' Interest in Math, Korean, English, and Science (N = 376)

		Frequency	Percent	Cumulative percent
Math	Not interesting at all	58	15.4	15.4
	Not so interesting	111	29.5	44.9
	Interesting	124	33.0	77.9
	Very interesting	83	22.1	100.0
Korean	Not interesting at all	27	7.2	7.2
	Not so interesting	113	30.1	37.2
	Interesting	158	42.0	79.3
	Very interesting	78	20.7	100.0
English	Not interesting at all	23	6.1	6.1
	Not so interesting	101	26.9	33.0
	Interesting	128	34.0	67.0
	Very interesting	124	33.0	100.0
Science	Not interesting at all	18	4.8	4.8
	Not so interesting	80	21.3	26.1
	Interesting	138	36.7	62.8
	Very interesting	140	37.2	100.0

The results for the item “*My overall academic grades are.....*” is shown in Table 12. The response chosen with the highest frequency was “fair” ($N = 153$, 40.7 %) followed by “good” ($N = 140$, 37.2 %). Seventy-one participants (18.9 %) indicated that their overall academic grades were “excellent.” The remaining 12 students (3.2 %) indicated that their overall academic scores were “poor.”

Table 12

Overall Academic Grades (N = 376)

	Frequency	Percent	Cumulative Percent
Poor	12	3.2	3.2
Fair	153	40.7	43.9
Good	140	37.2	81.1
Excellent	71	18.9	100.0
Total	376	100.0	

Table 13 shows the results regarding participants’ *economic condition*. The response chosen with the highest frequency was “wealthy” ($N = 182$, 48.4 %), followed by “medium” ($N = 106$, 28.2 %), “very wealthy” ($N = 86$, 22.9 %) and “poor” ($N = 2$, 0.5 %). None of the participants indicated that his/her family was “very poor.”

Table 13

Economic Condition (N = 376)

	Frequency	Percent	Cumulative Percent
Very poor	0	0	0
Poor	2	.5	.5
Medium	106	28.2	28.7
Wealthy	182	48.4	77.1
Very wealthy	86	22.9	100.0
Total	376	100.0	

The parents' education is summarized in Table 14. The response chosen with the highest frequency was "college/university" both for fathers ($N=168$, 44.7 %) and mothers ($N=174$, 46.3 %), followed by "I don't know." About one third of the students indicated that they didn't know about their parents' education ($N=123$, 32.7 %). High levels of education were reported: 63 (16.8 %) indicated that their fathers had graduated from a graduate school and 50 (13.3%) that their mothers had. Only 21 students (5.6%) reported that the father had graduated from a high school and 24 (6.4 %) that their mother had. Only one student (0.3 %) reported that his/her father that had graduated from a middle school or less.

Table 14

Parents' Education (N = 376)

	Father			Mother		
	Frequency	Percent	Cumulative percent	Frequency	Percent	Cumulative percent
Middle school or under	1	0.3	0.3	0	0	0
High school	21	5.6	5.9	24	6.4	6.4
College/university	168	44.7	50.5	174	46.3	52.7
Graduate school	63	16.8	67.3	50	13.3	66.0
I don't know	123	32.7	100.0	128	34.0	100.0
Total	376	100.0		376	100.0	

The following section provides the results from the principal component analyses (PCA).

Principal Component Analyses

Principal component analyses (PCA) were conducted to reveal latent components of the SLSUESS. The results of the data adequacy tests and the PCA solution are reported below, followed by the results of reliability tests for the entire LSUESS and for each subscale of the items.

Data Adequacy Tests

The adequacy of the sample size was evaluated first for PCA. Data came from a total of 376 participants, and the number of learning strategy items was 74. Five cases per item are considered as the rule of thumb (Tabachnick & Fidell, 2007). Thus, the number of collected data achieved sampling adequacy ($5 \times 74 = 370$).

Factorability tests were carried out by examining the correlation matrix, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO), and Bartlett's test of sphericity. The correlation matrix of the 74 items revealed that all the items were correlated. All of the items were correlated at least 0.3 with many other items. The KMO was 0.91, a "marvelous" factorability index (Kaiser, 1974). Bartlett's test of sphericity indicated that the correlation matrix was significant ($\chi^2 = 13906.151$; $df = 2701$; $p = .000$). Finally, the communalities of all the items were shown to be above 0.3. Therefore, the data were deemed adequate for a principal component analysis.

Principal Component Analysis (PCA)

The results of the initial solution of PCA suggested 17 components. The total variance of 63.57 % was explained with these 17 components, and all the components' eigenvalues were greater than 1. However, the results of the PCA with 17 components included many "messy" loadings such as items loading at less than 0.32 and cross-loaded items. Thus, a scree plot was

created and examined (shown in Figure1). The scree plot suggested 3 to 6 factors. The total-variance-explained index with the 3 components was only 35.39 %. At 9 components, the total-variance-explained index exceeded 50%. Therefore, a decision was made to perform all possible factor solutions from 3 to 9 components.

When all seven outputs were compared (from 3 to 9 factor solutions), the 6-component solution appeared to yield the cleanest factor structure. The loadings with 6 components showed fewer items loading at less than 0.32, and a fewer numbers of cross-loaded items. Also, it indicated that all 6 components were loaded with at least 3 strong items, which meant that items were loaded at greater than 0.5.

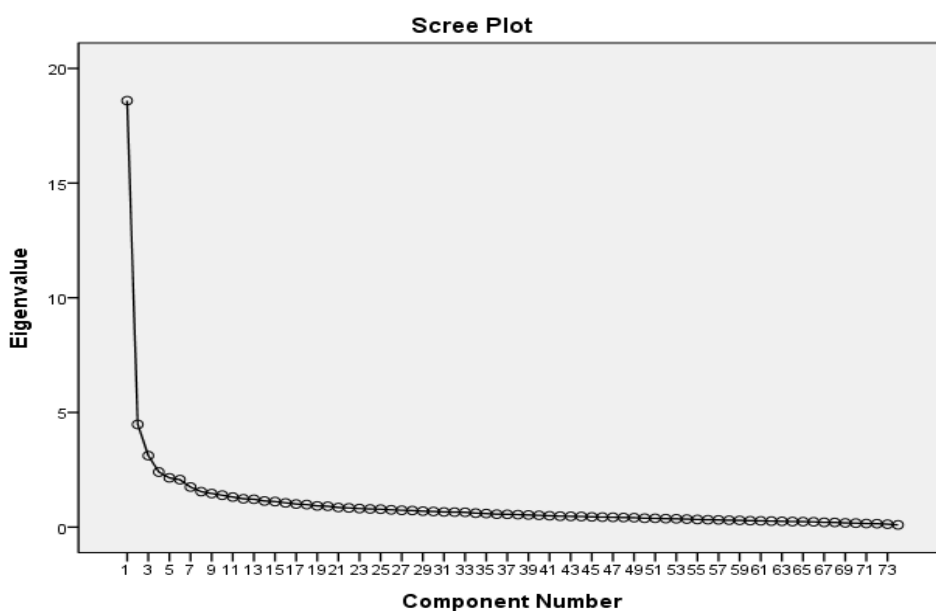


Figure 1 Initial Solution for Factor Extraction

After deciding on a six-factor solution, the next step was to determine the factor rotation. A PCA was run with direct oblimin, a type of oblique rotation, to produce a component correlation matrix. The results indicated that the 6 pairs in the correlation matrix were highly

correlated ($r > |\pm 0.30|$). Thus, a decision was made to conduct PCA with oblique rotation (direct oblimin) for further analysis.

In the process of conducting PCA, cross-loaded items (i.e., those that loaded on more than one component) were deleted one by one, as well as items that did not load at greater than 0.32 on any of the components. After an assessment of communalities and total variances, the same process of item deletion was conducted for the remaining items. This process was repeated until all remaining items were loaded at least over 0.32 on one of the components, with no cross-loadings, and with all components having at least 3 strong items.

After 32 items were deleted, the remaining 42 items were arranged on each of the 6 components so that each had 0.40 or higher loadings without any cross-loadings. These factor loadings are presented in Table 15. Each component included at least 4 items. The 6-component solution explained 50.78 % of the total variance. The communalities of all 42 items exceeded 4.0. Once those indications were achieved, a decision was made to stop item deletions, and move to the next step of data analysis, reliability estimation.

Reliability Estimation

Cronbach's alpha measure of internal consistency tests was used to examine reliabilities for the entire set of 42 items and for each of the six subscales. These internal consistency estimates are reported in Table 15. As shown in the table, the full set of 42 items and each subscale obtained high reliabilities, with an alpha range from .92 to .78. Thus, a decision was made to take the tentative solution as the final solution, and names were devised for each subscale (Table 15).

Overall, the rotated 6-component solution accounted for 53.82% of the variance, and the entire scale shows an internal consistency of .93. Component 1, *Study Skills & Efforts* ($\alpha = .92$),

contains 15 items and accounts for 28.12% of the variance. Component 2, *Neglect* ($\alpha = .83$), includes 6 items and accounts for 5.81 % of the variance. Component 3, *Test Anxiety* ($\alpha = .78$), contains 4 items and accounts for 4.46 % of the variance. Component 5, *Organization* ($\alpha = .84$), includes 6 items and accounts for 4.17 % of the variance. Component 6, *Scheduling & Prioritizing* ($\alpha = .79$), contains 5 items and accounts for 3.91 % of the variance.

Shortly, the whole set and all six subscales show dependable levels of reliability. As a result, the next phase of the data analyses, a set of group difference tests, was carried out with the newly defined items of *the Scale of Learning Strategies for Upper Elementary School Students* (SLSUESS).

Table 15

Results from PCA & Reliability Tests

Cronhach's alpha for the entire set of 42 items ($\alpha = .93$)		
Component 1 <i>Study Skills & Effort</i> ($\alpha = .92$, # of items: 15)		Loadings
1.	q6 Look over charts	.716
2.	q3 Try to memorize what I've learned in class	.708
3.	q7 Read titles and subtitles	.687
4.	q5 Look over tables	.679
5.	q18 Listen well when the teacher is speaking	.663
6.	q8 Look over illustrations on text books	.663
7.	q11 Try to understand important subjects	.661
8.	q15 Review problems that I have skipped	.617
9.	q19 Check answers before turning in a test	.564
10.	q16 Highlight important words while reading	.530
11.	q20 Try to choose best answer in a multiple choice question	.523
12.	q28 Try hard even in classes that I don't like	.474
13.	q26 Work hard on homework	.426
14.	q24 Prepare well for a test	.415
15.	q56 Think things I learn in class are important	.414
Component 2 <i>Neglect</i> ($\alpha = .83$, # of items: 6)		Loadings
16.	q35 Put off homework if I do not know the answer	.806
17.	q33 Put off homework until the last minute	.765
18.	q32 Daydream in class	.756
19.	q34 Miss homework	.713
20.	q31 Walk around during class	.691
21.	q52 Be late to class	.560
Component 3 <i>Test Anxiety</i> ($\alpha = .78$, # of items: 4)		Loadings
22.	q73 Have test anxiety days before the test	.845
23.	q72 Feel nervous when taking a test	.844
24.	q71 Forget things because of test anxiety	.745
25.	q74 Feel sick before an important test	.590
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i> ($\alpha = .82$, # of items: 8)		Loading
26.	q67 Learn faster than others	.682
27.	q59 Think good grades are important	.644
28.	q60 Think getting recognized for good grades is important	.612
29.	q58 Have to be better at schoolwork than my friends	.606
30.	q69 Complete school works by myself	.588
31.	q68 Solve most problems if I invest enough efforts	.584
32.	q65 Think school work is easy	.567
33.	q66 Think I'm smart	.560
Component 5 <i>Organization</i> ($\alpha = .84$, # of items: 4)		Loadings
34.	q39 Write down things needed for class	.764
35.	q38 Have my materials for class ready	.727
36.	q40 Find class materials easily	.688
37.	q37 Make sure my desk area is neat	.600
Component 6 <i>Scheduling & Prioritizing</i> ($\alpha = .79$, # of items: 5)		Loadings
38.	q47 Have a study calendar	.807
39.	q48 Have a schedule for the day	.749
40.	q46 Set aside time to study	.643
41.	q29 Finish homework first even if there are other fun things to do	.548
42.	q25 Have ways to get through boring classes	.526

Group Differences

To examine group differences, the independent variables were specified as 16 demographic variables: *gender*, *grade*, *birth order*, *year of birth*, *math scores*, *Korean-language scores*, *English-language scores*, *science scores*, *math is interesting*, *Korean is interesting*, *English is interesting*, *science is interesting*, *overall academic grade*, *economic situations*, *father's education*, and *mother's education*. The dependent variables were the scores obtained from the six subscales of the SLSUESS. Those subscales were (a) *Study Skills & Effort*, (b) *Neglect*, (c) *Test Anxiety*, (d) *Self-Efficacy & Extrinsic Motivation*, (e) *Organization*, and (f) *Scheduling & Prioritizing*. The mean scores of each subscale were compared between groups of the demographic variables in order to examine group differences.

Bonferroni Correction

Altogether, a total of 96 statistical tests were conducted, six *t*-tests and 90 one-way ANOVAs. To avoid an inflated Type I error rate, the Bonferroni correction was used. The traditional 0.05 level of significance was divided by 96. This adjustment of the alpha level caused the critical values for the various tests to become larger and thus more conservative.

Statistical Comparisons

An independent *t*-test was performed for the variable *gender*. Using the Bonferroni correction ($0.05/96 = 0.00052$) in conjunction with any of these *t*-test comparison of two group means (with a total of 376 participants), the calculated *t*-value had to be greater than 3.5 to be significant.

A one-way analysis of variance (ANOVA) was performed for the remaining 15 demographic variables. Using the Bonferroni correction ($0.05/96 = 0.00052$) in conjunction with any of these ANOVA comparison of four group means (and a total of 376 participants), the

calculated F -value had to be greater than 6.015 to be significant. With three or five groups, the corresponding critical F -value was 7.72 and 5.10, respectively.

If any ANOVA produced a significant result, a post hoc investigation was conducted. This was accomplished by means of Tukey's HSD test procedure. Due to the nature of this study's research hypotheses, the only significant results reported in this dissertation are those pairwise comparisons involving the hypothesized "superior" group, on the one hand, and any other group, on the other. For example, when comparison groups were formed on the basis of participants' self-reported *overall academic grades*, the ANOVA using *Study Skills & Efforts* as the dependent variable yielded a significant result ($p < .00052$). The full-blown follow-up post hoc investigation involved six pairwise Tukey tests, but only three of those are reported here: those involving the group of participants saying that their grades were "excellent" compared against each of the other three groups (those groups with participants claiming that their grades were "good," "fair," or "poor"). These three comparisons were the relevant ones in light of Hypothesis 4: High achievers exhibit more effective use of learning strategies than low achievers.

Gender

Male and female students showed significant differences on three of the subscales of learning strategies: a) *Study Skills & Effort*, b) *Organization*, and c) *Scheduling & Prioritizing*. Girls ($M = 51.46$, $SD = 7.11$, $N = 180$) showed significantly higher levels of *Study Skills & Effort* than boys ($M = 48.19$, $SD = 7.67$, $N = 196$), $t(374) = 4.28$, $d = 0.44$, $p < 0.00052$, two tailed. Girls ($M = 23.37$, $SD = 4.65$, $N = 180$) also showed significantly higher *Organization* skills than boys ($M = 12.27$, $SD = 3.00$, $N = 196$), $t(374) = 5.05$, $d = 0.25$, $p < 0.00052$, two tailed. Finally, girls ($M = 13.54$, $SD = 3.74$, $N = 180$) showed significantly higher levels of *Scheduling &*

Prioritizing - than boys - ($M = 12.20$, $SD = 3.60$, $N = 196$), $t(374) = 3.52$, $d = 0.18$, $p < 0.00052$, two tailed.

Math Scores

Students were divided into four groups based on their self-reported competence in mathematics. These groups were then compared on each of the six subscales of learning strategies. As indicated previously, a conservative level of significance was used in making each of these comparisons. Significant group differences showed up on five subscales: a) *Study Skills & Effort*, b) *Test Anxiety*, c) *Self-Efficacy & Extrinsic Motivation*, d) *Organization*, and e) *Scheduling & Prioritizing*.

Table 16

Math Scores

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Effort</i>	$\{F(3, 272) = 42.45, \eta_p^2 = .26, p < .00052\}$	Excellent ($M = 54.93$, $SD = 5.73$, $N = 90$)	Poor ($M = 45.25$, $SD = 9.69$, $N = 16$, $p < .00052$) Fair ($M = 45.19$, $SD = 6.86$, $N = 123$, $p < .00052$) Good ($M = 50.90$, $SD = 6.40$, $N = 147$, $p < .00052$)
Component 3 <i>Test Anxiety</i>	$\{F(3, 272) = 10.38, \eta_p^2 = .08, p < .00052\}$	Excellent ($M = 13.66$, $SD = 2.43$, $N = 90$)	Poor ($M = 10.00$, $SD = 3.35$, $N = 16$, $p < .00052$) Fair ($M = 11.83$, $SD = 3.09$, $N = 123$, $p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 35.15, \eta_p^2 = .21, p < .00052\}$	Excellent ($M = 25.87$, $SD = 4.83$, $N = 90$)	Poor ($M = 20.87$, $SD = 4.44$, $N = 16$, $p < .00052$) Fair ($M = 20.13$, $SD = 4.46$, $N = 123$, $p < .00052$) Good ($M = 23.43$, $SD = 3.97$, $N = 147$, $p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 14.80, \eta_p^2 = .11, p < .00052\}$	Excellent ($M = 14.35$, $SD = 1.91$, $N = 90$)	Poor ($M = 11.38$, $SD = 2.50$, $N = 16$, $p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 16.52, \eta_p^2 = .12, p < .00052\}$	Excellent ($M = 14.99$, $SD = 3.64$, $N = 90$)	Poor ($M = 11.88$, $SD = 2.60$, $N = 16$, $p < .00052$) Fair ($M = 11.67$, $SD = 3.31$, $N = 123$, $p < .00052$)

Group differences among the *math* groups on *Study Skills & Effort* was significant, $F(3, 272) = 42.45$, $\eta p^2 = .26$, $p < .00052$. According to commonly accepted standards for assessing the magnitude of this effect, the estimate of effect size (ES) for this result is judged to be “large.” Group differences among the *math* groups regarding *Test Anxiety* was also significant, $F(3, 272) = 10.38$, $\eta p^2 = .08$, $p < .00052$. Here, the estimated effect size was “medium.” The group difference among the *math* groups on *Self-Efficacy & Extrinsic Motivation* was significant, $F(3, 272) = 32.15$, $\eta p^2 = .21$, $p = .00052$. The estimated ES was “large.” Group difference on *Organization* was significant, $F(3, 272) = 14.80$, $\eta p^2 = .11$, $p = .00052$. This finding had a “large” estimated ES. Group difference of on *Scheduling & Prioritizing* was significant, $F(3, 272) = 16.35$, $\eta p^2 = .12$, $p = .00052$. This finding had a “large” estimated ES.

Korean-Language Scores

Students were divided into four groups based on their self-reported competence in using the Korean language: excellent, good, fair, and poor. These groups were then compared on each of the six subscales of learning strategies. A conservative level of significance was used in making each of these comparisons. Significant group differences were found on five subscales: a) *Study Skills & Effort*, b) *Neglect*, c) *Self-Efficacy & Extrinsic Motivation*, d) *Organization*, and e) *Scheduling & Prioritizing*.

Group differences on *Study Skills & Effort* was significant, $F(3, 272) = 44.13$, $\eta p^2 = .26$, $p < .00052$. The estimated ES here was “large.” Group differences on *Neglect* was also significant, $F(3, 272) = 10.32$, $\eta p^2 = .18$, $p < .00052$, again with a large ES. Group difference on *Self-Efficacy & Extrinsic Motivation* was significant, $F(3, 272) = 16.01$, $\eta p^2 = .11$, $p = .00052$, again with a large estimated ES. Group difference on *Organization* was significant, $F(3, 272) = 14.46$, ηp^2

= .10, $p = .00052$, with a large estimated ES. Group difference on *Scheduling & Prioritizing* was significant, $F(3, 272) = 13.34$, $\eta_p^2 = .10$, $p < .00052$, with a medium-to-large estimated ES.

Table 17

Korean-Language Scores

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Effort</i>	$\{F(3, 272) = 44.13, \eta_p^2 = .26, p < .00052\}$	Excellent ($M = 54.69, SD = 5.21, N = 78$)	Poor ($M = 36.25, SD = 9.66, N = 8, p < .00052$) Fair ($M = 45.49, SD = 7.37, N = 113, p < .00052$) Good ($M = 50.91, SD = 6.33, N = 177, p < .00052$)
Component 2 <i>Neglect</i>	$\{F(3, 272) = 10.32, \eta_p^2 = .18, p < .00052\}$	Excellent ($M = 22.53, SD = 2.70, N = 78$)	Poor ($M = 18.12, SD = 4.64, N = 8, p < .00052$) Fair ($M = 20.74, SD = 3.24, N = 113, p < .00052$) Good ($M = 21.96, SD = 2.78, N = 177, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 16.01, \eta_p^2 = .11, p < .00052\}$	Excellent ($M = 25.19, SD = 4.61, N = 78$)	Poor ($M = 16.63, SD = 4.69, N = 8, p < .00052$) Fair ($M = 21.28, SD = 4.78, N = 113, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 14.46, \eta_p^2 = .10, p < .00052\}$	Excellent ($M = 14.23, SD = 1.89, N = 78$)	Poor ($M = 9.12, SD = 3.52, N = 8, p < .00052$) Fair ($M = 12.24, SD = 3.07, N = 113, p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 13.34, \eta_p^2 = .10, p < .00052\}$	Excellent ($M = 14.67, SD = 3.35, N = 78$)	Poor ($M = 9.12, SD = 3.98, N = 8, p < .00052$) Fair ($M = 11.76, SD = 3.48, N = 113, p < .00052$)

English-Language Scores

Students were divided into four groups based on their self-reported competence in using English: excellent, good, fair, and poor. These groups were then compared on each of the six subscales of learning strategies. As indicated previously, a conservative level of significance was used in making each of these comparisons. This set of analyses showed significant group differences on four subscales: a) *Study Skills & Effort*, b) *Self-Efficacy & Extrinsic Motivation*, c) *Organization*, and d) *Scheduling & Prioritizing*.

The ANOVA comparing scores on *Study Skills & Effort* was significant, $F(3, 272) = 42.52$, $\eta_p^2 = .26$, $p < .00052$, with a large estimated effect size. An examination of scores on *Self-Efficacy & Extrinsic Motivation* produced a significant finding, $F(3, 272) = 20.89$, $\eta_p^2 = .14$, $p = .00052$, with a large estimated ES. A separate ANOVA using scores using *Organization* as the dependent variable was significant, $F(3, 272) = 13.68$, $\eta_p^2 = .10$, $p = .00052$, with a medium-to-large estimated ES. Lastly, the comparison of the four group on *Scheduling & Prioritizing* was significant, $F(3, 272) = 14.90$, $\eta_p^2 = .11$, $p < .00052$, with a large estimated ES.

Table 18
English-Language Scores

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Effort</i>	$\{F(3, 272) = 44.52$ $\eta_p^2 = .26, p < .00052\}$	Excellent ($M = 53.61, SD = 5.49, N = 166$)	Poor ($M = 41.25, SD = 10.11, N = 12, p < .00052$) Fair ($M = 44.61, SD = 8.24, N = 75, p < .00052$) Good ($M = 48.52, SD = 6.35, N = 177, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 20.89$ $\eta_p^2 = .14, p < .00052\}$	Excellent ($M = 24.70, SD = 4.33, N = 166$)	Poor ($M = 19.17, SD = 51.13, N = 12, p < .00052$) Fair ($M = 20.24, SD = 4.71, N = 75, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 13.68$ $\eta_p^2 = .10, p < .00052\}$	Excellent ($M = 13.90, SD = 2.47, N = 166$)	Poor ($M = 10.42, SD = 3.48, N = 12, p < .00052$) Fair ($M = 11.97, SD = 3.22, N = 75, p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 14.90$ $\eta_p^2 = .11, p < .00052\}$	Excellent ($M = 14.16, SD = 3.47, N = 166$)	Poor ($M = 10.33, SD = 3.10, N = 12, p < .00052$) Fair ($M = 11.33, SD = 3.69, N = 75, p < .00052$)

Science Scores

Students were divided into four groups based on their self-reported competence in science: excellent, good, fair, and poor. These groups were then compared on each of the six subscales of learning strategies. As indicated previously, a conservative level of significance was

used in making each of these comparisons. This set of analyses showed significant group differences on five subscales: a) *Study Skills & Effort*, b) *Neglect*, c) *Self-Efficacy & Extrinsic Motivation*, d) *Organization*, and e) *Scheduling & Prioritizing*.

Table 19
Science Scores

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Effort</i>	$\{F(3, 272) = 29.67, \eta_p^2 = .19, p < .00052\}$	Excellent ($M = 53.77, SD = 6.73, N = 84$)	Poor ($M = 43.69, SD = 11.69, N = 13, p < .00052$) Fair ($M = 45.51, SD = 6.70, N = 113, p < .00052$)
Component 2 <i>Neglect</i>	$\{F(3, 272) = 10.32, \eta_p^2 = .06, p < .00052\}$	Excellent ($M = 22.22, SD = 2.73, N = 84$)	Fair ($M = 20.62, SD = 3.89, N = 113, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 24.46, \eta_p^2 = .17, p < .00052\}$	Excellent ($M = 26.69, SD = 4.37, N = 84$)	Poor ($M = 18.53, SD = 4.56, N = 13, p < .00052$) Fair ($M = 20.67, SD = 4.43, N = 113, p < .00052$) Good ($M = 23.17, SD = 4.56, N = 166, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 14.24, \eta_p^2 = .10, p < .00052\}$	Excellent ($M = 14.08, SD = 2.25, N = 84$)	Poor ($M = 10.23, SD = 3.77, N = 13, p < .00052$) Fair ($M = 12.12, SD = 2.87, N = 113, p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 12.14, \eta_p^2 = .09, p < .00052\}$	Excellent ($M = 14.03, SD = 3.76, N = 84$)	Poor ($M = 10.38, SD = 3.59, N = 13, p < .00052$) Fair ($M = 11.45, SD = 3.20, N = 113, p < .00052$)

The ANOVA comparing the four science groups on *Study Skills & Effort* was significant, $F(3, 272) = 29.67, \eta_p^2 = .19, p < .00052$, with a large estimated ES. The ANOVA using *Neglect* as the dependent variable was significant, $F(3, 272) = 10.32, \eta_p^2 = .06, p < .00052$. The estimate ES associated with this ANOVA finding was medium. When the four “science groups” were compared on *Self-Efficacy & Extrinsic Motivation*, the result was significant, $F(3, 272) = 24.46, \eta_p^2 = .17, p = .00052$. As with many other ANOVA F -tests, the estimated ES here was large. When *Organization* was the dependent variable, the ANOVA result was significant, $F(3, 272) =$

14.24, $\eta_p^2 = .10$, $p < .00052$, with a medium-to-large estimated ES. An ANOVA comparison of the science groups on *Scheduling & Prioritizing* produced a significant result, $F(3, 272) = 12.14$, $\eta_p^2 = .09$, $p < .00052$, again with a medium-to-large estimated ES.

Math-is-Interesting

When four comparison groups were established based on participants' response to the variable *math- is-interesting*, significantly differences between groups scores were observed on four subscales of the SLSUESS: a) *Study Skills & Effort*, $F(3, 272) = 25.81$, $\eta_p^2 = .17$, $p < .00052$; *Self-Efficacy & Extrinsic Motivation*, $F(3, 272) = 15.85$, $\eta_p^2 = .11$, $p < .00052$; *Organization*, $F(3, 272) = 9.83$, $\eta_p^2 = .70$, $p < .00052$; and *Scheduling & Prioritizing*, $F(3, 272) = 21.77$, $\eta_p^2 = .15$, $p < .00052$.

Table 20

Math-is Interesting

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Efforts</i>	$\{F(3, 272) = 25.81, \eta_p^2 = .17, p < .00052\}$	Very interesting ($M = 54.54, SD = 5.47, N = 83$)	Not interesting at all ($M = 45.29, SD = 7.54, N = 58, p < .00052$) Not so interesting ($M = 47.51, SD = 7.47, N = 111, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 15.85, \eta_p^2 = .11, p < .00052\}$	Very interesting ($M = 25.65, SD = 4.75, N = 83$)	Not interesting at all ($M = 20.76, SD = 4.71, N = 58, p < .00052$) Not so interesting ($M = 21.86, SD = 4.44, N = 111, p < .00052$) Interesting ($M = 22.76, SD = 4.63, N = 124, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 9.38, \eta_p^2 = .07, p < .00052\}$	Very interesting ($M = 14.08, SD = 2.19, N = 83$)	Not interesting at all ($M = 11.84, SD = 2.68, N = 58, p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 21.77, \eta_p^2 = .15, p < .00052\}$	Very interesting ($M = 15.19, SD = 3.60, N = 83$)	Not interesting at all ($M = 10.62, SD = 2.93, N = 58, p < .00052$) Not so interesting ($M = 12.30, SD = 3.36, N = 111, p < .00052$) Interesting ($M = 12.79, SD = 3.65, N = 124, p < .00052$)

The estimated effect sizes associated with these significant findings were all large. More specific statistics pertaining to differences among groups defined by varying interest levels in math are shown in Table 16.

Korean-is-Interesting

When subgroups were created by participants' response to the item "*Korean- is-interesting*," significant differences were observed in three subscales: a) *Study Skills & Efforts*, b) *Organization*, and c) *Scheduling & Prioritizing*. For *Study Skills & Effort*, $F(3, 272) = 22.44$, $\eta_p^2 = .15$, $p < .00052$. For *Organization*, $F(3, 272) = 7.02$, $\eta_p^2 = .05$, $p < .00052$. For *Scheduling & Prioritizing*, $F(3, 272) = 22.69$, $\eta_p^2 = .16$, $p < .00052$. The first and third of these estimated effect sizes was large, whereas the second was medium.

Table 21

Group Difference with "Korean-is Interesting" as the Independent Variable

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Efforts</i>	$\{F(3, 272) = 22.44, \eta_p^2 = .15, p < .00052\}$	Very interesting ($M = 54.47, SD = 5.77, N = 78$)	Not interesting at all ($M = 43.67, SD = 9.67, N = 27, p < .00052$) Not so interesting ($M = 46.84, SD = 7.66, N = 113, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 7.02, \eta_p^2 = .05, p < .00052\}$	Very interesting ($M = 13.75, SD = 2.44, N = 78$)	Not interesting at all ($M = 11.22, SD = 3.33, N = 27, p < .00052$)
component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 22.69, \eta_p^2 = .16, p < .00052\}$	Very interesting ($M = 14.95, SD = 3.44, N = 78$)	Not interesting at all ($M = 9.48, SD = 2.61, N = 27, p < .00052$) Not so interesting ($M = 11.72, SD = 3.39, N = 113, p < .00052$)

English-is-Interesting

When subgroups were created by participants' response to the item “*English is interesting*,” significant differences were observed for four subscales: a) *Study Skills & Efforts*, b) *Self-Efficacy & Extrinsic Motivation*, c) *Organization*, and d) *Scheduling & Prioritizing*. These results are presented in Table 18.

Table 22

English-is Interesting

Summary of ANOVA		Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Efforts</i>	{ $F(3, 272) = 35.39$, $\eta_p^2 = .22$, $p < .00052$ }	Very interesting ($M = 53.70$, $SD = 5.60$, $N = 124$)	Not interesting at all ($M = 41.13$, $SD = 11.03$, $N = 23$, $p < .00052$)
			Not so interesting ($M = 46.41$, $SD = 7.14$, $N = 101$, $p < .00052$)
			Interesting ($M = 50.12$, $SD = 6.36$, $N = 128$, $p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	{ $F(3, 272) = 11.25$, $\eta_p^2 = .08$, $p < .00052$ }	Very interesting ($M = 24.62$, $SD = 4.25$, $N = 124$)	Not so interesting ($M = 21.16$, $SD = 4.94$, $N = 101$, $p < .00052$)
Component 5 <i>Organization</i>	{ $F(3, 272) = 11.41$, $\eta_p^2 = .08$, $p < .00052$ }	Very interesting ($M = 13.74$, $SD = 2.78$, $N = 124$)	Not interesting at all ($M = 10.60$, $SD = 3.72$, $N = 23$, $p < .00052$)
component 6 <i>Scheduling & Prioritizing</i>	{ $F(3, 272) = 21.95$, $\eta_p^2 = .15$, $p < .00052$ }	Very interesting ($M = 14.51$, $SD = 3.37$, $N = 124$)	Not interesting at all ($M = 9.13$, $SD = 2.90$, $N = 23$, $p < .00052$)
			Not so interesting ($M = 11.74$, $SD = 3.44$, $N = 101$, $p < .00052$)

Regarding *Study Skills & Effort*, $F(3, 272) = 35.39$, $\eta_p^2 = .22$, $p < .00052$. For *Self-Efficacy & Extrinsic Motivation*, $F(3, 272) = 11.25$, $\eta_p^2 = .08$, $p < .00052$. For *Organization*, $F(3, 272) = 11.4$, $\eta_p^2 = .08$, $p < .00052$. As for *Scheduling & Prioritizing*, $F(3, 272) = 21.95$, $\eta_p^2 = .15$, $p < .00052$. The estimated indices of effect size for these four F -tests ranged from medium to large.

Science-is-Interesting

When four comparison groups were formed based on participants' response to the item "science-is-interesting", significant differences were observed in four subscales: a) *Study Skills & Efforts*, b) *Neglect*, c) *Test Anxiety*, and d) *Self-Efficacy & Extrinsic Motivation*. Results of these comparisons can be found in Table 19.

Table 23

Science-is Interesting

Summary of ANOVA		Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Efforts</i>	$\{F(3, 272) = 10.93, \eta_p^2 = .08, p < .00052\}$	Very interesting ($M = 52.06, SD = 7.62, N = 140$)	Not so interesting ($M = 46.38, SD = 6.79, N = 80, p < .00052$)
Component 2 <i>Neglect</i>	$\{F(3, 272) = 6.23, \eta_p^2 = .05, p < .00052\}$	Very interesting ($M = 22.33, SD = 2.56, N = 140$)	Not so interesting ($M = 20.51, SD = 3.54, N = 80, p < .00052$)
Component 3 <i>Test Anxiety</i>	$\{F(3, 272) = 6.23, \eta_p^2 = .05, p < .00052\}$	Very interesting ($M = 12.98, SD = 2.98, N = 140$)	Not so interesting ($M = 11.21, SD = 3.05, N = 80, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 9.20, \eta_p^2 = .07, p < .00052\}$	Very interesting ($M = 25.20, SD = 4.79, N = 140$)	Not so interesting ($M = 20.74, SD = 4.44, N = 80, p < .00052$)

Regarding *Study Skills & Effort*, $F(3, 272) = 10.93, \eta_p^2 = .08, p < .00052$. For *Neglect*, $F(3, 272) = 6.23, \eta_p^2 = .05, p < .00052$. As for *Test Anxiety*, $F(3, 272) = 6.23, \eta_p^2 = .05, p < .00052$. Regarding *Self-Efficacy & Extrinsic Motivation*, $F(3, 272) = 9.20, \eta_p^2 = .07, p < .00052$. The estimated effect sizes associated with these findings were all medium.

Overall Academic Grades

When comparisons were made among four subgroups formed by participants' self-reported academic grades, significant differences were observed in all six subscales: a) *Study*

Skills & Efforts, b) *Neglect*, c) *Test Anxiety*, d) *Self-Efficacy & Extrinsic Motivation*, e) *Organization*, and f) *Scheduling & Prioritizing*.

Table 24

Overall Academic Grades

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 1 <i>Study Skills & Effort</i>	$\{F(3, 272) = 43.79, \eta_p^2 = .26, p < .00052\}$	Excellent ($M = 56.97, SD = 4.84, N = 71$)	Poor ($M = 43.75, SD = 5.36, N = 12, p < .00052$) Fair ($M = 46.01, SD = 7.68, N = 153, p < .00052$) Good ($M = 51.21, SD = 5.99, N = 140, p < .00052$)
Component 2 <i>Neglect</i>	$\{F(3, 272) = 12.97, \eta_p^2 = .10, p < .00052\}$	Excellent ($M = 22.72, SD = 2.66, N = 71$)	Poor ($M = 18.75, SD = 4.35, N = 12, p < .00052$) Fair ($M = 20.81, SD = 3.40, N = 153, p < .00052$)
Component 3 <i>Test Anxiety</i>	$\{F(3, 272) = 11.01, \eta_p^2 = .08, p < .00052\}$	Excellent ($M = 13.39, SD = 2.40, N = 71$)	Poor ($M = 9.42, SD = 3.03, N = 12, p < .00052$) Fair ($M = 11.68, SD = 3.22, N = 153, p < .00052$)
Component 4 <i>Self-Efficacy & Extrinsic Motivation</i>	$\{F(3, 272) = 29.35, \eta_p^2 = .19, p < .00052\}$	Excellent ($M = 26.14, SD = 4.62, N = 71$)	Poor ($M = 18.67, SD = 1.14, N = 12, p < .00052$) Fair ($M = 20.81, SD = 4.64, N = 153, p < .00052$)
Component 5 <i>Organization</i>	$\{F(3, 272) = 12.51, \eta_p^2 = .09, p < .00052\}$	Excellent ($M = 14.33, SD = 2.20, N = 71$)	Fair ($M = 15, SD = 3.30, N = 153, p < .00052$)
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 9.34, \eta_p^2 = .07, p < .00052\}$	Excellent ($M = 14.76, SD = 3.71, N = 71$)	Fair ($M = 12.02, SD = 3.47, N = 153, p < .00052$)

Regarding *Study Skills & Efforts*, $F(3, 272) = 43.79, \eta_p^2 = .26, p < .00052$. The estimated effect size here was large. With regard to *Neglect*, $F(3, 272) = 12.97, \eta_p^2 = .10, p < .00052$. The estimated effect size here was medium-to-large. As for *Test Anxiety*, $F(3, 272) = 11.01, \eta_p^2 = .08, p < .00052$. The estimated effect size here was medium. With respect to the dependent variable *Self-Efficacy & Extrinsic Motivation*, $F(3, 272) = 29.35, \eta_p^2 = .19, p < .00052$. The estimated effect size here was large. Regarding *Organization*, $F(3, 272) = 12.51, \eta_p^2 = .09, p < .00052$.

The estimated effect size here was medium. Finally, there were significant differences among these groups with regard to their mean scores on *Scheduling & Prioritizing*, $F(3, 272) = 9.34$, $\eta_p^2 = .07$, $p < .00052$. The estimated effect size here was medium.

Economic Conditions

When comparisons were made among four subgroups formed by participants' self-reported status concerning *economic conditions*, a significant effect was found for the dependent variable, *Scheduling & Prioritizing*. The ANOVA here produced these results: $F(3, 272) = 13.85$, $\eta_p^2 = .10$, $p < .00052$. The estimated effect size here was medium-to-large. The group difference between “very wealthy” and “poor” was not significant. This may be accounted for by the tiny sample size of the “poor” group ($N = 2$).

Table 25

Economic Conditions

	Summary of ANOVA	Group Differences Statistics	
		Summary of group differences	
Component 6 <i>Scheduling & Prioritizing</i>	$\{F(3, 272) = 13.85, \eta_p^2 = .10, p < .00052\}$	Very wealthy ($M = 14.03, SD = 3.83, N = 86$)	Medium ($M = 11.08, SD = 3.26, N = 106, p < .00052$)

Other ANOVA Results

The results from the remaining ANOVAs each conducted with a Bonferroni adjustment indicated that group differences were not significant. The dependent variables in these analyses were: *grade level*, *birth year*, *birth order*, *father's education*, and *mother's education*.

Tying Statistical Results to the Study's Hypotheses

The results of the data analysis are interpreted here with respect to the seven research hypotheses delineated in Chapter 1.

Hypothesis 1: Male students' uses of learning strategies are different from those of female students. The results from independent *t*-tests revealed that girls achieved significantly higher scores on four subscales: a) *Study Skills & Efforts*, b) *Neglect*, c) *Organization*, and d) *Prioritizing & Scheduling*. These results suggest that girls tend to have higher levels of study skills and commit more effort to studying than boys. Further, girls tend to have more effective organizational skills and are better at prioritizing and scheduling than boys. Finally, girls seem less likely to neglect homework or daydream during class. Consequently, this hypothesis is supported.

Hypothesis 2: Older students (in upper grades) exhibit higher levels of learning strategies than younger students (in lower grades). The data analysis revealed that the older and younger students were not significantly different. In other words, there is no supporting evidence to show that students develop learning strategies as they get older or move up through grade levels, at least from this research. Thus, this hypothesis is not supported.

Hypothesis 3: Students who are the first child or only child in their families exhibit higher levels of learning-strategy use than children whose birth-order is second, third or higher. No group difference was found on any of the six subscales of the SLSUESS when groups were defined by the demographic variable, birth order. Thus, this hypothesis was not supported.

Hypothesis 4: High achievers exhibit more effective use of learning strategies than low achievers. The data analysis suggests that students whose self-reported *academic grades* is higher have higher levels of learning strategies across all six subscales: a) *Study Skills & Effort*, b) *Neglect*, c) *Test Anxiety*, d) *Self-Efficacy & Extrinsic Motivation*, e) *Organization*, and f) *Scheduling & Prioritizing*. These results suggest that high academic achievers exhibit more

effective study skills and provide more effort than their peers, that they have higher self-efficacy and extrinsic motivation, and that they are better at organizing, scheduling and prioritizing. Also, high academic achievers seem less likely to avoid homework or daydream in class. Finally, high academic achievers seem to be less nervous about tests.

Similar results were found when students were grouped based on their self-reported achievements in the subjects of math, Korean-language, English-language, and science. Students who rated their scores on those subjects as “excellent” generally showed higher scores on the subscales of SLSUESS. Thus, this hypothesis was supported.

Hypothesis 5: Motivated learners exhibit more effective learning strategies. The results of the data analysis indicated that motivated students in *math*, *Korean-language*, *English*, and *science* had higher levels of *Study Skills & Effort*. Motivated students in *science* also showed significantly lower tendencies of *Neglect* and *Text Anxiety*. Motivated students in *math*, *English*, and *science* exhibited higher *Self-Efficacy & Extrinsic Motivation*. Motivated students in *math*, *Korean-language* and *English* indicated higher scores on *Organization* and *Scheduling & Prioritizing*. Therefore, the results obtained support the hypothesis that motivated students exhibit more effective learning strategies than do less motivated students.

Hypothesis 6: Students living in wealthy environments exhibit more effective learning strategies than those who do not live in wealthy environments. Wealthier students showed higher scores on one of the six subscales (*Scheduling & Prioritizing*) than their less wealth peers. Thus the data analysis partially supports this hypothesis.

Hypothesis 7: Students whose parents are highly educated exhibit more effective learning strategies than those whose parents are not highly educated. The data analysis revealed no group differences between highly educated father groups and low educated father

groups, and between highly educated mother groups and low educated mother groups. Thus, this hypothesis was not supported.

Summary

Data were collected from an elementary school in Busan, South Korea to examine latent variables constructed in the SLSUESS. The participation rate was 94 % ($N= 376$). All of the participants were in the 4th, 5th, or 6th grade at the school.

The results from PCA showed a 6-component solution of the SLSUESS. Internal consistency was estimated to be .93 from the entire set of 42 items; .92 for component 1, *Study Skills & Efforts* (15 items); .83 for component 2, *Neglect* (6 items); .78 for component 3, *Test anxiety* (4 items); .82 for component 4, *Self-Efficacy & Extrinsic Motivation* (8 items); .84 for component 5, *Organization* (4 items); and .79 for component 6, *Prioritizing & Scheduling* (5 items).

The analysis of group differences indicated that higher levels of learning strategies seemed to exist among (a) female students, (b) high-scoring students in math, Korean, English, and science, (c) highly motivated students, (d) overall high academic achievers, and (e) wealthy students exhibited. However, when comparison groups were defined by the demographic variables of *grade-level*, *birth year*, *birth order*, *father's education*, and *mother's education*, no significant differences were found on any of the six subscales.

CHAPTER 5

CONCLUSION

The purpose of this study was to develop an instrument for assessing elementary school students' uses of learning strategies and to assess that instrument's psychometric characteristics. To achieve this purpose, *the Scale of Learning Strategies of Upper Elementary School Students* (the SLSUESS) was created. The proposed research questions in Chapter 1 were as follows:

RQ 1 What is the underlying factor structure of the new instrument?

RQ 2 What is the reliability of the new instrument?

RQ 3 What group differences are revealed by the new instrument?

The SLSUESS was composed of 16 questions for identifying demographic characteristics and 74 items for diagnosing learning strategies. It was administered to nearly 400 students in 4th, 5th, and 6th grades. The items for diagnosing learning strategies were subjected to a principal components analysis (PCA), reliability assessment, and several tests of group differences. Chapter 4 presented the results of these data analyses and evaluated seven research hypotheses in light of the findings.

The current chapter draws conclusions more broadly about the implications of the data analysis for the research questions stated above. It also offers recommendations and suggestions for future research. First, however, a brief review is provided of (a) the procedures and methods used in the investigation and (b) the results of the data analysis.

Summary of Procedures

There were three phases in the development of *the Scale of Learning Strategies for Upper Elementary School Students* (SLSUESS): item development, data collection, and data analysis. In the item development phase, three rules were applied: First, the new scales needed to

embrace the major schemes of learning strategies. Researchers on learning strategies discuss these major schemes in terms of cognitive strategies, metacognitive strategies, resource management strategies, and motivation/Motivation/Affective domains (Charmot et al, 1999; Chiu et al., 2007; Green & Oxford, 1995; Gu, 2012; Liu, 2009; McKeachie, et al., 1987; O'Malley & Chamot, 1990; Oxford, 1989; and Schmeck, 1988). Accordingly, the SLSUESS was structured by these four schemes.

Second, the items of the SLEUESS were designed to fit theoretically sound frameworks that are intertwined in other learning strategy inventories. To meet this criterion, the researcher reviewed a variety range of learning strategy taxonomies, synthesized ideas from the literature review to delineate the subcategories under each major scheme, and then created operational definitions for each subcategory to ensure the relevance of the items (Table 6).

Lastly, the SLEUSS items were thoughtfully examined to ensure that their age-appropriateness for the target population of elementary school students. Specifically, the items referred to contexts that would be familiar to elementary school children, such as school, classroom, and home. Careful attention was also given to ensure that the vocabulary used was simple and clear, and that the sentence structures were straightforward. The resulting items were evaluated for appropriateness. Based on these criteria, 16 items dealing with demographic characteristics and 74 items designed to diagnose the uses of learning strategies were put into the SLEUSS.

The next stage of this project was data collection. The data were collected from an elementary school in Busan, South Korea. To gain access to the population, a research assistant, a current teacher at the school, was appointed. He became part of this research endeavor last January. After that, a letter requesting permission to conduct this research was sent in the early

April to the school principal, who granted permission on April 16, 2014. The data collection began immediately after the IRB approval, on May 13, 2014 (IRB # 9508 B), and was completed early in June. The research assistant played a central role in the data collection (i.e. distributing the survey, hosting a workshop for teachers, collecting the data, and mailing the collected data to my current address in the U.S).

The third and final phase was data analysis. Data were entered into an SPSS file and variable names, variable properties, and labels were specified. After this, a process of data cleaning was performed, in which coding errors, missing values and outliers were checked and corrected. Finally, normality was checked for the 16 demographic variables.

A Principal components analysis (PCA) was conducted to identify the underlying structure of the SLSUESS. During this process, sample size adequacy and factorability tests were conducted. The results indicated that the sample size ($N = 376$) was adequate ($N = 376$) and the data were appropriate for a factor analysis (based on KMO and sphericity statistics). Following these initial checks, the main analyses including PCA, reliability tests, and group differences tests were conducted.

Summary of Findings

A total of 376 participants supplied data for this project, creating a participation rate of 94%. The breakdown inside this group was as follows: Male = 196 (52.1 %), female = 180 (47.9 %); 4th graders = 117 (31.1 %), 5th graders = 132 (35.1 %), 6th graders = 127 (33.8 %). The majority of the participants were the second child in their families ($N = 164$, 43.6 %), the two next largest groups were first children ($N = 130$, 34.6 %) and only children ($N = 56$, 14.9 %). Only 24 participants (6.4 %) were the third child, and the only 2 (0.5 %) had a higher birth order than third.

The majority number of students perceived that their family were “wealthy” ($N = 182$, 48.4 %), “medium” ($N = 106$, 28.2 %), or “very wealthy” ($N = 86$, 22.9 %). The remaining 2 participants (0.5 %) rated their families as “poor.” Regarding parents’ education levels, the response chosen most often was “college/university” both for the father’s education ($N = 168$, 44.7 %) and the mother’s education ($N = 174$, 46.3 %). Meanwhile many of the students indicated “I don’t know” with regard to their parents’ education ($N = 123$ (32.7 %) for *father’s education*; $N = 128$ (34.0 %) in *mother’s education*}).

The participants rated their *overall academic grades* as “fair” ($N = 153$, 40.7 %), “good” ($N = 140$, 37.2 %), “excellent” ($N = 71$, 18.9 %), or “poor” ($N = 12$, 3.2 %). Many of the participants perceived that their English-language scores to be “excellent” ($N = 166$, 44.1 %) while 90 students perceived their math scores as excellent (23.9%). However, only 84 students (22.3%) perceived their *science* scores as “excellent.

A principal components analysis (PCA) was conducted to understand the underlying structure of the 42-item SLSUESS. The PCA suggested 6 factors of the SLSUESS. Assessment of internal consistency test revealed these reliability estimates: .93 for the entire set of 42 items; .92 for component #1, *Study Skills & Efforts* (15 items); .83 for component #2, *Neglect* (6 items); .78 for component #3, *Test anxiety* (4 items); .82 for component #4, *Self-Efficacy & Extrinsic Motivation* (8 items); .84 for component #5; *Organization* (4 items), and .79 for component #6, *Prioritizing & Scheduling* (5 items).

Significant group differences were found when subgroups were created based on *gender*, *math scores*, *Korean-language scores*, *English-language scores*, *science scores*, *math- is-interesting*, *Korean- is- interesting*, *English- is-interesting*, *science-is-interesting*, *overall*

academic scores, and *economic conditions*. Meanwhile, for the other five variables, *birth year*, *grades*, *birth order*, *father's education*, and *mother's education*, no group differences emerged.

Discussion

This section contains discussion of the study's literature review and statistically based results, using three research questions defined in Chapter 1.

RQ 1 What is the underlying factor structure of the new instrument?

Originally, the items of the SLSUESS were designed to coincide with the main structures of learning strategies identified by various theorists, particularly Charmot et al. (1999), Chiu et al. (2007), Green & Oxford (1995), Gu (2012), Liu (2009), McKeachie et al. (1987), O'Malley & Chamot (1990), Oxford (1989), Schmeck (1988) and Weinstein & Mayer (1986). Accordingly, cognitive learning strategies, metacognitive learning strategies, resource management learning strategies, and motivation/affective domains were the defined main structures for item development. Table 26 specifies how the PCA solution with 6 factors conforms to the dimensions of the original structures. In the table, all 42 items are denoted as to discern each item's category and specified subcategory.

The PCA suggested 6 factors of the 42-item SLSUESS. This result was achieved by removing 32 items from the original version of the instrument. After obtaining the PCA solution, titles were created for the six subscales: *Study Skills & Efforts*, *Neglect*, *Test Anxieties*, *Self-efficacy & Extrinsic Motivation*, *Organization*, and *Scheduling & Prioritizing*.

Three important observations should be made about Table. First, the SLSUESS includes the main dimensions of the learning strategies. Among the 42 items, 8 items measure cognitive strategies, 13 items measure metacognitive strategies, 8 items measure resource management strategies, and the remaining 13 items measure motivation/affect domains of learning strategies.

Thus, the SLSUESS has “balanced weight” among the major dimensions of learning strategies, a feature that any instrument for assessing learning strategies should possess.

Second, the items that measure extrinsic motivation were found to be a stronger factor than the items that measure intrinsic motivation and lack of motivation. When the PCA was conducted, all three items measuring the lack of motivation and four items measuring intrinsic motivation were deleted because the patterns of those items was not as systematic as that shown by the items measuring extrinsic motivation. These results suggest that the items measuring intrinsic motivations and lack of motivation are simply not good items. Otherwise, extrinsic motivation would likely be a more important factor, at least for the kind of students who participated in the survey.

Table 26

Items and Learning Strategies to Measure

Categories	Subcategories	Items	Subscale
Cognitive LS (8 items)	Rehearsing	q3 Try to memorize what I've learned in class	1
	Imagery	q5 Look over tables	1
	Imagery	q6 Look over charts	1
	Inference	q7 Read titles and subtitles	1
	Inference	q8 Look over illustrations on text books	1
	Elaborating	q11 Try to understand important subjects	1
	Deduction/induction	q15 Review problems that I have skipped	1
	Note taking	q16 Highlight important words while reading	1
Meta- cognitive LS (13 items)	Monitoring	q18 Listen well when the teacher is speaking	1
	Monitoring	q19 Check answers before turning in a test	1
	Monitoring	q20 Try to choose best answer in a multiple choice question	1
	Planning	q24 Prepare well for a test	1
	Regulating	q25 Have ways to get through boring classes	6
	Regulating	q26 Work hard on homework	1
	Regulating	q28 Try hard even in classes that I don't like	1
	Regulating	q29 Finish homework first even if there are other fun things to do	6
	Regulating (-)	q31 Walk around during class	2
	Regulating (-)	q32 Daydream in class	2
	Regulating (-)	q33 Put off homework until the last minute	2
	Regulating (-)	q34 Miss homework	2
	Regulating (-)	q35 Put off homework if I do not know the answer	2
Resource management LS (8 items)	Organizing	q37 Make sure my desk area is neat	5
	Organizing	q38 Have my materials for class ready	5
	Organizing	q39 Write down things needed for class	5
	Organizing	q40 Find class materials easily	5
	Time management	q46 Set aside time to study	6
	Time management	q47 Have a study calendar	6
	Time management	q48 Have a schedule for the day	6
	Time management (-)	q52 Be late to class	2
Motivation/ Motivation/ Affective domains (13 items)	Motivation (intrinsic)	q56 Think things I learn in class are important	1
	Motivation (extrinsic)	q58 Have to be better at schoolwork than my friends	4
	Motivation (extrinsic)	q59 Think good grades are important	4
	Motivation (extrinsic)	q60 Think getting recognized for good grades is important	4
	Self-efficacy	q65 Think school work is easy	4
	Self-efficacy	q66 Think I'm smart	4
	Self-efficacy	q67 Learn faster than others	4
	Self-efficacy	q68 Solve most problems if I invest enough efforts	4
	Self-efficacy	q69 Complete school works by myself	4
	Test anxiety	q71 Forget things because of text anxiety	3
	Test anxiety	q72 Feel nervous when taking a test	3
	Test anxiety	q73 Have test anxiety days before the test	3
	Test anxiety	q74 Feel sick before an important test	3

(-) means lacking strategies

Finally, the SLSUESS assesses diverse aspects of learning strategies. In Chapter 2, the key characteristics of learning strategies were summarized as intentionality, self-initiation, sequencing of activities, and automaticity (Gu, 2012; Weinsein & Mayer, 1990). The structures of the SLSUESS reflect these key characteristics of learning strategies. Specifically, the items reflect the requirements that learners should exert intentional effort to acquire and maintain effective learning strategies until those learning strategies become automatic.

In sum, the structures of SLSUESS match up nicely with the major key themes of learning strategies. Moreover, the structures of the scale reflect the importance of extrinsic motivation. Finally, the items of the scale correspond to the key characteristics of learning strategies.

RQ 2 What is the reliability of the new instrument?

The results of the reliability assessment indicated that the SLSUESS is highly reliable. Cronbach's alpha of internal consistency test revealed these reliability estimates: .93 for the complete set of 42 items, .92 for *Study Skills & Effort*, .83 for *Neglect*, .78 for *Test anxiety*, .82 for *Self-Efficacy & Extrinsic Motivation*, .84 for *Organization*, and .79 for *Prioritizing & Scheduling*.

According to Kline (2000), one can use these benchmarks for interpreting Cronbach's alpha:

If $\alpha \geq .9$, the internal consistency is excellent (high stake testing)

If $0.7 \leq \alpha < 0.9$, the internal consistency is good

If $0.6 \leq \alpha < 0.7$, the internal consistency is acceptable

If $0.5 \leq \alpha < 0.6$, the internal consistency is poor

If $\alpha < 0.5$, the internal consistency is unacceptable (p. 13).

Consequently, the SLSUESS was found to be a highly reliable scale for measuring learning strategies.

RQ 3 What group differences are revealed by the new instrument?

Group differences of the SLSUESS were observed for 11 out of 16 of the demographic variables (independent variables) defined in the SLSUESS. First of all, the SLSUESS suggests that high academic achievers are much more efficient with learning strategies than low achievers. Significant group differences of *overall academic grades* were observed in all six factors of the subscales of the SLSUESS. The high achievers showed a tendency to be different from low achievers in terms of *Study Skills & Effort, Organization, Prioritizing & Scheduling, Self-Efficacy & Extrinsic Motivation, Neglect, and Test Anxiety*.

Similar results were found when the study's participants were divided into comparison groups based on their self-reported levels of academic interest and achievement. High scoring students in *math, Korean-language, English-language, and science* showed, on average, more use of *Study Skills & Effort, Self-Efficacy & Extrinsic Motivation, Organization, and Scheduling & Prioritizing* than do low scoring students. High-achieving students either in *Korean-language* or *science* showed significantly lower *Neglect* behaviors than low scoring students in those subjects. High scoring students in *math* showed significantly lower *Test Anxiety* than low scoring students.

Second, motivated students are more effective learners. Motivated students in any of the subjects, including *math, Korean-language, English-language, and science*, showed higher frequencies of using *Study Skills & Effort*. Motivated students in *science* showed lower tendency of *Neglect* behaviors and *Test Anxiety* than less motivated students in the subject. Motivated students in any of the subjects including *math, English-language, and science* showed higher

Self-Efficacy & Extrinsic Motivation than less motivated students. Motivated students in any of the subjects, including *math*, *Korean-language*, and *English Language*, showed higher tendency of using strategies of *Organization* and *Scheduling & Prioritizing*.

Third, girls seemed to be much more efficient with learning strategies than boys. The girls surveyed for this study showed, on average, a higher mean than the boys on the scales of *Study Skills & Effort*, *Organization*, and *Prioritizing & Scheduling*. These results suggest that girls are more skillful learners than boys, particularly with those three categories of learning strategies.

Finally, economic wealth also seems to correlate with the use of effective learning strategies. The self-reported “wealthy” students in this study had more effective learning strategies in *Scheduling & Prioritizing*.

Recommendations

The findings of this study suggest that the scale of *Learning Strategies for Upper Elementary School Students* (SLSUESS) can be usefully adopted for elementary school students who are in 4th 5th and 6th grade. The resulting assessment can prove useful to teachers.

One of the advantages of the SUESS is that the instrument was created to accommodate the needs of young respondents. Though short and simple, it includes the major schemes that an instrument of learning strategies should cover. *The School Motivation and Learning Strategies Inventory* (SMALSI), the only other validated inventory of learning strategies for elementary school students based on a self-report method, is composed of 147 items. In contrast, the SLSUESS includes only 42 items. This new instrument is more convenient for users.

The SLSUESS can also provide an opportunity for young test takers to reflect on their learning skills. We can assume that a large number of elementary school students in those age

groups may not have previously had any occasion to think about the importance of learning strategies. If they evaluate their own learning strategies and then are guided by teachers or parents to reflect on their results, those students may be prompted to think about the value of learning strategies and to understand how effective learning strategies can help them get the most out of their school experiences.

For instance, some students may simply assume that a lack of motivation is a natural part of their school experiences, without seriously thinking about the connection between high motivation and better grades. Likewise, some students may not draw a logical connection, on their own, between good organizational skills and improved achievement. In brief, the SLSUESS can promote elementary school student's awareness of the value of learning strategies. Such awareness can lead the students to take more control of their learning.

The SLSUESS is also useful for teachers. If teachers administer the SLSUESS to their classes, they can use the results to understand their students' learning processes as well as their learning results and can make logical deductions about how best to structure their curriculum to take advantage of students' strengths and compensate for their weaknesses in learning strategies.

Teachers can also use the SLSUESS to understand more fully the needs of individual students. Some students may have problems in cognitive strategies while others may suffer from test anxiety. Such problems are hard to detect without systematic interventions. The simple version of the scale measuring young students' learning strategies can help teachers to probe their students' "mind-set" toward learning, and, more importantly, to choose the most appropriate instructional methods to guide them in the right direction.

As a final comment, two unique features about this study need to be pointed out: the Bonferroni adjustment and my Korean participants. Bonferroni correction is known as the most rigorous method to control Type I error inflation. Because significance in group comparison tests were evaluated with a rigorous adjusted alpha level $\{0.05 \text{ (conventional significance level)} \div 96 \text{ (number of tests)} = 0.00052\}$, the significant group differences identified in this research study are more dependable.

Finally, the site for this study was from South Korea. While most research is conducted and, therefore, discussed using data from within the US, the data collection came from a different country. As a result, this study brought an opportunity to understand a society other than the US.

Suggestions for Further Research

For further research, the following suggestions are recommended. First, to ensure factor structures and the reliability, the results should be duplicated with other populations. For example, comparing the results for upper elementary school students (in 4th, 5th and 6th grade in particular) at different schools would provide useful insights about the accuracy of the current study's factor analysis and reliability.

For example, items in the subscales of *Organizing* and *Scheduling & Prioritizing* appear to be similar. Further analysis is needed to see if those items can be combined into one subscale. Another example is that PCA revealed that extrinsic motivation items were strong while the items measuring intrinsic motivation were weak. To support the hypothesis that extrinsic motivation is a stronger factor than intrinsic motivation factor for elementary school students, duplicated results should be observed from further studies.

Second, sampling should be taken from a more diverse population. This research was conducted with a convenience sample. Therefore, there are limits on the generalizations that can

confidently be drawn from the results. If data were collected from both rural and urban schools, wealthy and poorer communities, and schools with more diversity in ethnicity and nationality, confidence for generalization could be increased.

Finally, future analysis should include more assessment of validity. This study used factor analysis, which is one means of establishing construct validity (Anastasi, 1988). Content validity was also confirmed by the fact that the items were created based on a large body of literature reviews, but additional validation process such as concurrent and predictive validity are also recommended.

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APPENDICES

APPENDIX A

Letter for Permission

Mijoo Lee
 535 Jane & David Bailey Education Complex
 1122 Volunteer Boulevard
 Knoxville, Tennessee 37996-3452
 Phone: 865-974-8145
 Fax: 865-974-0135
 Email: mlee25@utk.edu

April 2, 2014

Kildong Hong (Pseudonym)
 Principal
 Joy Elementary School (Pseudonym)
 Address
 Busan Metropolitan City, 612-863

Dear Principal Kildong Hong ,

My name is Mijoo Lee, a Ph. D. student in Applied Educational Psychology at the University of Tennessee, Knoxville. I am writing this letter to request your approval to conduct a survey for students who are in 4th through 6th grades.

The items on the survey are to develop a new instrument of learning strategies for elementary school students. As you may know, learning strategies are known to be one of the most influential elements for academic success. Therefore diagnosing the uses of learning strategies should be importantly considered from an elementary school period. However, inventories for learning strategies for elementary school students are limited. Only a few of published instruments are available. They are also expensive and require complex process for an assessment. Thus, this project of the development of the new instrument of learning strategies will provide a great deal of benefits for elementary education in the future.

Your students' participation in the survey is one of the most important processes of the project. The data from the survey will be used to evaluate the diagnostic capacity of the items on the questionnaire. Without that process, any good instrument of learning strategies would be impossible to create.

The participants for the survey will be students in 4th, 5th and 6th grades. To complete the survey, it will take approximately 10 to 15 minutes. The survey is anonymous. Thus any individual information will not be reported, and confidentiality will be strictly kept. The research has already obtained the approval from Institutional Review Board (IRB) at the University of Tennessee, Knoxville.

If you permit me access to the students at your school, it would be greatly appreciated. By participating in this survey, your students will be instrumental in this project to develop a new instrument of learning strategies. If this pilot study verifies the new instrument of learning strategies, it could potentially benefit children all around the world. I would particularly be pleased in knowing the children from my hometown, Busan, participated in this project.

Thank you for your time and consideration. I look forward to hearing back from you at your convenience.

Sincerely,

Mijoo Lee
 The University of Tennessee
 Department of Educational Psychology & Counseling
 Doctoral Student & Graduate Research Assistant

APPENDIX B

Student Assent

535 Jane & David Bailey Education Complex
1122 Volunteer Boulevard
Knoxville, Tennessee 37996-3452
Phone: 865-974-8145
Fax: 865-974-0135
Email: mlee25@utk.edu

Hello. My name is Mijoo Lee. I am a doctoral student at University of Tennessee, Knoxville in the USA. I very much would like you to complete a survey I have developed.

The questions on my survey may end up being included in an instrument of learning strategies for elementary school students. Your answers (and those from other students) will be used to determine if each question on the survey is good or bad. Since determining this is very important, you are providing important information for this project.

For this survey, all you have to do is answer the questions. The questions do not have any right or wrong answers. So, please respond to the questions honestly. No one will know how you answer my questions because you will put your name on the survey. In other words, your answers will be “anonymous.”

My survey includes 16 demographic questions and 74 learning strategy questions. It may seem that the survey has a large number of questions, but the questions are easy to answer. Most likely, you will be able to answer all the survey questions in about 10-15 minutes.

When you finish answering the questions, return the survey materials to your teacher. If you decide that you don't want to do this anymore, all you have to do is stop. It is OK. Also if you do not like to answer some of the questions, just skip the questions.

If you have any questions, feel free to ask your teacher. Your teacher will assist you any time you need help.

I hope you to enjoy the survey.

Mijoo Lee

APPENDIX C

Survey Questionnaire (English)

Part I Demographic Question

Choose **ONE** answer among the examples below that describes you the most, and circle. There is no wrong or right answer in the questions. Please try to be as accurate as possible.

<Examples>

No		A	B	C	D	E
1	I am a	Korean	American	Chinese		
2	My art scores are	Excellent	Good	Fair	Poor	

Now answer the questions. You may ask your teacher to explain the questions if needed.

No	Questions	A	B	C	D	E
1	I am	a boy	a girl			
2	I am in the	4 th grade	5 th grade	6 th grade		
3	I am	the only child	the first child	the second child	the third child	other
4	I was born in	2003	2004	2005	2006	other
5	My math scores are	excellent	good	fair	poor	
6	My Korean scores are	excellent	good	fair	poor	
7	My English scores are	excellent	good	fair	poor	
8	My science scores are	excellent	good	fair	poor	
9	Studying math is	very interesting	interesting	not so interesting	not interesting at all	
10	Studying Korean is	very interesting	interesting	not so interesting	not interesting at all	
11	Studying English is	very interesting	interesting	not so interesting	not interesting at all	
12	Studying science is	very interesting	interesting	not so interesting	not interesting at all	
13	My overall academic grades are	excellent	good	fair	poor	
14	My family is	very wealthy	wealthy	medium	poor	very poor
15	My father graduated from a (an)	graduate school	college or university	high school	middle school or below	I don't know
16	My mother graduated from a (an)	graduate school	college or university	high school	middle school or under	I don't know

Part II Learning Strategy Questions

Choose **ONE** answer among the examples below that describes you the most, and circle. There is no wrong or right answer in the questions. Please try to be as accurate as possible.

<Examples>

No	How often do I/ How much do I.....	Almost never	Rarely	usually	Almost always
1	Like to solve hard problems	1	②	3	4
2	Stay up late at night	1	2	3	④

Now please answer the questions. You may ask your teacher to explain the questions if needed.

No	How often do I/ How much do I.....	Almost never	Rarely	usually	Almost always
1	Review notes	1	2	3	4
2	Review chapter problems	1	2	3	4
3	Try to memorize what I've learned in class	1	2	3	4
4	Take notes during class	1	2	3	4
5	Look over tables	1	2	3	4
6	Look over charts	1	2	3	4
7	Read titles and subtitles	1	2	3	4
8	Look over illustrations on text books	1	2	3	4
9	Ask if I don't understand	1	2	3	4
10	Look up the material if I don't understand	1	2	3	4
11	Try to understand important subjects	1	2	3	4
12	Look up words I don't know the meaning of	1	2	3	4
13	Use sources other than the textbook to study	1	2	3	4
14	Make test prep questions for myself	1	2	3	4
15	Review problems that I have skipped	1	2	3	4
16	Highlight important words while reading	1	2	3	4
17	Ask if I don't understand a test question	1	2	3	4
18	Listen well when the teacher is speaking	1	2	3	4
19	Check answers before turning in a test	1	2	3	4
20	Try to choose best answer in a multiple choice question	1	2	3	4
21	Know how long my homework will take	1	2	3	4
22	Try to sleep good the night before a test	1	2	3	4
23	Prepare well for a presentation	1	2	3	4
24	Prepare well for a test	1	2	3	4
25	Have ways to get through boring classes	1	2	3	4

26	Work hard on homework	1	2	3	4
27	Have a place just for studying	1	2	3	4
28	Try hard even in classes that I don't like	1	2	3	4
29	Finish homework first even if there are other fun things to do	1	2	3	4
30	Not pay attention in class	1	2	3	4
31	Walk around during class	1	2	3	4
32	Daydream in class	1	2	3	4
33	Put off homework until the last minute	1	2	3	4
34	Miss homework	1	2	3	4
35	Put off homework if I do not know the answer	1	2	3	4
36	Think about what to do after school during class	1	2	3	4
37	Make sure my desk area is neat	1	2	3	4
38	Have my materials for class ready	1	2	3	4
39	Write down things needed for class	1	2	3	4
40	Find class materials easily	1	2	3	4
41	Take good notes	1	2	3	4
42	Forget to bring something to school	1	2	3	4
43	Forget to bring something home from school	1	2	3	4
44	Go to bed early	1	2	3	4
45	Get up early	1	2	3	4
46	Set aside time to study	1	2	3	4
47	Have a study calendar	1	2	3	4
48	Have a schedule for the day	1	2	3	4
49	Spend too much time watching TV	1	2	3	4
50	Spend too much time on computer	1	2	3	4
51	Spend too much time on studying	1	2	3	4
52	Be late to class	1	2	3	4
53	Like to read books	1	2	3	4
54	Like going to the library	1	2	3	4
55	Think studying is fun	1	2	3	4
56	Think things I learn in class are important	1	2	3	4
57	Think school teaches me important things	1	2	3	4
58	Have to be better at schoolwork than my friends	1	2	3	4
59	Think good grades are important	1	2	3	4
60	Think getting recognized for good grades is	1	2	3	4

	important				
61	Study hard to please my parents	1	2	3	4
62	Don't want to go to school	1	2	3	4
63	Want to quit school	1	2	3	4
64	Think school isn't important in my life	1	2	3	4
65	Think school work is easy	1	2	3	4
66	Think I'm smart	1	2	3	4
67	Learn faster than others	1	2	3	4
68	Solve most problems if I invest enough efforts	1	2	3	4
69	Complete school works by myself	1	2	3	4
70	Feel studying becomes harder as grade level progresses	1	2	3	4
71	Forget things because of test anxiety	1	2	3	4
72	Feel nervous when taking a test	1	2	3	4
73	Have test anxiety days before the test	1	2	3	4
74	Feel sick before an important test	1	2	3	4

Thank you for your participation for the survey.

APPENDIX D

Survey Questionnaire (Korean)

※인적 사항 질문

보기 중에서 자기를 가장 잘 나타낸 번호를 하나만 골라 ○표를 해 주세요. 맞거나 틀린
답이 없으니 정직하게 답해 주세요.

<예시>

번호	질문	가	나	다	라	마
1	나는	한국인	미국인	중국인		
2	나는 미술을	매우 잘 함	잘 함	보통	노력 요함	

이제 질문에 답해 주세요. 이해가 잘 안 되면 선생님께 여쭙보세요.

번호	질문	가	나	다	라	마
1	나는	남자	여자			
2	나는	4 학년	5 학년	6 학년		
3	나는 부모님의	외동이다	첫째 아이다	둘째 아이다	셋째 아이다	기타
4	내가 태어난 해는	2003 년	2004 년	2005 년	2006 년	기타
5	나는 수학을	매우 잘 함	잘 함	보통	노력 요함	
6	나는 국어를	매우 잘 함	잘 함	보통	노력 요함	
7	나는 영어를	매우 잘 함	잘 함	보통	노력 요함	
8	나는 과학을	매우 잘 함	잘 함	보통	노력 요함	
9	나는 수학을	매우 좋아 함	좋아함	보통	안 좋아 함	
10	나는 국어를	매우 좋아 함	좋아함	보통	안 좋아함	
11	나는 영어를	매우 좋아 함	좋아함	보통	안 좋아함	
12	나는 과학을	매우 좋아 함	좋아함	보통	안 좋아함	
13	나의 학교 성적은	매우 우수함	우수함	보통	노력 요함	
14	나의 집안환경은	매우 풍족함	풍족함	보통	가난함	매우 가난함
15	아빠의 최종학력은	대학원 졸업	대학 졸업	고등학교 졸업	중학교 이하	모름
16	엄마의 최종학력은	대학원 졸업	대학 졸업	고등학교 졸업	중학교 이하	모름

※ 학습 전략 질문

보기 중에서 자기를 가장 잘 나타낸 번호를 하나만 골라 ○표를 해 주세요. 맞거나 틀린 답이 없으니 정직하게 답해 주세요.

<예시>

번호	나는...	거의 안 하는 편/ 거의 안 그런 편	안 하는 편/ 안 그런 편	하는 편/ 그런 편	항상 하는 편/ 항상 그런 편
1	어려운 문제 푸는 걸 좋아한다	1	②	3	4
2	밤늦게 까지 깨어있는다	1	2	3	④

이제 질문에 답해 주세요. 이해가 잘 안 되면 선생님께 여쭙보세요.

번호	나는...	거의 안 하는 편/ 거의 안 그런 편	안 하는 편/ 안 그런 편	하는 편/ 그런 편	항상 하는 편/ 항상 그런 편
1	요점 정리한 것을 나중에 다시 본다	1	2	3	4
2	단원의 복습 문제를 풀어본다	1	2	3	4
3	수업 시간에 배운 내용을 잘 기억하려고 노력한다	1	2	3	4
4	수업 시간에 요점 정리를 한다	1	2	3	4
5	표를 잘 살펴본다	1	2	3	4
6	그래프를 잘 살펴본다	1	2	3	4
7	제목과 부제목을 읽는다	1	2	3	4
8	삽화를 잘 살펴 본다	1	2	3	4
9	이해가 안되면 주변 사람들에게 물어 본다	1	2	3	4
10	이해가 안되면 자료를 찾는다	1	2	3	4
11	중요 내용은 꼭 이해하려고 한다	1	2	3	4
12	잘 모르는 단어의 뜻을 조사한다	1	2	3	4
13	교과서 이외에 다양한 공부 자료를 사용한다	1	2	3	4
14	시험에 대비해서 예상 문제를 만들어 본다	1	2	3	4
15	모르고 넘어간 문제를 다시 체크 한다	1	2	3	4
16	중요한 부분에 밑줄을 긋는다	1	2	3	4
17	시험 문제가 이해가 잘 안될 때는 질문을 한다	1	2	3	4
18	선생님의 설명을 귀담아 듣는다	1	2	3	4
19	시험지를 제출하기 전에 다시 살펴 본다	1	2	3	4
20	사지선다형 문제를 풀 때는 가장 적당한 답을 고르려고 한다	1	2	3	4

21	숙제를 얼마 만에 끝낼 수 있는지를 안다	1	2	3	4
22	시험 치기 하루 전날에는 잠을 잘 자려고 노력한다	1	2	3	4
23	발표에 대비해서 준비를 한다	1	2	3	4
24	시험에 미리 대비한다	1	2	3	4
25	지루한 과목을 재미있게 공부하기 위한 방법을 짠다	1	2	3	4
26	숙제를 잘하려고 노력 한다	1	2	3	4
27	내 공부 장소를 정해놓는다	1	2	3	4
28	내가 싫어하는 과목이라도 성적을 잘 받기 위해 노력한다	1	2	3	4
29	다른 재미있는 일이 있어도 숙제를 먼저 한다	1	2	3	4
30	수업에 집중을 못 한다	1	2	3	4
31	수업시간에 일어나서 돌아다닌다	1	2	3	4
32	수업 중 딴 생각을 한다	1	2	3	4
33	숙제를 미룰 때까지 미룬다	1	2	3	4
34	숙제를 안 한다	1	2	3	4
35	모르는 것이 나오면 숙제를 그만 둔다	1	2	3	4
36	학교 끝나고 할 일을 공부 시간에 생각한다	1	2	3	4
37	내 자리는 정리가 되어 있어야 한다	1	2	3	4
38	학습 준비물을 미리 챙긴다	1	2	3	4
39	학습 준비물을 적는다	1	2	3	4
40	학습 용품을 잘 찾는다	1	2	3	4
41	노트 필기에 신경 쓴다	1	2	3	4
42	학교에 오면 항상 무엇을 까먹었다	1	2	3	4
43	집에 와서 숙제를 하려고 보면 학교에 무엇을 두고 왔다	1	2	3	4
44	일찍 잔다	1	2	3	4
45	일찍 일어 난다	1	2	3	4
46	공부시간을 정해 놓는다	1	2	3	4
47	공부 달력을 사용한다	1	2	3	4
48	하루 일과 계획을 세운다	1	2	3	4
49	텔레비전을 지나치게 본다	1	2	3	4
50	컴퓨터를 하며 보내는 시간이 너무 많다	1	2	3	4
51	공부하는 시간이 지나치게 많다	1	2	3	4
52	수업시간에 늦게 나타난다	1	2	3	4
53	책 읽는 것을 좋아한다	1	2	3	4
54	도서관 가는 걸 좋아한다	1	2	3	4

55	공부는 재미있다	1	2	3	4
56	수업 시간에 배운 것은 중요하다	1	2	3	4
57	학교는 내게 중요한 걸 가르쳐 준다	1	2	3	4
58	친구들보다 나는 학교 공부를 잘 해야 한다	1	2	3	4
59	학교 성적을 잘 받는 것은 중요하다	1	2	3	4
60	공부를 잘 해서 칭찬 받는 것은 중요하다	1	2	3	4
61	공부를 잘 해서 부모님을 기쁘게 하려고 한다	1	2	3	4
62	학교 가기가 싫다	1	2	3	4
63	학교를 그만 두고 싶다	1	2	3	4
64	학교는 내 인생에서 중요하지 않다	1	2	3	4
65	학교 공부는 쉽다	1	2	3	4
66	나는 똑똑하다	1	2	3	4
67	나는 다른 애들 보다 빨리 배운다	1	2	3	4
68	시간만 투자하면 대부분의 문제를 풀 수 있다	1	2	3	4
69	학교 공부를 혼자 해낸다	1	2	3	4
70	학년이 올라 갈수록 공부가 점점 어려워 진다	1	2	3	4
71	시험을 치면 불안해서 공부 한 게 생각이 안 난다	1	2	3	4
72	시험 칠 때 무척 떨린다	1	2	3	4
73	시험을 앞두면 며칠 전부터 떨린다	1	2	3	4
74	중요한 시험을 앞두면 아프기 시작한다	1	2	3	4

설문에 참가해 주어서 고맙습니다.

Vita

Mijoo Lee was born on August 29, 1965 in Busan, South Korea. Prior to her involvement in the current doctoral program at the University of Tennessee, Knoxville, she achieved a Master of Science degree in Applied Educational Psychology at the same school in 2006. She also earned a Master of Education degree in English Education at Pukyong National University, South Korea in 2002. Her masters' thesis was entitled: *An aspect of the English fricative pronunciation by Korean EFL children at the beginning level.*

She completed a Bachelor of Education degree in Elementary Education at Busan National University of Education in 1988. Immediately after obtaining the bachelor degree, she was employed by the Busan Metropolitan City Office of Education and began her career as an elementary school teacher in Busan, South Korea.