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Exploring Hong Kong University Students' Use of Pronunciation Learning Strategies (PLS)

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Abstract

While the broad field of Language Learning Strategies (LLS) has attracted a considerable amount of interest in the past thirty years, research investigating Pronunciation Learning Strategies (PLS) has been somewhat limited. At a theoretical level, few studies have examined the underlying construct of PLS nor ascertain the possible correlation between PLS use and actual pronunciation performance; at a pedagogical level, the use of specific language tasks to engage learners in PLS use has also been scant. This exploratory study attempts to fill the existing knowledge gaps by investigating the use of pronunciation learning strategies among university students in Hong Kong.

Phase I of the study explored the types and frequency of PLS used by full-time undergraduate students enrolling in a university in Hong Kong and any possible correlation between two primary variables, namely their strategy use frequency and pronunciation ability. 451 participants completed a pronunciation learning strategies questionnaire, among whom 190 participants further completed a pronunciation performance test comprising a read-aloud task and an extemporaneous speaking task conducted in a language laboratory. The survey data were subject to a factor analysis, which resulted in an 8-factor structure, with compensatory-heuristic strategies reported to be most frequently used followed by metacognitive-independent study strategies and sensory-mechanical drilling strategies. An inferential analysis initially suggests that there was a positive correlation between participants' use of PLS and their pronunciation scores ($r = 0.562$, $p < 0.001$). Possible correlation between the two primary variables and a number of other secondary variables was explored through *t*-tests and Spearman's rank order correlation coefficient: it was found that female students tended to use PLS more frequently and also delivered better pronunciation performance than their male counterparts; students who had received previous training on phonetics also showed higher frequency of PLS use and better pronunciation performance than those without; whereas students who studied in EMI schools performed better in the pronunciation test than those from CMI schools without showing significant difference in their PLS use frequencies. Also, the amount of time spent on out-of-class practices and the length of residence in English-speaking countries both showed positive correlations to pronunciation performance. Lastly, a regression statistical analysis examining the relative effects of these above primary and moderator variables on pronunciation performance further suggests that use frequency of functional practice strategies and communicative-interactive strategies as well as the medium of instruction in school remained the most significantly associated with pronunciation scores.

Phase II of the study explored the effectiveness of introducing a digital storytelling (DST) project as a language task in two tertiary English language classrooms to engage students in PLS use. Another group of 33 undergraduate students from the same Hong Kong university enrolling in a 12-week English course were to complete a digital story as part of coursework. Data were collected through a post-course questionnaire, written reflection and follow-up semi-structured interviews to investigate students' use of PLS throughout the one-month project period and factors affecting their strategy choice and use patterns. Results suggest that DST successfully engaged students in active use of a range of PLS. In particular, the format and specific components of DST were directly or indirectly conducive to the development of functional practice strategies, metacognitive-independent study strategies, sensory mechanical-drilling strategies and cognitive, formal rule-processing strategies among students. Observations about students' engagement in peer support-social strategies and affective strategies were also discussed.

Dedication

To Jimmy, my beloved brother.

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Author’s Declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University’s Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate’s own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

Signature: Date: 28 August 2020.

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CHAPTER 1: INTRODUCTION

1.1 My Teaching Context

I am a language teacher in a local university in Hong Kong where I serve in its English language centre that runs mandatory and optional courses for its undergraduates. A comprehensive tertiary institute, the university offers degree programmes in a variety of academic disciplines through eight faculties, namely Arts, Education, Engineering, Science, Social Science, Business Administration, Law and Medicine, with a bilingual (English and Chinese) language policy. It admits close to 3000 full-time undergraduate students every year and the majority of the student body are local students, constituting around 84% of the student intake, while the remaining students come from Mainland China (roughly 10%) and overseas (around 6%) (Office of Student Affairs, 2013).

Over the past few years, I served as one of the teachers instructing a foundational course titled “ELT1107: English Improvement Strategies for Listening and Speaking”, a 12-week introductory course training English listening and speaking skills with a heavy focus on acquisition of basic features of spoken English and pronunciation training, directed at less capable students having lower language proficiency as its target group. The remedial course was compulsory as a graduation requirement to those scoring D or E grades in their Use of English papers at Hong Kong Advanced Level Examination (i.e. the two lowest entrance grades eligible for university admission, benchmarked against IELTS banding of 5.4 to 6.5) (HKEAA, 2015). Meanwhile, it was also available for voluntary enrolment by other undergraduates, such as those attaining better results in the HKALE, students admitted via other non-local examination schemes, International Baccalaureate (IB) or Advanced Placement (AP) for example, as well as overseas students on exchange, as a free elective.

ELT1107 was the first one in a set of three consecutive courses aiming to scaffold the development of students’ speaking competencies, putting strong focuses on “micro-level speech production” of “discrete-point pronunciation features” like vowels and consonants, “base features” of rhythm and stress, as well as some coverage of “global patterns of macro-level speech performance” like the suprasegmentals and overall fluency, which would subsequently be strengthened in the two higher-level courses (Morley, 1991, p.497; Morley, 1994, p.75). The course design of ELT1107 reflected the course convenor’s attempt to encourage student engagement in cognitive analyses and to promote autonomous learning to some degree, for example, through familiarizing students with rules such as explaining the

connection between morphological structures of word spellings and pronunciation, and promoting hands-on use of pronunciation dictionaries (Kenworthy, 1987, as cited in Seidlhofer, 2001, p.63). Instruction materials adopted in the course featured pronunciation teaching techniques along the lines of linguistic approaches, particularly audiolingualism: For example, phonetic symbols or key words were used to signify phonemes, sagittal diagrams drawn to illustrate manners of articulation, and minimal pairs exercises used for practicing commonly confused sounds (Brinton, 2012, pp.247-251).

1.2 My Inspiration and Drive for the Study

Being a frontline teacher, I actively reflect on my teaching practice in hopes that my teaching could support students in achieving the intended learning outcomes more effectively. Having delivered ELT1107 for several terms, I have repeatedly reviewed and introduced additions and modifications to the set course material yet remained well aware of the fact that the majority of my students enrolled in this language course involuntarily and hence often appeared less motivated in working on their proficiency as we might have wished. Meanwhile, despite the title of the course being “English Improvement Strategies”, the course syllabus scarcely covered topics related to strategic learning, or more specifically, Pronunciation Learning Strategies. As a result, even though a considerable portion of class time was dedicated to teaching pronunciation related knowledge and features of spoken English, students were seldom observed to invest time and energy to put what they had learned into practice.

Just as the repetitive teaching of the said course gradually fell into a humdrum routine with the increment in teaching effectiveness reaching a bottleneck, I stumbled upon a series of professional development events for language teachers delivered by Dr Paul Sze from the Department of Curriculum and Instruction at the Chinese University of Hong Kong, where he shared the mechanics of adopting digital storytelling (DST) as a language learning activity supported by new technologies. While practitioners around the world have focused on the educational value of DST in developing narrative pedagogy (Garcia & Rossiter, 2010; Gazarian, 2010) and reflective skills (Jenkins & Lonsdale, 2007; Callens & Ellen, 2008; Callens & Ellen 2009), I was instead struck by its untapped potential in enhancing students’ speaking and pronunciation competencies as I engaged in hands-on trials during the workshops.

The above experiences have led me to become interested in learning more about strategic learning for pronunciation improvement as well as the possibility of using digital storytelling to engage students in active pronunciation practice. My professional interest in the former and my new found pedagogical interest in the latter would thereby be combined in the present research project. This chapter will provide an introduction to the two-part study, covering its background, research questions, potential contributions to knowledge, and the structural overview of the entire dissertation.

1.3 Background and Rationale for the Study

1.3.1 Why Pronunciation Learning Strategies (PLS)?

Pronunciation was dubbed the "Cinderella of language teaching" (Kelly, 1969, p.87) that was "kept behind doors and out of sight" (Celce-Murcia, Brinton & Goodwin, 1996, p.323). For a long period of time pronunciation has been marginalized from the TESL mainstream, "relegated to a subordinate role" compared to other skills sets (Isaacs, 2013, p.2).

In second language research, one area in which the neglect of pronunciation is evident appears to be that of Language Learning Strategies (LLS). The 1970s to 1980s saw a shift from teacher-centred to learner-centred instructional approaches, with language learners playing an increasingly active and pivotal part throughout the process of learning. This in turn led to considerable interests in individual differences (ID), with a focus on what makes a language learner successful. One of the first scholars to delineate the traits of a "good language learner" (GLL), Rubin (1975) profiled a list of strategies used by those considered to be successful in language acquisition. His attempt was followed by an explosion of research in the area of strategic language learning.

Language Learning Strategies have been defined by Oxford (1990, p.8) as "specific actions, behaviours, steps, or techniques that students use to improve their progress in developing L2 skills". The past thirty years has seen a great deal of research exploring learners' use of various LLS. The literature presents an extensive array of attempts to identify and classify LLS (Ellis, 1994; Naiman, 1978; O'Malley et al., 1985; Oxford 1990; Wenden & Rubin, 1987, among many others). Oxford's categorization scheme, which was established through analysing data collected from a number of large-scale studies (including Ehrman & Oxford, 1995, p.73; Nyikos & Oxford, 1993; Green & Oxford, 1995; Hsiao & Oxford, 2002) and eventually became widely recognized as the most comprehensive classification of LLS to

date (Ellis, 1994, p.539), identifies two main classes, namely “direct strategies” and “indirect strategies”, which are further divided into six sub-categories including “cognitive”, “metacognitive”, “compensatory”, “social”, “affective” and “memory” strategies.

One key contribution that Oxford (1986) has made in LLS research was to develop the *Strategy Inventory for Language Learning* (SILL), a psychometric assessment tool to measure learners’ strategy use in relation to the acquisition of vocabulary as well as reading, writing, listening and speaking skills (Oxford, 1986, p.4). Despite the under-representation of pronunciation strategies in the inventory, the SILL was later on used widely in the field by researchers and practitioners in exploring learner strategies in various contexts, proficiency levels, and even with different languages (including Park, 1997; Watanabe, 1990; Bremner, 1999; Mochizuki, 1999; Yang, 1999; Wharton, 2000; Robson & Midorikawa, 2001; El-Dib, 2004; Nisbet, Tindall & Arroyo, 2005; Kato, 2005; Lai, 2009; Magno, 2010; Park, 2011; Ghaih & Harkouss-Rihan, 2012; Yeşibursa & İpek, 2012; Heo, Stoffa & Kush, 2012). As a matter of fact, the role of pronunciation has been conspicuously downplayed amidst the rapid development of the research area of strategic language learning, the SILL being but one of the examples. This omission was made evident in Chamot’s summary of thirty years of LLS research in the *Annual Review of Applied Linguistics* (2005, p.117-121), where individual sections were devoted to review “Listening Comprehension Strategies Studies”, “Oral Communication Strategies Studies”, “Reading Strategies Studies”, “Vocabulary Strategies Studies” and “Writing Strategies Studies” to date, as well as in Oxford’s (2011) book *Teaching and Researching Language Learning Strategies* with six sub-chapters summarizing knowledge acquired from L2 learning strategy research in the past three decades in L2 “reading”, “writing”, “listening”, “speaking”, “vocabulary” and “grammar”, again with the discernible absence of learning strategies for “pronunciation”.

It was not until the 2000s that the dry spell was broken by Peterson (2000), who conducted the long awaited first study exclusively focused on Pronunciation Learning Strategies (PLS). Peterson identified 44 strategies that English-speaking learners used to improve their Spanish pronunciation by reviewing the literature and collecting data retrospectively through interviewing and using participants’ diaries. Though some of its results may be questionable due to insufficient sample size and obscured factorial analysis procedures, Peterson’s attempt successfully opened up a new area of inquiry on PLS, which was further pursued by a handful of other researchers: To name but a few, Derwing and Rossiter (2002) elicited pronunciation strategies used by immigrant students to address

communication breakdown; Osburne (2003) explored strategies used by adult learners to remedy pronunciation problems encountered in an oral protocol; Eckstein (2007) and Sardegna (2009; 2011) both attempted to explore any influence learners' use of Pronunciation Learning Strategies might have on their pronunciation acquisition; and Pawlak (2010) and Calka (2011) continued the efforts to further identify and classify PLS.

While it is encouraging to see more researchers to join in the bourgeoning line of inquiry in PLS, relevant research attempts remain preliminary, leaving considerable knowledge gaps yet to be filled. For one, the majority of PLS studies conducted thus far had been undertaken in universities in America or Poland, targeted specifically to students majoring in English studies or language education. Secondly, while new PLS used by learners have been continuously uncovered through exploratory research, efforts devoted to examining the underlying construct of PLS remain limited and superficial, thereby resulting in categorization systems that lack consistency and validity. Third, attempts to assess and affirm the positive correlation between PLS use and pronunciation ability are scant. The fact that most of these studies were small-scale with less than 100 participants also posed questions as to the validity and reliability of the factorial and regression analyses therein. Last but not least, researchers have primarily focused on either the effects direct strategy instruction had on students' strategy use behaviour within the classroom or their self-reported strategy use outside class. In other words, studies that explore language tasks that facilitate students' engagement in PLS use are yet to be seen.

The present two-part study aims to contribute to knowledge by filling some of the research gaps identified above by investigating PLS use at two levels: Phase I addresses the macro level by exploring the frequencies and types of Pronunciation Learning Strategies used by university students in Hong Kong and ascertaining any correlations between their PLS use and pronunciation ability while Phase II addresses the micro level by exploring the potential of introducing a language task in engaging students in active use of PLS, namely digital storytelling, in a local tertiary language classroom.

1.3.2 Why digital storytelling (DST)?

In simple terms, a digital story in its minimalist is a form of narrative that comprises a series of still images blended with a narrated audio track to portray a personal story (Lambert, 2002; Bull & Kajder, 2004; Davis, 2004; Banaszewski, 2005). DST engages learners as narrators of their own experience with an emphasis on "the gift of the narrator's voice"

(Lambert, 2002). Such nature of DST therefore renders it an ideal learning activity for practicing speaking skills in an L2 classroom. And DST may potentially be a very useful tool to involve students in the use of Pronunciation Learning Strategies for two reasons:

First, motivation has been found to have an intricate relationship with strategic learning (Cohen, 2003; Oxford, 1990), and in some cases even found to exert "the single most important influence on learning strategy use" among learners (Erhman & Oxford, 1989, p.2). An initial literature review found widespread support for digital storytelling as a learning activity from frontline teachers, especially those facing less able or struggling students with low motivation. In particular, testimonials from teachers almost unanimously agree that DST has time and again proven to boost learning motivation (Fig & McCartney, 2010; Hung, Hwang & Huang, 2012; Yang & Wu, 2012), foster agency and build positive self-image in students (Hull & Katz, 2006; Vinogradova, 2006; Brushwood Rose, 2009).

Christopher (2011) argues that the reason why DST was found enjoyable and empowering by learners from a wide range of backgrounds can be perceived from a constructivist viewpoint: Because storytelling of lived experience "represents the construction of meaning, not simply the conveyance of information" (Garcia & Rossiter, 2010, p.1093) — Given "the centrality of narrative to the human experience" of identity-building and meaning-making (Rossiter, 2002), advocates of narrative pedagogy come to place high value on and take advantage of the power of storytelling in education (see, for example, Gazaran, 2010; Koki, 1998). Or as Oates (1998) puts it, simply and elegantly, "the love of storytelling is universal to our species" (as cited in Christopher, 2011, p.411). Bringing storytelling into the language classroom, it turns learning practices into meaningful activities as learners get to connect the language exercises to their personal, authentic, day-to-day lived experiences, since "everyone has a story to tell" (Behmer, Schmidt & Schmidt, 2006). "Learning is most effective when people can create some kind of meaningful product, often referred to as an artefact of learning" (Harel & Papert, 1991, as cited in Green, 2013, p.25). Digital storytelling, is but traditional storytelling taking a modern form in the digital age, a form of storying that leads to not words on paper but an audio-visual product. Based on the above reasons, it is envisaged that DST could serve as a motivating and engaging language activity for my students.

Second, and more importantly, digital storytelling appears to be an apt activity for engaging students in the active use of Pronunciation Learning Strategies. For one, the improvement of pronunciation ability requires consistent practices (Avery & Ehrlich, 1992;

Kendrick, 1997) so language teachers often face the challenge of having to find ways to provide meaningful and engaging speaking experiences whereby students could be regularly self-monitoring and modifying own speech (Morley, 1991, p.508). Digital storytelling could therefore provide learners with that meaningful context for pronunciation practice. Meanwhile, it is observed that the setup of a DST project is commensurate with Dickerson's (1989, p.1) model for pronunciation learning, the "Covert Rehearsal Model" (CRM). With a theoretical basis from learning strategies research, Dickerson's model proceduralizes a process of "self-monitoring" form-focused pronunciation practice (as cited in Jensen, 2011, p.28), with the following six key components as concisely summarized by Sardegna (2009, p.46):

i. Finding privacy
ii. Engaging in oral practice outside class time
iii. Monitoring own speech
iv. Comparing speaking performance with other models
v. Making changes and adjustments on own pronunciation
vi. Practicing changes aloud for improvement

The procedures a learner goes through to complete a digital storytelling project are commensurate with the components of the CRM as proposed by Dickerson in many ways. It is therefore hypothesized that DST as a language activity has the potential to facilitate students' development of Pronunciation Learning Strategies.

1.4 Objectives of the Study and Research Questions

With the aim to bridge the existing gaps lying within as well as between PLS and DST research, this study attempts to investigate the use of Pronunciation Learning Strategies among university students in Hong Kong, thereby gaining a better understanding of the construct of strategic learning in English pronunciation (Phase I) and ascertain the potentials of adopting digital storytelling in a language classroom as a project-based learning activity to engage students in active use of Pronunciation Learning Strategies (Phase II).

The study was exploratory in nature and conducted in two phases. Phase I of the study was aimed to find out the types and frequency of Pronunciation Learning Strategies used by 451 full-time undergraduate students enrolling in a comprehensive university in Hong Kong (Part A) and then to ascertain any possible correlation between the strategy use and

pronunciation ability of a subset of 190 students among the sampled group (Part B). Data were collected through a pronunciation strategy questionnaire and a pronunciation performance assessment, and then subject to a factorial analysis and a correlation analysis. Phase II of the study was conducted in two speech-pronunciation classrooms in the same Hong Kong university. A digital storytelling project was introduced to another group of 33 undergraduate students enrolling in a 12-week foundation English course and data were collected to explore the potential of digital storytelling in enhancing students' engagement in the active use of Pronunciation Learning Strategies outside class through a post-course questionnaire, a guided written reflection and follow-up interviews. Specifically, the following research questions were addressed in this two-part study:

Phase I (Macro level — Exploring learners' general strategy use)

- *Research Question 1*.
  What Pronunciation Learning Strategies do university students in Hong Kong use to improve their English pronunciation performance?
- *Research Question 2*.
  What factors are associated with these learners' pronunciation performance? In particular, to what extent is learners' use of Pronunciation Learning Strategies associated with their English pronunciation performance?

Phase II (Micro level — Exploring learners' strategy use in response to a language task)

- *Research Question 3*.
  What Pronunciation Learning Strategies do students use in a digital storytelling task in an English language classroom in a Hong Kong university?
- *Research Question 4*.
  In what ways does digital storytelling engage students in the use of Pronunciation Learning Strategies and affect their strategy choice?

1.5 Structure of the Dissertation

Chapter 1 has outlined my teaching context, inspiration and motivation for the research, basic background information about the two key areas of interest, namely Pronunciation Learning Strategies (PLS) and digital storytelling (DST), and a statement of the research questions to be tackled in the study. Chapter 2 will review literature related to PLS

and DST with an aim to summarize related research to date and to identify knowledge gaps. Chapter 3 will detail the research design and methodological procedures including the participants for both phases of the study, and the respective instruments and procedures for data collection and analysis. Chapter 4 will report findings of Phase I of the study and their implications. Chapter 5 will report findings of Phase II of the study and their implications. Chapter 6 will conclude the study by summarizing the key findings and observed limitations of the study with suggestions for future research.

CHAPTER 2: LITERATURE REVIEW

This chapter is organized in two parts. The first section introduces the body of research on Language Learning Strategies (LLS) by summarizing the evolution of the definition and classification of LLS as proposed by strategic learning experts over time, with a focus on reviewing literature specifically relating to Pronunciation Learning Strategies (PLS), which has bourgeoned in the past twenty years. The second section offers an overview of the development of digital storytelling (DST) for educational use, particularly its employment by language teachers in the ESL/EFL classroom. Since both areas of interest in the present study (PLS and DST) are relatively novel with rapid development taking place in the immediate past couple decades, this chapter shall attempt to review related literature primarily in a chronological order while moving along various key themes that have emerged as the research continues to develop. This chapter is informed by formative coursework on EDUC0001 and EDUC0090 (Cheung, 2014b; Cheung, 2015).

2.1 Language Learning Strategies (LLS)

2.1.1 Overview

Learning strategies are “steps taken by students to enhance their own learning” (Oxford, 1990, p.1). Essentially “tools for active, self-directed involvement”, learning strategies are instrumental in helping language learners develop communicative competencies (ibid, 1990). Language Learning Strategies (LLS) research proliferated in these past forty years, with leading studies conducted by O’Malley & Chamot (1990), Oxford (1990; 1993, 2011), and Macaro (2001), investigating various ways in which learners deploy Language Learning Strategies to build and enhance their second language. Sadly, one significant topic within this area of inquiry — Pronunciation Learning Strategies (PLS) use — seems to have been widely overlooked. For example, it is noticeable from her review in 2011 where Oxford compiled research work undertaken in LLS that only strategies related to the four key language skills as well as grammar and vocabulary learning were included while PLS was conspicuously omitted. Considering that the study of PLS remains in infancy, this section will review the handful of previous research outputs chronologically and thematically to reveal their evolution in terms of research focuses and methodologies over time, while identify research gaps that the current study may potentially fill.

2.1.2 Background

The arrival of Communicative Language Teaching (CLT) around 1970 to 1980 led to a shift in the language classroom from the teacher-centred onto the learner-centred approach. This fundamental change advocated the learner playing a more active role throughout the course of acquiring a new language. New found interests arose as a result in exploring individual differences (ID) among learners, particularly concerning the characteristics of "good language learners" as well as strategic choices they made when picking up a language (Hsiao & Oxford, 2020, p.369). For example, Rubin made one of the early attempts to compile a strategic profile for "successful learners" (1975, p.42), highlighting the following key features: "willingness to guess"; "strong drive to communicate"; "willingness to make mistakes"; "attention to form"; "dedication to repeated practice"; "monitoring of speech of self and others"; and "attention to meaning" (ibid, p.45-48). Thereafter, scholars became increasingly devoted to defining and classifying language learning strategies and to ascertaining any association learners' strategic behaviour and choices may have with their achievements in language learning.

2.1.3 Defining Language Learning Strategies (LLS)

LLS literature shows no singular, unified definition for the concept of "strategy". The term has been broadly adopted for denoting what a language learner does to achieve successful learning. Over time scholars have offered a range of definitions for "strategies" and these include:

- Rubin, "techniques or devices which a learner may use to acquire knowledge" (1975, p,43);
- Wenden, "techniques, tactics, potentially conscious plans, consciously employed operations, learning skills, cognitive abilities, language processing strategies and problem solving procedures" (1987, p.7);
- O'Malley and Chamot, "the special thoughts or behaviours that individuals use to help them comprehend, learn, or retain new information" (1990, p.1);
- Oxford, "specific actions, behaviours, steps, or techniques that students use to improve their progress in developing L2 skills" (1990, p.8);
- Oxford, "to make learning easier, faster, more enjoyable, more self-directed, more effective, and more transferrable to new situations" (Oxford, 1992, p.18);
- Cohen, "processes consciously selected by learners and which may result in action to enhance the learning or use of a second or foreign language" (1998, p.4); and

- Hsiao & Oxford, “the L2 learner’s tool kit for active, conscious, purposeful, and attentive learning” that “paves the way toward greater proficiency, learner autonomy, and self-regulation” (2002, p.372).

Looking at the above listed definitions of LLS which have been revised and polished throughout the past thirty years, it could be observed that the majority highlighted three commonalities (Chang, 2012; Oxford 2001): (i) strategic learning can be manifested not only at behavioural levels but also cognitive levels; (ii) strategy usage is goal-oriented and driven by purpose; and (iii) strategies enhance learner autonomy and self efficacy. (For a comprehensive article discussing the definitions around “strategies”, please refer to Griffiths & Oxford, 2014).

2.1.4 Classifying Language Learning Strategies (LLS)

Apart from the numerous attempts to refine the definition of strategies, also contentious has been that of their classification. And same as LLS definitions, an array of LLS inventories and taxonomies have been put forward by researchers. Oxford’s early review (1993) alone has found more than two dozen of L2 strategy categorization systems (, for example, Cohen, 1990; O’Malley & Chamot, 1990; Rubin 1975; Seliger, 1982; Stern, 1975). A more recent review by Cohen (2018, pp.33-34) also pointed out that the existence of “numerous and often competing” systems, including categorizations by “goal”, “function” or “skill”, is partly responsible for the difficulty in interpreting LLS literature. Table 1 below shows three key classification systems widely recognized in the field:

O’Malley and Chamot (1990)	Three categories (26 items) *Metacognitive strategies*: managing or regulating one’s own efforts in the learning process *Cognitive strategies*: related to cognitive processing such as inferencing, guessing and relating new information to old information *Socio-affective strategies*: to interact with other learners and manage one’s feelings in the learning process
Oxford (1990)	Six categories (50 items) *Cognitive strategies*: how learners think of their learning *Metacognitive strategies*: how learners manage their own learning *Memory strategies*: how learners remember and retain language *Compensation strategies*: how learners make up for the limited language to achieve successful language use *Social strategies*: how learners learn language through social interaction *Affective strategies*: how learners adjust their affective status in the learning process
Cohen et al. (2006)	This is a skill-specific taxonomy with 90 items in six skill categories: listening, vocabulary, reading, writing, speaking, and translation. In each category, strategy items are further divided into strategies for different learning scenarios.

Table 1: *Three major LLS inventories (Gao, 2010, p.13)*

Among the many classification systems, the most well acknowledged and widely adopted version appears to be the "*Strategy Inventory for Language Learning (SILL)*" drawn by Oxford (1990, p.37; p.135; p.277) which she built upon the basis of Rubin's (1981) dichotomous division between "direct" and "indirect" strategies. In comparison to its antecedents, the SILL is considered further comprehensive as it subdivided strategies in six categories: "memory", "cognitive", "compensation", "metacognitive", "affective" and "social", whereby the first three groups cover strategies directly involving mentally processing the target language whereas the last three groups cover strategies used to manage or facilitate learning without direct engagement with the language per se (Oxford, 1990).

2.1.5 LLS research methodologies

With Oxford's (1990) *Strategy Inventory for Language Learning* being atop the popularity list, quantitative research using student-completed, summative rating scales (such as Likert-scale questionnaires) has dominated the field alongside the rapid development of strategy taxonomies and inventories. Initially used for identifying and measuring learners' strategy use frequency and preferences, these quantitative tools were later adopted to explore relationships between learners' strategy use patterns and learner success as well as a myriad of other ID variables such as age, gender, personality, aptitude, learning style, motivation and belief (Gao, 2010; Benson & Gao, 2008; Cohen, 2018). While the use of such research instruments has many advantages, including access to a large number of participants, easy application and modification for different learner groups and target languages, ability to generate large amounts of research data in a "cost-efficient manner", to lead to "objectively analysable outcomes", and to allow "systematic investigation of various factors that influence strategy use", researchers also become increasingly aware of their shortcomings (Ellis, 2004, p.545; Gao, 2010, p.14; Oxford & Amerstorfer, 2018, p.75; Gu, Hu & Zhang, 2005, p.282). For example, Benson and Gao (2008) pointed out that strategy questionnaires often ask learners to describe their strategy responses in a very generic manner and the results hence tend to be context insensitive. In this sense, quantitative methods appear to address "strategy preferences or predispositions to adopt certain strategies independently of the situation or task at hand rather than strategy use" (ibid, p.30). Other researchers also contended that such instruments are unable to get at the mechanisms behind strategy learning (Gu, Hu & Zhang, 2005) nor to reflect the "orchestration of strategies", and may not even necessarily reflect actual behaviour (Cohen, 2018, p.46).

Considering that quantitative methods focus much on the frequency rather than quality of strategy use (Gu, 2014) while survey studies are generally unable to capture learners' emotional reactions nor reveal insights about the "fluctuating, changeable, moment-by-moment use" of LLS (Oxford & Amerstorfer, 2018, p.76), more researchers turned to qualitative means to gather data. As qualitative methods are considered relatively adept in capturing immediate or micro-contextual factors influencing strategy choice and use in response to specific situations or tasks rather than general or macro-contextual factors contributing to learner identity (Benson & Gao, 2008, p.30), data collection tools such as think-aloud protocols, interviews, recollective narratives, diaries or dialogue journals are used by LLS researchers in the hope to reveal a more "dynamic picture of learners' strategy use in particular contexts" (Gao, 2010, p.14).

2.1.6 Conceptualizing Language Learning Strategies (LLS)

This shift in methodological preferences is also closely related if not directly parallel to the different ways scholars and researchers tend to conceptualize LLS. Quantitative methods are often used by researchers conceptualizing LLS from a cognitive psychology perspective, which theorizes learners' patterns of strategy use as enduring "psychological traits" (Gao, 2010, p.11) that could be captured and systematically investigated through survey studies (Ellis, 2004). While such an approach has generated considerable research in the form of cross-sectional, descriptive, correlational, and intervention studies (Gao, 2006, p.56), it has also been criticized for its somewhat questionable assumption that language tasks and contexts are generalizable (Donato & McCormick, 1994) and its inclination to project an "ahistoric, decontextualized and static picture" of learners' strategy use (Gao, 2010, p.14). Meanwhile, contextual factors such as "stage of learning", "cultural background", and "setting" tend to fall outside this research proper because these are often seen as "being external to language learning as a cognitive process" (Benson & Gao, 2008, p.27).

A socio-cultural perspective, on the other hand, views learners as social agents and their strategy use to be dynamic, varying across contexts, and continually under development — a "temporally and contextually situated phenomenon" (Gao, 2010; Gao 2006, p.56; Donato & McCormick, 1994). A concept fundamental to a socio-cultural perspective to LLS use is that of mediation, in that strategic activity is "mediated" in the sociocultural setting within which such activity is situated (Donato & McCormick, 1994, p.456). With reference to Vygotsky's theory, Donato and McCormick put forward the notion that mediators "in the form of objects, symbols and persons" can transform "natural, spontaneous impulses" into

"higher mental processes", including strategic learning and problem solving (ibid). In other words, mediation essentially refers to the notion that higher mental processes develop through interactions with material tools, symbolic systems and behaviour of other human beings (Benson & Gao, 2008, p.31), an idea that is potentially useful to showcasing the linkage between learners' strategy knowledge and their actual strategy use (Gao, 2010). In a similar vein, Gu (2003) proposed a tetrahedral model to examine how the choice, use and effectiveness of LLS (vocabulary learning strategies in particular) is mediated by "person", "task" and "context".

The above sections have given a brief summary of the development of language learning strategies, a field that has attracted immense interest for more than four decades now. Despite criticisms (particularly those raised by prominent scholars such as Dörnyei, 2005; Ellis, 1994; Skehan, 1989) on the grounds of definitions and classification, effectiveness, theoretical and methodological concerns, pedagogical value and application (Zhang, Thomas & Qin, 2019), the field has never ceased to exist; rather, LLS research is "alive and kicking" on a global scale, with a consistent growth in the number of related publications year after year (Mizumoto & Takeuchi, 2018, p.100). For more comprehensive literature reviews on research development in the field of LLS to date, see Anderson (2005), Cohen and Macaro (2007), Gao (2010), Pawlak (2011), Griffiths and Oxford (2014), Zhang, Thomas and Qin (2019). For more recent discussions on the theorization of self-regulation as a potential substitute for the traditional notion of LLS, see Dörnyei (2005, p.163-196), Tseng, Dörnyei and Schmitt (2006), Gao (2007), Rose (2011). In view of the vast volume of existing research on LLS and the limited scope of this dissertation, instead of duplicating the efforts of these scholars, the following sections will focus on reviewing research literature related specifically to the exploration of Pronunciation Learning Strategies (PLS).

2.1.7 LLS research and pronunciation learning

While learning strategies gradually became a prominent component of second language learning (Eckstein, 2007), pronunciation appeared to capture significantly less attention than its counterparts such as reading, writing, listening, speaking, vocabulary or grammar from LLS researchers and language educators. Somehow "the acquisition of pronunciation has fallen to the wayside and has suffered from serious neglect in the communicative classroom" (Elliot, 1997, p.96, as cited in Eckstein, 2007, p.12). Even though "communicative pronunciation" was included in certain teacher education curriculums, the

majority of speaking courses "sadly…continue to give very short shrift" to pronunciation components (Morley, 1994, p.68).

Such an imbalance is perhaps partially attributable to insufficient research that informs teaching and learning of pronunciation. Derwing and Rossiter noticed that even though there had been rather extensive research into communicative strategies, "the studies have not dealt with pronunciation per se" (2002, p.157); Vitanova and Miller too observed that publications related to pronunciation largely "deals with what and how to teach, while the learner remains an abstract, silent body in the classroom" (2002, p.1). Indeed, the role of pronunciation has been conspicuously downplayed amidst the rapid development of LLS research. The absence of pronunciation was noticeable in Chamot's summary of three decades of LLS research in the *Annual Review of Applied Linguistics* (2005, p.117-121), where she dedicated individual sections to reviewing "Listening Comprehension Strategies Studies", "Oral Communication Strategies Studies", "Reading Strategies Studies", "Vocabulary Strategies Studies" and "Writing Strategies Studies" hitherto; in conjunction with Oxford's book *Teaching and Researching Language Learning Strategies* (2011), which devoted six sub-chapters to recapitulate knowledge gained from L2 learning strategy research in the past three decades on each of the four key language skills as well as grammar and vocabulary, again discernibly omitting a chapter on pronunciation. As a matter of fact, pronunciation strategies were also underrepresented in Oxford's (1987, p.4) own "*Strategy Inventory for Language Learning (SILL)*", the psychometric assessment tool which measures strategy use by learners in acquiring vocabulary, reading, writing, listening and speaking skills and later became most widely used in the field. Observing how Language Learning Strategies had attracted widespread interest from mid-70s, Eckstein (2007) considered the obvious neglect of pronunciation in LLS research and application in the subsequent thirty years a "bizarre" phenomenon (p.12).

2.1.8 Defining Pronunciation Learning Strategies (PLS)

This "bizarre phenomenon" was to be changed as LLS research stepped into the twenty-first century, whereby researchers in the field became aware of the substantial research gap and opened up a new avenue of research in Pronunciation Learning Strategies (PLS). Unlike the everlasting and intense debate over definition and conceptualization of LLS, PLS researchers tend not to indulge in definitional arguments. In fact, a literature search would reveal that most PLS researchers who cared enough to define the construct simply adopted

definitions that directly borrow wordings from well-known and widely accepted LLS definitions such as the following:

In her pioneering study, Peterson (2000, p.7) stated that "PLS can be thought of as the steps taken by students to enhance their own pronunciation learning", a definition obviously based on Oxford (1990). Rokoszewska (2012, p.392; 2013, p.1) and Calka (2011, p.150) both defined PLS as "specific actions taken by the learner to make learning pronunciation easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations", taking Oxford's (1990) LLS definition word-for-word except for changing "language" into "pronunciation". Pawlak (2010, p.191), extrapolating from the definition of Grammar Learning Strategies by Cohen and Pinilla-Herrera (2009), stated that "PLS can be defined as actions and thoughts that are consciously employed, often in a logical sequence, for learning and gaining greater control over the use of various aspects of pronunciation".

Hişmanoğlu (2012, p.248), who did not mention any definitional sources, provided a more elaborate definition that includes exemplifications, "PLS are intentional behaviours and thoughts used by learners so as to enable them to comprehend, learn, or remember L2 pronunciation. A PLS is an attempt to enhance phonetic and phonological competence in the target language. Every pronunciation learner utilizes PLS either deliberately or indeliberately when focusing on segmental and/or suprasegmental phonemes in the target language and try to do tasks given by teachers in the pronunciation classroom."

Other PLS related research reports either used the above "working definitions" or skipped sections on definitions altogether and directly delved into methodological issues and discussion of findings, with the underlying assumption that readers are readily familiar with the concept of Language Learning Strategies through decades of scholarly work in the field and thereby could readily extend their understanding to Pronunciation Learning Strategies.

2.1.9 Pronunciation Learning Strategies (PLS) – the first research study

In 2000, Peterson published a seminal paper reporting the very first research with an exclusive focus on PLS (1997; 2000). The report was based on her doctoral study, in which she set out to uncover strategic behaviour her students adopted to learn pronunciation in Spanish and collected data retrospectively through examining their diaries and interviewing them.

Entering this uncharted territory of strategic pronunciation learning, Peterson's (ibid) contributions were five-fold: (i) she coined the term "Pronunciation Learning Strategies"; (ii)

through extensive review of literature and her own study on PLS, she compiled the first PLS taxonomy, laying solid groundwork for subsequent research works that followed; (iii) she integrated her results into the broader context of LLS research through selecting Oxford's SILL (1990) as a basis for categorising PLS; (iv) she made the first attempt to better understand the construct of PLS through conducting a factor analysis; and (v) she was also the first to explore any possible correlation between learners' pronunciation ability and their PLS use as well as other secondary variables such as gender, perceived importance of pronunciation proficiency, and exposure to the language outside class.

Albeit a valiant attempt, the study showed a number of limitations. Peterson claimed that she chose six as the number of factors when conducting the factor analysis "for both statistical and theoretical reasons" (1997, p.94) without further elaborating on the said reasons. It could only be speculated that the number was determined with reference to Oxford's (1990) factorial structure for LLS. In the discussion of the results, however, Peterson could only interpret the first five factors with "reasonably high reliability" thereby giving them meaningful names (p.94) while a unifying, meaningful category could not be assigned to the sixth factor. This result could be attributed to two causes: First, the number of participants (64 students) may simply have been too small for the factor analysis to yield statistically reliable results; and second, the assumption that the construct of Oxford's LLS is automatically applicable or transferrable to the construct of PLS may be questionable. This, by and large, also left many researchers' hasty adoption of a six-category structure in subsequent PLS studies in doubt.

2.1.10 Typology of PLS — identification, categorization and taxonomies

Despite the perhaps dubious research design, Peterson's pioneering study very much set the tone and direction for subsequent PLS research — researchers devoted much effort to identifying and categorizing PLS in the form of exploratory studies, eventually leading to the formation of various taxonomies (For a summary, see Table 2).

With the aim to explore how immigrant ESL college students in Canada perceived difficulty in pronunciation and to examine strategy choices they made when faced with pronunciation problems and communication breakdown, Derwing and Rossiter (2002) conducted individual structured interviews with a hundred participants. Based on their responses to a Likert-scale survey and short open-end questions, "paraphrasing", "self-

repetition", "switching to writing or spelling", "volume adjustment", "using clearer speech", and "slowing speech rate" were found to be the seven most often used strategies (ibid, p.159).

Vitanova and Miller (2002) conducted a similar study with postgraduate students studying English as L2 in an American university. Participants were prompted to reflect on their learning process in a graduate pronunciation course, the data from which were then subject to a thematic analysis. Results show that trainings on phonetics and phonology were conducive to students' engagement with metacognitive and social-affective strategies.

Also aiming to investigate 50 adult ESL learners' PLS use, Osburne (2003) adopted an oral protocol. Respondents each first produced a ten-minute long "oral autobiography" by recounting a language learning experience on audio-recording. Upon playback of the soundtrack, respondents would have to re-utter three sentences the experimenter randomly selected from the recorded text until they managed to produce the given lines with "excellent pronunciation" (p.134). At this point the respondents were asked to recall what they attempted to perfect their pronunciation. The study identified eight strategies, including both "local articulatory gestures" and "global articulatory gestures" (p.135). Meanwhile, respondents reported paying scant attention to "segmental phonology" and "prosodic structures" (p.138-139), which Osburne considered unexpected and quite surprising since the two areas had traditionally and recently been prominently highlighted in pronunciation training.

Though the first PLS study done by Peterson (2000) targeted English-speakers learning the Spanish language, the majority of academics following her footsteps in search of pronunciation strategies were of ESL/EFL backgrounds and mostly interested in exploring the strategy use among learners of the English language. Undoubtedly, these researchers have substantially enriched literature on Pronunciation Learning Strategies as a new research area through employing a multitude of research tools to collect data and contextualizing their studies in disparate ways. Yet such diversity also results in difficulty to further compare or synthesize results.

Peterson (2000), for example, adopted a relatively embracing research design and a broader scope by eliciting strategies used by learners to acquire and improve their Spanish pronunciation around the clock in their day-to-day experience. On the other hand, in Derwing and Rossiter's (2002) study, students were invited to recollect any strategy use they adopted as they were facing a communication breakdown, basically limiting strategies possibly elicited to one highly specific circumstance. Osburne's (2003) study pushed even farther with

the help of an oral protocol, restricting responses to learners' instantaneous amelioration of just several selected utterances. Inevitably, such data collection setups would generate much smaller numbers of pronunciation strategies.

Moreover, the way how these researchers contextualized their studies also affected the nature of strategies uncovered, as can be seen in Derwing and Rossiter's (2002) and Osburne's (2003) studies, whereby the majority of strategies yielded belong to the category of "compensatory strategies", meaning participants were using them only for mitigating pronunciation issues encountered when they ran into one particularly difficult utterance in an immediate situation — for example, "by paraphrasing the meaning of a mispronounced word" or "by spelling the word out for the listener" (Derwing & Rossiter, 2002, p.59; Osburne, 2003, p.131) — instead of taking steps to enhance the quality of their general pronunciation ability over time. The kind of strategies found from the two studies were therefore much different than those seen in Peterson's (2000) study. In comparison, the study by Vitanova and Miller (2002) appears to embrace the broadest scope amongst these earlier works. Regrettably, the unduly concise descriptions on their methodological approaches, particularly omitting the exact procedures they followed to collect and analyse data, results in difficulty in evaluating the researchers' findings and further advancing or expanding their study.

The first to take a quantitative approach, Eckstein (2007) invited 183 ESL students enrolled in an academic English course at a university in the United States to complete his Strategic Pronunciation Learning Questionnaire. Like Peterson (2000), Eckstein (2007) also attempted to accomplish the challenging feat to categorize Pronunciation Learning Strategies but approached the task using a different theoretical framework. When selecting a basis for his categorization, Eckstein chose Kolb's (1984) model *"Experiential Learning Cycle"* over Oxford's (1990) system "*Strategy Inventory for Language Learning (SILL)"* as he posited that Kolb's theoretical construct "can be specifically related to pronunciation acquisition theory" (p.32). As a result, he divided the strategies in four categories: "input/practice", "feedback/noticing", "hypothesis forming" and "hypothesis testing".

One major methodological contribution made by Eckstein was to explore the construct of strategic pronunciation learning by examining the factorial structure of a data set yielded from a comparatively larger sample size through statistical analysis — this was a big step forward in increasing the rigor in the categorization of PLS. In many other studies, PLS researchers often intuitively resorted to categorizing strategies elicited from participants by simply fitting them into Oxford's existing six-part structure based on personal interpretation

or a general sense of professional judgment. This could be problematic — while Oxford and her collaborators strived to uphold construct validity by repeatedly exploring and confirming the "meaningful patterns" underlying the large pool of data collected in her SILL (Green & Oxford, 1995, p.272; Hsiao & Oxford, 2002; Oxford, 1987; Oxford & Nyikos, 1989; Oxford & Burry-Stock, 1995), her data were focused on participants' employment of strategies related to a range of general language (reading, writing, listening, speaking) skills, the underlying structure of which might well be different from the construct underlying strategic pronunciation learning.

Despite Eckstein's sensible move to conduct a factor analysis to explore the underlying structure of Pronunciation Learning Strategies, the result yielded appeared to be incompatible with Kolb's "*Experiential Learning Cycle"* model, which formed the theoretical basis of Eckstein's research — while the model hypothesized a structure of four distinct strategic categories, Eckstein's analysis only found a structure of two key factors, each of which seemed to contain items from all four proposed categories. This somehow limited the explanatory power of Eckstein's proposed taxonomy and perhaps explained why researchers thereafter were inclined to turn back to Peterson's (2000) framework based on Oxford's taxonomy as a basis for further expansion.

Wrembel (2008) surveyed 32 first-year students enrolled in a pronunciation course in a Polish university using a questionnaire consisting of closed and open-ended questions, yes/no questions and Likert-scale items. While the primary goal of the study was to explore students' preferences and evaluation of PLS, Wrembel ended the research report by proposing a different categorization, with a structure of three categories based on O'Malley et al. (1985), namely cognitive, metacognitive and socio-affective. The resulting table showed a three-level layout without clear labelling but it might be assumed that the second level subsumed under the three categories was 14 strategies, under which a third level of 45 tactics were subsumed. A few observations could be made here: First, Wrembel's categorization resulted in a rather imbalanced distribution of strategies — cognitive (8 strategies, 19 tactics), metacognitive (4 strategies, 11 tactics), and socio-affective (2 strategies, 5 tactics). For example, the category "affective strategies" only yielded one tactic, namely "using humour to lower anxiety" (ibid, p.194); second, the naming of strategies and assigning of tactics under them appeared to be intuitive if not arbitrary, which resulted in confusing groupings. For example, "laboratory" as a tactic was assigned under the strategy of "repetition" but "language laboratory exercise" was assigned under that of "directed attention". While "sound symbolism" was categorized as a

"memory strategy" a similar tactic "visual representation" was categorized as an "imagery strategy". Sometimes the same tactic would be repeatedly categorized under more than one strategy category such as "articulatory description" being categorized both as a "deduction strategy" and a "grouping strategy"; third, both pronunciation learning and teaching strategies were included in this taxonomy without clear distinction between the two.

Seeing the absence of "a generally accepted descriptive scheme for classifying PLS" and the lack of a common theoretical basis alongside the resulting reliance on disparate data collection tools as immediate concerns in the field, Pawlak (2010, p.194) planned to develop a new taxonomy of pronunciation strategies based on which he could then attempt to design a research tool for measuring PLS use. After consulting three key LLS models, Cohen and Dörnyei (2002), Oxford (1990), and O'Malley and Chamot (1990), as well as widely adopted pronunciation instructional texts such as Kelly (2000) and Goodwin (2001), Pawlak decided that his new taxonomy should have a basic framework of four strategy types — "metacognitive", "cognitive", "affective" and "social" strategies. To arrive at such categorization, he followed O'Malley and Chamot's (ibid) recommendation to subsume "memory strategies" under "cognitive strategies" and took Oxford's (ibid) suggestion to have "affective strategies" separated from "social strategies".

With this framework of four categories as basis, Pawlak (ibid) devised an instrument he called "*The Pronunciation Learning Strategy Survey (PLSS)"* comprising 60 statements eliciting quantitative data on a five-point Likert-scale plus open-ended and close-ended questions to collect qualitative input. With the objective to improve its reliability and validity, the instrument was piloted with 80 year-two and three undergraduates majoring in English theology. The process revealed a number of issues with the questionnaire design, such as ambiguity in wording and discernible overlap among items. He also found insufficient correlation between the Likert-scale section of his instrument to the SILL (Oxford, 1990), with some of his items relatable to more than one category. The pilot study also uncovered new PLS strategies that were not already covered by the questionnaire. Based on these observations, Pawlak had to conclude that "the decision to exclude compensatory strategies might have been premature" (ibid, p.198) and the instrument still needed substantial adjustment.

While Pawlak's (2010) study was appreciated for its valiant endeavour to develop a unified PLS measurement tool, the result was far from sufficient in giving future research the kind of support promised by the project. First, Pawlak (ibid) adapted partial components of

both frameworks of Oxford (1990) and O'Malley and Chamot (1990) yet did not provide justifications for the decision. Such alterations therefore appeared to be somewhat haphazard and seemingly defeated his original purpose to validate this new instrument. Meanwhile, Pawlak (ibid) did not actually present the full questionnaire design of the PLSS and even withheld "insightful information" on certain PLS uses, which he claimed to be representing "the outcome of a work in progress" so ought to be revealed only when they had been modified (p.196). Had a more complete version of his proposed instrument been presented and findings reported in their entirety, the value of this project would have been much strengthened.

Similar to Pawlak (2010), Calka (2011) also perceived the necessity to unify PLS classifications and took upon herself the charge to build a new taxonomy yet doing so for a relatively humbler cause: to assess the learning need of 74 freshmen majoring in English studies at two Polish teacher training colleges who were about to join her practical phonetics course. Setting out to identify and categorize students' use of Pronunciation Learning Strategies, Calka (2011) first elicited their strategic behaviour by asking questions like "How did you learn English pronunciation before entering the college?" (p.155). This was followed by a survey written in Polish listing 65 Likert-scale statements to yield respondents' PLS use frequencies. In terms of categorization, Calka's survey followed Peterson's (2000) adoption of Oxford's six-pronged scheme. Results showed that participants were inclined to selectively rely on a favourite strategy or two while great variation among learners' PLS use patterns was observed.

Contrary to Pawlak (2010), Calka (2011) reported all her statistical findings including the overall use frequencies and standard deviations for all items, and revealed both the design of the survey and the taxonomy subsequently drawn in full, lending researchers interested in continuing the efforts to investigate PLS much stronger support. Though Calka's (2011) taxonomy may be at best an expansion and modification on Peterson's (2000) original version, her contributions lie in devising and disseminating a more comprehensive instrument which enables more effective elicitation of learners' self-reports on their PSL use behaviour.

Researcher(s)	Participants	Data collection instruments	PLS identified	PLS categorization
Peterson (2000)	n = 64	Literature review; learner diary; interviews	12 general strategies covering 44 specific tactics	Categorized based on Oxford's 6 categories (1990): memory, cognitive, compensation, metacognitive, affective, and social; Factor analysis yielded 5 categories to be meaningfully named and 1 unnamed category
Derwing & Rossiter (2002)	n = 100	Individual structured interviews with a Likert-scale survey and open-ended questions	7 most frequently used and preferred strategies	/
Vitanova & Miller (2002)	/	Open-ended reflection prompts	Metacognitive and socio-affective strategies	/
Osburne (2003)	n = 50	10-minute oral recount followed by audio playback to learners; repeated oral delivery of selected segment to elicit PLS use	8 strategies	/
Eckstein (2007)	n = 183	Questionnaire to measure frequency; open-ended questions to elicit PLS use; Speaking prompts to elicit spontaneous oral response	28 strategies	Categorized based on Kolb's Experiential Learning Cycle (1984) with 4 categories: Input/practice, feedback/noticing, hypothesis forming. and hypothesis testing; Factor analysis yielded 2 key categories.
Wrembel (2008)	n = 32	Questionnaire with closed, yes/no and open-ended questions, and Likert-scale items	16 pronunciation teaching and learning strategies	Categorized based on O'Malley et al. (1985)'s three categories: Cognitive, metacognitive and socio-affective
Pawlak (2010)	n = 80	Questionnaire with 60 Likert-scale items	60 strategies	Categorized, after consulting Oxford (1990), O'Malley & Chamot (1990) and Cohen & Dornyei (2002) into 4 categories: Metacognitive, cognitive, affective and social
Calka (2011)	n = 74	Open-ended questions; Questionnaire with 65 Likert-scale items	18 strategies covering 65 tactics	Categorized based on Oxford's 6 categories (1990): memory, cognitive, compensation, metacognitive, affective, and social

Table 2: A list of studies on identifying and categorizing PLS

2.1.11 Relationship among PLS use, pronunciation proficiency and other factors

Another line of inquiry that has interested researchers is to ascertain the possible relationship between learners' use of PLS and their pronunciation proficiency. A handful of studies started to explore the extent to which frequent use of PLS may effect better mastery of English pronunciation, and some of them took a step further to also look at the mediating effect of other factors. Most of these studies were quantitative in nature and involved turning PLS inventories (those developed by researchers working on strategy identification and categorization as mentioned in Section 2.1.10) into questionnaires to measure the frequency or intensity of learners' use of PLS, followed by applying various statistical analyses to determine its association with other variables, often with pronunciation ability as a primary variable and other individual difference factors such as gender as secondary variables (for a summary, see Table 3).

Eckstein (2007) was among the first to explore the potential correlation between PLS use and pronunciation achievement of 183 adult ESL learners from an American university. He measured the former through administering a self-designed 28-item survey, which he named "*Strategic Pronunciation Learning Scale (SPLS)*", and the latter a speaking achievement test using prompts to elicit spontaneous speech. With PLS frequency counts, pronunciation scores and participants' self-reported demographic data, he then performed a stepwise regression analysis and found three strategies, namely "noticing others' pronunciation mistakes", "asking for pronunciation help", and "adjusting facial muscles" as well as two other demographic factors, namely "native language" and "level of study at the language centre", to be significant predictors of pronunciation score (p.61). Meanwhile, another two strategies, namely "repeating others' words silently" and "changing volume of speech", and another demographic factor "length of stay in USA" were found to be negatively correlated with pronunciation performance (p.63).

Rokoszewska (2012) carried out a similar study with 63 freshmen majoring in English in a Polish university by administering Calka's (2011) 64-item questionnaire and a pronunciation test consisting of an 80-point perception section of three tasks modified from Baker (2006, as cited in Rokoszewska, 2012, p.394) and a 152-point production section of three tasks requiring students to read aloud pure vowels, diphthongs and a passage taken from Ponsonby (1992, as cited in Rokoszewska, 2012, p.394). Students scored a mean of 94% and 78% on the two sections respectively, with a total mean score standing at 194 out of 232 points (SD = 9.37). The results revealed no systematic relationship between learners' PLS use

and their perception of English vowels and diphthongs; on the other hand, a significant positive relationship was found between learners' PLS use and their pronunciation accuracy of English vowels and diphthongs.

Berkil (2008) took a step further to include a list of other mediating variables in her study with 40 English language and literature majors in a Turkish university, using a 52-item questionnaire which she modified based on Peterson's (2000) version and a two-part pronunciation test. Analysing the data using ANOVAs, Pearson chi-square and independent samples t-tests, Berkil found no significant relationship between PLS use and pronunciation ability. She also observed no association between pronunciation ability and factors including "gender", "self-perception of pronunciation ability", "perceived importance of pronunciation" and "out-of-class exposure to English". On the other hand, "length of English study" and "age to begin English study" varied significantly among pronunciation ability groups.

Campos (2015) investigated the relationship among PLS use, pronunciation performance, and foreign language aptitude. 43 pre-service teachers of English in Chile took part in her study and completed the 36-item version of Eckstein's SPLS questionnaire, a pronunciation test, as well as two sections of the Modern Language Aptitude Test (MLAT). In particular, Campos (ibid) purposely asked participants to report both their frequency and duration of PLS use as two different variables. When analysing the data, the Spearman correlation test found no major correlations among any of the three independent variables (namely PLS frequency of use, PLS duration of use, and language aptitude) and the dependent variable (pronunciation accuracy). A multivariate model incorporating these same variables also found no significant correlations.

It is intriguing that most if not all of these studies attempting to verify a positive correlation between learners' use of PLS and their pronunciation proficiency found no significant relationship between the two, which could lead teachers and learners to question the value of instructing or diligently applying PLS in the learning process. Having said that, it is also noteworthy that among these studies the only one happened to have detected a positive correlation between strategic learning and pronunciation attainment, namely Eckstein's (2007) study, was one with a significantly larger sample size (n=183). The fact that all these studies had rather small sample sizes (from around 40 to 60, in some cases divided into smaller sub-groups even) might have been a major limitation in assessing correlations among key variables.

Researcher(s)	Participants	Data collection instruments	Data analysis methods	Other factors/ variables	Key findings
Eckstein (2007)	Adult ESL learners (international students) on an intensive English programme in an American university (n = 183)	28-item self-designed questionnaire to measure frequency ; open-ended questions to elicit PLS use; Speaking achievement test with prompts to elicit spontaneous oral response for pronunciation assessment	Stepwise regression analysis	/	Frequent use of certain PLS was significantly correlated with better spontaneous pronunciation performance
Rokoszewska (2012)	First-year English majors in a Polish university (n = 63)	Calka's (2011) 64-item questionnaire and a two-part pronunciation test, namely an 80-point perception test modified from Baker (2006) and a 152-point production test reading aloud vowels, diphthongs and a passage from Ponsonby (1992)	Spearman's rho for one-tailed hypothesis		No systematic relationship was found between students' use of PLS and their perception of English vowels and diphthongs; on the other hand, a significant positive relationship was found between students' use of PLS and their production of English vowels and diphthongs.
Berkil (2008)	English majors in a Turkish university (n = 40)	52-item questionnaire modified from Peterson (2000); 2 pronunciation elicitation tasks	One-way analyses of variances (ANOVAs), Pearson chi-square tests and independent samples t-tests	- Self-perception of pronunciation ability, - Perceived importance of pronunciation, - Gender, - Out-of-class exposure to English, - Length of English study, - Age at beginning of English study	No significant relationship between PLS use and pronunciation ability; no relationship between pronunciation ability and four of the secondary variables but some variance with length of English study and age to begin English study; Strategy use was also found to vary significantly by gender

Campos (2015)	Pre-service Chilean teachers of English (n = 43)	Eckstein's (2007) 36-item questionnaire; a pronunciation test; two sections of Modern Language Aptitude Test (MLAT)	Meyer-Olkin Test and Bartlett's Test; Spearman correlation test; Multivariate model	Language aptitude	Factor analysis found impossible after applying Kaiser-Meyer-Olkin Test and Bartlett's Test. Spearman correlation test found no major correlations between any of the independent variables (PLS frequency of use, PLS duration of use, language aptitude) and the dependent variable pronunciation accuracy; a multivariate model incorporating these same variables also found no significant correlations

Table 3: *A list of studies exploring the relationship among PLS use, pronunciation proficiency and other factors or variables*

2.1.12 Comparative studies comparing PLS use between learner groups

A handful of researchers attempted to explore PLS in the form of comparative studies. These often involved comparing the frequency or choice of PLS and pronunciation performances among two or more distinct learner groups of different characteristics in terms of their backgrounds, proficiency levels or learning contexts (For a summary, see Table 4).

Hişmanoğlu (2012) conducted a study with 38 freshmen majoring in English in a Cypriot university with the aim of comparing PLS use between "successful" and "unsuccessful" pronunciation learners by administering a 42-item questionnaire designed based on Eckstein (2007), Oxford (1990), Peterson (2000) and Tseng, Dörnyei and Schmitt (2006) and an end-of-term final exam to elicit pronunciation scores. He did not provide the content of this questionnaire but indicated that it covered six sections according to Oxford's (1990) strategy model with one to four strategies in each section and one to fourteen tactics under each strategy. Students were classified as either successful or unsuccessful pronunciation learner with 65 marks as the cut-off point in their final exam. Independent samples t-tests were applied to compare each pair of mean scores given by successful and unsuccessful learners to the list of tactics and strategies, revealing significant differences between the two groups in their use of general metacognitive strategies, use of the specific

metacognitive tactic of “self-evaluating”, and use of the affective strategy of “using humour to lower anxiety”.

Szyszka (2015) also set out to compare good pronunciation users against average pronunciation users in a similar study where she recruited 28 higher education teachers and scholars at an international academic conference to represent the former and 33 EFL students at a Polish teacher training college to represent the latter. Participants completed a questionnaire consisting of 14 Likert-scale items taken from Berkil’s (2009) 52-item version and questions on individual difference factors. Among the 14 PLS, three showed significant difference in frequency of use between GPU and APU — “Listening to authentic texts” was used significantly more frequently by APU whereas “Reading reference materials about English pronunciation” and “Forming and using hypotheses about pronunciation” were used more significantly frequently by GPU.

Fang and Lin (2012) took up a more ambitious feat of comparing the PLS use among four learner groups exposed to different pronunciation training methods. The participants were 120 Taiwanese students at a teacher training university undergoing two semesters of pronunciation training. They were divided evenly into four groups of 30: Group 1 was assigned to learn pronunciation through computer-aided pronunciation training (CAPT) for two hours per week, Group 2 to attend weekly classroom-based pronunciation training (CBPT), Group 3 and 4 to receive both types of training with Group 3 (Both-A) only giving response to questions relating to CAPT and Group 4 (Both-B) only responding to CBPT items. All participants responded to a questionnaire with 8 PLS items taken from Osburne (2003) on a 5-point Likert scale and a checklist with 9 common pronunciation activities, after which Chi-square test was applied to compare learners’ employment of pronunciation activities between the two learning contexts (CAPT versus CBPT) and one-way ANOVA to compare PLS use frequency. Results revealed that almost all pronunciation activities were used more frequently by students in CBPT than CAPT context with a statistically significant difference. As for PLS use among different groups, though no significant difference was found between CAPT and CBPT, there were significant differences between CAPT versus Both-A and CBPT versus Both-B, whereby learners receiving both CAPT and CBPT training engaged in higher frequency of PLS use than learners receiving only either one of the two types of training.

Mirza (2015) was interested in comparing the impact of PLS intervention on students in an EFL versus an ESL learning context. In her study, two groups of students received in-

class strategy instruction on six cognitive and two social strategies for twelve 90-minute sessions — Group 1 consisted of 11 EFL students in a Lebanese university with French (L2) as the medium of instruction whereas Group 2 included 11 ESL Early-Childhood Education majors in a public Lebanese university with Arabic (L1) as the MOI. Analysing the results of pre- and post-training pronunciation tests using a common mistake checklist, Mirza (ibid) found that while both EFL and ESL groups have shown improvement in pronunciation performance after strategy instruction, there appeared no significant difference between the two groups.

In a similar vein, Baker Smemoe and Haslam (2013) also set out to compare the PLS use and pronunciation performance between an ESL and an EFL group but took a step further to include language learning aptitude as an additional variable. Two groups of participants enrolling in a ten-week speaking course were recruited, namely 31 Chinese EFL learners from two intensive English language schools in China and 31 international ESL students from a university in the United States, in order to examine the influence of different learning contexts. Baker Smemoe and Haslam (ibid) administered Eckstein's (2007) SPLS, pre- and post-course pronunciation tests, and the Pimsleur Language Learning Aptitude Battery (PLAB) to measure learners' PLS use, pronunciation proficiency, and language learning aptitude respectively. To compare whether learners in different learning contexts (EFL versus ESL) and with different aptitudes (low versus high) used different pronunciation strategies, two-way ANOVAs were run on the average frequency scores for the five types of pronunciation strategies. Neither aptitude nor learning context displayed a significant effect on strategy use. A similar analysis was run on the impact these two variables may have on pronunciation gain as operationalized by pronunciation test scores, and again found no significant effect of learning context, aptitude, nor a "context by aptitude" relationship on pronunciation gain. To address the possibility that only certain features of learner aptitude, strategy use or pronunciation proficiency were correlated, Baker Smemoe and Haslam (ibid) did further correlation analyses with the breakdown scores in each subcategory of the three data sets. It was found that out of the four sub-scores on PLAB (vocabulary, auditory, motivation, language analysis), only motivation score correlated positively with PLS use; and among the four pronunciation scores (accuracy, fluency, comprehensibility, global foreign accent), only comprehensibility correlated positively with four of the five types of PLS (noticing, hypothesis-formation, hypothesis-testing, and motivation strategies, but not practicing).

Researchers	Learner groups	Classroom Instruction	Data collection instruments	Method	Findings
Hismanoglu (2012)	Two groups of first-year English majors in a Cypriot university (n = 38): Group A – 17 'successful' pronunciation learners Group B – 21 'unsuccessful' pronunciation learners	/	42-item questionnaire modified from Eckstein (2007), Oxford (1990), Peterson (2000) and Tseng, Dornyei & Schmitt (2006); end-of-term final exam to elicit pronunciation score	independent samples t-tests	Significant differences between 'successful' and 'unsuccessful' learners were found in their use of general metacognitive strategies, use of the specific metacognitive tactic of self-evaluating, and use of the affective strategy of using humour to lower anxiety
Szyszka (2015)	Two groups of English users (n = 61): Group A (Good Pronunciation Users) – 28 higher education teachers and scholars Group B (Average Pronunciation Users) – 33 EFL teacher training students	/	A questionnaire consisting of 14 Likert-scale items taken from Berkil's (2009) 52-item version and questions on: - Age of onset, - Exposure to L2 in class, - Exposure to L2 outside class, - L2 teachers' model pronunciation, - Concern for L2 pronunciation, - Ways of learning pronunciation	Descriptive statistics, independent samples t-tests	Among the 14 PLS, 3 show significant difference in frequency of use by GPU and APU: 'Listening to authentic texts' was used significantly more frequently by APU whereas 'Reading reference materials about English pronunciation' and 'Forming and using hypotheses about pronunciation' were used more significantly frequently by GPU.
Fang & Lin (2012)	Four groups of Taiwanese EFL learners (n = 120): Group 1 (CAPT) – 30 students with computer-aided pronunciation training two hours per week Group 2 (CBPT) – 30 students attending weekly classroom-based	Learned pronunciation through either a computer-aided programme, or in-class training, or both Pronunciation classes are only available to English majors and minors;	A questionnaire with 8 PLS based on Osburne (2003) on a 5-point Likert scale and a checklist with 9 common pronunciation activities	Chi-square test to compare pronunciation activities employment between two contexts One way ANOVA to compare PLS scores in two contexts	Almost all pronunciation activities were used more frequently by students in CBPT than in CAPT and results show significant difference between the two learning contexts. Leaners used different PLS in different groups – no significant difference was found between

	pronunciation training Group 3 (Both-A) – 30 students attending both CAPT and CBPT but only responding to CAPT items Group 4 (Both-B) – 30 students attending both CAPT and CBPT but only responding to CBPT items	CAPT programmes are available to all students including undergraduates and postgraduates			CAPT and CBPT. But there was significant difference between CAPT vs. Both-A and CBPT vs. Both-B. i.e. Learners using both CAPT and CBPT showed higher frequency in using PLS than either one of the two contexts.
Mirza (2015)	Two groups of students in Lebanon (n = 22): Group A – 11 EFL students in a private Lebanese university with French (L2) as MOI Group B – 11 ESL Early-Childhood Education majors in a public Lebanese university with Arabic (L1) as MOI	In-class strategy instruction (focusing on 6 cognitive strategies and 2 social strategies) for twelve 90-minute sessions	- A pre- and post-course pronunciation test using a common pronunciation mistakes checklist - Interviews with participants on their English learning backgrounds	t-tests	Both EFL and ESL groups have shown improvement in pronunciation after PLS intervention; No significant difference was found between the two groups.
Baker Smemoe & Haslam (2013)	Two groups of Chinese students (n = 62): Group A – 31 Chinese students (EFL) from two intensive English language schools in China Group B – 31 international students (ESL) in an American university	Eckstein's (2007) questionnaire, pre- and post-pronunciation tests, Pimsleur Language Learning Aptitude Battery (PLAB)	Two-way (aptitude by language context) analysis of variance (ANOVAs); Bivariate correlation between PLS and PLAB; Bivariate correlation between PLS, PLAB and pronunciation score	Language learning aptitude, EFL/ESL learning contexts	No significant effects of aptitude nor learning context on learners' use of PLS; Out of four sub-scores on PLAB, only motivation score correlated with use of PLS; improvement in one of the four pronunciation scores, namely comprehensibility, was correlated with four types of PLS, namely noticing, hypothesis-formation, hypothesis-testing and motivation strategies.

Table 4: *A list of comparative studies comparing PLS use of two or more learner groups*

2.1.13 Effects of PLS strategy instruction in the pronunciation classroom

Studies such as Fang and Lin's (2012) and Mirza's (2015), apart from examining PLS use among different learner groups, also shed light on the potential impact of PLS strategy instruction in the pronunciation classroom, which was yet another avenue of investigation taken by a number of PLS researchers, including Wrembel (2008), Ingels (2011) and Sardegna (2009; 2011) (For a summary, see Table 5).

Wrembel (2008) conducted a study with the aim to examine students' evaluations of and attitudes towards using PLS acquired via classroom instruction. 32 freshmen majoring in English philology in a Polish university filled out a survey upon completion of an English pronunciation course. Instead of keeping PLS frequency counts as many other studies did, Wrembel (ibid, p.188) "targeted pronunciation learners' preferability rankings of PLS" they came across in lessons. Students were asked to indicate the level of usefulness and enjoyability they perceived along a list of sixteen strategies by assigning 5 as "useless/not enjoyable" whereas 1 as "very useful/enjoyable" on Likert-scale. It appeared that strategies participants regarded as "useful" often did not coincide with strategies perceived to be "enjoyable". In students' evaluation, "using phonetic transcription" and "dialogue reading and performing" scored the highest ratings for usefulness whereas "relaxation and breathing exercises" and "drama performance" topped the enjoyability list (p.189). Based on overall average scores of 2.1 out of 5 for "perceived usefulness" and 2.6 out of 5 for "perceived enjoyability", Wrembel (ibid) concluded that learners' attitudes towards PLS training received in class were "fairly positive" (p.193).

The final portion of the questionnaire examined socio-affective strategies, in particular the extent to which they were executed effectively by the teacher during lessons. Participants reported on how frequently they found themselves experiencing an array of emotions including "appreciated", "stressed", "satisfied", and "frustrated" along a Likert-scale with 5 representing "never" and 1 representing "very often" (p.193). Results suggested that even though participants occasionally experienced stress, the majority experienced satisfaction and appreciation during lessons and rarely experienced indifference. Wrembel (ibid) saw this as an indication of teachers' success in employing socio-affective strategies in classroom instruction.

"Emotions, beliefs and attitudes can influence L2 learning and can be modified by strategies" (Oxford, 2011, p.67); Wrembel (ibid) is therefore recognized for attempting to

look at Pronunciation Learning Strategies from an affective perspective through exploring learners' evaluative ratings towards various strategies on their level of "usefulness" and "enjoyability" while examining their emotional reactions to pronunciation instruction received. Having said that, the study took on an entirely quantitative approach resorting to numerical representations of attitudinal and affective aspects of learners' behaviour. With an absence of related qualitative input, Wrembel (ibid) passed up the golden opportunity to yield revealing insights concerning factors having contributed to students' different degrees of positive responses towards the various kinds of strategies or to provide explanations for their reported reactions to socio-affective strategies, which somewhat weakened the value of the study and transferability of its findings to other contexts.

When it comes to research on strategy instruction, most interesting to teachers and practitioners would likely be studies that aim to ascertain any actual pronunciation gain that PLS instruction might potentially bring. Ingels (2011) made one such attempt by providing PLS instruction as part of a pronunciation course for International Teaching Assistants (ITA) to 15 postgraduate students at an American university. Through a 16-week semester, these students were trained in various combinations of self-monitoring and rehearsal strategies and completed recordings of 5-minute presentations before and after such training to which pronunciation scores were given. Ingels (ibid) performed pairwise comparisons to the mean pronunciation scores to check the effect size of PLS instruction. Her analysis found that the use of self-monitoring strategies resulted in improved suprasegmental accuracy in general. Specifically, the strategy combination of "Listening-Transcription-Rehearsal" was more effective for lower proficiency learners whereas that of "Listening-Transcription-Annotation-Rehearsal" worked better for higher proficiency learners.

Another pressing question concerning pronunciation gains induced by PLS instruction was whether such gains would wear off over time, which indicated a need for longitudinal studies. In her doctorate research, Sardegna (2009; 2011; 2012) challenged to explore this terra incognita and subsequently published her results in two articles. Conducting her study in an American university, Sardegna (ibid) assessed the long-term effect pronunciation training would induce on 38 ESL postgraduate learners' improvements, through which she aimed to draw evidence that would support the "*Covert Rehearsal Model (CRM)*", a pronunciation learning model proposed by Dickenson (1989; 1994; 2000; Hahn & Dickerson, 1999a; 1999b) that he believes could enable students to make the best use of PLS to practise pronunciation in privacy, that is, in "covert rehearsal" conditions (1989, p.4). Dickenson characterizes this

process as “a self-monitoring, self-correcting, and self-practicing activity” comprising six major elements: (i) “privacy”, (ii) “oral practice out of class”, (iii) “speech monitoring”, (iv) “comparing one’s performance with other models”, (v) “making changes to match those models”, and (vi) “practicing changes aloud”. Adopting the CRM as her instructional framework, Sardegna (ibid) introduced the group of students to an array of Pronunciation Learning Strategies, the majority of which came from the “metacognitive” and “cognitive” families (Peterson, 2000), and encouraged them to use them in each stage of their “covert rehearsal” practices.

Students’ pronunciation improvements induced by such interventions were measured by assessing audio recordings of their pronunciation of stresses (including “phrase stress”, “construction stress” and “word stress”) and linking (both “within words” and “across words”) immediately before (Time-1) and after (Time-2) they received the classroom training, and then at a certain interval, between five and 25 months, after they left the course (Time-3), followed by one last time another nine months after that (Time-4). Students were also asked to fill in surveys where they reported their experience and behaviour in periods of “covert rehearsal”. Sardegna (ibid) found marked improvements in students’ pronunciation of stresses as well as linking from T-1 to T-2. Even though performance deteriorated slightly from T-2 to T-3 possibly because students ceased receiving intensive training, general pronunciation gain from T-1 to T-3 and T-1 to T-4 remained significantly positive, with improvements “reaching a plateau” from T-3 to T-4, signalling “long-lasting” retention (2011, p.116). Based on these observations, Sardegna drew the conclusion that the coupling of strategy instruction and extensive “covert rehearsal” practices effectively improved students’ pronunciation accuracy not only during training but also months beyond that when students ceased receiving instruction.

Sardegna made a number of significant contributions to PLS literature: She was first to conduct longitudinal research to trace learner performances in two key aspects of suprasegmental pronunciation over an extended period of time; Opting for an experimental design, she successfully obtained empirical data on the positive effect that in-class pronunciation strategy instruction may exert on student performance, providing unprecedented evidence for supporting strategy instruction in pronunciation teaching and learning. Having said that, it is worth noting that control groups were absent in both Ingels (2011) and Sardegna (2009; 2011), which posed difficulty on evaluating the marginal impact induced by strategy training in comparison to phonetic and phonological training alone on

learner performances. That is to say, while the two researchers managed to confirm that participants had shown improvements after completing the given pronunciation courses, there was no way to ascertain whether any improvements sustained were direct results of strategy use or simply natural gains resulting from students receiving instruction of pronunciation knowledge.

Researchers	Learner groups	Classroom Instruction	Data collection instruments	Method	Findings
Wrembel (2008)	First-year English philology students in a Polish university (n = 32)	Introduced 16 selected PLS to students in a 2-semester pronunciation course	Questionnaire with closed, yes/no and open-ended questions, and Likert-scale items	Descriptive statistics showing student preferences towards the taught PLS	Results show a fairly positive general attitude of students towards the PLS they were trained in. Also, students often felt appreciated, satisfied and happy and rarely felt indifferent nor frustrated during pronunciation class
Ingels (2011)	International postgraduate students taking an ESL pronunciation course for International Teaching Assistants (ITA) (n = 15)	Students were trained in various combinations of self-monitoring and rehearsal strategies through a 16-week semester	Pre- and post-training voice recordings of 5-minute student presentations	Descriptive statistics to show mean scores for pronunciation performances; Pairwise comparisons were performed to check effect size	The use of self-monitoring strategies resulted in improved suprasegmental accuracy in general. But specifically, the strategy combination of 'Listening-Transcription-Rehearsal' was more effective for lower proficiency learners whereas that of 'Listening-Transcription-Annotation-Rehearsal' worked better for higher proficiency learners.
Sardegna (2011)	International postgraduate students taking a pronunciation course in an American university (n = 38)	Students were instructed in the use of PLS by closely following Dickenson's (1998; 2000) instructional model of Covert Rehearsal	4 read-aloud pronunciation tests on stress and linking administered at 4 time points (1 pre- and 3 post-tests); 2 questionnaires and a self-report survey	Longitudinal study; ANOVA test to examine overall time effect on performance; pairwise comparisons to determine significance	Learners maintained significant improvement over time regardless of native language, gender and length of prior stay in USA

Table 5: *A list of studies on the effects of PLS strategy instruction in the pronunciation classroom*

2.1.14 Limitations of previous research to date and research gap

This section reviewed the literature on the relatively new research area of Pronunciation Learning Strategies (PLS). An evaluation of its status quo reveals a number of research gaps:

i. The majority of PLS studies published so far were conducted in universities in Poland, America (the United States and Chile) and Mediterranean countries (Turkey, Cyprus, and Lebanon), implying that research interests in Pronunciation Learning Strategies were predominantly concentrated within a few regions. At the same time, participants have been largely restricted to students of English philology and language education, likely because phonology or pronunciation was compulsory components in the curriculum of these disciplines. To gain insights into strategy use by more typical learners of English as a second or foreign language, researchers need to broaden the scope of investigation by including non-English majors as research subjects and expand data collection to different regions and continents.

ii. Eckstein (2007), Berkil (2008), Rokoszewska (2012) and Campos (2015) made significant contributions by making a start in exploring possible correlation between appropriate and frequent use of Pronunciation Learning Strategies and positive pronunciation proficiency. However, these correlational studies often suffered methodological constraints such as skewed sampling and small sample sizes. Meanwhile, efforts in further assessing and confirming the impact of strategic pronunciation learning on pronunciation performance remain scant thereafter.

iii. Efforts devoted to further examining the underlying construct of Pronunciation Learning Strategies have been rather limited and superficial. Over the years, researcher have continued to evaluate components of the "*Strategy Inventory of Language Learning (SILL)*" by conducting large scale data collection on learners' general LLS use and subjecting these data to factorial analysis and related statistical procedures to increase research rigor and provide more solid grounds for validating the proposed framework (for example, Yang, 1999; Robson & Midorikawa, 2001; El-Dib, 2004; Kato, 2005; Park, 2011; Yeşilbursa & İpek, 2012; Heo, Stoffa & Kush, 2012). In comparison, the expansion of the taxonomy of Pronunciation Learning Strategies (PLS) has lagged behind in research rigor. Efforts in understanding the

construct through statistical validation have somewhat ceased after the initial attempts by Peterson (2000) and Eckstein (2007), whereby any other proposed categorizations presented in literature were largely based on researchers' intuition or expert judgment without subjecting collected data to statistical validation. The resulting categories or taxonomies therefore lacked a firm grounding in research evidence, resulting in tenuous construct validity.

iv. Other than early PLS studies (Peterson, 2000; Derwing & Rossiter, 2002; Vitanova & Miller 2002; Osburne, 2003) aimed to identify strategies from qualitative input through exploratory lenses, research in the area has become strongly inclined to quantitative methods, where questionnaires and tests were heavily relied on to measure the frequency counts of pronunciation strategy use (Calka, 2011; Eckstein, 2007; Pawlak, 2010; Sardegna, 2009; 2011), assess pronunciation ability (Sardegna, 2009; 2011; Eckstein, 2007) and collect attitudinal ratings (Wrembel, 2008). While these endeavours helped depict a general picture of participants' PLS usage patterns and ascertain possible correlations among strategic choices and pronunciation proficiencies, there was scarcely any related investigation of factors contributing to learner behaviour through hearing participants' voices from qualitative data. In other words, while the many quantitative studies have given insights in answering questions of "what", existing knowledge gaps call for qualitative approaches to tackle questions of "how" and "why" in future research.

v. Following the above observation, a series of factors influence learners' choice of Language Learning Strategies, including "motivation; language learning environment; learning style and personality type; gender; culture; age; and the nature of the language task" (Oxford, 2011, p.170). Impacts such factors may exert upon learners' Pronunciation Learning Strategies use and their pronunciation learning outcomes remain untapped.

vi. In particular, studies reported thus far have primarily focused on exploring students' general use of PLS outside class (Peterson, 2000; Vitanova & Miller, 2002; Eckstein, 2007; Pawlak, 2008; Calka, 2011), with a small number of studies investigating learner's use of PLS in very specific contexts such as when facing communication breakdown (Derwing & Rossiter, 2002; Osburne, 2003). On the other hand, other than Wrembel (2008), Sardegna (2009; 2011) and Ingels (2011), who evaluated the impact of direct explicit PLS instruction, very few researchers have actually explored how

PLS use could be enhanced in an ESL/EFL classroom context. In other words, hardly any research has been done to examine learners' use of PLS in learning activities or tasks administered in language classes, which could be of interest to frontline teachers and practitioners.

Since the 1980s saw the arrival of Communicative Language Teaching, pronunciation gradually regained "its rightful place at the forefront of language teaching" (Brinton, 2012, p.246); nevertheless, strategy research with the aim of pronunciation improvement only began to gain interest in the recent decade. Hopefully, studies on Pronunciation Learning Strategies shall keep gaining momentum to fill such knowledge gap as discussed in the above review.

2.2 Digital Storytelling (DST)

2.2.1 Overview

Apart from the rise of CLT and a learner-centred approach, another catalyst that has changed the face of education (language education in particular) is the arrival of a digital age which has brought information communications technologies (ICT) into the classroom and revolutionized the effects of "literacy" through new means for representation and communication in all levels and domains (Kress, 2003, p.1). In a modern world of multi-media, for instance, reading and writing are not limited to simply "coding" and "decoding" of texts anymore (McFarlane, 2000).

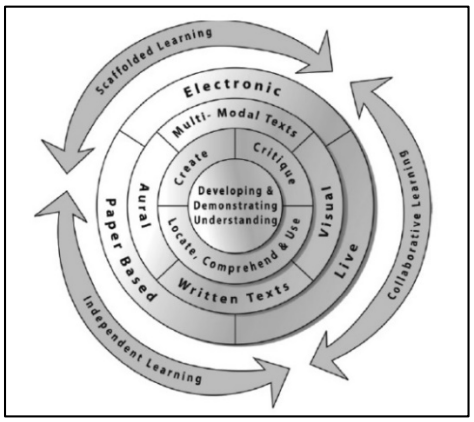

Figure 1: *The New Learning Environments Curriculum Framework (Zammit, 2011)*

The *"New Learning Environments Curriculum Framework"* (Downes & Zammit, 2001; Zammit, 2010, Zammit, 2011) captures modes of learning, types of text and forms of media in education afforded by the digital age (as shown by concentric circles in Figure 1 above). These elements have been experimented by educators through introducing various

new literacy practices to students in the past two decades, such as creating podcasts, weblogs, wikis, and holding online discussions (Lankshear & Knobel, 2013). Being a more recent addition to the list, digital storytelling (DST) has been dubbed "the signature pedagogy for the new humanities in the 21st century" (Benmayor, 2008, cited in Garcia & Rossiter, 2010).

This section first defines DST by introducing the origination of this practice followed by a historic overview of DST as a teaching and learning activity in the education sector. It then moves on to present a critical review of empirical research investigating DST in the context of language teaching and learning and concludes with observations and recommendations.

2.2.2 What is digital storytelling (DST)?

The beginning of digital storytelling (DST) could be traced back to 1993 when Dana Atchley organized a workshop on video creation at American Film Institute. Joe Lambert later collaborated with him and Nina Muller to build the Centre for Digital Storytelling (CDS) where they modified and popularized the activity (Bull & Kajder, 2004; Meadows, 2003; Rebmann, 2012). The premise of digital storytelling promoted by these early advocates was the use of technology to allow anyone with little technical knowledge to create meaningful works that narrate their personal stories with sound and images. In 2001 and 2002, digital storytelling was brought to the general public in BBC's projects "*Capture Wales*" and "*Telling Lives*" (Meadows, 2003).

Digital storytelling involves using computer-based tools to tell stories (Abdel-Hack & Helwa, 2014). In simple terms, a digital story in its minimalist is a form of narrative that blends a series of images blended and a narrated sound track to tell a personal story (Banaszewski, 2005; Bull & Kajder, 2004; Davis, 2004; Lambert, 2002). With modern technology, any storyteller could quite easily exploit a "palette of technical tools to weave personal tales using images, graphics, music and sound…with the author's own story voice" (Porter, 2004, cited in Garcia and Rossiter, 2010).

2.2.3 Digital storytelling in education

In early 21st century, DST went from the public domain to the education section. Many educators introduced digital storytelling in their classrooms following the framework built by Lambert (2002) with seven key components, namely "point of view", "dramatic question", "emotional content", "economy", "pacing", "gift of the voice", and "soundtrack".

This was subsequently expanded by Robin and Pierson (2005) to cover three additional elements, “overall purpose”, “quality of multimedia elements” and “good language use”.

The past two decades saw teachers increasingly gravitating towards DST — a review of related literature found DST projects gaining momentum first in schools and then into tertiary institutes, expanding into not only language subjects (literacy building, composition and language arts classes) but also other disciplines (such as science, public health, cultural studies, social studies, education), and tapping a wide range of skills (such as multi-literacies, reflective skills, critical thinking skills, intercultural competence, creativity, collaborative learning, experiential learning) and areas of interest (including learner motivation, agency and identity, social engagement, deep learning, narrative pedagogy), as illustrated in the following tables:

Subjects/Disciplines	Primary level	Secondary level	Tertiary level	Others
• English language	Sylvester & Greenidge (2009); Tatum (2009); Gregory & Steelman (2008); Toohey, Dagenais & Schulze (2012); Yang & Wu (2012); Green (2013)	Behmer, Schmidt & Schmidt (2006); Figg & McCartney (2010)	Abdel-Hack & Helwa (2014); Hafner (2011); Thang, Lee, Mahmud, Lin, Noraza, & Kemboja (2014)	
• Language arts	Ranker (2008)	Kajder & Swenson (2004); Behmer, Schmidt & Schmidt (2006)		
• Spanish			Lee (2014)	
• Science	Hung, Hwang & Huang (2012)			
• Public health/ Healthcare			Jamissen & Skou (2010)	Gazarian (2010)
• Cultural studies			Raimist, Doerr-Stevens & Jacobs (2010)	Burgess (2006)
• Social studies		Levin (2003)	Figg, Ward & Guillory (2006)	
• Multi-disciplines		Sadik (2008)	Jenkins & Lonsdale (2007)	
• Pre-service teacher education			Heo (2009); Callens & Elen (2008); Callens & Elen (2009)	Maddin (2011)
• In-service teacher education				Dogan & Robin (2008); Dogan & Robin (2009)

Table 6: *Literature on DST implementation in different subjects/disciplines*

Different skills/ areas of interest	Primary level	Secondary level	Tertiary level	Others
• Language learning / Literacy building	Banaszewski (2002); Ranker (2008); Toohey, Dagenais & Schulze (2012);	Behmer, Schmidt & Schmidt (2006); Kearney & Schuck (2005)	Thang, Lee, Mahmud, Lin, Noraza, & Kemboja, 2014	
• Writing skills	Banaszewski (2002); Sylvester & Greenidge (2009), Green (2013)	Figg & McCartney (2010)	Abdel-Hack & Helwa (2014)	
• Reading skills	Tatum (2009); Green (2013)		Lee (2014)	
• Speaking skills			Lee (2014)	
• Multi-literacies/ New literacies/ 21st century skills	Banaszewski (2002); Vasudevan, Schultz & Bateman (2010), Nilsson (2010); Sadik (2008)	Downes & Zammit (2001); Zammit (2010); Kearney & Schuck (2005); Angay-Crowder, Choi & Yi (2013); Robin (2008); Figg & McCartney (2010); Behmer, Schmidt & Schmidt (2006); Psaomos & Kordaki (2012)	Thang, Lee, Mahmud, Lin, Noraza & Kemboja (2014); Thang & Mahmud (2013); Raimist, Doerr-Stevens & Jacobs, (2010)	Jamissen & Skou (2010); Dogan & Robin (2008)
• Reflective learning skills/ Reflective practices		Hlubinka (2003)	Clarke & Adam (2012); Callens & Elen (2008); Callens & Elen (2009); Jenkins & Lonsdale (2007)	Podkalicka & Campbell (2010); Jamissen & Skou (2010); Walters, Green, Wang & Walters (2011)
• Creativity/ Creative thinking skills	Wu & Yang (2008), Nilsson (2010)			Jamissen & Skou (2010)
• Critical thinking skills/ Problem-solving skills	Hung, Hwang & Huang (2012)	Yang & Wu (2012)	Abdel-Hack & Helwa (2014); Thang & Mahmud (2013); Rodriguez (2010)	
• Collaborative/ project-based learning methods	Hung, Hwang & Huang (2012); Green (2013)	Kearney & Schuck, 2005	Thang & Mahmud (2013)	Podkalicka & Campbell (2010)
• Deep learning	Sadik (2008)			Barrett (2005)
• Learner motivation	Wu & Yang (2008); Hung, Hwang & Huang (2012)	Yang & Wu (2012), Figg & McCartney (2010)		
• Experiential learning			Rodriguez (2010)	

• Intercultural competence	Toohey, Dagenais & Schulze (2012)		Raimist, Doerr-Stevens & Jacobs (2010); Rodriguez (2010)	Walters, Green, Wang & Walters (2011)
• Narrative pedagogy	Nilsson (2010)		Davis (2004); Abdel-Hack & Helwa (2014); Rudnicki (2009)	Jamissen & Skou (2010); Garcia & Rossiter (2010); Rossiter & Garcia (2010); Gazarian (2010)
• Learner agency/ identity/ positive self-image/ self-efficacy/ self-expression/ voice	Bjorgen (2010); Vasudevan, Schultz & Bateman (2010); Nilsson (2010)	Kearney & Schuck (2005)	Heo (2009); Paull (2009); Raimist, Doerr-Stevens & Jacobs (2010)	Podkalicka & Campbell (2010); Hull & Katz (2006); Brushwood Rose (2009)
• Social presence/ social engagement/ social agency			Williams, Bedi & Goldberg (2006); Vinogradova (2007); Paull (2009)	Lowenthal & Dunlap (2010); Militello & Guajardo (2013)
• Academic achievement	Wu & Yang (2008); Hung, Hwang & Huang (2012)	Yang & Wu (2012)		
• Teacher beliefs/ Teacher experience	Sadik (2008)			Dogan & Robin (2009); Dogan & Robin (2008)

Table 7: *Literature exploring DST in relation to various target skills/ areas of interest*

In general, testimonials from practitioners who experimented with DST almost unanimously agree that it holds enormous untapped pedagogical benefits. In particular, DST shows great potentials as a practice that supports literacies building in ESL/EFL classes. Ohler suggests that DST is conducive to developing four types of learner literacies, namely "digital literacy", "art literacy", "oral literacy", and "writing literacy" — what he calls "DAOW literacies" (p.54). And as frontline teachers accumulated experiences in executing DST activities across the curriculum, the number of publications sharing their triumphs and failures proliferated.

2.2.3.1 Initial publications to instruct on basics and mechanics

Most of the early digital storytelling articles served an instructional purpose, placing a heavy focus on introducing the parameters of DST and specifying the mechanics of its implementation with students in lessons, usually published in professional magazines like *"Educational Leadership"* and "*Learning & Leading with Technology"*. For instance, Sara Kajder and her colleagues put forward a number of instructional texts in 2004 to 2005. These include sharing "the nuts and bolts of building a digital story" (Kajder & Swenson, 2004, p.21, 46); delineating a seven-part lesson plan extrapolated from their experience promoting a

country-wide digital storytelling campaign with the University of Virginia (Kajder, Bull & Albaugh, 2005); summarising "classroom strategies" they devised by "distilling" Lambert's seven-pronged DST scheme and describing how these were implemented in their language arts classes (Bull & Kajder, 2004, p.47-49). Kajder (2004) even recommended supplementary revision exercises in addition to the core DST activities. Meanwhile, digital storytelling instruction in the form of online blogs hosted by practitioners also flourished. Examples included Tom Banaszewsi's (2003) blog "*Teach story*" on the use of technology for storytelling, the "*L2 Digital Storytelling blog*" by Kristy McGeoch (2009) and "*Guide to Digital Storytelling*" by Kathy Schrock (2011), to name but a few. These initial publications on DST equipped the teaching community with the foundational technical skills and pedagogical resources to experiment with DST in practice.

2.2.3.2 Teacher reflections to share hands-on experiences

With digital storytelling gaining popularity as a teaching tool, an increasing number of published works emerged in the form of teacher reflection. To name a few examples, Maddin (2011) reflected upon her induction to 39 undergraduate pre-service teachers "the concept of DST as pedagogy". She provided a three-week teaching plan with a detailed session-by-session guide and highlighted six insights which "emerged as her approach to DST evolved over the course of three semesters" (p.7). Similarly, Angay-Crowder, Choi and Yi (2013) detailed the content of seven DST lessons they designed for seventh and eighth-graders on a month long course and carefully evaluated both the successes achieved and difficulties encountered. Williams, Bedi and Goldberg (2006, p.4) gave a recount on how they trained teaching staff alongside students enrolled in a virtual institute to produce digital stories through remote teaching, sharing "four principles for applying DST" as well as trainees' comments. These reflective works documented frontline teachers' first-hand experience, after thoughts and lessons learned upon implementing digital storytelling in their classrooms.

Soon, some practitioners began to engage in reflections with reference to existing concepts of literacy pedagogy. For example, Toohey, Dagenais and Schulze (2012) brought together young English learners from Canada, India and Mexico whereby each of the three groups created digital stories to showcase their hometown to participants from the other two places. In their article they detailed the procedures of how learning activities were organized, depicted the "artistic, textual and sociocultural properties of the digital stories" produced by the children (p.85), and referred to concepts relating to multimodal literacies when evaluating their work in an attempt to affirm the value of DST in supporting intercultural

communications. Jamissen and Skou (2010) introduced digital storytelling to 23 social work majors as a professional reflective practice in two cycles, bringing the practice into a tertiary setting. Instead of conducting "systematic text or film analysis" or "evaluation process" (p.5, p.7), the researchers approached the topic through exploratory lenses by running story circles in which they closely observed students' dialogues. They concluded that peer support was integral to successful execution of reflective DST, which helped achieve a "poetic mode of reflection" and enhance learner satisfaction.

Perceivably, this kind of articles remained largely teacher-oriented, giving handy pointers and practicable guidelines, with a heavy focus on addressing pedagogical concerns by detailing lesson procedures and documenting best practices as well as lessons learned. At this point, despite emerging discussions of literacy theories, key findings on DST pedagogy were by and large deduced from teachers' observations and hands-on experiences. Systematic collection, analysis and report of data to support more objective research were yet to be seen.

2.2.3.3 Discussion papers to summarize and disseminate good practices

As the community saw more teachers expressing delight in successfully executing DST activities in their classrooms, discussion papers that tried to synthesize these piecemeal and fragmentary revelations from practitioners emerged. For instance, seeing how "despite the growing popularity of DST, its place in the classroom is still unclear" (p.297), Lowenthal (2009) compiled digital storytelling's many pedagogical values from various teacher testimonies, listing reported gains in terms of "student engagement", "student voice", "multiple literacies", "agency" (pp.298-300) while also outlining challenges they had met such as issues related to "time", "training", "curriculum", "trust", "access to resources" and "assessment of learning" (pp.302-304). Garrety and Schmidt (2008) examined contents of digital stories collected from a range of school settings, categorizing these emergent genres into "learning stories", "social justice and community development stories", and "reflective practice stories". Also interested in story genres, Robin (2006, 2008) analysed "personal narratives", "stories on historical events" and "stories to inform and instruct" in terms of Brown, Bryan and Brown's five "21st century skills" (2005, cited in Robin, 2008, p.224) and Riesland's "nine literacy skills" (2005, cited in Robin, 2006, p.5).

2.2.3.4 Discussion papers with reference to theories

Meanwhile, writers continued the search for relevant and appropriate theories and concepts to facilitate analysis and discussion of DST. For example, Lowenthal and Dunlap

(2010) inspected such concept as “Community of Inquiry (CoI)”, adopting DST in an online course with the aim to help build social presence and ultimately establish a productive and healthy CoI. They discovered that using DST was conducive to establishing social presence both for themselves and for those participating in the online environment. Robin (2006, 2008) suggested integrating “Technological-Pedagogical-Content-Knowledge (TPCK) framework” (Shulman, 1986; Mishra & Koehler, 2006; 2007; Pierson, 2001, cited in Robin, 2008, p.226) into digital storytelling instruction. Robin and McNeil (2012), on the other hand, drew from their past experience to compile a checklist of twenty recommendations for teachers using DST based on the “Analyse-Design-Develop-Implement-Evaluate (ADDIE) framework”.

Despite continuing to suffer a lack of support from empirical research data, these discussion papers began considering DST activities with reference to different theoretical frameworks and concepts, showing a gradual shift of focuses from classroom execution and teacher experience onto student gains and intended learning outcomes. They also made apparent the lack of an appropriate theoretical basis to further develop DST research.

2.2.3.5 Articles reporting empirical research

The 2010s welcomed accentuated efforts in exploring uses of DST for educational purposes round the globe, moving away from personal sharing and intuitive discussions to research based investigations characterized by more objective collection and analyses of empirical data. For instance, Clarke and Adam (2012) elicited input from six Australian academics through semi-structured interviews regarding their motivation for using DST as well as their perceived advantages and shortcomings of this format. Three key themes emerged as they conducted a thematic analysis on the data, namely “contentious definitions”, “a call for constructive alignment”, and “the need of support and resources” (p.171). Dogan and Robin (2009) surveyed 194 K-12 students participating in a district-wide DST competition in San Antonio, Texas and their 36 teachers. This quantitative study posed Likert-scale and multiple-choice questions to elicit their common experience in and perceived gains from DST practices. Yuksel, Robin and McNeil (2011) conducted another study with a similar aim but targeted at participants with more diversified backgrounds. They surveyed 154 students and teachers from 22 nations who had tried or might try DST with an online survey comprising open-ended and multiple-choice questions. Their findings helped understand the benefits of DST, subject areas where DST could be used educationally, reasons or purposes supporting its use in class, and training resources currently available or still in need. These

studies represented a start in digital storytelling research through objective data collection and analyses.

2.2.3.6 Limitations of previous works to date and research gap

Based on the above review of literature related to digital storytelling in education, several observations could be made:

i. While an exponential growth was seen in publications on DST, these texts were primarily in the form of teacher testimonies recounting hands-on experience implementing the practice. Conclusions drawn regarding the effectiveness and educational values of DST were by and large based on the writers' own intuitions and personal observations. This called for more attempts at empirical studies and systematic data collection, which appeared relatively scant by far.

ii. Among the publications which did include some form of qualitative or quantitative research data, the majority appeared in conference proceedings databases or on educational or even personal webpages in the form of informal online sharing from individual practitioners. Data collection procedures and data analyses were often described simplistically. Meanwhile, articles published in peer-reviewed journals reporting studies using more rigorous and replicable designs appeared to be scarce.

iii. Yuksel, Robin and McNeil's (2011) research found DST being used by educators and learners from 22 countries. Yet despite DST becoming widely popularized around the globe, most DST literature has been concentrated on depicting related work in the United States, followed by Canada and Australia. Reports were also occasionally seen from European countries such as Belgium, Norway, Sweden, and the United Kingdom. In contrast, publications depicting research in Asia appear to be scant if not entirely absent. The handful of existing studies include two studies with Taiwanese students, one on the impacts of digital storytelling on critical thinking and motivation of grade-10 EFL students (Yang & Wu, 2012) and the other on the engagement of elementary school students in project-based learning through digital storytelling on a science subject (Hung, Hwang & Huang, 2012), and a study on the introduction of digital storytelling to a group of Malaysian students enrolled in an academic English programme (Thang, Lee, Mahmud, Lin, Noraza & Kemboja, 2014). The relative recency of these reports probably indicates that DST has only gained popularity in

Asia for a relatively short period, evidently leaving a knowledge gap that called for more research to be done in this region.

2.2.4 Digital storytelling and (second) language learning

"Storytelling is a long-standing technique for second language acquisition" (Green, 2013, p.25). Digital storytelling, quite literally, converts the art of storytelling through digitalization, yet at the most fundamental level it still builds upon the conventions of typical narrative forms, which explains why it has channelled the powers of traditional storytelling into the modern classroom. Being an activity that actively engages learners in both writing and speaking, DST soon became widely popular among language teachers (Ohler, 2006).

DST literature on language education mushroomed since the 2000s, with interests concentrated on ways in which the practice might afford support to leaners in literacy development, second language learning, language arts and composition skills. It is observed that much of this work also appeared in the form of instructional texts, reflections or discussion papers whereas empirical studies remained scant. This section will take a closer look at the few empirical research articles there are on DST for ELT:

2.2.4.1 Early focus: Feasibility and technical integration of DST in ESL classes

In the conference proceeding *"Everyone has a story to tell: Examining DST in the Classroom"*, Behmer, Schmidt and Schmidt (2006, p.2) experimented with DST in a grade 7 literacy class activity whereby 69 children were assigned to small groups creating digital stories on "family issues" related themes, namely "drugs", "cancer" and "Tourette's". They gathered data through focus-group interviews, students' post-project reflective writing, and teacher assessment of the products. The participants were guided to report how they were personally connected to the digital stories, to evaluate their own learning, and to suggest alternative methods for better outcomes. Results showed student-perceived successful learning, in descending order, in "technology skills", "information about their topics", "patience" and "interviewing skills" (ibid, p.4). Respondents generally rated their own work with A or B grades and advised future students to select "good music" and "a topic you like".

Being one of the first studies to gauge experiences of both teachers and students in the setting of a second language class, Behmer, Schmidt and Schmidt (ibid) made a valuable addition to DST literature; however, it appears that the attention of most respondents was somehow drawn towards the technical aspects involved in producing a digital story: Student

reflections focused primarily on mechanics such as music selection or time management whereas three-fourths of the teachers' opinions were related to technical skills and the remaining quarter on time allocation. Although the researchers set out to train students' "research, reading and writing skills…during a literacy unit" (ibid, p.1), they hardly investigated the ways in which digital storytelling impacted students' language learning in this study. A strong focus on technological integration was similarly noticeable in another research carried out by Sadik (2008) where he experimented with digital storytelling in an ESL classroom in two private institutes in Qena, Egypt.

2.2.4.2 Case studies: DST to aid struggling writers

As early studies had offered sufficient evidence in support of the technical feasibility of introducing DST in lessons, interests naturally and rightfully turned to the latent effectiveness of DST in building learners' writing skills. Sylvester and Greenidge (2009) and Ranker (2008) both explored ways in which digital storytelling might afford support to students struggling with writing. In the article "*Digital storytelling: Extending the potential for struggling writers"*, Sylvester and Greenidge (ibid) described writing performances by Colleen, Ray and Kyle, three grade 4 students considered archetypal "struggling writers" among children of the elementary age. Regrettably, Sylvester and Greenidge (ibid) did not actually introduce DST activities to the three named students in view of time constraints. Alternatively, based on previous experience they envisaged different ways in which they saw DST as capable of aiding the three types of "struggling writers".

Ranker (2008), in contrast, managed to carry out actual DST intervention with two grade 5 students experiencing difficulties with literacy development. In this qualitative case study, he investigated the ways in which the interface of a video editing software affected the composition process as the two students tried to create a digital story, and reported the findings in the article *"Composing across multiple media"*. By carefully observing and documenting different stages along the pair's collaboration, Ranker drew the conclusion that "the multimedial composing environments of digital storytelling" provided struggling writers with "unique ways of meaning-making" (ibid, p.229). Exploring and delineating the pair's deployment of different semiotic resources to facilitate their writing, Ranker (ibid) believed that reflective conversations acted as a catalyst for the two young writers' successful deployment of semiotic resources when they composed the digital story. These two articles provided stimulating starting points for research concerning benefits that DST might offer to students of lower proficiency.

It seems that research exploring the use of digital storytelling for ESL/EFL purposes so far was still restricted to the settings of elementary or junior high school in subjects such as basic literacy or language arts, except perhaps for the study of Wyss (2009), *"Applying digital storytelling technology to a problem of practice in education"*, which moved up to the tertiary level, whereby he recounted the experience of instructing English courses at a top-ranking South Korean university, highlighting specific pedagogical values of DST in correspondence to special traits of Asian learners.

2.2.4.3 Classroom research: DST effects over language/other skills

Considerably more substantial digital storytelling studies in ESL/EFL contexts at senior secondary and tertiary levels surfaced in recent years. In their work *"Digital storytelling for enhancing student academic achievement, critical thinking, and learning motivation: A year-long experimental study"*, Yang and Wu (2012) opted for a quasi-experimental design to explore the effect of DST on 110 tenth-graders in two English classes in Taiwan. Three aspects of student learning, including their "academic achievement in English, critical thinking skills, and learning motivation" (p.343), were assessed and compared through pre- and post-tests between the experimental group who received instruction on digital storytelling and the control group who received "lecture-type information-technology-integrated instruction" (p.340) on a 22-week course. Results suggested that the DST group gave considerably better performances in all three targeted respects. Yang and Wu (ibid) made a valuable addition to DST literature as one of the first quantitative studies to provide empirical evidence for the positive impact DST might exert on language learners. However, a few limitations in their research design might call for attention and adjustment.

Firstly, the experimental group only received formal teaching for about 10% of lesson time whereas 90% of class hours were devoted to digital storytelling work in the form of collaborative projects engaging students in writing, speaking, product presentation, and peer-reviews. The control group, on the other hand, passively received teacher instruction and feedback so much as 85% of lesson time while spending merely 15% of class hours on performance tasks where students actually wrote and spoke English. Considering how the former was afforded ample opportunities while the latter was obviously deprived of the chance to actively engage in authentic language practices, it seems hardly surprising to see one with more "significant improvement in English proficiency, critical thinking, and learning motivation" than the other (p.350). Secondly, at the outset of the study a noticeable difference

could be observed in the initial levels of proficiency between the two classes, with the control group scoring a significantly lower 3.14 points in comparison to 8.86 out of 20 attained by the DST group in the pre-test on English writing. This marked discrepancy implies a much stronger need for training in productive language skills among the control group, so it appears a rather dubious arrangement to assign this weaker, less proficient group to an instructional plan essentially depriving them of language practices in class.

In short, Yang and Wu's decision to opt for a comparative approach, in particular for choosing the two seemingly incomparable approaches of instruction to ascertain the teaching effectiveness of digital storytelling, renders the research design somewhat questionable. The rather problematic sampling in this study also potentially reduces its level of reliability.

A similar research design was adopted by Abdel-Hack and Helwa (2014) in their study "*Using digital storytelling and weblogs instruction to enhance EFL narrative writing and critical thinking skills among EFL majors at faculty of education*", where they used pre- and post-tests to ascertain how "digital story and weblogs instruction" impacted the "EFL narrative writing skills" and "critical thinking skills" of 40 seniors studying language education in Benha University, Egypt (p,28). The assessments measured marked positive improvement in both skills, thereby affirming the researchers' hypotheses and reinforcing Yang and Wu (2012)'s findings. Abdel-Hack and Helwa also took a step forward by triangulating the quantitative results obtained from these tests with qualitative input from participants, increasing the comprehensiveness of the study.

Nonetheless, a few limitations were noteworthy. First, though similarly being classroom research in nature, contrary to Yang and Wu (ibid), Abdel-Hack and Helwa (ibid) did not report details regarding the actual classroom delivery adopted, in particular the ways in which their so-called "digital storytelling and weblog instruction" were executed, making it hard for readers to interpret their results. Second, though both "digital storytelling" and "weblog" involved information technologies, these two practices highlighted rather distinct linguistic and communicative features and therefore benefited student learning in respective ways. Yet the two approaches were investigated in the study as a bundled package. Third, the researchers took the time to interview participants for "evaluation of the effectiveness of digital storytelling and weblogs" (p.29) yet their reports on the data obtained appear to be rather confusing.

In the interviews respondents were firstly asked, *"Does DST and weblogs instruction provide positive opinions toward improving EFL narrative writing and critical thinking skills?*" (p.36). The question was phrased awkwardly, obscuring the questioner's meaning and intent and leaving readers in puzzle — How could the "instruction" "provide opinions"? And to whose "opinions" did the question refer? The writers said that they asked this question to gauge participants' feeling towards digital storytelling and weblogs, and cited several responses to demonstrate that the interviewees viewed the instruction positively. However, many of the reported quotes from the respondents included lines such as "*I enjoyed using the website*" or "*I can understand the vocabulary on the website*" (p.36) to explain their positive evaluation. It appears participants' responses focused on a "website" that was never mentioned in the paper rather than DST and weblogs. Such ambiguous and perplexing research result again shows that omission of information about classroom delivery could be problematic. Interviewees were then asked "*Do you think EFL narrative writing skills have improved?"* (p.36) to which they were reported to give overwhelmingly positive responses. The cited answers included "*I think my narrative writing and critical thinking have improved because it makes me happy with writing*" and "*It makes me more interested in writing*" (p.36). Based on the research purpose, the researchers apparently aimed the first question at examining the affective aspect whereas the second at the performance aspect of participants' DST/weblog learning experiences. Yet respondents' mismatched answers clearly suggest that either they misunderstood the questions or the interviewers did not moderate the interview process to give them sufficient guidance. Modifications to wordings of interview questions might be needed in order to obtain more relevant and meaningful results.

Thang and Mahmud's (2013) work *"A case of equipping Malaysian ESL undergraduates with 21st century skills via digital storytelling"* reports a study they conducted at the National University of Malaysia with 201 students taking an "English for Social Science" course to explore their perceptions of digital storytelling concerning its efficacy in developing their English communication skills, critical thinking, ICT literacies, and collaborative skills with a 31-item survey when the 13-week long semester was over. Quantitative results ranged from an average of 2.9 to 3.2 out of 4 on a Likert-scale for items across the four aspects while no notable differentiation was detected between students with high versus low language proficiencies. The researchers thereby drew the conclusion that participants perceived benefits from completing the DST project and believed that it supported their acquisition of 21st century skills.

2.2.5 Limitations of previous research to date and research gap

This section briefly reviewed digital storytelling literature to date, particularly works focusing on the integration of the practice in ESL/EFL contexts. Researchers may expand the research scope in two ways: first, many potential topics and issues raised by teacher reflections and discussions articles remain untapped; second, much room is left for enhancing the design of DST studies particularly through adopting more rigorous approaches of data collection and analysis.

More specifically, research gaps are revealed as follows:

i. Ohler (2008) "calls what digital storytelling offers the world of literacy and learning the DAOW of literacy" (p.54), advocating the usefulness of DST in supporting learners' development of "Digital literacy", "Art literacy", "Oral literacy" and "Writing literacy". As more frontline language teachers adopted digital storytelling in their classrooms, naturally research investigating the ways in which such practice might be conducive to the development of students' language competence in the ESL/EFL classroom, especially in productive language skills, would be expected to surface. Regrettably, related studies to date have primarily concentrated on examining DST's impact on learners' writing skills and hardly any research dealt with speaking skills. This is somewhat astonishing since "the gift of the voice" has always been a key highlight in Lambert's original DST framework (2002), which made a point to emphasize the need for the narrators' skilled use of the inflections and timbre of their voices and good control in the pace of narration to maximize impacts. The knowledge gap calls for efforts to verity the effectiveness of DST in enhancing learners' speaking skills, particularly in verbal delivery such as pronunciation, intonation and fluency, which have been neglected so far.

ii. Except for Ranker (2008), who adopted a "process approach" to examine the collaboration and interaction between two learners throughout the course of building a digital story, most researchers including Yang and Wu (2012) and Abdel-Hack and Helwa (2014) took a "product approach" using pre- and post- tests to measure learners' improvement in language skills before and after a digital storytelling intervention. What seems abstruse about such research designs is how these researchers tended to overlook the fact that digital stories created by students were actually literacy products themselves. In other words, rather than evaluating students'

competence through a post-DST language assessment and haphazardly inferring a somewhat indirect causal correlation between the test scores and digital storytelling instruction, researchers could have directly examined the digital stories students created, which were essentially language products that evidently demonstrate their language performance — as Robin (2006) analysed, digital stories effectively showcase learners' writing, speaking, research, organization and even interview skills.

iii. It was also observed that many researchers have opted for quantitative methods. Though quantitative approaches might arguably be a more advisable means of data collection and analysis when investigating the performance aspects of participants' language learning to allow more objective assessments and comparisons of language proficiency, it might not be as suitable or desirable when it comes to exploring the metacognitive or socio-affective aspects. For instance, a number of studies (e.g. Yang & Wu, 2012) resorted to measuring motivation levels with questionnaires. Yet without the supplement of qualitative data, results drawn from motivation scales alone might not be comprehensive enough to thoroughly understand such complex relation between digital storytelling activities and learners' motivation.

"Storytelling is a uniquely human activity that has guided learning since ancient times" (Garzarian, 2010). In this sense, digital storytelling is but "an ancient and proven methodology made new with technology" (Christopher, 2011). This section attempted to define DST, outline its historical developments, review relevant literature on its educational uses, particularly in ESL/EFL classrooms, and identify research gaps in the area. To substantiate claims made by language teachers regarding the pedagogical value of DST, more rigorous research design and diverse methodologies for data collection and analysis are called for.

CHAPTER 3: METHODOLOGY

3.1 Overview

This chapter presents the methodological basis of the present study by first explaining the philosophical stance, which will be followed by descriptions of the research design of the two phases of the study including participants, instruments, and procedures of data collection and analysis. Ethical concerns and ways to addressed them are also discussed. This chapter is informed by formative coursework on EDUC0089 (Cheung, 2014a).

3.2 Philosophical Perspective and Research Paradigm

Guba and Lincoln (1994) define paradigms to be "the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically (the nature of reality) and epistemologically (relationship of the knower to the known) fundamental ways" (p.105). A paradigm can be viewed as "a set of basic beliefs or metaphysics that deals with ultimates or first principles". It represents a worldview that defines, for its holder, the nature of the "world", the individual's place in it, and the range of possible relationships to that world and its parts. (p.105)

The philosophical paradigm that underlies the current study is postpositivism, which is a philosophical stance that builds on or "reacts to" (Tashakkori & Teddlie, 1998, p.12) but is still commensurate with positivism (Lincoln, Lynham & Guba, 2017, p.231). To positivists, there is a single reality and the purpose of doing research is to understand and describe the phenomena of the world (i.e. the reality) through observable facts and ultimately to share this understanding in the form of time- and context-free generalizations (Bassey, 1990, p.3; Guba & Lincoln, 1994, p.105). The positivist epistemology is characterized by dualism and objectivity — the investigator and the investigated are assumed to be independent entities while axiologically positivist inquiry is believed to be value-free. This is why positivist researchers expect others to arrive at the same conclusion as they test any hypotheses or propositions with rigorous methods and empirical tests (Bassey, 1990, p.3; Guba & Lincoln, 1994, p.110).

Sharing a similar ontology and epistemology with positivists, postpositivists also believe that there is a reality independent of our thinking, one that exists as an independent entity and can be studied scientifically. But postpositivists believe that this reality can only be

imperfectly apprehendable because observation is fallible in view of the flawed human intellectual mechanisms (Guba & Lincoln, 1994): The way the researcher looks, feels, or acts may all unintentionally affect the results of a study (Cook & Campbell, 1979; Tashakkori & Teddlie, 1998, p.12). This is why, in the postpositivist paradigm, objectivity remains a "regulatory ideal" and inquiry is essentially value-laden (Guba & Lincoln, 1994, p.110). Despite this recognition, postpositivists devote efforts to reduce the influence of personal values on research results (Teddlie & Tashakkori, 2009). For example, one way to achieve (or try to achieve) what may be closest to the truth is triangulation.

The present study is readily associated with postpositivism in terms of the nature of its research questions and its methodological approach. It sets out to study university students' strategic pronunciation learning behaviour and their pronunciation performances as "objective" phenomena through collecting a sufficiently large sample of data, examining frequencies of occurrences or observations, and conducting statistical analyses in the hope of arriving at a relatively generalizable understanding of these phenomena as well as the relationship between them. And while considerable efforts are made to observe objectivity in terms of research design and preparation of research instruments, potential influences of the researcher's involvement and the presence of contextual factors are duly and properly acknowledged.

3.3 Research Design for Phase I of the Study

Phase I of the study was aimed to find out the types and frequency of Pronunciation Learning Strategies used by full-time undergraduate students enrolling in a local university in Hong Kong and to ascertain any possible correlation between their strategy use and their pronunciation performance. Data were collected through a pronunciation strategy survey and a pronunciation performance assessment, the details of which are presented below.

3.3.1 Participants

The participants in Phase I were full-time undergraduate students (n=451) enrolled in English language courses offered by the English language centre at a local university in Hong Kong. The English language centre offered credit-bearing compulsory and elective courses to support all students' English learning for general and academic purposes in the university. It offered courses at three proficiency levels from foundation level to intermediate and advanced level and each course featured instruction on one or more of seven key modalities of language

learning, namely listening, speaking, reading, writing, grammar, vocabulary and pronunciation. Students were directed to courses focusing on various language skills pitched at a particular proficiency level based on their results of the English language subject in the region-wide university entrance examinations, namely the Hong Kong Advanced Levels Examination and the Hong Kong Diploma for Secondary Education. Participants were randomly recruited from all three levels of courses offered by the ELC. Demographic information of the sample is reported in Chapter 4: Results and Discussion.

3.3.2 Instruments

The main instrument in Phase I of the study was the Pronunciation Learning Strategies Questionnaire (PLSQ), which was designed to measure the frequency at which participants generally applied Pronunciation Learning Strategies outside the classroom. According to White, Schramm and Chamot (2007, p.94), self-report questionnaires are "the most frequently used and efficient method for ascertaining learner strategies". Other instruments included a pronunciation performance task and a pronunciation performance assessment scale.

3.3.2.1 Pronunciation Learning Strategies Questionnaire (PLSQ)

The researcher developed the content of a Pronunciation Learning Strategies Questionnaire (PLSQ) (Appendix C), the format of which was modelled after the *Strategy Inventory for Language Learning* (SILL) developed by Oxford (1990), whose purpose was to collect participants' self-reported frequency counts of Pronunciation Learning Strategies under the six categories of Language Learning Strategies in Oxford's comprehensive strategy system, namely memory strategies, cognitive strategies and compensation strategies, which are classified as direct strategies, as well as metacognitive strategies, social strategies and affective strategies, which are classified as indirect strategies.

> 1. When you try to learn or improve your English pronunciation, have you used the following Pronunciation Learning Strategies (PLS)? Please insert 1, 2, 3, 4, or 5 in the blank to indicate how true the statement is in terms of what you actually do when you are learning or trying to improve your English pronunciation. You will also be asked to identify your three favourite strategies among the list by the end of the survey.

Figure 2: *Introductory prompt adopted in the Pronunciation Learning Strategies Questionnaire (PLSQ)*

Following the above introductory prompt, a total of 60 statements related to English Pronunciation Learning Strategies, which describe actions, behaviour or plans carried out by learners to improve their pronunciation performance, were included in the first part of the

questionnaire. Each statement started with the personal pronoun “I” followed by an action verb that described learner behaviour or thought. For example,

- *I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.*

- *I pay attention to the similarities and contrasts between my native language and English pronunciation.*

Participants were asked to indicate estimated frequency of their own use of these strategies outside class by responding to each statement in a scale of 1 to 5, representing very low to very high use. These were followed by two open-ended questions asked to elicit any additional strategies that were not already covered and to elicit participants’ preferences regarding strategy use with possible explanation for their choices. The second part of the questionnaire asked participants to provide background and demographic information. It was estimated that the survey should take about 20 minutes to complete.

The 60 descriptive statements were taken from a list of Pronunciation Learning Strategies collected by the researcher from literature on Pronunciation Learning Strategies to date (Appendix A). Peterson (1997) was the first researcher to have conducted a study on Spanish learners’ use of Pronunciation Learning Strategies by modifying Oxford (1990)’s SILL. Various scholars have since then made further contribution to the area by uncovering more Pronunciation Learning Strategies used by learners of English as well as other languages and by creating their own versions of pronunciation strategy inventories and questionnaires following Peterson’s footsteps. The researcher of the present study attempted to synthesize input from these previous studies by adapting descriptions of Pronunciation Learning Strategies from Peterson (1997; 2000), Vitanova and Miller (2002), Derwing and Rossiter (2002), Osburne (2003), Eckstein (2007), Sardegna (2009), Pawlak (2010), Wrembel (2008) and Calka (2011).

To better enable cross comparison with results from previous studies, the researcher used the original wordings in the adapted statements whenever possible. When two or more previous studies had referred to the same strategy but in different wordings, the researcher would either adopt the version she considered most likely to be clearly understood by the participants, or modify and combine the various versions into one. Also, to help contribute to the establishment of a comprehensive Pronunciation Learning Strategies inventory in the long run and to better inform both researchers and practitioners interested in studying or teaching the use of Pronunciation Learning Strategies, the researcher re-organized these items revealed

in the literature by establishing an updated taxonomy that further extended Calka's (2011) version based on the result of a factor analysis of the data collected. The proposed Pronunciation Learning Strategies Inventory together with original sources of references for each pronunciation learning strategy captured by the 60 descriptive statements in the Pronunciation Learning Strategies Questionnaire (PLSQ) created by the researcher for the current study can be found in Appendix A and Appendix B.

It is worth noting that, at the moment of delivery to participants in the present study, the 60 strategies statements were tentatively categorized into Oxford's (1990) six categories, as shown in Table 8 below, by largely following Peterson (2000) and Calka (2011)'s intuitions and judgments. However, the data collected would subsequently be subjected to a factor analysis to examine the underlying construct, after which the tentative six-prong categorization might be retained upon confirmation or replaced by a new categorization system should the result support one.

Section in the PLSQ	Corresponding category based on Oxford (1990)
A 1-6	Memory strategies
B 7-35	Cognitive strategies
C 36-39	Compensation strategies
D 40-51	Metacognitive strategies
E 52-56	Affective strategies
F 57-60	Social strategies

Table 8: *Tentative categorization of strategy items in survey adopted in the current study based on literature*

3.3.2.2 Pronunciation performance assessment

Among the 451 participants who had filled in the survey, 190 participants were further asked to complete a pronunciation performance task which was aimed to elicit and audio-record their English pronunciation. The task included two parts: Part I asked participants to read aloud a short narrative text and Part II asked participants to recount a personal experience in the past by responding to a prompt (See Appendix J).

The current study hoped to increase the comprehensiveness of results by incorporating both a read-aloud and a spontaneous speech component in the pronunciation assessment. In particular, the use of read-aloud tasks could "address the concern of skill confounding" (Peterson, 1997, p.57) because participants are not required to choose vocabulary, form syntax, check grammaticality or consider sociolinguistic appropriateness when performing the task. This way, pronunciation may remain the only skill assessed by the raters. As pointed out by Yager (1992, p.5, as cited in Peterson, 1997, p.57), raters likely "downgrade even native

pronunciation of a text" when it contains obvious grammatical mistakes and wrong use of vocabulary. Also, the administering of a read-aloud task allows data collection to be done under standardized conditions as all participants are subject to the same text. In other words, a well-selected text for a read-aloud task could ensure elicitation of a specific variety of targeted pronunciation features from all participants (E.g. the choice of a narrative text may help assess participants' grasp of the various types of inflectional *"ed"* endings and thereby their mastery of syllables in past-tensed verbs; the choice of a text with dialogue elements may help assess participants' grasp of intonation for various types of sentences).

On the other hand, compared with a read-aloud task where the participants may feel strained having to deal with an unknown text or unfamiliar vocabulary, a recount task could mitigate these shortcomings by eliciting more natural, authentic speech patterns that are close to what participants would produce in daily life. For example, Oyama (1976) proposed that reading aloud of a printed text might be a well more stressful task than giving informal recounting of an anecdote; Munro and Derwing (1994) also discussed the increased likelihood of a higher frequency of errors, reduction in fluency and stronger accent to be perceived in read-aloud of given texts than in spontaneous speech should the given text consist of unfamiliar vocabulary or syntactic structures.

Overall speaking, by examining "both controlled reading data and uncontrolled spontaneous data, we could obtain a more holistic view of the participants' production," especially when the latter could allow words and clusters other than those pre-selected by the researcher to be elicited, thus "ensuring a more reliable picture of the learners' speech behaviour" (Chan, 2010b, p.108). This mixed approach of data collection was also adopted by Chan (2006; 2007), Angelovska (2012), Rokoszewska (2012; 2013) and Smemoe and Haslam (2013) in their studies investigating learners' pronunciation performance.

3.3.2.2.1 Read-aloud text

The idea of adopting a read-aloud task for pronunciation assessment was adapted from Peterson (1997), Dlaska and Krekeler (2008), Sardegna (2009), Robins (2010), Liu and Fu (2011), Hişmanoğlu (2012), Smemoe and Haslam (2013), and Rokoszewska (2012; 2013). The majority of these studies asked participants to read aloud lists of pre-selected words or sentences. For example, both Dlaska and Krekeler (2008) and Liu and Fu (2011) provided a vocabulary list to elicit participants' pronunciation performance, while Sardegna (2009) asked participants to read aloud individual words followed by sets of short dialogues. In the present study, however, rather than focusing on a specific pronunciation feature (such as

Rokoszewska, 2012, who focused on English vowels, and Sardegna, 2009, who focused on word stress), the researcher was more interested in participants' holistic performance both at the segmental and suprasegmental level. It therefore appeared that using an authentic narrative text with paragraphs providing a context of meaning as well as embedded conversations eliciting intonation would be more appropriate and less artificial sounding than using lists of non-contextualized words or sentences in isolation.

The read-aloud text adopted was a 341-word long excerpt taken from the novel *The Terrible Thing That Happened to Barnaby Brocket* written by John Boyne. The task elicited approximately two minutes of speech from the participants, which was considered of sufficient length for assessing oral production (Peterson, 1997, p.56). The text was chosen also because it happened to cover a wide range of pronunciation features including the following:

1. Diphthongs *
   e.g. pointing, gave, aimlessly, train, alone, miles around, allow, grounded, down, height
2. Long and short vowels *
   e.g. bean (not bin), keep (not kip), seen (not sin), seat (not sit)
   e.g. sit (not seat), fill (not feel), brim (not bream), kid (not keed)*
3. Distinguish between /ʃ/ and /s/ * #
   e.g. shoulder, shopping, unsure, should
4. Distinguish between /v/ and /w/ * #
   e.g. adventure, very
5. /r/ sound * #
   e.g. remembering, arrived, refreshed, rucksack, crowds
6. /ʌ/ sound *
   e.g. rucksack, shrugging, wondering
7. /ə/ sound #
   e.g. conductor, policeman, aimlessly
8. Inter-dental sounds /ð/ and /θ/ #
   e.g. thousand, south, north, something
9. Word-final consonants #
   e.g. gift, like, felt, streets, bag, aback, sign, smell
10. Consonant clusters #
    e.g. exactly, shrugging
11. Regular inflectional morphology such as 'ed' endings in past-tensed verbs and 's' in plural nouns
    e.g. arrived, filled, departed, unchallenged, asked
    e.g. places, passages
12. Placement of word stress
    e.g. EXit/exIT, OBviously/obVIOUsly, AVenue/aVENue

* Those marked with an asterisk are sounds bearing high functional loads, as discussed in Catford (1987) and Brown (1988).

Those marked with a hash include sounds non-existent in Cantonese and might thereby pose difficulty to participants in the study. For example, the consonants /r/, /v/, /z/, /θ/, /ð/, /ʃ/, /ʒ/, /tʃ/, /dʒ/ and vowel /ə/ do not exist in Cantonese (Chan, 2006; Chan & Li, 2000); Cantonese also does not have plosives /b/, /d/, /g/ or lateral /l/ in word-final positions and has no consonant clusters (Chan & Li, 2000).

***Figure 3**: Target pronunciation features covered in read-aloud text*

As revealed in the study by Thomson and Isaacs (2009), lexical familiarity has a significant impact on the intelligibility of learners' production of L2 phonemes regardless of their L1. It is therefore important to select a text of an appropriate difficulty level in terms of lexical richness and complexity.

Number of Words:	348 tokens; 203 types
Type-token ratio:	0.58
Tokens per type:	1.71
Vocab Profile:	0-1K – 81.5%; 1-2K – 6.94%; AWL – 0.58%; Off List – 10.98%
Flesch Reading Ease:	67.9
Flesch-Kincaid Grade Level:	8.9

***Table 9:** Vocabulary profile of the selected read-aloud text*

The chosen text was run through the vocabulary profiler developed by Cobb (n.d.) based on Heatley, Nation and Coxhead (2002) and results are presented in Table 9. Among the 348 words in the text, more than 88% belonged to the most frequent 2000 words of English. A readability check showed that the level of Flesch Reading Ease was 67.9, meaning the text was easily understandable by students of 13- to 15-year of age, and the Flesch-Kincaid Grade Level was 8.9, meaning the text should be easily understandable by a ninth-grade student. The text should therefore not be overly lexically challenging as to hinder the valid assessment of targeted students' pronunciation performance.

Meanwhile, the proportion of academic words in the text might be noticeably quite low. This was because the text chosen was taken from a children's story the context of which was one of everyday life. Although the target participants were university students, it was decided that a narrative text would be chosen instead of an academic article for two reasons: First, academic texts are not designed for reading-aloud while narratives consist of features such as plot, actions and conversations, which favour oral expression and therefore appear more suitable for assessing such qualities as stress, rhythm, pause and intonation; second, academic texts are often discipline specific and may involve more off-list low-frequency

words that are subject related. First-year and final-year students may also demonstrate different levels of familiarity with the academic genre, which may lead to another skills confound.

3.3.2.2.2 Prompt for spontaneous speech

The second part of the pronunciation assessment elicited spontaneous speech of participants by providing a simple prompt. This method of assessment was adopted in some previous studies such as Eckstein (2007) and Smemoe and Haslam (2013). Eckstein (2007, p.44) used a "compare/contrast task" and a "narration task" with participants of low and high proficiency levels respectively, but unfortunately did not clearly described the actual prompt he used for the two tasks. Smemoe and Haslam (2013, p.443) used the prompt "please tell me about one of your favourite movies and why you like it", which elicited a recount of a past experience as well as the participant's reaction and opinions towards the experience.

The researcher modelled after the two studies by adopting the following prompt:

> 'Recall and speak about your happiest moment in life. Share your experience by describing what happened that brought your happiness.'

Figure 4: *Introductory prompt adopted to elicit spontaneous speech for pronunciation assessment*

Like the design of Eckstein (2007) and Smemoe and Haslam (2013), this prompt elicited speech from participants that was related to their personal experience and was narrative in nature, in order to increase the ease of generating content and lexical-grammatical input, as compared to a prompt eliciting argumentation, which would likely be more demanding both in terms of topical knowledge and linguistic competence in general.

3.3.2.2.3 Pronunciation recording

Data collection was carried out in multimedia language laboratories on campus equipped with high quality sound recording hardware. In each data collection session, about 10 to 20 students were recorded performing the pronunciation tasks in the laboratory. Each participant was placed in a work station surrounded by sound insulation boards and provided with a microphone attached to a headset so they would not be disturbed by the surroundings or the voices of other participants. The participants were recorded using SANAKO Lab 100 language learning system, which enabled multiple recordings from all work stations to be conducted simultaneously. The recordings were exported digitally as wave sound files for storage and following assessments.

3.3.2.2.4 Pronunciation performance rubric

A pronunciation performance rubric (Appendix K) was designed by the researcher with reference to a number of existing speaking competence rubrics used by internationally renowned testing organizations. As pointed out by Isaacs (2014), rating scale development in the area of pronunciation is still rather limited and there are numerous shortcomings in how pronunciation has been modelled in currently available rating scales. For example, in some cases, pronunciation is only partially covered along the spectrum of scales, as in only four of the 10-level ACTFL Oral Proficiency Guidelines, while in other cases, it is entirely omitted, as in the *Common European Framework of Reference* (p.145).

To increase its comprehensiveness, the researcher designed the rubric by drawing on her experience as a frontline English language teacher while incorporating input from the speaking scales of the IELTS exam (IELTS, n.d.) — largely modelling after its coverage of segmental speech features); the TOEFL iBT exam (TOEFL, n.d.) — for its coverage of speech features at the prosodic/suprasegmental level; and the Cambridge ESOL Common Scale for Speaking (Cambridge English, n.d.) — for its coverage of both segmental and suprasegmental features. Colour-coded versions of the finalized pronunciation performance rubrics can be found in Appendix L showing the manner in which the incorporation of various sources of input was done.

The rubric was divided into five levels from 1 to 5, with 5 representing excellent mastery of English pronunciation features with no unintelligible pronunciation to a proficient English user. Each level except for the highest was further divided into a sub-level which was labelled half a point above the level score. For example, above level 3 and below level 4 there was a level 3.5, meaning that a pronunciation sample demonstrated both features that fit the scale descriptors of level 3 and features that fit the higher requirements of level 4. This half-point allowed for greater accuracy in assigning pronunciation scales.

3.3.3 Piloting

A pilot study was conducted three months prior to the actual administering with ten undergraduate students who volunteered to participate in order to collect feedback on the functionality of the two instruments.

Regarding the content of the survey, participants found most of the question items clear and easy to complete, except for items where a technical term was provided alongside a

"layman" explanation for a particular strategy, which confused a few of them. For example, some participants were confused by items such as the following:

> *- I selectively focus my attention on pronunciation while listening to or speaking English (directed attention).*
>
> *- I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation (selective attention).*

Participants reported unsure of the meaning of these items but when they were asked to explain their understanding, they could articulate and describe what they thought the item meant very well. Essentially it was the technical references in the brackets that confused them. Since the bracketed were terms coined and used by scholars and researchers to facilitate academic discussion about strategic learning, they were removed from the finalized survey to avoid unnecessary distraction and confusion to participants. They would only be included in the final report on results.

The pronunciation recording that followed the survey went smoothly. All students were able to complete the read-aloud part within two to three minutes' time and spent the remaining half within the given five minutes on the spontaneous speech part. The entire data collection procedure could therefore fit perfectly into a single lesson of the university's timetable.

On the other hand, a couple of minor problems were detected with the content of the read-aloud task: First, quite a number of the participants could not pronounce proper nouns such as the protagonist's name and names of places. This in turn affected their pronunciation at the suprasegmental level as they stumbled through any sentences containing proper nouns that they did not know. To minimize the impact of these unfamiliar proper nouns from obscuring the results, they were replaced with more common names (e.g. the protagonist's name Barnaby was replaced with Benny) so that the focus of the task would remain on assessing students' pronunciation competence rather than vocabulary repertoire.

Second, as mentioned in Section 3.3.2.2.1, the read-aloud text was chosen largely because it covered a large range of pronunciation features. However, as an authentic piece of writing not originally intended for eliciting pronunciation features in an assessment context, the text did miss out a particular feature that the researcher would like to target, namely the multiple instances of inflectional "*s*" and "*es*" endings which could help ascertain learners' mastery of suprasegmental features. An initial assessment of participants' recordings in the pilot study revealed this loophole. To ensure a more complete coverage, minor changes were

made to the text to include words that carry the omitted target features. This increased the length of the text from 336 words to 348 words with an insignificant impact on the required time for task completion.

3.3.4 Ethical considerations

3.3.4.1 Fulfiling legal and institutional requirements

Permission to survey students enrolled in various courses was sought from and granted by the English language centre as well as each teacher-in-charge. Noting the importance to seek approval from research ethics review boards at the institution level prior to collecting data (Burns, 2010, p.34; Mackey & Gass, 2005, p.37; Dörnyei, 2007, p.66), a research protocol (Appendix E) outlining the data collection instruments, particularly the survey, was submitted to and approved by the Research Administration Office of the Chinese University of Hong Kong (together with the Survey and Behavioural Research Ethics Approval Form, in Appendix H) and the Ethics of Research Committee of the University of Bristol (together with the GSoE's Research Ethics Form, in Appendix I).

3.3.4.2 Seeking informed consent from participants

Before data were collected, all participants were asked to consider and grant informed consent to ensure they were duly informed of the purposes and procedures of the study as well as their rights (See Appendix F).

3.3.4.3 Confidentiality and anonymity

To ensure confidentiality of participants' identities (Burns, 2010, p.35; Dörnyei, 2007, p.65), a reference number was printed on each questionnaire and pronunciation task prompt for each participant, which they were asked to read aloud at the beginning of their voice recording. This way, data collected from the two instruments could be matched for investigation of possible correlation without revealing the identity of each participant.

3.3.4.4 Harm and reciprocity

Another issue concerning research ethics is "harm" versus "reciprocity" (Punch, 2006, p.56), or what Dörnyei (2007, p.67) calls "an equitable cost-benefit balance". This principle stipulates that the researcher must check that the study would incur no harm to the participants. Meanwhile, it would be desirable if the research may bring certain benefits to participants. In this present study, upon completion of the questionnaire participants would receive a list of useful self-study resources on pronunciation improvement for their benefit.

Meanwhile, it was also hoped that the act of completing the survey could offer participants an opportunity to learn about pronunciation strategies previously not known or used.

3.3.5 Procedures of the main study — Data collection

3.3.5.1 Administering survey

The questionnaire survey was conducted in pen and paper rather than electronically because an open-ended question following the 60 descriptive items required participants to choose their favourite strategies from the previous list and explain their choices. To present this format in an electronic interface was considered less effective while using traditional pen and paper would allow easy page-flipping and cross-checking. It was also anticipated that a much higher response rate could be achieved using hard copies rather than electronic surveys. Translation of the questionnaire into native languages was deemed unnecessary following a pilot study. Participants, however, were encouraged to ask questions should they have problem understanding any items. Participants were given as much time as they needed to complete the survey. The average time required to complete all items was 15-20 minutes.

3.3.5.2 Administering pronunciation task

Participants invited to complete an audio recording were given 10 minutes to prepare for the pronunciation task. They might mark or make notes on the paper on which the narrative excerpt for read-aloud and the prompt for spontaneous response were printed. They were then given 5 minutes to record their performance for both parts.

3.3.5.3 Pronunciation assessment and inter-rater reliability

The pronunciation recordings were then assessed by the researcher by giving four pronunciation performance sub-scores. To ensure that the scores were reliable, a second rater was trained on using the pronunciation rubric and asked to give a second set of pronunciation scores to a random 20% of the samples. The second rater was a trained teacher of English as a second language who had had 8 years of English language teaching experience at the tertiary level and was a trained oral assessor for English speaking assessments conducted by the Hong Kong Examinations and Assessment Authority. At the time of the study, the second rater was working as a full time lecturer at the English Language Centre of the university where the data were collected so her daily interaction with some of the participants in the language classroom may have influenced her objectivity; however, both raters scored the pronunciation performances without reference to any participant information including names, age, nationality, native language or year of study at the ELC.

Out of the 152 pairs of scores given (38 samples x 4 sub-scores each), only 1 pair differed by more than one point and 11 pairs differed by more than half a point. To test for inter-rater reliability, a *t*-test was applied to the two sets of score data to detect differences between the mean scores of the two raters with the following hypotheses.

H0 (null hypothesis): the two means show no difference
H1 (alternative hypothesis): the two means show significant difference

The resulting test statistic was 0.044, with *p*-value = 0.964, meaning the null hypothesis was not rejected. This suggests that there was no significant deviation between the two raters, implying that the original rater remained acceptably consistent in assigning pronunciation scores.

3.3.6 Procedures of the main study — Data analysis

3.3.6.1 Primary variables

Phase I of this study involves two primary variables. The dependent variable is pronunciation ability, which was operationalized through measuring students' pronunciation performance at segmental and suprasegmental levels as elicited in a reading aloud task and a spontaneous speech task using a continuous scale ranging from 0.0 (unintelligible pronunciation) to 5.0 (excellent pronunciation) whereby raters may give fractional scores such as 2.5 to allow higher accuracy in scoring.

The independent variable is students' use of Pronunciation Learning Strategies outside class, which was operationalized through students' self-report of frequency counts of strategy use in the Pronunciation Learning Strategies Questionnaire (PLSQ) designed by the researcher. This instrument yielded a score from 1 (never or almost never true of me) to 5 (always or almost always true of me) on each of its 60 items.

3.3.6.2 Secondary variables

There were several moderator variables of interest that were analysed in relation to pronunciation performance, including gender (male or female), medium of instruction during secondary education (in a school with English or Chinese as medium of instruction, i.e. EMI or CMI), length of stay in an English-speaking country overseas (in months), self-reported amount of time spent on out-of-class pronunciation practice (never, rarely, sometimes, often, frequently), and previous training in pronunciation or phonetics (yes or no).

3.3.6.3 Statistical procedures

First, it was of major interest in this study to explore the underlying construct of strategic pronunciation learning and to better understand the patterns of pronunciation strategy use among Hong Kong university students. Since the PLSQ was developed by the researcher to define "an abstract notion of a theoretical construct", which is Pronunciation Learning Strategy, it was necessary to use relevant statistical procedures "to establish evidence that this theoretical construct is defined by the items on the instrument" (Oxford & Burry-Stock, 1995, p.8). To achieve this, a factor analysis was performed on the PLSQ survey results. Factor analysis operates on the notion that "measurable and observable variables can be reduced to fewer latent variables that share a common variance and are unobservable" (Yong & Pearce, 2013, p.80). Its purpose is to "isolate constructs and concepts" through summarizing data, interpreting patterns and regrouping variables into limited sets of clusters (ibid, p.79). Basically, it is a statistical procedure that helps "identify the main underlying factors which explain the greatest amount of the reported covariation among individual participants' responses". By using numerical values, factor analysis is a useful tool for "formulating psychological and educational constructs in a relatively objective manner" (Nyikos & Oxford, 1993, p.14).

In particular, Exploratory Factor Analysis (EFA) is used when a researcher wants to discover the number of factors influencing variables and to analyse which variables "go together" (DeCoster, 1998), and is therefore normally the first step in building scales or uncovering constructs (Yong & Pearce, 2013). The recommended sample size is at least 300 participants whereas the variables subjected to factor analysis should each have at least 5 to 10 observations (ibid). In the present study, an Exploratory Factor Analysis (EFA) was performed on the 451 participants' reported use of the 60 Pronunciation Learning Strategies using the extraction method of Maximum Likelihood Estimate (MLE) and rotation method of oblique Promax, with .40 as the cut-off point for factor loadings. The analysis yielded an eight-factor solution. Based on the resulting factor structure, descriptive and inferential statistics were presented to explore any pattern of strategy use among various learner groups.

Second, it was also of major interest in this study to investigate factors associated with pronunciation ability, in particular to ascertain any possible association between participants' Pronunciation Learning Strategies use and their pronunciation ability. An exploratory data analysis using a fitted regression model was initially performed on the total pronunciation score (dependent variable) and the total strategy score (independent variable) to test for

correlation between the two. *t*-tests and Spearman's Rho test were applied to explore the level of predictability various moderator variables including gender, previous phonetics training, medium of instruction at school, time spent on out-of-class practice, and length of stay in English-speaking countries may have on learners' pronunciation performance. Finally, a multiple linear regression model was applied to all the variables initially identified as positively associated with pronunciation performance in order to find out which factors might be relatively more significant in incurring a predictive influence on pronunciation performance when the interplay among the use of different types of strategies and various moderators is taken into account.

The statistical analyses were conducted using the statistical tool R (R Core Team, 2014) with support from the Department of Statistics at the Chinese University of Hong Kong.

3.4 Research Design for Phase II of the Study

Phase II of the study was action-based. A digital storytelling project was introduced to 33 undergraduate students enrolling on a 12-week foundation English course and data were collected to explore the potential of digital storytelling in enhancing students' engagement in the active use of Pronunciation Learning Strategies outside class through a post-course questionnaire, a guided written reflection and follow-up interviews, the details of which are presented below.

3.4.1 Participants

Participants in Phase II of the study were full-time undergraduate students (n=33) enrolled in two class sections of a foundation-level language course entitled "ELT1107: English Improvement Strategies for Listening and Speaking". The course was mandatory for students who obtained only grade D or E (the two lowest grades eligible for admission) in the Use of English paper in the Hong Kong Advanced Level Examination, the public entrance examination for university admission in Hong Kong. Meanwhile, it was also open for enrolment as an elective course to other types of students, including those obtaining better result from the HKALE, local or international students who entered the university via other admission means, and exchange students from other countries. In other words, while most of the participants were expected to be EFL learners with comparatively lower proficiency level, some of them might have come from different language learning backgrounds. To detect for

potential influence on the results, demographic information regarding background and language learning experience, especially previous pronunciation training, was collected (and reported in the Results chapter).

3.4.2 Instruments

To answer Research Questions 3 and 4 in Phase II of the study, the main instrument was a course-based version of the Pronunciation Learning Strategies Questionnaire (PLSQ), which was designed to measure the frequency at which participants applied Pronunciation Learning Strategies when completing the digital storytelling project.

Other instruments included a written reflection guide and a follow up interview, which were aimed to collect qualitative data. The former was chosen because the reflective journal is a data collection tool gaining increasing popularity in strategies research, as Nunan (1992) opines, written journals "have secured a place as important introspective tools in language research", particularly as "a means to tap into students' perspective on how they learn" (as cited in White, Schramm & Chamot, 2007, p.97). It is therefore considered a suitable tool to help triangulate quantitative results in the current study. Meanwhile, the latter was chosen because interviews allow the interviewer such flexibility in "seeking clarification and elaboration from learners on various aspects of their strategy use" (White, Schramm & Chamot, 2007, p.94).

3.4.2.1 Course-based Pronunciation Learning Strategies Questionnaire (C-PLSQ)

The researcher developed a course-based Pronunciation Learning Strategies Questionnaire (Appendix D) for data collection in Phase II, the format of which was largely based on the general PLSQ developed and used in Phase I of the study.

Part I of the course-based version of the questionnaire was aimed to elicit participants' intuitive use of Pronunciation Learning Strategies throughout the process of completing their digital storytelling projects. The following introductory prompt was included to provide context to the subsequent survey items.

> 1. Throughout your Digital Storytelling Project, have you used the following Pronunciation Learning Strategies (PLS)? Please insert 1, 2, 3, 4, or 5 in the blank to indicate how true the statement is in terms of what you actually did when you were trying to improve your English pronunciation during the process of completing your Digital Storytelling project.
>
> You will also be asked to identify your three favourite strategies among the list by the end of the survey.

Figure 5: *Introductory prompt adopted in the Course-based Pronunciation Learning Strategies Questionnaire (C-PLSQ)*

Not all of the 60 statements related to English Pronunciation Learning Strategies in the original version of PLSQ were included in the course-based version. This was because some of these items described learner behaviour either in very general contexts or specific situations in daily life, which was not applicable to a learner's attempt in completing a digital story. For example, among the following items in the original PLSQ, the first two items were not applicable as the former described an instance of general learner behaviour in acquiring the pronunciation of any new or unfamiliar words whereas the latter referred to learner behaviour in a very specific situation of daily conversation. Only the third and fourth items were applicable to the context of a digital storytelling project:

- *I make up songs or rhymes to remember how to pronounce some words.*
- *When I am conversing with someone speaking in English, I try to sound like an English speaker.*
- *I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.*
- *I encourage myself to carry on when I encounter pronunciation difficulties.*

After this process of screening, 32 out of the 60 statements were selected to be included in the course-based survey. The selection was further verified against Dickerson's Covert Rehearsal Model (Dickerson, 1987; 1989; 2000; Sardegna, 2009; Jensen, 2011) to double check if they indeed fulfilled the purpose of the current study (For a detailed discussion on the CRM, please refer to Chapter 2 Literature Review). The 32 statements were presented in the questionnaire under five sections as characterized by the five-step process of Covert Rehearsal, namely:

Section A. Finding privacy for out-of-class oral practice
Section B. Practicing aloud
Section C. Self-monitoring of speech
Section D. Comparing performance with target models
Section E. Making changes and practicing the adjustments until accurate and fluent

3.4.2.2 Written reflection on digital storytelling project

After submitting their digital stories, participants were asked to complete a written reflection by describing and reflecting on their learning experience throughout the digital storytelling project. To more thoroughly elicit participants' input and help them recall their learner behaviour and experience, a list of guiding questions was provided (Appendix M), while participants were reminded that there was no limitation on the length of their writing, nor were they restricted to only answering the listed questions.

3.4.2.3 Follow-up interview

For more in-depth discussions of participants' strategic learning throughout the project, four participants were invited to attend a follow-up interview. Focus-group interviews were ruled out as they are more suitable for investigating collective experience of a group of participants where the aim is to elicit their reactions to ideas from others and encourage them to inspire and challenge each other to ultimately induce "collective wisdom" in a group setting (Dörnyei, 2007, pp.145-146). In the current study, however, completing a digital story was a very personal and individualized learning experience, while introducing a group interview may actually reduce the amount of time affordable for each participant to examine and elaborate on their strategy use and rationale behind their choices in detail.

On the other hand, semi-structured individual interviews would be a useful tool to gather information on students' strategy use (Oxford, 1990, p.197). Examples of such use of individual interviews include asking students to report and discuss their general language strategy use in their daily activities (Wenden, 1987) or eliciting more specific strategy use by giving students target "problem contexts" based on which students are asked to name the strategies they would use for each scenario (Zimmerman & Martinez-Pons, 1988). The interview setting for the current study would encompass both features of (i) eliciting participants' strategy use in response to a given task or scenario, namely the digital storytelling task, and (ii) asking participants to recall their actual strategy use in a language activity.

When task-based strategy research is conducted, there are generally three ways to do it, namely prospective, introspective, and retrospective approaches (Oxford, 2011; Dörnyei, 2007). The prospective approach involves hypothetically asking students what they plan to do if given a certain task, the introspective approach asks students to vocalize what is going through their minds simultaneously as they perform a task, and the retrospective approach asks students to look back at their thoughts or actions after they have completed a task. In the present study, since participants were completing the digital storytelling project as assessed coursework, the prospective approach was unnecessary. Meanwhile, the introspective approach was also deemed unsuitable because digital storytelling was a project-based task that stretched over a period of time outside class so think-aloud protocol would be very difficult to administer. Also, digital storytelling was a speaking task and therefore least feasible to perform introspection with because reporting that occurs during the task would be too disrupting (Oxford, 2011, p.151). This left the researcher with retrospective approach,

which was considered most relevant and helpful for eliciting strategy use in L2 speaking tasks (ibid).

The downside of using the retrospective approach, however, is the possibility of memory loss and participants' "inarticulateness" about their mental operations (Oxford, 2011, p.142; Dörnyei, 2007, p.148). To mitigate these problems, a "stimulated recall" element was incorporated in the follow-up interviews. Stimulated recall means to provide some sort of stimulus to help the respondents retrieve their relevant thoughts and memories (Dörnyei, 2007, p.149). In particular, some tangible, such as visual or aural, reminders of a previous event may help stimulate memory recollection to an extent whereby the respondents can retrieve and then verbalize what they had in mind during the event (Gass & Mackey, 2007). To support participants' memory recall in the present study, before going into the interview questions, respondents were given time to watch their completed digital stories. It was hoped that the visual and audio elements perceived in the stories would stimulate their memory of strategies employed to accomplish their speech production as presented in the videos. Excerpts from their own written learners' reflections were also cited to help them recall memories when necessary.

As for the potential "inarticulateness", descriptions of pronunciation strategies as included in the course-based Pronunciation Learning Strategies Questionnaire were provided in the interview to help students identify strategies they had used. Participants were also free to switch back to their first language should they encounter difficulty in describing their thoughts or actions during the interview.

Among the 33 participants, four were invited to attend a follow-up interview. The interviewees were selected initially based on their response in the self-reported survey against two criteria — firstly, that interviewees had indicated relatively high use frequency of targeted pronunciation strategies and secondly, that interviewees had spent significant amount of out-of-class time in completing the digital storytelling project (at least two hours a week throughout the one-month long project). It was hoped that respondents fulfilling the two criteria would be able to provide more substantial input regarding their pronunciation learning experience.

Participant ref no.	Sex	Faculty of study	HKALE result (Overall, speaking paper)	Reported time spent on DST project	Digital story score	Interview conducted in (language)	Length of interview
017	F	Medicine	D, D	28 hours	88	English	59 min
021	M	Science	D, D	11 hours	77	English	53 min
033	F	Social Science	D, C	20 hours	84	Cantonese	42 min
039	M	Education	E, E	9 hours	74	Cantonese	41 min

Table 10: *Information about the four respondents participating in interview*

Among respondents who fulfilled the two criteria, four students were selected (see demographic details in Table 10). Among them, two were males and two were females. They were from four different faculties, namely Medicine, Social Science, Science and Education. They also represented comparatively higher to lower proficiency levels along the spectrum both in terms of their university admission English exam results and in their scores obtained in the digital storytelling project. The four interviewees were informed that they might choose a language they felt comfortable using to express themselves during the interview. Two of them opted to speak in English the best they could whereas the other two opted to use Cantonese, their first language.

3.4.3 Ethical considerations

3.4.3.1 Fulfilling legal and institutional requirements

Same as the procedures taken in Phase I, permission to survey students enrolled in ELT1107 in Phase II was sought from and granted by the English language centre while approval to administer the course-based Pronunciation Learning Strategies Questionnaire, self-reflection guide and follow-up interviews was obtained from the Research Administration Office of the Chinese University of Hong Kong (together with the Survey and Behavioural Research Ethics Approval Form, in Appendix H) and the Ethics of Research Committee of the University of Bristol (together with the GSoE's Research Ethics Form, in Appendix I).

3.4.3.2 Seeking informed consent from participants

Again, same as Phase I, all participants were asked to consider and grant informed consent before data were collected to ensure they were duly informed of the purposes and procedures of the study as well as their rights (See Appendix G). In particular, it was clearly expressed to students that participation in the study was entirely voluntary while non-participation would not lead to any repercussion or potential downgrading of their course grades (See more on this in Section 3.4.4.1).

3.4.4 Procedures

3.4.4.1 Administering survey and interview

Upon submitting their digital stories and written reflection in the final lesson, students each received a copy of the informed consent form and the survey. Students were invited to indicate their willingness to participate in the study on the spot by signing the consent form but were informed that they were free to withdraw from the study any time. They were asked to send the completed survey to the researcher either in hard copy or via email in the following two weeks. It was announced that course grades would be released within one week so that students would not feel the risk of getting a lower course grade as a result of unwillingness to participate in the study or of displeasing the teacher-researcher with potentially unsatisfactory answers in the survey. In other words, participants might opt to submit the completed survey after receiving their course grades if they so wished.

3.4.4.2 Data analysis

Phase II of the study seeks to explore participants' active use of Pronunciation Learning Strategies in a digital storytelling project. In particular, it aims to elicit the frequency and pattern of such strategy uses and corresponding factors affecting participants' strategy choices. Quantitative data collected through the course-based Pronunciation Learning Strategies Questionnaire (C-PLSQ) were computed to find the mean score of use frequency for each pronunciation strategy. The average amount of time spent by students on completing various parts of the project was also calculated.

On the other hand, two sources of qualitative data were collected, namely students' post-project written reflections and follow-up semi-structured interviews. All four interviews were transcribed and two of them were further translated into English. All qualitative data in text form were imported in NVivo 10 for coding. Marshall and Rossman (2011, p.209) discuss a continuum of coding strategies that span from "pre-figured technical" codes or categories (what they refer to as coding in a quasi-statistical analytic style) to "emergent intuitive" categories (an immersion crystallization style). To answer Research Question 3, coding was first performed in the former style, whereby the said qualitative data were coded using "*a priori* codes" derived from the pronunciation strategy inventory to be resulting from the factor analysis conducted in Phase I of the study. The number of sources and references of each code (i.e. each strategy) was reported to provide an indicator of frequency of occurrence, which can be compared with the results yielded from the quantitative data for triangulation (Creswell, 2007, p.152). To answer Research Question 4, coding was performed on the same

data in the latter style where key themes relating to various factors affecting strategy choices were coded as they emerged. Such key themes were identified with reference to Gu's (2003) person-task-context-strategy model (See Section 5.3). Coding was performed twice on the data set for each exercise to ensure internal consistency and to check against errors.

CHAPTER 4: RESULTS AND DISCUSSION (PHASE I)

4.1 Overview of Phase I Results

Phase I of the study was designed to investigate Hong Kong university students' use of Pronunciation Learning Strategies by collecting a sample of their self-reports on strategy use and audio-recordings of their pronunciation performance in a two-part pronunciation test. In particular, it was aimed to observe the frequency and types of strategies used by Hong Kong university students, thereby gaining a better understanding of the construct of strategic learning in English pronunciation (Phase I, Part A) and to determine if any relationship exists between Pronunciation Learning Strategies use and pronunciation ability (Phase I, Part B). A total of 451 valid responses were collected in Phase I Part A and 190 responses in Phase I Part B, with details to be elaborated in the following sections.

This chapter presents descriptive and inferential statistics related to these objectives and discusses the results. The descriptive statistics are majorly useful in addressing Research Question 1 while the inferential statistics are useful in addressing Research Question 2.

4.2 Results of Research Question 1: "What Pronunciation Learning Strategies do university students in Hong Kong use to improve their English pronunciation performance?"

4.2.1 Demographics (Phase I Part A)

To answer Research Question 1, participants were randomly recruited from all three levels of courses offered by the ELC of a university in Hong Kong. A total of 454 responses to the Pronunciation Learning Strategies Questionnaire (PLSQ) were collected, among which 451 were considered valid for data analysis whereas 3 responses were discarded due to the presence of incomplete items and missing data.

Among the participants (n=451), 62.5% (n=282) were female and 37.5% (n=169) were male, their age ranging from 17 to 26 with an average at 19.5 years. Among them, 80.3% (n=362) were local Hong Kong students, 16% were from Mainland China (n=72), 2% from Taiwan (n=9), 0.7% from Macau (n=3), 0.4% from Korea (n=2), and 0.2% from Malaysia, Indonesia and Canada respectively (n=1). Their native languages were: 78.7% Cantonese (n=355), 20.6% Mandarin (n=93), 0.2% Korean (n=2) and 0.2% Indonesian

(*n*=1). Their major disciplines and years of study at the university varied, the details of which as well as other demographic information are shown in Table 11 below:

Participants	
Total no.	451

Secondary education	
English as Medium of Instruction Schools (EMI)	302
Chinese as Medium of Instruction Schools (CMI)	149

Gender	
Female	282
Male	169

Year of study	
1st Year	206
2nd Year	143
3rd Year	77
4th Year	24
5th Year	1

Faculty	
Faculty of Arts	126
Faculty of Education	13
Faculty of Engineering	42
Faculty of Law	4
Faculty of Business	124
Faculty of Medicine	8
Faculty of Science	77
Faculty of Social Science	57

Origin	
Hong Kong	362
Mainland China	72
Macau	3
Taiwan	9
Korea	2
Malaysia	1
Indonesia	1
Canada	1

Native language	
Cantonese	355
Mandarin	93
Korean	2
Indonesian	1

Table 11: *Demographic information of participants in Phase I Part A of the study*

4.2.2 Results of Pronunciation Learning Strategies Questionnaire (PLSQ)

The PLSQ required participants (*n*=451) to respond to 60 statements about their pronunciation strategy use by indicating how true each statement was in terms of what they actually did when they were learning or trying to improve their English pronunciation. Participants responded on a Likert scale of 1 to 5, with "1" meaning "*never or almost never true of me*" and "5" meaning "*always or almost always true of me*", which were later on coded with scores 1 to 5 such that the higher the score the more frequently and generally the strategy was used by the respondent. Cronbach's alpha coefficient for the survey was 0.839. Table 12 shows the mean score and distribution of responses for each strategy based on the 451 responses in a descending order. For a table with these results presented under different types of PLS based on factor analysis, please see Appendix P.

Rank	Item	Pronunciation Learning Strategy (PLS)	Mean	SD	1	2	3	4	5
1	**C36**	I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).	**4.12**	0.83	1.1%	2.4%	15.5%	45.5%	35.5%
2	**B35**	I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.	**4.00**	1.07	3.5%	6.9%	15.5%	34.6%	39.5%
3	**D51**	When I find I make a mistake in pronunciation, I try to correct myself immediately.	**3.98**	0.88	1.1%	3.8%	21.3%	43.7%	30.2%
4	**D47**	I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.	**3.93**	1.03	2.7%	6.4%	21.5%	34.1%	35.3%
5	**C37**	When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).	**3.92**	0.96	2.4%	4.7%	21.7%	41.0%	30.2%
6	**C39**	When others can't understand me, I would adjust my speaking volume or speed.	**3.83**	0.99	2.0%	9.1%	20.0%	41.7%	27.3%
7	**C38**	When I can't pronounce certain words correctly, I paraphrase (i.e. use other words with similar meanings).	**3.74**	0.99	2.9%	7.8%	24.6%	42.1%	22.6%
8	**A5**	I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.	**3.73**	1.01	3.5%	7.8%	23.5%	42.1%	23.1%
9	**B13**	I talk to myself (out loud or silently) and listen to my pronunciation.	**3.69**	1.04	3.3%	9.8%	25.7%	37.5%	23.7%
10	**B12**	I mentally rehearse how to say something before saying it aloud.	**3.66**	1.06	3.3%	11.5%	24.6%	36.8%	23.7%
11	**B14**	I repeat after a model such as a native speaker, teacher, sound recordings, television or movies to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).	**3.59**	1.08	3.8%	13.3%	24.8%	36.8%	21.3%
12	**B22**	I try to avoid producing inappropriate sounds from my native language.	**3.53**	1.01	3.5%	10.9%	31.0%	37.9%	16.6%
13	**E55**	I encourage myself to carry on when I encounter pronunciation difficulties.	**3.48**	1.01	4.0%	11.3%	31.9%	38.1%	14.6%
14	**B9**	I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.	**3.46**	1.03	4.0%	13.1%	31.5%	35.7%	15.7%
15	**B24**	I pay attention to divide thought groups and pause appropriately when I read sentences.	**3.46**	1	2.9%	14.4%	30.4%	38.4%	14.0%
16	**B10**	I practice saying words slowly at first and then faster.	**3.45**	1.04	4.4%	14.6%	26.8%	40.1%	14.0%
17	**D48**	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).	**3.44**	1.16	7.8%	12.0%	28.2%	32.8%	19.5%
18	**B23**	I pay attention to place the word stress on the right syllables within words.	**3.41**	1	2.9%	14.9%	35.3%	32.4%	14.6%
19	**B11**	I practice pronouncing words first in isolation and then in context.	**3.38**	1.09	5.5%	14.6%	31.7%	32.4%	15.7%
20	**B20**	When I am conversing with someone speaking in English, I try to sound like an English speaker.	**3.37**	1.09	5.1%	16.0%	32.2%	30.6%	16.2%
21	**B26**	I pay attention to connected speech (linking words together).	**3.37**	1	3.5%	15.1%	34.4%	34.8%	12.2%
22	**B18**	I listen to the radio, television or movies to observe English speakers' speech production.	**3.35**	1.07	4.0%	18.6%	31.3%	31.0%	15.1%

23	**B27**	I pay attention to maintain an English rhythm and intonation to sound more natural.	**3.34**	0.99	3.5%	16.6%	34.1%	35.3%	10.9%
24	**B25**	I pay attention to decide where to make an emphasis in sentences to better express the meaning.	**3.33**	1	3.5%	15.3%	38.1%	30.4%	12.6%
25	**F58**	I ask someone to pronounce something for me.	**3.33**	1.14	7.5%	16.9%	25.3%	35.9%	14.4%
26	**B15**	I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).	**3.28**	1.12	6.4%	19.3%	27.9%	32.4%	14.0%
27	**D42**	I selectively focus my attention on pronunciation while listening to/speaking English.	**3.26**	0.97	4.2%	16.4%	37.5%	99.8%	8.6%
28	**D50**	I monitor my own pronunciation when speaking to others in English.	**3.25**	1.05	5.3%	17.7%	35.9%	28.8%	12.2%
29	**B21**	I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.	**3.24**	1	5.3%	14.4%	41.0%	29.3%	10.0%
30	**B30**	When I listen to someone speaking English, I pay attention to and notice errors.	**3.15**	1.08	6.9%	21.5%	31.3%	30.8%	9.5%
31	**A4**	I memorize a word's pronunciation by making associations (e.g. by associating the word with another word or with sounds in my first language, or associating it with a previous occasion where I heard it).	**3.13**	1.25	15.7%	13.3%	25.9%	32.6%	12.4%
32	**E53**	I keep a sense of humour about my mispronunciations.	**3.06**	1.12	9.1%	22.4%	32.4%	26.2%	10.0%
33	**B31**	I pay attention to the similarities and contrasts between my native language and English pronunciation.	**3.03**	1.08	9.3%	20.4%	36.6%	25.5%	8.2%
34	**D43**	I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.	**3.03**	1	6.7%	22.0%	39.0%	26.2%	6.2%
35	**B17**	I use computer software/ apps/ internet resources to practice pronunciation.	**3**	1.29	14.0%	24.8%	23.7%	21.7%	15.7%
36	**A3**	I use my own codes to remember how to pronounce some words.	**2.99**	1.25	16.0%	19.3%	25.3%	28.6%	10.9%
37	**E52**	I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.	**2.99**	1.1	10.0%	23.1%	32.8%	26.2%	8.0%
38	**B28**	I make hypotheses and develop my own understanding of how English pronunciation works, even if sometimes I have to revise my understanding based on new information.	**2.92**	1.02	9.1%	23.1%	39.9%	22.4%	5.5%
39	**B34**	I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.	**2.92**	1.39	21.7%	20.0%	19.5%	22.6%	16.2%
40	**D46**	I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.	**2.92**	1.13	11.8%	25.1%	30.8%	24.6%	7.8%
41	**E54**	I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).	**2.92**	1.18	12.0%	25.9%	30.8%	20.2%	11.1%
42	**B19**	I practice talking with others in English to improve my pronunciation.	**2.87**	1.06	8.4%	29.5%	36.4%	17.7%	8.0%
43	**B16**	I notice or try out different English accents.	**2.86**	1.23	13.5%	30.6%	23.5%	20.8%	11.5%
44	**D44**	I actively seek opportunities to talk with others in English and practice my pronunciation.	**2.82**	1.06	9.3%	31.9%	33.9%	17.5%	7.3%
45	**F57**	I ask someone to evaluate or correct my pronunciation.	**2.81**	1.19	15.5%	25.7%	29.9%	19.5%	9.3%
46	**B29**	I analyse English spoken texts using pronunciation rules I have learned.	**2.71**	1.05	13.5%	30.2%	31.3%	21.7%	3.3%

47	**B32**	I learn about English pronunciation rules and take note of such information.	**2.69**	1.09	14.2%	31.5%	30.2%	19.3%	4.9%
48	**B8**	I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.	**2.67**	1.16	17.7%	29.5%	28.4%	17.3%	7.1%
49	**F59**	I work with other learners to practice, review or share information about English pronunciation.	**2.65**	1.11	18.0%	27.3%	31.3%	19.1%	4.4%
50	**B7**	I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.	**2.59**	1.15	20.4%	29.0%	27.3%	18.0%	5.3%
51	**F60**	I try to teach someone else about English pronunciation.	**2.59**	1.19	22.4%	26.4%	27.5%	17.3%	6.4%
52	**E56**	I reward myself for success or effort put into pronunciation improvement.	**2.56**	1.16	22.0%	27.7%	27.9%	17.3%	5.1%
53	**D41**	I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation or presentation task).	**2.51**	1.1	21.7%	27.9%	32.2%	14.2%	4.0%
54	**D49**	I record myself to listen to and evaluate my own pronunciation.	**2.38**	1.22	29.7%	28.6%	22.4%	12.4%	6.9%
55	**D45**	I set goals for myself and plan my pronunciation learning to reach these goals.	**2.36**	1.1	25.7%	31.5%	27.5%	11.5%	3.8%
56	**A2**	I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.	**2.28**	1.33	38.4%	24.8%	16.0%	11.1%	9.5%
57	**A6**	I regularly revise new words' pronunciation using some mechanical techniques (e.g. making flash cards, creating word lists).	**2.18**	1.1	33.5%	30.8%	23.7%	8.0%	4.0%
58	**B33**	I do phonetic exercises, such as transcription exercises.	**2.08**	1.03	36.4%	31.9%	20.8%	9.5%	1.3%
59	**A1**	I make up songs or rhymes to remember how to pronounce some words.	**2.04**	1.07	41.0%	27.3%	20.8%	8.6%	2.2%
60	**D40**	I study books or reference materials about English pronunciation rules.	**2.02**	1.07	39.5%	32.6%	17.7%	7.1%	3.1%

***Table 12**: Results of PLSQ with mean pronunciation strategies use scores and frequency distributions*

Among the 60 strategies surveyed, 16 showed a mean score of reported use at 3.5 to 5.0, meaning a high frequency of use according to Oxford's (1990, p.301) categorization, 37 showed a mean score at 2.5 to 3.4 meaning a medium level of use frequency, and 7 showed a mean score at 1.0 to 2.4 meaning a low level of use frequency.

To explore the underlying construct of strategic pronunciation learning and to better understand the patterns of pronunciation strategy use among Hong Kong university students, an Exploratory Factor Analysis (EFA) was performed on the 451 participants' reported use of the 60 Pronunciation Learning Strategies using the extraction method of Maximum Likelihood Estimate (MLE) and rotation method of oblique Promax, with factor loadings of .40 as the cut-off point for inclusion of an item in a given factor (For more on EFA, see Section 3.3.6.3).

This resulted in an eight-factor solution as shown below in the factor matrix in Table 13 (An extract is shown for ease of reading. For a detailed version with full loadings, please refer to Appendix O). The result was further supported by inspection of the scree plot (Figure

6), whereby examination of eigenvalues, parallel analysis and optimal coordinates suggested that the number of factors would most likely lie between 5 and 13.

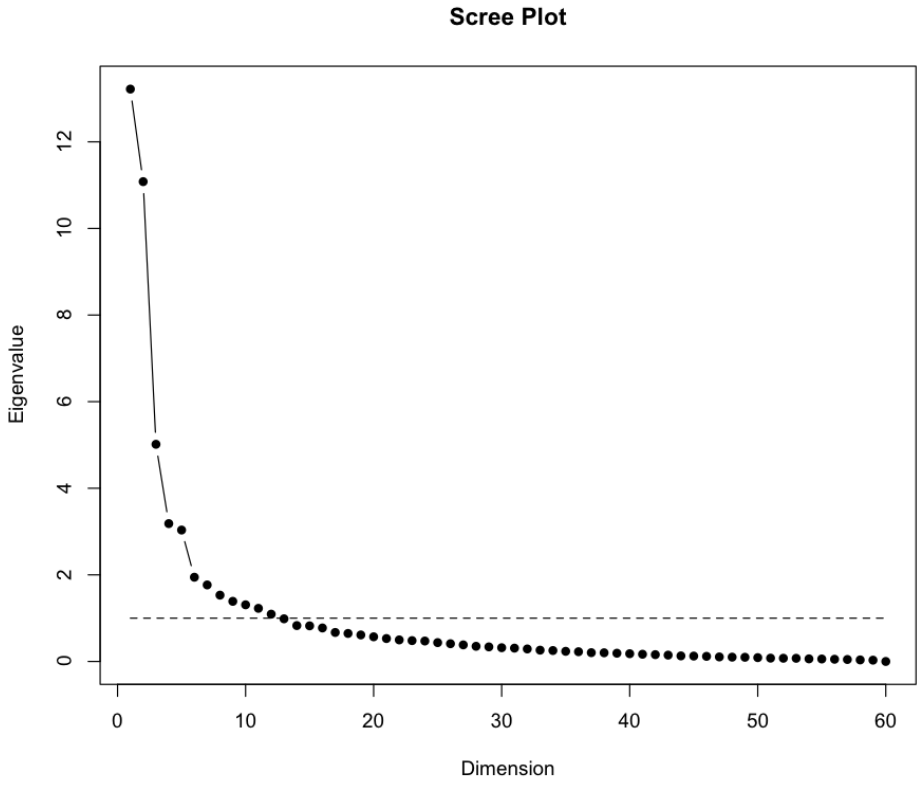

Figure 6: *Scree plot*

Pronunciation Strategies	Factor Loadings							
Item number	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
B15	0.422							
B21	0.524							
B23	0.718							
B24	0.884							
B25	0.873							
B26	0.757							
B27	0.800							
B30	0.402							
A2		0.602						
B32		0.617						
B33		0.641						
B34		0.682						
D40		0.742						
D41		0.796						
D43		0.526						
D48			0.576					
E52			0.651					
E53			0.728					
E54			0.721					
E55			0.595					
E56			0.541					
A5				0.703				
B7				0.405				
B9				0.697				
B10				0.752				
B11				0.604				
B14				0.398				
F57					0.646			
F58					0.819			
F59					0.619			
B19						0.746		
B20						0.451		
D44						0.733		
B35							0.518	
D47							0.484	
D48							0.471	
D51							0.473	
C36								0.682
C37								0.823
C38								0.399
	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**	**Factor 7**	**Factor 8**
SS Loadings	5.119	4.282	3.615	3.335	2.379	2.108	2.099	1.837
Proportion Variation	0.085	0.071	0.06	0.056	0.04	0.035	0.035	0.031
Cumulative Variation	0.085	0.157	0.217	0.273	0.312	0.347	0.382	0.413

Table 13: *Factor matrix showing an 8-factor structure resulting from a factor analysis of the PLSQ results using maximum likelihood estimation (extraction method) and oblique Promax (rotation method)*

The first factor, labelled ***functional practice strategies*** by the researcher (with reference to those labelled by Nyikos and Oxford, 1993), loaded highly on eight strategies used by the pronunciation learner to focus on various pronunciation features when engaging in authentic, naturalistic language use, such as item 23 "*When I speak English I pay attention to place the word stress on the right syllables*" and item 24 "*When I speak English I pay attention to decide where to make an emphasis in sentences to better express the meaning*". These items involve the learner actively practicing pronunciation while listening to or speaking the target language.

The second factor, labelled ***cognitive-formal rule processing strategies*** by the researcher (with reference to those labelled by Nyikos and Oxford, 1993), loaded highly on seven items characterized by highly cognitive, information-processing strategies that are often internal to the learner and resulting in less observable behaviours (as opposed to explicit pronunciation performance entailed by functional practice strategies), such as item 32 "*I learn about English pronunciation rules and take note of such information*" and item 33 "*I do phonetic exercises, such as transcription exercises*". These strategies involve analysing and reasoning, using resources to decompose target language input, assimilating target language data through reading, making mental summaries, extracting, learning and using rules.

The third factor, labelled ***affective strategies*** (with reference to Oxford, 1990), loaded highly on six items, which are emotion and motivation related strategies such as anxiety awareness and reduction, use of humour and self-reward. Some examples include item 52 "*I have ways to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation*" and item 56 "*I reward myself for success or effort put into pronunciation improvement*".

The fourth factor, labelled ***sensory-mechanical drilling strategies*** by the researcher, loaded highly on six items whereby the learner gets familiarized with the target pronunciation through mechanical drilling or repetition for muscle memory. These include drilling through either receptive senses (such as listening repeatedly to a pronunciation) or mechanical practice in bettering one's control over speech production organs to produce accurate articulations. Some examples include item 9 "*I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation*" and item 10 "*I practice saying words slowly at first and then faster*".

The fifth factor, labelled ***peer support-social strategies*** by the researcher, loaded highly on three items, which involve cooperation with other language users or learners through seeking and providing help and sharing useful information. Examples in this factor include item 57 "*I ask someone to evaluate or correct my pronunciation*" and item 59 "*I work with other learners to practice, review or share information about English pronunciation*".

The sixth factor, labelled ***communicative-interactive strategies*** by the researcher, loaded highly on three items, which involve improving pronunciation through directly conversing and interacting with other language users or learners with the target language in authentic communication. Examples in this factor include item 19 "*I practice talking with others in English to improve my pronunciation*" and item 20 "*when I am conversing with someone speaking in English, I try to sound like an English speaker*".

The seventh factor, labelled ***metacognitive-independent study strategies***, loaded highly on four items. This group includes strategies that the pronunciation learner can use independently of a partner or a class to manage and support their own learning through self-monitoring and preparation for tasks, such as item 35 "*I listen to model pronunciation of online or electronic dictionaries when I am unsure how to pronounce a word*" and item 47 "*I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance*".

The eighth factor, labelled ***compensatory-heuristic strategies***, loaded highly on three items. These are strategies to compensate for limited knowledge such as making guesses and using temporary solutions or alternatives when the learner fails to produce accurate pronunciations. Examples include item 36 "*I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings)*" and item 37 "*When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation)*".

It is worth noting that one split loading occurred in the result, namely that item 48 "*When I study or practice English pronunciation I look for a good learning environment (e.g. a quiet place or place providing useful facilities)*" loaded on both Factor 3 and Factor 7. The crossloading is explainable as item 48, while meaningfully fits into Factor 7 as a metacognitive independent study strategy whereby the learner makes a conscious decision to support his own learning by planning for a suitable venue, could also be interpreted as an affective strategy if the choice of learning environment is based on affective reasons, for example, where a learner picks a quiet and private environment to practice pronunciation in

order to reduce stress and anxiety. The split loading is not necessarily a surprising result as it has long been acknowledged that overlapping between categories of Language Learning Strategies is possible (Oxford, 1990; Griffiths, 2004). In the following discussion, the item would be kept in both categories for the sake of maintaining the overall statistical integrity of the present analysis. But researchers interested in adopting the proposed factorial structure in any future studies may consider revising this item with more specific wordings.

Table 14 below shows the full list of the eight extracted factors and corresponding PLSQ items loaded on each factor for easy reference.

Factor 1: Functional practice strategies

These are strategies used by the pronunciation learner to focus on various pronunciation features when engaging in authentic, naturalistic language use, i.e. the learner actively practicing pronunciation when listening to or speaking the target language.

Item	Loading	Pronunciation learning strategy
B15	0.422	I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).
B21	0.524	When I speak English I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.
B23	0.718	When I speak English I pay attention to place the word stress on the right syllables within words.
B24	0.884	When I speak English I pay attention to divide thought groups and pause appropriately.
B25	0.873	When I speak English I pay attention to decide where to make an emphasis in sentences to better express the meaning.
B26	0.757	When I speak English I try to maintain connected speech by linking words together.
B27	0.800	When I speak English I try to maintain an English rhythm and intonation to sound more natural.
B30	0.402	When I listen to someone speaking English, I pay attention to and notice errors.

Factor 2: Cognitive, formal rule processing strategies

These are characterized by highly cognitive, information-processing strategies, which are internal to the pronunciation learner (often resulting in few observable behaviours) such as analyzing and reasoning, using resources to decompose target language input, assimilating target language data through reading, making mental summaries, extracting, learning about and using the phonetic system and its rules.

Item	Loading	Pronunciation learning strategy
A2	0.602	I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.
B32	0.617	I learn about English pronunciation rules and take note of such information.
B33	0.641	I do phonetic exercises, such as transcription exercises.
B34	0.682	I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.
D40	0.742	I study books or reference materials about English pronunciation rules.
D41	0.796	I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation or presentation task).
D43	0.526	I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.

Factor 3: Affective strategies

This group includes affective strategies which are emotion and motivation related strategies such as anxiety awareness and reduction, self-encouragement and self-reward.

Item	Loading	Pronunciation learning strategy
D48	0.576	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).
E52	0.651	I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.
E53	0.728	I keep a sense of humour about my mispronunciations.
E54	0.721	I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).
E55	0.595	I encourage myself to carry on when I encounter pronunciation difficulties.
E56	0.541	I reward myself for success or effort put into pronunciation improvement.

Factor 4: Sensory-mechanical drilling strategies

These are sensory strategies whereby the learner gets familiarized with the target pronunciation through mechanical drilling or repetition for muscle memory. These include drilling through either receptive senses (e.g. listening repeatedly to a pronunciation) or mechanical practice in bettering one's control over speech production organs to produce accurate articulations.

Item	Loading	Pronunciation learning strategy
A5	0.703	I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.
B7	0.405	I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.
B9	0.697	I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.
B10	0.752	I practice saying words slowly at first and then faster.
B11	0.604	I practice pronouncing words first in isolation and then in context.
B14	0.398	I repeat after a model such as a native speaker, teacher, sound recordings, television or movie to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).

Factor 5: Peer support-social strategies

This group includes social strategies which involve cooperation with other language users or learners through seeking help and providing help or sharing information.

Item	Loading	Pronunciation learning strategy
F57	0.646	I ask someone to evaluate or correct my pronunciation.
F58	0.819	I ask someone to pronounce something for me.
F59	0.619	I work with other learners to practice, review or share information about English pronunciation.

Factor 6: Communicative-interactive strategies

These are strategies which involve improving pronunciation through directly conversing and interacting with other language users or learners with the target language in authentic communication.

Item	Loading	Pronunciation learning strategy
B19	0.746	I practice talking with others in English to improve my pronunciation.
B20	0.451	When I am conversing with someone speaking in English, I try to sound like an English speaker.
D44	0.733	I actively seek opportunities to talk with others in English and practice my pronunciation.

Factor 7: Metacognitive-independent study strategies This group includes strategies that pronunciation learners can use independently of a partner or a class, to manage and support their own learning through self-monitoring and preparation for pronunciation or speaking tasks.		
Item	Loading	Pronunciation learning strategy
B35	0.518	I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.
D47	0.484	I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.
D48	0.471	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).
D51	0.473	When I find I make a mistake in pronunciation, I try to correct myself immediately.
Factor 8: Compensatory-heuristic strategies These are strategies to compensate for limited knowledge such as making guesses and using temporary solutions or alternatives when failing to produce accurate pronunciations.		
Item	Loading	Pronunciation learning strategy
C36	0.682	I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).
C37	0.823	When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).
C38	0.400	When I can't pronounce certain words correctly, I paraphrase (use other words with similar meanings).

Table 14: *A list of the eight extracted factors and corresponding PLSQ items*

4.2.4 The construct of strategic pronunciation learning

Compared with Oxford's *Strategy Inventory for Language Learning* (SILL), the most widely recognized and adopted inventory on strategic language learning, the items of which were organized into six subscales based on factor analysis first conducted in 1989 (Oxford, 1990; Oxford & Burry-Stock, 1995), the results of the present study show notable similarities as well as a few key differences (See comparison table below in Table 15).

Factorial structure of Strategy Inventory for Language Learning (SILL) by Oxford (1990)		**Factorial structure of Pronunciation Learning Strategies Questionnaire (PLSQ) in the present study**
Direct strategies		**Direct strategies**
Cognitive strategies		Cognitive and formal, rule-processing strategies
Compensation strategies		Compensatory-heuristic strategies
Memory strategies		Sensory-mechanical drilling strategies
		Functional practice strategies
		Communicative-interactive strategies
Indirect strategies		**Indirect strategies**
Metacognitive strategies		Metacognitive-independent study strategies
Affective strategies		Affective strategies
Social strategies		Peer support-social strategies

Table 15: *A comparison between the factorial structures of Oxford's SILL (1990) and the PLSQ in the present study*

The comparison shows that five of the factors coincide between the two constructs: English pronunciation learners employ the same three types of indirect strategies, namely metacognitive, affective, and social strategies and two types of direct strategies, namely cognitive strategies and compensation strategies, in ways similar to English language learners acquiring the language in general.

On the other hand, there appear to be strategies that are specific to the construct of pronunciation learning: First, two types of direct strategies not entailed in the construct of general strategic language learning were revealed, namely functional practice strategies and communicative-interactive strategies, both of which involve learners practicing pronunciation through active use of the target language; second, while strategies for strengthening memory were present in the construct of pronunciation learning, they were manifested in a different way from those in general language learning in that they were focused on building muscle memory through sensory mechanical drilling exercises rather than cognitive memory. These two key differences provide input for better understanding of the construct of strategic pronunciation learning.

4.2.5 Strategies use frequency mean scores by factor

Pronunciation Learning Strategy	**Mean score of pronunciation strategies use** ($n = 451$)				Rank
Type	Highest	Lowest	**Mean**	SD	
Factor 1: Functional practice strategies	3.46	3.15	**3.323**	0.099	4
Factor 2: Cognitive and formal, rule-processing strategies	3.03	2.02	**2.504**	0.399	8
Factor 3: Affective strategies	3.48	2.56	**3.075**	0.345	5
Factor 4: Sensory-mechanical drilling strategies	3.73	2.59	**3.366**	0.401	3
Factor 5: Peer support-social strategies	3.33	2.65	**2.930**	0.355	7
Factor 6: Communicative-interactive strategies	3.37	2.82	**3.019**	0.303	6
Factor 7: Metacognitive-independent study strategies	4.00	3.44	**3.836**	0.265	2
Factor 8: Compensatory-heuristic strategies	4.12	3.74	**3.925**	0.190	1

Table 16: *Mean scores and ranking profile for Pronunciation Learning Strategies under eight PLSQ factors for all students (n = 451)*

Among the eight types of strategies, participants appeared to use those from the category of compensatory-heuristic strategies most frequently, closely followed by those from the metacognitive-independent study category. Cognitive, formal rule-processing strategies,

on the other hand, were reportedly the least frequently used (For a table with mean scores for all strategies presented under the eight factors, see Appendix P).

4.2.6 Strategies use mean scores by gender

Though not the main focus of the present study, statistics investigating any gender difference in pronunciation strategy use may be of interest to other researchers, as it has been the focuses of many studies concerning general Language Learning Strategies such as Oxford and Nyikos (1989), Oxford, Park-Oh, Ito and Sumrall (1993), Oxford and Ehrman (1995), Green and Oxford (1995), Phakiti (2003), El-Dib (2004), Nisbet, Tindall and Arroyo (2005), and Kato (2005). This section will briefly explore any gender difference in pronunciation strategy use.

In Table 17 below, the highest, lowest and mean scores for pronunciation strategy use (with a maximum possible score of 195, i.e. 39 extracted items from Factor Analysis x 5 points each) of the two learner groups are shown:

	Pronunciation strategy use total score (out of 195)			
Gender	Highest	Lowest	Mean	SD
Overall (*n*=451)	181	55	124.28	20.88
Female (*n*=282)	177	70	125.79	20.34
Male (*n*=169)	181	55	121.7	21.52

***Table 17**: Mean scores of pronunciation strategy use frequency by gender*

While the raw aggregate mean scores suggest that female learners generally used Pronunciation Learning Strategies more frequently than male learners, a statistical examination is needed to test if there was any "real" difference between the two frequency counts. Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the male learners was equal to or significantly higher than that of female learners (See Appendix Q for details). The null hypothesis was rejected at $p < .001$ ($t = 3.194$, $df = 336$), meaning male learners' frequency of pronunciation strategy use is significantly lower than the use frequency of female learners.

A further step was taken to look at any gender difference in each of the eight types of Pronunciation Learning Strategies based on use frequencies. Frequency means of strategies under Factors 1 to 8 used by male and female learners are presented in Table 18 below:

Pronunciation Learning Strategy	**Mean score of pronunciation strategies use by gender**								
Type	**Female (*n* = 282)**			**Male (*n* = 169)**			***t*-test**		
	Mean	SD	Rank	**Mean**	SD	Rank	***t***	***df***	***p-value***
Factor 1: Functional practice strategies	**3.364**	0.728	4	**3.253**	0.767	4	1.536	339	0.1245
Factor 2: Cognitive and formal, rule-processing strategies	**2.510**	0.819	8	**2.493**	0.763	8	0.219	374	0.8268
Factor 3: Affective strategies	**3.113**	0.742	5	**3.012**	0.777	5	1.375	341	0.1692
Factor 4: Sensory-mechanical drilling strategies	**3.390**	0.666	3	**3.325**	0.748	3	0.958	322	0.3383
Factor 5: Peer support-social strategies	**3.073**	0.902	6	**2.690**	0.973	7	4.237	333	0.0000***
Factor 6: Communicative-interactive strategies	**3.039**	0.859	7	**2.986**	0.893	6	0.625	343	0.5320
Factor 7: Metacognitive-independent study strategies	**3.907**	0.690	2	**3.719**	0.762	2	2.692	327	0.0071**
Factor 8: Compensatory-heuristic strategies	**3.944**	0.696	1	**3.892**	0.781	1	0.733	322	0.4634
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1									

Table 18: *Mean scores of pronunciation strategy use frequency in eight strategy categories by gender*

The comparison suggests that there appeared to be little variation between female learners' and male learners' preferences towards various categories of Pronunciation Learning Strategies. Both females and males used compensatory-heuristic strategies and metacognitive-independent study strategies most frequently among the eight types. Both genders used cognitive and formal rule-processing strategies the least frequently. Two-tailed *t*-tests (to verify any difference between two mean scores) were applied to each pair of mean scores between male and female learners for each factor. The results indicate that there were only significant differences between use frequency of male versus female learners in two types of strategies, namely that female learners significantly more frequently used peer support-social strategies ($p < .001$) and metacognitive-independent study strategies ($p < .01$).

4.2.7 Strategies use mean scores by medium of instruction for secondary education

Another learner difference that might be of interest is between those having been subject to English as the medium of instruction versus those to Chinese as MOI during secondary education. In Table 19 below, the highest, lowest and mean scores for pronunciation strategy use (with a maximum possible score of 195, i.e. 39 extracted items from Factor Analysis x 5 points each) of the two learner groups are shown:

	Pronunciation strategy use total score (out of 195)			
Medium-of-instruction	Highest	Lowest	Mean	SD
Overall (n = 451)	181	55	124.14	20.92
CMI (n = 149)	177	55	125.66	21.78
EMI (n = 302)	181	60	123.38	20.47

***Table 19**: Mean scores of pronunciation strategy use frequency by medium of instruction*

While the raw aggregate mean scores suggest that CMI learners generally used Pronunciation Learning Strategies more frequently than EMI learners, a statistical examination is needed to test if there was any "real" difference between the two frequency counts. Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the EMI learners was equal to or significantly higher than that of CMI learners (See Appendix R for details). The null hypothesis could not be rejected as there was no statistically significant difference between the two frequency counts at $p > .05$ ($t = 1.063$, $df = 279$).

Though there appears to be no statistically significant difference between the overall strategy use frequency between the two groups, a further step was taken to look at any group difference in each of the eight types of Pronunciation Learning Strategies based on use frequencies. Frequency means of strategies under Factors 1 to 8 used by CMI learners and EMI learners are presented in Table 20 below:

Pronunciation Learning Strategy	**Mean score of pronunciation strategies use by medium-of-instruction**								
Type	**CMI (n = 149)**			**EMI (n = 302)**			***t*-test**		
	Mean	SD	Rank	**Mean**	SD	Rank	***t***	***df***	***p-value***
Factor 1: Functional practice strategies	**3.227**	0.813	4	**3.370**	0.704	3	-1.825	260	0.069
Factor 2: Cognitive and formal, rule-processing strategies	**2.785**	0.743	8	**2.365**	0.788	8	5.539	311	0.000***
Factor 3: Affective strategies	**3.129**	0.765	5	**3.049**	0.752	5	1.045	290	0.297
Factor 4: Sensory-mechanical drilling strategies	**3.423**	0.756	3	**3.272**	0.712	4	2.027	280	0.044*
Factor 5: Peer support-social strategies	**2.841**	0.964	7	**2.974**	0.937	7	-1.384	287	0.167
Factor 6: Communicative-interactive strategies	**3.013**	0.787	6	**3.022**	0.911	6	-0.104	336	0.917
Factor 7: Metacognitive-independent study strategies	**3.854**	0.792	1	**3.828**	0.687	2	0.345	261	0.730
Factor 8: Compensatory-heuristic strategies	**3.826**	0.718	2	**3.974**	0.730	1	-2.048	299	0.041*
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1									

***Table 20:** Mean scores of pronunciation strategy use frequency in eight strategy categories by medium of instruction*

The comparison suggests that there appeared to be little variation between CMI learners' and EMI learners' overall preferences towards various categories of Pronunciation Learning Strategies. Both CMI and EMI learners used compensatory-heuristic strategies and metacognitive-independent study strategies most frequently among the eight types. Both learner groups used peer support-social strategies and cognitive and formal, rule-processing strategies the least frequently. Two-tailed t-tests (to verify any difference between two mean scores) were applied to each pair of mean scores between male and female learners for each factor. The results indicate that while the two learner groups' strategy use patterns were similar, CMI learners used cognitive and formal-rule processing strategies ($p < .001$) and sensory-mechanical drilling strategies ($p < .05$) significantly more frequently than EMI learners did while EMI learners used compensatory-heuristic strategies ($p < .05$) significantly more frequently than CMI learners did.

4.2.8 Strategies use mean scores by previous training in phonetics and pronunciation

Another point of interest is to explore if there might be any difference between strategy use frequency of those who had previously received training in phonetics and pronunciation and those who had no prior training. In Table 21 below, the highest, lowest and mean scores for pronunciation strategy use (with a maximum possible score of 195, i.e. 39 extracted items from Factor Analysis x 5 points each) of the two learner groups are shown:

	Pronunciation strategy use total score (out of 195)			
Prior Training	Highest	Lowest	Mean	SD
Overall ($n = 451$)	181	55	124.14	20.92
With previous training in phonetics/pronunciation ($n = 211$)	181	76	127.65	19.65
Without previous training in phonetics/pronunciation ($n = 240$)	174	55	121.05	21.54

***Table 21**: Mean scores of pronunciation strategy use frequency by previous training in phonetics/pronunciation*

While the raw aggregate mean scores suggest that learners previously trained in phonetics or pronunciation generally used Pronunciation Learning Strategies more frequently than learners without such training, a statistical examination is needed to test if there is any "real" difference between the two frequency counts. Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the learners without phonetics training was equal to or significantly higher than that of trained learners (See Appendix S for details). The null hypothesis was rejected at $p < .001$ ($t = 3.404$, $df = 448$), meaning the frequency of

pronunciation strategy use of learners without phonetics training was significantly lower than that of learners who had prior training in pronunciation.

A further step was taken to look at any difference between the two learner groups in each of the eight types of Pronunciation Learning Strategies based on use frequencies. Frequency means of strategies under Factors 1 to 8 used by phonetically trained and untrained learners are presented in Table 22 below:

Pronunciation Learning Strategy Type	**Mean score of pronunciation strategies use by previous phonetics training**								
	Phonetics training (*n* = 211)			**No training (*n* = 240)**			***t*-test**		
	Mean	SD	Rank	**Mean**	SD	Rank	*t*	*df*	*p-value*
Factor 1: Functional practice strategies	**3.499**	0.731	3	**3.167**	0.721	4	4.847	440	0.000***
Factor 2: Cognitive and formal, rule-processing strategies	**2.657**	0.816	8	**2.368**	0.757	8	3.880	431	0.000***
Factor 3: Affective strategies	**3.088**	0.725	6	**3.065**	0.783	5	0.325	448	0.745
Factor 4: Sensory-mechanical drilling strategies	**3.388**	0.715	4	**3.264**	0.739	3	1.802	445	0.072
Factor 5: Peer support-social strategies	**2.896**	0.940	7	**2.960**	0.953	6	-0.717	443	0.474
Factor 6: Communicative-interactive strategies	**3.106**	0.881	5	**2.943**	0.858	7	1.982	438	0.048*
Factor 7: Metacognitive-independent study strategies	**3.893**	0.701	2	**3.786**	0.739	2	1.576	446	0.116
Factor 8: Compensatory-heuristic strategies	**4.003**	1.000	1	**3.856**	1.000	1	2.000	448	0.030*
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1									

Table 22: *Mean scores of pronunciation strategy use frequency in eight strategy categories by previous training in phonetics/pronunciation*

The comparison suggests that there appeared to be little variation between learners with or without previous training on phonetics and pronunciation in terms of their overall preferences towards various categories of Pronunciation Learning Strategies. Both learner groups used compensatory-heuristic strategies and metacognitive-independent study strategies most frequently among the eight types. Both groups used cognitive and formal rule-processing strategies the least frequently. Two-tailed *t*-tests (to verify any difference between two mean scores) were applied to each pair of mean scores between the two learner groups for each factor. The results indicate that learners who had been previously trained in phonetics and pronunciation used four of the eight types of strategies significantly more frequently than learners who had no prior training, namely functional practice strategies ($p < .001$), cognitive and formal, rule-processing strategies ($p < .001$), communicative-interactive strategies ($p < .05$), and compensatory-heuristic strategies ($p < .05$).

4.3 Results of Research Question 2: "What factors are associated with these learners' pronunciation performance? In particular, to what extent is learners' use of Pronunciation Learning Strategies associated with their English pronunciation performance?"

4.3.1 Demographics (Phase I Part B)

To answer Research Question 2, 190 participants were, upon completion of the PLSQ, invited to further complete two pronunciation tasks, namely a read-aloud task and a recount task. The former elicited read-aloud speech with a given text and the latter extemporaneous speech with a prompt. The resulting five-minute audio recordings were scored using an assessment rubric designed by the researcher (See Appendix K) covering pronunciation performance descriptors at both segmental and suprasegmental levels on a five-point scale (For detailed elaboration, see Section 3.3.2.2.4). Participants' strategy use data and pronunciation performance scores were then processed with inferential statistical analysis to detect any potential association.

Among the participants (*n*=190) in Phase I Part B, 58.4% (*n*=111) were female and 41.6% (*n*=79) were male, their age ranging from 17 to 26 with an average at 19.43 years. Among them, 83.7% (*n*=159) were local Hong Kong students, the remaining being students from Mainland China (*n*=25), Macau (*n*=2), Taiwan (*n*=3) and Canada (*n*=1). Their native languages were: 82.1% Cantonese (*n*=156) and 17.9% Mandarin (*n*=34). Their major disciplines and years of study at the university varied, the details of which as well as other demographic information are shown in the Table 23 below:

Participants		**Secondary Education**		**Gender**	
Total no.	190	School using English as Medium of Instruction (EMI)	128	Female	111
		School using Chinese as Medium of Instruction (CMI)	62	Male	79

Year of study		**Faculty**		**Origin**		**Native language**	
1st Year	78	Faculty of Arts	28	Hong Kong	159	Cantonese	156
2nd Year	59	Faculty of Education	13	Mainland China	25	Mandarin	34
3rd Year	38	Faculty of Engineering	16	Macau	2		
4th Year	15	Faculty of Law	4	Taiwan	3		
		Faculty of Business	13	Canada	1		
		Faculty of Medicine	7				
		Faculty of Science	57				
		Faculty of Social Science	52				

Table 23: *Demographic information of participants in Phase I Part B of the study*

It is worth noting that even though the participants of Phase I Part B (n=190) were selected based on convenience sampling (namely students from classes the lesson time of which coincided with the availability of language laboratories), the attributes of the selected sample are observed to be fairly similar to those from the larger sample of Phase I Part A (n=451), with a similar gender ratio, similar EMI-CMI ratio, and participants present from all eight academic faculties.

4.3.2 Pronunciation performances on read-aloud task and recount task

Exploratory analyses on correlation were first performed on the four sets of pronunciation performance scores, namely scores at the segmental level and suprasegmental level respectively elicited in the read-aloud task and the recount task. Results indicate high correlation between performances in the two tasks (r = 0.94, with CI = [0.921, 0.954]), as shown in the scatter plot in Figure 7 below. Scatter plots are useful for "roughly showing the direction and degree of relation between paired observations to two variables" (Peterson, 1997, p.66). Note that pronunciation scores in the read-aloud task are plotted along the x-axis whereas scores in the recount task along the y-axis. Repeated observations with ties (i.e. with the same values) are shown by increased size of the plotted dot.

Analyses further showed high positive correlations between segmental level performances in the read-aloud task and the recount task (r = 0.928, with CI = [0.904, 0.945]) as well as between suprasegmental level performances in the read-aloud task and the recount task (r = 0.896, with CI = [0.864, 0.921]).

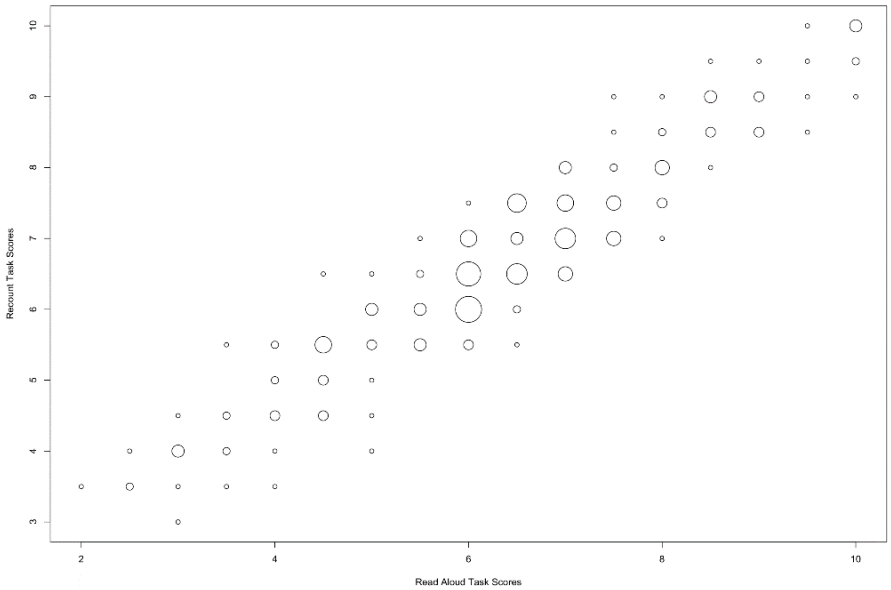

Figure 7: *Scatter plot on read-aloud pronunciation scores and recount pronunciation scores*

Based on the above analysis, it was therefore considered appropriate to perform any statistical procedures henceforth using the total pronunciation score (i.e. the sum of all four analytical scores obtained from the two pronunciation tasks) as a holistic representation of a participant's pronunciation ability.

Inferential statistics

4.3.3 Exploratory data analysis on pronunciation performance and strategy use

It was of major interest in this study to ascertain any relationship between students' pronunciation ability and their use of Pronunciation Learning Strategies. An exploratory data analysis using simple linear regression model was initially performed on the total pronunciation score (with a maximum of 20 marks as the sum of the four sub-scores) and the total strategy score (with a maximum of 300 marks as the sum of the 60 sub-scores). In statistical modelling, regression analysis is a "statistical technique for investigating and modelling the relationship between variables" (Montgomery, Peck & Vining, 2012, p.1). It includes techniques for analysing the relationship between a response variable (i.e. dependent variable) and one or more predictors or regressors (i.e. independent variables). When the equation involves only one predictor variable, it is called a "simple linear regression model" (ibid, p.3).

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	1.924350	1.203478	1.599	0.112
Variable – Strategy use	0.059819	0.006429	9.305	<2e-16 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 2.743 on 188 degrees of freedom				
Multiple R-squared: 0.3153, Adjusted R-squared: 0.3117				
F-statistic: 86.58 on 1 and 188 DF, p-value: < 2.2e-16				

Table 24: *Results from a simple linear regression model on effect of Pronunciation Learning Strategies use on pronunciation performance*

Results revealed a moderately strong positive correlation between the two ($r = 0.562$) with a high significance level ($p < 0.001$), as shown in Table 24, a graphical representation of which is shown in Figure 8. In other words, there is a less than 0.1% probability that the observed correlation of .562 between learners' frequency counts of pronunciation strategy use and their pronunciation performance scores occurred by chance alone. The relationship is also represented in the scatter plot in Figure 8, where the total strategy use scores are plotted along the x-axis whereas the total pronunciation performance scores along the y-axis. Repeated

observations with ties (i.e. with the same values) are shown by the increased size of the plotted dot.

The result suggests that active use of Pronunciation Learning Strategies in general correlated positively with learners' pronunciation performance as operationalized by their pronunciation test scores (which thereby provides stronger justification for Phase II of the study) and was consistent with Rokoszewska's (2012) study which also found a positive correlation between strategy use and pronunciation performance (where $r = 0.64$, $p < 0.05$), though her study looked at participants' English vowels production alone whereas the current study examined pronunciation ability more holistically.

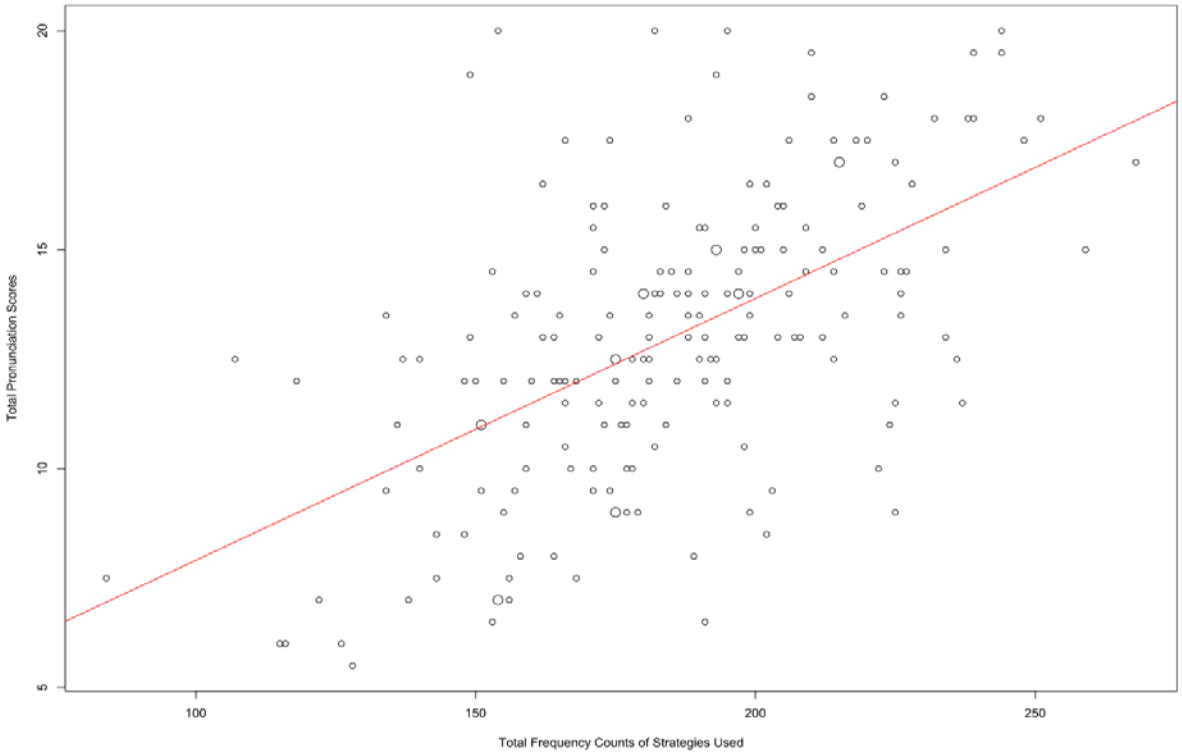

***Figure 8**: Relationship between use of Pronunciation Learning Strategies and pronunciation performance*

Additional exploratory data analyses using simple linear regression model were also performed on the total pronunciation score and the total strategy score of all items loaded on each of the eight factors (For detailed results, please see Appendix Y). Results show that students' use frequencies of all eight types of Pronunciation Learning Strategies correlated positively with the pronunciation performance score, to various degree of significance respectively.

4.3.4 Pronunciation performance mean scores by learner groups

While a considerable amount of learning strategies related research has focused on verifying any association between learners' use of Language Learning Strategies and their

language proficiency, these studies have often taken on the task of also investigating any possible influence additional factors such as gender, motivation and aptitude may have on proficiency alongside strategies use (For example, see Magno (2010), Nisbet, Tindall & Arroyo (2005), and Kato (2005) , Green & Oxford (1995), Oxford & Nyikos (1989), Oxford, Park-Oh, Ito & Sumrall (1993a), Oxford, Park-Oh, Ito & Sumrall (1993b), Oxford & Ehrman (1995).).

To contribute further to existing literature, this section looks at various learner characteristics including gender, medium of instruction during secondary education, previous training in phonetics, time spent on out-of-class practice, as well as length of residence in English-speaking countries, and reports on any positive association identified between these factors and learners' pronunciation performance as measured by their scores in the pronunciation tasks.

4.3.4.1 Pronunciation performance mean scores by gender

	Pronunciation performance total score			
Gender	Highest	Lowest	Mean	SD
Overall (n = 190)	20	5.5	12.97	3.31
Female (n = 111)	20	6	13.60	3.08
Male (n = 79)	19.5	5.5	12.08	3.43

***Table 25**: Mean scores of pronunciation performance by gender*

A one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean pronunciation score of the female learners was equal to or lower than that of male learners (See Appendix T for details).

The null hypothesis was rejected at $p < .001$ ($t = 3.15$, $df = 156$), meaning female learners' pronunciation performance mean score was significantly higher than the mean score of male learners. In other words, there appeared to be gender difference when it comes to pronunciation ability whereby girls performed better than boys.

4.3.4.2 Pronunciation performance mean scores by previous training in phonetics/pronunciation

Previous training in phonetics/pronunciation	**Pronunciation performance total score**			
	Highest	Lowest	Mean	SD
Overall (n = 190)	20	5.5	12.97	3.31
With previous training (n = 88)	20	7	13.65	2.98
Without previous training (n = 102)	19.5	5.5	12.38	3.47

Table 26: *Mean scores of pronunciation performance by previous training in phonetic/pronunciation*

A one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean pronunciation score of learners with previous training in phonetics or pronunciation was equal to or lower than that of learners without prior training (See Appendix U for details).

The null hypothesis was rejected at $p < .001$ ($t = 2.73$, $df = 187$), meaning the pronunciation performance mean score of learners without previous phonetics training was significantly lower than the mean score of learners with such training. In other words, those having studied phonetics performed significantly better in pronunciation than those not having studied phonetics. These findings are inconsistent with those reported by Eckstein (2007), who found both gender and previous training in phonetics to have insignificant effect on predicting pronunciation scores (with $p > .05$).

4.3.4.3 Pronunciation performance mean scores by medium of instruction (MOI) for secondary education

Medium-of-instruction for Secondary Education	**Pronunciation performance total score**			
	Highest	Lowest	Mean	SD
Overall ($n = 190$)	20	5.5	12.97	3.31
CMI ($n = 62$)	20	5.5	11.56	3.54
EMI ($n = 128$)	20	6	13.65	2.97

Table 27: *Mean scores of pronunciation performance by medium of instruction during secondary education*

A one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean pronunciation score of learners with English as the medium of instruction during secondary education was equal to or significantly lower than that of learners with Chinese as the medium of instruction (See Appendix V for details).

The null hypothesis was rejected at $p < .001$ ($t = 4.005$, $df = 103$), meaning EMI learners' pronunciation performance mean score was significantly higher than the mean score of CMI learners. This means those having studied their high school subjects using English performed significantly better in pronunciation than those having studied through Chinese.

It is perhaps unsurprising to find the medium of instruction during secondary education to be a significant predictor of pronunciation performance considering the fact that exposure to the target language supports acquisition of its phonological features. The above result is consistent with Peterson's (1997) finding that English learners of Spanish experiencing higher exposure to Spanish in their daily lives tended to perform better in a Spanish pronunciation test. In other words, it is understandable that students having spent six

to seven years of their teenage, a critical period for language acquisition, in a school where teachers instructed most subjects through the English language were likely to perform better in terms of English pronunciation skills than those who only got taught in the English language a dozen hours or so a week in English lessons. Another less probable alternative explanation is that the general English language proficiency of students entering EMI schools were in general higher, and were more likely to already possess higher level of pronunciation skills as they entered secondary education. In Hong Kong, individual schools' freedom to choose its medium of instruction has been limited after 1997 (Bai, 2014). The Education Bureau required schools to meet certain requirements before approving their statuses as EMI schools and these requirements include students and teachers' ability in using English (Education Bureau, 1997).

4.3.4.4 Pronunciation performance mean scores by time spent on out-of-class practice

A Spearman's rank order correlation coefficient was computed to explore any correlation between learners' reported amount of time spent on out-of-class pronunciation practices on a scale of 1 to 5 (from never to frequently) and their pronunciation performance score (See Appendix W for details).

Results revealed a positive correlation between the two (*rho* = .3075) with a significance level at $p < 0.001$. In other words, the more active engagement in out-of-class pronunciation practices in general positively correlated to a learner's pronunciation ability.

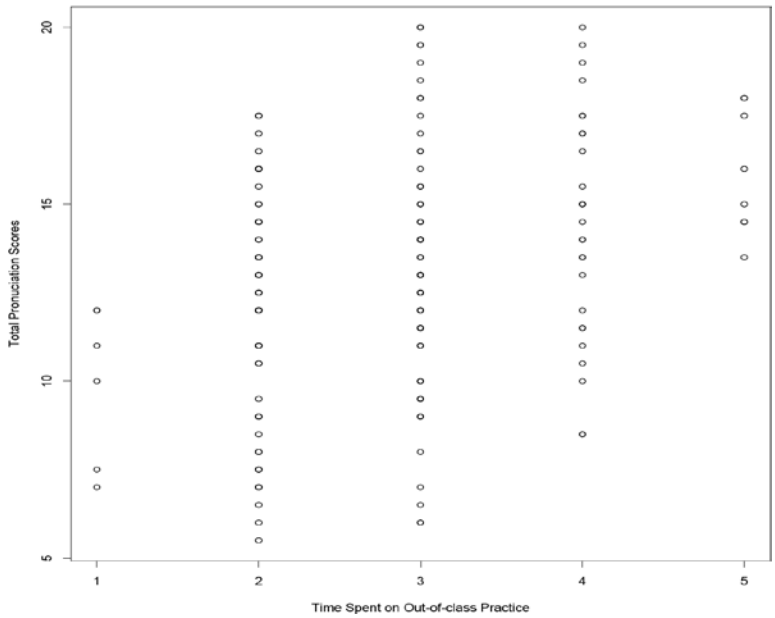

Figure 9: *Scatter plot on pronunciation performance scores and time spent on out-of-class practice*

4.3.4.5 Pronunciation performance mean scores by length of residence in an English-speaking country

Residence in English speaking countries and with native English speakers have been repeatedly found to be a strong predictor of English pronunciation accuracy in past research, such as Suter (1976), Purcell and Suter (1980) and Flege, Munro and MacKay (1995). It was therefore considered necessary to take this factor into account in the present study. Among the 190 participants, 31 (16.3%) reported to have spent time in an English-speaking country, with the length of stay ranging from 1 up to 108 months.

A Spearman's rank order correlation coefficient was computed to explore any correlation between learners' reported length of residence in any English-speaking countries (in number of months) and their pronunciation performance score (See Appendix X for details).

Results revealed a positive correlation between the two (*rho* = .2138) with a moderate significance level at $p < 0.01$. In other words, lengthier stay in an English-speaking country in general correlated positively to better pronunciation ability. Though only 16% of the respondents in the sample reported having stayed in English-speaking countries, statistically this result appears to be consistent with the findings of past studies.

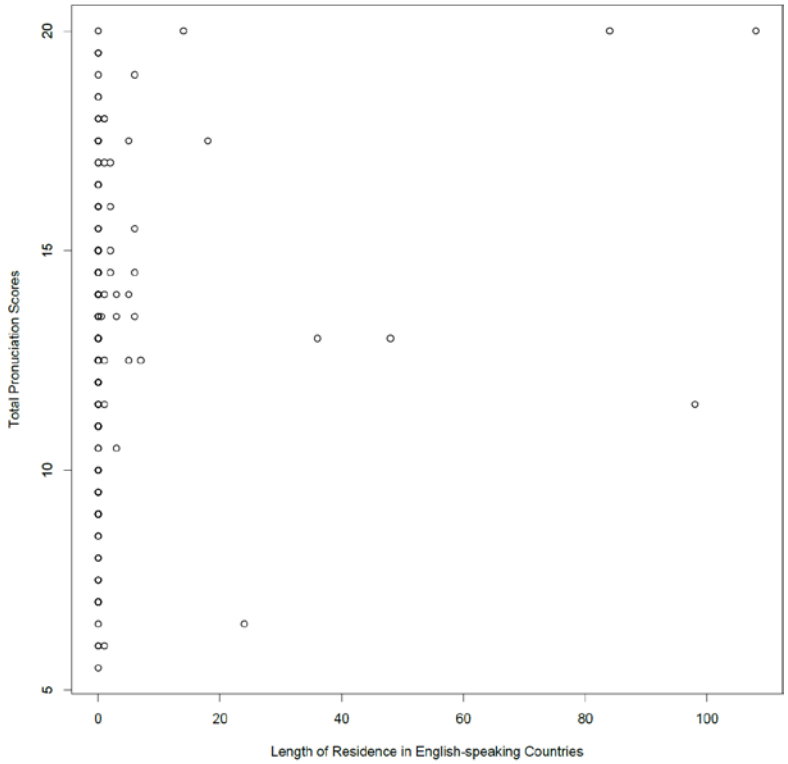

Figure 10: *Scatter plot on pronunciation performance scores and length of stay in English-speaking countries*

4.3.5 Multiple linear regression model on the effect of different variables on pronunciation performance

Turning back to the ascertainment of relationship between strategy use and pronunciation performance, now that the above analyses have (i) established a generally positive correlation between the overall use frequency of Pronunciation Learning Strategies and pronunciation performance and (ii) identified a number of relatively significant moderator factors, it would be of interest to further explore the predictor effect that various types of Pronunciation Learning Strategies (i.e. the eight factors resulting from factor analysis) may have on pronunciation performance, with the marginal effect of significant moderator factors taken into account. In other words, the next step was to find out which factors might be relatively more significant in predicting pronunciation performance when the interplay among the use of different strategies, learners' gender, medium of instruction in school, prior training in phonetics, time spent on out-of-class practice and length of residence in English-speaking countries was to be examined.

To do so, a multiple linear regression model was applied since "more than one predictor was involved" (Montgomery, Peck & Vining, 2012, p.4). It is worth noting that while the pronunciation strategy factors were operationalized in participants' usage mean scores and their length of stay in English-speaking countries in the number of months, some of the other factors such as gender (female/male) and medium of instruction in secondary education (English/Chinese) were discrete items or categorical in nature. Therefore, to increase rigor of the model, for categorical data, dummy/indicator variables were adopted in order to indicate the absence or presence of such categorical effect that might be expected to shift outcomes (ibid, p.260). Results are shown in Table 28 below.

The resulting model suggests that, when the effect of various factors was taken into account, learners' the medium of instruction in secondary education ($p < 0.01$) remained moderately strong predictors of their pronunciation performance. Meanwhile, among the eight types of strategies, functional practice strategies and communicative-interactive strategies were the two that stood out and showed strong significance in incurring positive predictive influence over pronunciation performance ($p < 0.001$). It is worth noting that this result opposes the findings of Eckstein (2007), in which learners' reported use of functional practice strategies was statistically ruled out as an insignificant predictor of pronunciation scores.

	Coefficients:	Parameter Estimate	Standard Error	t value	Pr (> t)
Independent and Moderator Variables	Intercept	3.97933	1.39507	2.852	**0.00488** **
	Factor 1: Functional practice	0.41095	0.05662	7.258	**1.36e-11** ***
	Factor 2: Cognitive and formal, rule-processing	-0.12941	0.05394	-2.399	**0.01753** *
	Factor 3: Affective	-0.02740	0.07756	-0.353	0.72428
	Factor 4: Sensory-mechanical drilling	0.05821	0.08060	0.722	0.47114
	Factor 5: Peer support-social	-0.16413	0.09702	-1.692	0.09255
	Factor 6: Communicative-interactive	0.54924	0.13516	4.064	**7.39e-05** ***
	Factor 7: Metacognitive-independent study	0.11197	0.15149	0.739	0.46087
	Factor 8: Compensatory-heuristic	0.12902	0.12571	1.026	0.30623
	Gender (Male)	-0.87706	0.34432	-2.547	**0.01175** *
	Medium of instruction (Chinese)	-1.05426	0.37125	-2.840	**0.00507** **
	Prior training in phonetics/pronunciation (Without)	-0.48081	0.33636	-1.429	0.15472
	Time spent on out-of-class practice (Scale 2)	-0.12614	0.94623	-0.133	0.89411
	Time spent on out-of-class practice (Scale 3)	-0.13064	0.96198	-0.136	0.89214
	Time spent on out-of-class practice (Scale 4)	-0.37980	1.05873	-0.389	0.72024
	Time spent on out-of-class practice (Scale 5)	-0.32485	1.28054	-0.254	0.80005
	Length of residence in English-speaking country	0.01357	0.01329	1.021	0.30858
	Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 2.12 on 169 degrees of freedom					
Multiple R-squared: 0.6279, Adjusted R-squared: 0.5926					
F-statistic: 17.82 on 16 and 169 DF, p-value: < 2.2e-16					

Table 28: *Multiple linear regression model on marginal effects of different variables on pronunciation performance*

In other words, statistically speaking, a regression analysis of the data based on the given 190 samples suggests that frequent uses of functional practice strategies and communicative-interactive strategies showed the highest likelihood of positively influencing one's pronunciation performance out of the eight different types of strategies. Therefore, technically, if an English learner would like to improve pronunciation skills they should focus more on using these two types of strategies, both of which involve authentic, naturalistic pronunciation practices through active use of the target language. Having said that, it is important to be aware that while these selected items demonstrated a higher statistical significance it does not necessarily mean that the remaining unselected items completely lose their pedagogical value or that they should be neglected by learners. It will also be interesting to duplicate the study with a different group of learners (e.g. Non-Hong Kong students/ secondary or postgraduate students) to see if the relative impact of these variables on pronunciation ability remains the same.

To check against multicollinearity, which implies “near-linear dependence among the regressors” and may reduce the usefulness and precision of a regression model, a multicollinearity diagnostic of Variance Inflation Factors (VIFs) was run on the data set. Normally, VIFs > 10 imply serious problems with multicollinearity (Montgomery, Peck & Vining, 2012, p.117). In the present study, since not only continuous but also discrete and categorical data were present in the model, a more cautious approach of computing Generalized Variance Inflation Factors (GVIFs) was adopted, which provides numerical proxies that measure the magnitude of the variance of the estimated regression coefficients inflated because of collinearity (Fox & Monette, 1992), with the rule of thumb whereby multicollinearity is considered high were the GVIFs greater than 5. Results show that standardized GVIFs of the 13 variables in the present model ranged from 1.07 to 1.59, indicating the fitted regression model did not suffer from multicollinearity (see Table 29).

Variables	Generalized Variance Inflation Factor (GVIF)	Degrees of Freedom (Df)	GVIF^(1/(2*Df))
Factor 1: Functional practice	2.554711	1	**1.598346**
Factor 2: Cognitive and formal, rule-processing	1.533580	1	**1.238378**
Factor 3: Affective	2.107015	1	**1.451556**
Factor 4: Sensory-mechanical drilling	1.658128	1	**1.287683**
Factor 5: Peer support-social	1.506689	1	**1.227473**
Factor 6: Communicative-interactive	2.208193	1	**1.485999**
Factor 7: Metacognitive-independent study	1.813850	1	**1.346792**
Factor 8: Compensatory-heuristic	1.364856	1	**1.168271**
Gender (Male)	1.195168	1	**1.093237**
Medium-of-instruction (Chinese)	1.257666	1	**1.121457**
Prior training in phonetics/pronunciation (Without)	1.164364	1	**1.079057**
Time spent on out-of-class practice	1.684168	4	**1.067329**
Length of residence in English-speaking countries	1.176242	1	**1.084547**

Table 29: *Variance Inflation Factors (VIFs) of all variables in the multi-linear regression model to check against multicollinearity*

4.4 Summary of Findings in Phase I

Phase I of the study investigated the types and frequency of Pronunciation Learning Strategies used by full-time undergraduate students enrolling in a local university in Hong Kong and any possible correlation between two primary variables, namely the frequency of their strategy use and their pronunciation ability. 451 participants completed a pronunciation

learning strategies survey, among whom 190 participants further completed a pronunciation performance test including a read-aloud task and an extemporaneous speaking task conducted in a language laboratory.

4.4.1 Summary of results to Research Question 1

Part A of Phase I attempted to answer Research Question 1, "What PLS do university students in Hong Kong use to improve their English pronunciation performance?" by examining survey responses from 451 participants. Among the 60 strategies surveyed, 16 showed a high frequency of use, 37 a medium level of use and 7 a low level of use frequency based on Oxford's (1990) measure. The survey data was then subject to a factor analysis, resulting in an 8-factor structure, which is different than the traditional, widely adopted 6-factor structure from Oxford's SILL in her seminal papers (1989; 1990; Oxford & Burry-Stock, 1995), with compensatory-heuristic strategies reported to be most frequently used by students (mean = 3.925) followed by metacognitive-independent study strategies (3.836), sensory-mechanical drilling strategies (3.366), functional practice strategies (3.323), affective strategies (3.075), communicative-interactive strategies (3.019), Peer support-social strategies (2.930), and cognitive and formal-rule-processing strategies (2.504) in descending order. This indicates that the underlying construct of Pronunciation Learning Strategies may have notable differences from that of general Language Learning Strategies.

From literature, researchers have also been interested to explore any learner group differences in PLS use. As such, *t*-tests were run on the survey data and results found significant differences in overall strategy use frequencies between females and males (with the former using PLS more frequently than the latter) and between learners who have received training in phonetics and pronunciation and those without such training in the past (with the former using PLS more frequently than the latter) whereas the difference in strategy use frequencies appeared insignificant between EMI and CMI learners.

4.4.2 Summary of results to Research Question 2

Part B of Phase I attempted to answer Research Question 2, "What factors are associated with these learners' pronunciation performance? In particular, to what extent is learners' use of PLS associated with their English pronunciation performance?" This part examined survey results of a subset of participants in Part A (n = 190) and their pronunciation performance test scores to explore any association between learners' pronunciation performance and their use of PLS as well as a number of other ID factors that have interested

researchers in the past. An initial inferential analysis suggests that there was a positive correlation between participants' use of PLS and their pronunciation performance ($r = 0.562$, $p < 0.001$). Through a series of *t*-tests, females were found to have significantly better pronunciation performance than males, EMI students better than CMI ones, those having received previous training in phonetics better than those without. Through Spearman's rank order correlation coefficient, the time spent on out-of-class practices and the length of stay in English-speaking countries were both found to correlate positively with better pronunciation performance. Lastly, a regression statistical analysis was applied to explore the relative significance of these various factors in predicting pronunciation performance. Results further suggest that functional practice strategies and communicative-interactive strategies (the two types of PLS that involve direct, authentic language use) were most significantly associated with pronunciation performance whereas the learner's medium of instruction at school remained a strong factor among secondary variables.

CHAPTER 5: RESULTS AND DISCUSSION (PHASE II)

5.1 Overview of Phase II Results

Phase II of the study was designed to investigate the potential benefits of introducing a digital storytelling task in enhancing the active use of Pronunciation Learning Strategies among students in an English language course in a Hong Kong university. In particular, it was aimed to observe the frequency and types of Pronunciation Learning Strategies used by a group of 33 students enrolled in a 12-week English speech-pronunciation course with a digital storytelling project as assessed coursework (For details on the course content and background of participants, please refer back to Section 1.1 "My teaching context" on page 13, and Section 3.4 "Research design for phase II of the study" on page 82). This chapter presents findings based on data collected through a post-course questionnaire, a guided written reflection and follow-up interviews.

5.1.1 Demographics (Phase II)

Of the participants in phase II of the study (*n*=33), 52% (*n*=17) were female and 48% (*n*=16) were male, their age ranging from 18 to 24 with an average at 22 years. Among them, 85% (*n*=28) were local Hong Kong students, 9.1% were from Mainland China (*n*=3), 3% from Macau (*n*=1) and 3% from Korea (*n*=1). Their native languages were: Cantonese (26), Mandarin (5), Korean (1) and a Chinese dialect (1). Their major disciplines and years of study at the university varied, the details of which are shown in the table below:

Year of study	
1st Year	1
2nd Year	3
3rd Year	20
4th Year	8
5th Year	1
Total	33

Faculty / School	
Faculty of Arts	4
Faculty of Education	1
Faculty of Engineering	1
Faculty of Law	2
Faculty of Medicine	2
Faculty of Science	14
Faculty of Social Science	6
School of Business	3

Origin	
Hong Kong	28
Mainland China	3
Macau	1
Korea	1

Native language	
Cantonese	26
Mandarin	5
Korean	1
Others	1

Table 30: *Demographic information of participants in Phase II of the study*

5.2 Results of Research Question 3: "What Pronunciation Learning Strategies do students use in a digital storytelling task in an English language classroom in a Hong Kong university?"

This section answers Research Question 3 by reporting the frequencies and types of PLS used by students throughout their DST project, including the average scores (on a Likert scale from 1 to 5, with 5 indicating the highest frequency level) of PLS use in their self-reported data collected through a post-project questionnaire and the number of references (times being mentioned) and sources (number of participants) in which a particular strategy was mentioned in the qualitative data collected from students' written reflections and follow-up interviews (For details on the three data collection instruments, see Section 3.4.2; for details on the data analysis approach used, see Section 3.4.4.2). To help better understand learners' strategy use behaviour, an overview in the form of a table presenting these quantitative data will precede related discussions on each type of strategies while representative qualitative data from the student reflections and interviews will be cited in the form of excerpts. Item numbers for each strategy will be included in the tables for easy reference (note that strategy items not extracted in the earlier conducted factor analysis will still be included for readers' information but marked with an asterisk).

Overall, students (n=33) used all 32 Pronunciation Learning Strategies under seven out of the eight types of PLS (with the exception of type 6: communicative-interactive strategies, which was not surveyed) though at different levels of intensity. Results will be presented in descending order of use frequencies:

i. Type 1: Functional practice strategies
ii. Type 7: Metacognitive-independent study strategies
iii. Type 2: Cognitive, formal rule-processing strategies
iv. Type 4: Sensory-mechanical drilling strategies
v. Type 5: Peer support-social strategies
vi. Type 3: Affective strategies
vii. Type 8: Compensatory-heuristic strategies (For details, see Section 4.2.3)

This section (Section 5.2) will focus on presenting the quantitative results indicating students' use frequency of various types of PLS as observed in their self-reported data whereas an interpretation of factors associated to such strategy choices will be presented in the next section (Section 5.3).

5.2.1 Rank 1 — Type 1: Functional practice strategies

Functional practice strategies are strategies whereby learners focus on various pronunciation features when engaging in authentic, naturalistic language use. The use of such

strategies involves the learner actively practicing pronunciation while listening to or speaking the target language. They were among the most frequently used strategies by participants in the DST project as shown in both quantitative survey data and qualitative data, with mean scores for all seven strategies in this category above 3.5 (classified as "high" frequency of strategy use by Oxford, 1990, p.300) and 25 out of the 33 participants explicitly mentioning or describing employment of such strategies in their written reflections.

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 1: Functional Practice Strategies				**25**	**70**	**4**	**25**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
B21	When I speak English I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.	3.64	0.93	18	24	4	7
B23	When I speak English I pay attention to place the word stress on the right syllables within words.	3.79	0.82	5	5	2	2
B24	When I speak English I pay attention to divide thought groups and pause appropriately.	3.85	0.94	5	5	3	4
B25	When I speak English I pay attention to decide where to make an emphasis in sentences to better express the meaning.	3.91	0.80	7	9	1	1
B26	When I speak English I try to maintain connected speech by linking words together.	3.70	1.02	9	11	3	4
B27	When I speak English I try to maintain an English rhythm and intonation to sound more natural.	3.79	0.86	11	13	4	4
B22*	When I speak English I try to avoid producing inappropriate sounds from my native language.	3.85	0.97	3	3	2	3

Table 31: *Students' reported use of functional practice strategies in digital storytelling project*

It appears that students paid attention to perform English pronunciation features at both the segmental and suprasegmental levels when completing their digital stories. They expressed that they would "pay attention to articulate individual sounds or syllables clearly and accurately" (Strategy 21) as shown in some of the representative quotes as follows:

- *'Because in daily conversation you just won't pay attention to some sounds, but when I did the recording, for example, I would highlight the difference between the /t/ sound and the /d/ sound for '-ed' endings.' (Interview 02)*
- *'Actually for doing other speaking tasks we would be mostly just focused on the content and the ideas to present, but in a digital story while the content is also important, we would also spend a lot of time on each individual sound instead of focusing entirely on content.' (Interview 02)*
- *'I also intentionally pronounce the short vowels sound shorter and long vowel sound longer. Generally, pronounce every vowel clearly.' (Reflection 10)*
- *'I was more carefully to pronounce the word "dream". Because in my one minute talk, I mispronounce "dream" to "gym" several time. When I do this story I was be careful to pronounce all the /r/ sounds.' (Reflection 25)*
- *'Some words was difficult to read fast, e.g. Exhaustion /ɪgˈzɔːstʃən/ as there are many consonants including /g/, /z/, /s/, /tʃ/. I had many NG as I want to show /tʃ/ but not /ʃ/, and the voiced consonants /g/, /z/ too.' (Reflection 21)*
- *'I wanted to try my best to make every part perfect. I paid attention to say every word accurately and clearly. I reminded myself that "encourage" should be pronounced as 'in' not 'en' and 'big' should be /ɪ/ not /eɪ/' (Reflection 30)*

Excerpt 1: *Representative quotes on students' use of Strategy 21*

They would also "pay attention to place the word stress on the right syllables within words" (Strategy 23). For both strategies, students referred to specific examples of vowels, consonants and syllables in words they actually functionally practiced when working on the DST.

- *'I would also check to make sure I have put the stress on the correct syllable of the word because sometimes you would think the stress is on one syllable when in fact it should be on the next. For example, like the word "Tibet", I think I have heard different people say it differently, and I needed to make sure I stress the right sound.' (Interview 02)*
- *'I paid attention to put the suitable stress on some words, for example: "repetitive", "poetry", etc.' (Reflection 16)*

Excerpt 2: *Representative quotes on students' use of Strategy 23*

At the suprasegmental level, students expressed that they would "pay attention to divide thought groups and pause appropriately" (Strategy 24):

- *'Because for a long sentence you can't do it flatly. Instead there will be ups and downs in your pitch and you need to pause at the right place. I remember it took a long time to get it right.' (Interview 04)*
- *'Chunking is one of the techniques I have used. It is better to divide a whole sentence into several parts, having mini break within each phrases or clauses.' (Reflection 20)*

Excerpt 3: *Representative quotes on students' use of Strategy 24*

And they also would "pay attention to decide where to make an emphasis in sentences to better express the meaning" (Strategy 25). Qualitative data revealed that students were putting their knowledge of English pronunciation regarding chucking, primary stress and pitch into practice as they went through the DST project:

- *'For example, in the sentence 'life is unpredictable' here I will stress the word 'unpredictable'. And then something like the unimportant words like 'is', 'and', 'the' you just make it short and stress the important words instead.' (Interview 03)*
- *'I tried to figure out the important words in the text and pronounce the other words lightly as I always emphasize everything before.' (Reflection 03)*
- *'I will try my best to put the stresses on the right words. To convey my emotions better, I raised the pitch for key words despite it was quite unnatural for me, but the outcome was satisfactory.' (Reflection 33)*

Excerpt 4: *Representative quotes on students' use of Strategy 25*

There is also a fair number of references suggesting that students would "try to maintain connected speech by linking words together" (Strategy 26) to achieve fluency:

- *'It's sometimes if you have to read fast, I mean if I have to pay attention to every consonant, like if I did this consonant, and then the consonant after this one, and then I have to do it again because it just paused. It's just not so natural because you stop here and then pronounce the next one. It is difficult to start the next word. And then I will think of connected speech, because in connected speech you can link the consonants together. It sounds more fluent that you don't have to pause for the next word.' (Interview 03)*
- *'Because in words like "make up", at the word level if you pronounce it correctly it will be you pronounce 'make' and then the next word "up" but then just break up in between the two words. And so because of this I would think about connected speech, like oh this is a good way to connect them and it will be fluent.' (Interview 03)*
- *'For example, like connected speech, I would make an effort to do it. Like the line "walk in the street" and "kind and lovely" I paid attention to the connected speech. There may not be a lot of instances, but I had learned it and I would pay attention when I did the recording.' (Interview 04)*
- *'I paid attention to the linkages. For example, there is a sentence "It _ upset me but _ I didn't give _ up my _ ambition."(I pay attention to the linkages marked with underscore here)' (Reflection 26)*

Excerpt 5: *Representative quotes on students' use of Strategy 26*

And a considerable number of quotes mentioned that students would "try to maintain an English rhythm and intonation to sound more natural" (Strategy 27), a strategy the use of which they often related to their attempts to express emotions more appropriately:

- *'Speaking is not only about speaking aloud and clear. You have some emotions. Although my voice is not as beautiful as others I would try to raise some high pitches to raise attention and whenever it is a question rather than a sentence. I would think about it.' (Interview 01)*
- *'I think it's the emotional expression because in some places you needed to express emotions more deeply. In some parts of the story I would pay attention on how to use the most appropriate tone to make the story more expressive. For example, when I talked about the very risky and challenging leg of our hike, I chose to use a very serious and solemn tone to describe the dark and dangerous environment, like by lowering my pitch or using some force with my voice. But when I talked about the starry sky which made me think of my grandma, I would switch to a soft tone.' (Interview 02)*
- *'Sometimes I would even see if I could make some sentences rhyme to sound better, like I would pay attention to the rhythm and intonation, to have highs and lows in my voice, so I would not sound very flat and boring.' (Interview 04)*
- *'I tried my best to show ups and downs when speaking so I could convey emotions properly through the tone of my voice.' (Reflection 01)*
- *'I think smoothness and emotions are more essential elements so I focused more on areas of fluency and intonation.' (Reflection 30)*
- *'I found that reading the script fluently wasn't hard, but controlling the personal emotion through my own voices is quit hard.' (Reflection 31)*

Excerpt 6*: Representative quotes on students' use of Strategy 27*

Another strategy the students adopted at the segmental level was to "try to avoid producing inappropriate sounds from my native language" (Strategy 22). Qualitative data

included references made to conscious avoidance of Cantonese (native language of 80% of the participants) sounds in pronunciation practices during the DST project:

- *'Because we speak English in Cantonese accent and then somehow for some vowels we don't pronounce it so completely, like for the long vowels and the short vowels, in the Cantonese accent maybe we pronounce it in similar ways but when you listen back to what you have…er…I have recorded and then I find it doesn't sound so natural. So somehow I will focus more on these vowels and try to stress it in the western way.' (Interview 03)*
- *'Sometimes I would become frustrated when I tried a lot of times and still the recording did not sound good, like I just could not deliver it to sound like a foreigner. Like I always wanted to try and imitate what a native speaker would sound like when he says these lines, that's why I kept repeatedly trying to say the sentences again and again because I want to not sound like a Hong Kong accent. You just listen to it and you would know which way you sound like. I think at the end I still have not achieved it but at least I had tried my best.' (Interview 04)*
- *'Like the word "no", in the past, I always mispronounce the "n" consonant. I pronounced "NO" as Chinese word "撈" (as in 'Lo').' (Reflection 24)*

Excerpt 7: *Representative quotes on students' use of Strategy 22*

5.2.2 Rank 2 — Type 7: Metacognitive-independent study strategies

Also among the most frequently used strategies by participants in the DST project were metacognitive-independent study strategies, which are strategies that pronunciation learners can use independently of a partner or a class to support their own learning through self-monitoring and preparation for pronunciation or speaking tasks. Survey data shows that all six strategies in this category scored above 3.5 (classified as "high" frequency of strategy use by Oxford, 1990) with half of them reaching 4.0 or above and 24 out of the 33 participants explicitly mentioning employment of such strategies in their written reflections. All four interviewees reported using this type of strategies.

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 7: Metacognitive-Independent Study Strategies				**24**	**59**	**4**	**33**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
B35	I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.	4.00	1.20	2	2	4	6
D47	I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.	4.12	0.82	10	10	2	4
D51	When I find I make a mistake in pronunciation, I try to correct myself immediately.	4.15	0.67	8	9	4	7
D48	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).	3.79	1.17	1	1	2	2
D46*	I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.	3.55	1.09	4	4	3	3
D49*	I record myself to listen to and evaluate my own pronunciation	3.88	1.02	20	33	4	11

Table 32: *Students' reported use of metacognitive-independent study strategies in digital storytelling project*

Considering digital storytelling is a project-based learning activity, it was not surprising to find that participants reported high frequency of use for metacognitive strategies, which are essentially planning, preparation and self-monitoring strategies. Most students prepared for the recording by first "listening to model pronunciation of online or electronic dictionaries" for words the pronunciation of which they were unsure (Strategy 35) and "highlighting difficult-to-pronounce words in the notes" (Strategy 46). Here are a few quotes from the students explaining the steps they took to complete the task:

- *'I am actually listen to…I would try to listen to digital dictionaries and online dictionaries to hear their pronunciation of some words but there is a problem of it sometimes it is a woman pronounces it, and it is difficult for me to…um…to imitate the pitch. It is difficult for me to imitate it so there is some problem.' (Interview 01)*
- *'For difficult words, I first listened to their pronunciation in howjsay.com and Cambridge online dictionary.com which Ms Cheung recommended.' (Reflection 15)*
- *'I not only listened to Yahoo dictionary but also other online dictionaries because it may not always be accurate.' (Interview 04)*
- *'Facing some unsure pronunciation words, I would check the online dictionary at advance and heard the pronunciation first.' (Reflection 22)*

- *'In the script I highlight all the words that I cannot…I think I cannot pronounce it well, like 'once I get into university' for example 'to the university' at that time I think it was difficult to pronounce. Like 'university' I think it is a multi… (Interviewer: 'multi-syllabic?') Yes multi-syllabic word so I think I cannot handle it well.' (Interview 01)*
- *'I would open the Microsoft Word while I did this and used different colours to highlight difficult words and places to pay attention to. For example, we learned about connected speech in class so I would use the red colour to highlight places where I needed to connect sounds, like linking the words. Because in daily conversation you just won't pay attention to some sounds, but when I prepared for the recording, for example, I would highlight the difference between the /t/ sound and the /d/ sound for "ed" endings. This would help me remind myself to say them correctly when I did the recording.' (Interview 02)*
- *'Before recording my voices, I would read the scripts again, and marked red color on places which I needed pay attention to.' (Reflection 22)*
- *'I underlined the difficult words that I had to pay more attention during my story recording.' (Reflection 11)*

Excerpt 8: *Representative quotes on students' use of Strategy 35 and 46*

Students also took the time to "rehearse before carrying out the task to improve pronunciation performance" (Strategy 47), which resulted in a high strategy use score at 4.12 out of 5. One-third of the participants explicitly mentioned taking this step in their reflections, with some of the quotations cited below:

- *'Although I have done some reading aloud during the writing process, before the recording I would still prepare by reading aloud the script a few more times, but this time I would read aloud paragraph by paragraph. It can also serve as a rehearsal' (Interview 02)*
- *'Firstly I read the scripts loud as rehearsal. It helped practice stress and intonation, I could also check whether I spoke with great fluency or not.' (Reflection 22)*
- *'Before recording, I practiced reading my script paragraph by paragraph a lot of times.' (Reflection 07)*

Excerpt 9: *Representative quotes on students' use of Strategy 47*

Two-thirds of the participants described the process of "recording oneself to listen to evaluate own pronunciation" (Strategy 49). Qualitative data from the written reflections suggests that many students engaged in self-evaluation of pronunciation performance in the process of completing the audio-recording of their digital stories. Students described how they often "found problems" through "double-checking" or "re-watching" through "playback" of their own voice or video, and attempted to "adjust" their pronunciation, often repeatedly until the performance was "good enough" (See excerpts of quotations from participants below).

The fact that digital storytelling is a project involving an electronic product and is often conducted using software with the record-and-replay function (such as the freeware *Photostory 3* as recommended by Lambert (2006), which was the software introduced to participants in this study) appears to have been conducive to the elicitation of metacognitive strategies among learners.

- *'I realized my intonation patterns for sentences were almost the same. Upon playback I found my own voice annoying. So I spent considerable time trying different patterns.' (Reflection 33)*
- *'I would check to make sure we are pronouncing words correctly and check our speed whether we are going too fast or too slow… Actually to me speed has always been a problem, even my mum said I talk too fast. So when I did the digital story, I would listen to my own recording, and if I spoke too fast I would do it again and try to slow down. I used the software photostory3 to do the recording and I found it quite user friendly as it allowed me to do the recording one picture at a time, and I could listen to myself to decide if I needed to re-do the recording before it was good enough for me to move onto the next picture. I think I spent altogether like four hours to do the recording.' (Interview 02)*
- *'Through recording my voice and listening to it again and again, I found that my voice and my pronunciation were so different from what I thought. I have recoded the script for at least three times per slide, each time trying to adjust my pronunciation, level of my voice as well as intonation.' (Reflection 05)*
- *'To make sure those particular pronunciations are all right, I watched the video day by day again and I realized every time I re-watched the video I could figure out my mistakes even though I thought it was perfect before the day I checked the video.' (Reflection 06)*

- *'But if I was hesitant while recording, I would also stop to double check, because the software we used to do the recording, Photostory 3, allows you to stop after recording say one paragraph and then to repeatedly listen to yourself. So if I found problems when I listened to myself, I would stop and go online to check my pronunciation. I would also check my speaking speed. If I sounded too fast or too slow, then I would record it again. It took me a lot of time to do this.' (Interview 04)*
- *'It provides a way for me to listen to myself, to judge myself and eventually to improve my speech. Not just while recording it, but also afterwards. It keeps my voice and I can come back to it whenever I want in the future.' (Reflection 08)*
- *'I need to hear my voice over and over again, which helps me figure out what is doing wrong with my speaking skills.' (Reflection 12)*
- *'This makes a difference from reading aloud, which I will not listening to voice over and over again. Recording can efficiently improve my pronunciation. I found out that I did not pronounce every word correctly. Every time I played back my recording, I could find words that I have pronounced them wrong or not in a natural way.' (Reflection 29)*

Excerpt 10: *Representative quotes on students' use of Strategy 49*

Naturally, going hand in hand with rehearsals and self-evaluation was self-correction, whereby students reported to "try to correct myself immediately when I find I make a mistake in pronunciation" (Strategy 51), the strategy that scored the highest frequency of 4.15 out of 5 in this category. Some of the quotations from students' reflections are as follows:

- *'I could fix all the mistakes in my video that I could find.' (Reflection 06)*
- *'I recorded the speech again when I found any mistake of my pronunciation.' (Reflection 09)*
- *'As I listened to each sentence or paragraph after I read it aloud, I could immediately hear what my pronunciation was like and fix any problem right away. For example, I pronounced horizon wrongly by using a strong rather than weak vowel in the last part. I also kept amending sounds such as '-ed' and other word endings to increase my accuracy.' (Reflection 30)*
- *'Once I heard some faults in my inconsistency I would do it again to perfect it. As a result, I recorded my voice multiple times until I thought the final product was perfect.' (Reflection 01)*

Excerpt 11: *Representative quotes on students' use of Strategy 51*

A less frequently mentioned strategy among the metacognitive strategy group was "looking for a good learning environment when studying or practicing pronunciation" (Strategy 48). Students' sharing was primarily focused on the need of privacy and quiet for practice, which coincides with the conditions for pronunciation improvement in Dickerson's Covert Rehearsal Model (1989; 2000):

- *'When I did the Digital Storytelling I did it at home because I thought I could only practice pronunciation well if I am in a quiet environment without distraction or disturbance. I think it would be better if I could practice the read-aloud when no one is around.' (Interview 02)*
- *'I did it in the dormitory because my roommate will not be there on the weekends and I can do it on the weekend. But the equipment is a problem because I was late for using the language lab on campus and then the microphone of my laptop is really poor I just cannot stand the poor quality so I went out to the computer store to buy one.' (Interview 03)*

Excerpt 12: *Representative quotes on students' use of Strategy 48*

5.2.3 Rank 3 — Type 2: Cognitive, formal rule processing strategies

The third most frequently used type of strategies was cognitive, formal rule-processing strategies, which are characterized by cognitive information processing internal to the pronunciation learner such as analysing and reasoning and often resulting in less observable behaviours. The average frequency score for this group of strategies was 3.52 out of 5, ranging from 3.24 to 3.82 (classified as "medium" to "high" frequency of strategy use by Oxford, 1990).

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 2: Cognitive, formal rule processing strategies				**23**	**31**	**4**	**12**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
B34	I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.	3.82	1.18	11	13	4	6
D43	I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.	3.73	0.88	5	5	1	1
B29*	I analyse English spoken texts using pronunciation rules I have learned.	3.27	0.94	5	5	2	4
B31*	I pay attention to the similarities and contrasts between my native language and English pronunciation.	3.24	1.03	5	7	1	1

Table 33: *Students' reported use of cognitive, formal rule-processing strategies in digital storytelling project*

Among the strategies in this group, the highest scoring one adopted by students was to "check the dictionary for phonetic transcription when unsure how to pronounce a word" (Strategy 34), with a high use frequency at 3.82 and one-third of the students making reference to it in their reflections. Students reported consulting dictionaries for both the phonetic alphabet and the stress placement of unfamiliar vocabulary items:

- *'I would also look up the pronunciation of some vocabulary in the script by checking the words in online dictionary to make sure I know how to say them. Sometimes I take the pronunciation of some words for granted and assumed I know how to pronounce the word but when I checked the dictionary the IPA symbols suggested something else.' (Interview 02)*
- *'I also double checked the stress pattern in Google and in Cambridge dictionary to be sure. I really wanted to say it accurately.' (Interview 04)*

- *'I referred to the dictionary all the time not only for picking suitable vocabulary but also for checking correct pronunciation of words.' (Reflection 01)*
- *'I checked the pronunciation and stress pattern on the words, "crucial" and "raincoat". By checking the IPA of the words, I can make sure to speak the word accurately.' (Reflection 02)*
- *'I checked the pronunciation from the dictionary to make sure that I am saying the vocabularies such as 'privilege' and 'frivolous' correctly and this is time when I find that learning IPA is really useful. (Reflection 05)*
- *'IPA is very useful. I mean, the electronic sound after the devices may be altered, changed. So you need the IPA to confirm.' (Interview 03)*
- *'So before the recording I checked correct pronunciation and stress on the dictionary for a few words especially those words I was not sure it is a schwa sound or not. I have checked the international alphabet of many words on Oxford Dictionary to find the accurate pronunciation.' (Reflection 07)*

Excerpt 13: *Representative quotes on students' use of Strategy 34*

It is worth noting that International Phonetic Alphabet was one of the key teaching topics covered in the course. It appears that the digital storytelling project provided an opportunity for students to put what they had learned into practice when they eagerly consulted dictionaries for pronunciation input.

Students also applied what they had learned in terms of pronunciation knowledge by "analysing English spoken texts using pronunciation rules learned" (Strategy 29). With a "medium" frequency of use at 3.27, this strategy was adopted as students analysed the scripts they had written for their digital stories with rules they had learned on the course:

- *'I would also draw some slashes on the script to show pausing because sometimes I would be very hasty and rushed through the script. The speed could be a problem when I forgot to pause. I was worried I would go too fast so marking down the chunking on it would help remind myself.' (Interview 02)*
- *'I would also mark down the syllables in the long words. Like "consolation" I marked down there were four parts, con-so-la-tion. And if I need to stress a word I would circle it in the script. And if I need to pause I would put down dot-dot-dot (an ellipsis), like places where the emotion changes, from unhappy to happy.' (Interview 04)*

Excerpt 14: *Representative quotes on students' use of Strategy 29*

It also appears that some students were consciously "focusing attention on particular sounds or phonetic features when practicing pronunciation" (Strategy 43). Qualitative input from participants reveals that such selective attention was primarily directed to pronunciation features that were covered in class:

- *'I intended to make every word clear and correct. Especially I pay much attention in the /t/ and /d/ sound as I found that I always forget to pronounce them when I speak.' (Reflection 31)*
- *'I have also tried to apply what I learnt in the lesson into the digital story, like be extra careful of the pronunciation of past tense and pay attention to the different pronunciations between noun and verb forms.' (Reflection 19)*
- *'I paid special attention to pronouncing past tense, such as "depressed" and "wanted" are both regular past tense words. However, "want" end in a /t/ sound and it will add an extra syllable /ɪd/ in the past tense. But when "ed" added to "depress", as "depress" end in a unvoiced sound /s/, it just pronounced as /t/. Therefore I had to check carefully and practice many times to identify these differences.' (Reflection 23)*
- *'I paid much attention to the past tense sound of "-ed" ending. I followed the rules to add an extra syllable /Id/ such as 'invited', 'bonded', 'comforted'. 'ed' added to words ending in unvoiced sounds such as changed, tried, prepared are pronounced as /d/.' (Reflection 13)*

Excerpt 15: *Representative quotes on students' use of Strategy 43*

The lowest scoring strategy in this group was "paying attention to similarities and contrasts between my native language and English pronunciation" (Strategy 31), though still with an average score of 3.24 indicating "medium" frequency of use. It can be observed that students' description of their use of this strategy is comparatively less specific and less detailed — in other words, students who did attempt to apply this strategy tended to articulate the related pronunciation knowledge in a general manner:

- *'I can discriminate between English accent, American accent and Hong Kong accent. When I did the recording, I could not stand my Hong Kong accent and tried to make it sounded more Western.' (Reflection 10)*
- *'It was hard but at least I had had a sense of what native English pronunciation is liked. In my eyes, I would think "fast" was one of the elements that their pronunciation has. You can only perfect the skills like stressing words skillfully after you could speak the language fast and fluent.' (Reflection 17)*

Excerpt 16: *Representative quotes on students' use of Strategy 31*

5.2.4 Rank 4 — Type 4: Sensory-mechanical drilling strategies

The fourth most frequently used type of strategies were sensory-mechanical drilling strategies whereby the learner gets familiarized with the target pronunciation through mechanical drilling or repetition. Through such mechanical practice the learner improves control over speech production organs and muscle memory for the target pronunciation features. All strategies in this category scored an average frequency rate between 2.5 and 3.4 out of 5 (classified as 'medium' frequency of use by Oxford, 1990) except for one strategy (Strategy 9) which scored as high as 3.91.

Pronunciation Learning Strategies		DST survey data		Reflection data		Interview data	
Type 4: Sensory-Mechanical Drilling Strategies				**18**	**21**	**3**	**13**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
B7	I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.	2.97	1.16	1	1	1	1
B9	I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation	3.91	0.95	16	19	3	7
B10	I practice saying words slowly at first and then faster.	3.24	0.83	1	1	0	0
B11	I practice pronouncing words first in isolation and then in context.	3.39	1.17	0	0	0	0
B8*	I pay attention to/observe the articulatory gestures of my mouth, tongue, teeth and lips.	2.76	1.09	0	0	3	5

Table 34: *Students' reported use of sensory-mechanical drilling strategies in digital storytelling project*

Strategies relating to familiarization with and control of the oral organs appear to be the least frequently used among this group, whereby "relaxing and adjusting muscles of face and jaw when working on pronunciation" (Strategy 7) scored 2.97 and "paying attention to/ observe the articulatory gestures of mouth, tongue, teeth and lips" (Strategy 8) scored 2.76 (both classified as "medium" frequency of use by Oxford, 1990). Though only one student made an explicit reference in the written reflection, uses of such strategies were mentioned a few times during the interviews:

- *'And I will do some mouth exercise like I will feel my facial muscle in order to… I find it helpful because I like to do sports like basketball…I know that before you do some sports you need to warm up first…so you can also relax your facial muscle before…like I will do some biting…biting my muscle on my jaws. I hope it can help my pronunciation.' (Interview 01)*
- *'Before I recorded one sentence, I would speak it up first loudly so as to relax my mouth muscle' (Reflection 12)*
- *'And like this word 'cruel' I used, like the last /l/ sound, you need to intentionally put the tongue up to the back of your teeth.' (Interview 03)*

  - - - - -
- *'I intentionally to exaggerate my organs intentionally to make that kind of western sounds.' (Interview 03)*
- *'Like the word 'feel'…the /l/ sound. I cannot pronounce the /l/ sound. It's weird for me because I know every time I pronounce it I should use my tongue but I notice I just cannot do it properly.' (Interview 01)*
- *'I think like the /ɑː/ sound your mouth have to be open big enough to pronounce that sound but in Cantonese you don't pronounce that strong /ɑː/ sound so you have to intentionally move your organs in order to pronounce that sound. This sounds more western and natural.' (Interview 03)*

Excerpt 17: *Representative quotes on students' use of Strategy 7 and Strategy 8*

Even though only one student explicitly mentioned the use of strategy to scaffold their mechanical drills (in excerpt 18 as cited below),

- *'In order to conquer these pronunciation problems, I slowed down.' (Reflection 03)*

, the quantitative survey results suggest that students reported using these strategies such as to "practice saying words slowly at first and then faster" (Strategy 10) and "practice pronouncing words in isolation and then context" (Strategy 11), moderately frequently. The multiple-choice question "How did you record your narration?" may be able to provide additional input in this regard:

Question: How did you record your narration?

a. I recorded the sentences picture by picture
(17 responses)

b. I divided the story into a few parts and recorded one part after another
(11 responses)

c. I recorded the entire story all at once
(0 responses)

d. I recorded the entire story in one go but went back to revise unsatisfactory sentences
(5 responses)

Figure 11: *Student responses to question 'how did you record your narration' in post-DST project survey*

It appears that the possibility of pacing their own drilling practices based on individual students' level of confidence or proficiency was afforded by the nature of digital storytelling (whereby pictures or photos are used to support the narration while often end up serving as signals of transition between structural units along the script) and functions of the software used for recording (*Photostory3* allows learners to record and edit their speech by various lengths). Since the course was a remedial one targeted at low-proficiency students, it was not surprising to see that none of the participants opted to narrate the entire script all at once. Instead, students reported making choices from easier to more challenging options in terms of their pronunciation delivery according to their ability — some students read the sentences picture by picture (effectively a few sentences at a time) while others divided the whole script into several parts to attempt them in sequence; the most confident group would read the whole script in one sitting but returned to fix any unsatisfactory parts afterwards.

The most frequently applied strategy in the sensory-mechanical drilling group was to "practice pronouncing sounds/words that are difficult over and over to improve articulation" (Strategy 9). Representative qualitative data are cited below:

- *'Actually I did the recording sentence by sentence, because I felt more confident that way. Because sometimes I don't know why but I would make a mistake or get tongue-tied. So I would re-do that sentence again and again until it was right. I could try and re-try my pronunciation until I am satisfied with the outcome.' (Interview 04)*
- *'I was hoping that the production would be in a good broadcasting quality, so my passion drove me to record again and again to make it perfect. I unintentionally record 10 times for each sentence even for one word until I was satisfied. Finally it took me 2 full days and burning 2 midnights oil to finish it. This practice intensity for a sentence can never be done in face to face conversation. You cannot repeat and repeat one single sentence until your pronunciation is perfect when you are talking to friends. They will find you annoying. This recording exercise allows you to perfect your pronunciation first before your real daily life speaking.' (Reflection 10)*
- *'I could really attempt to perfect my pronunciation in recording my digital story because I could re-do a line for many times until I got a perfect one.' (Reflection 14)*
- *'So I practiced the words I did not familiar with and practiced the sentences once and once again before recording. After reading each sentence for 10 times, I know what I can do well and what I need to improve.' (Reflection 29)*
- *'It depends on the difficulty level of each sentence. I remember there were a few long sentences that were most difficult and it took me like twenty takes to get their right. I tried many, many times and still could not do it well. I remember it took me a long time to re-do it before I could say it accurately. Because for a long sentence you can't do it flatly. Instead there will be ups and downs in your pitch and you need to pause at the right place. I remember it took a long time to get it right.' (Interview 04)*

Excerpt 19: Representative quotes on students' use of Strategy 9

Acton (1984) and Dickerson (1989) both clearly state that learner's progress in pronunciation largely depends on their considerable commitment of time and effort to improve, especially outside of lesson time. In this study, digital storytelling appeared to be an activity whereby students willingly (or even enthusiastically) engaged in repetitive drilling of pronunciation features, which could be tedious and boring, in pursuit of improvement. The level of motivation and engagement are further illustrated by data obtained from the following questions in the survey:

Question: How many times did you record your narration?

a. Only once (0 response)
b. 2-3 times (18 responses)
c. 4-5 times (13 responses)
d. 6 times or more (2 responses)

Question: How much time did you spend on each of the following?

a. Brainstorming for topic (An average of 97 minutes)
b. Writing and editing script (An average of 162 minutes)
c. Collecting photos and music (An average of 109 minutes)
d. Recording voice narration (An average of 219 minutes)

Figure 12: *Student responses to questions on frequency and time spent on voice recording in post-DST project survey*

Instead of recording their narration once simply to complete the required task, all students reported carrying out multiple trials in perfecting their oral delivery of the script, which was in effect drilling and practice on top of any rehearsals previously done. Students also reported spending the most time on handling the read-aloud component of the project compared with selecting the topic, writing the script, and collecting the visuals.

5.2.5 Rank 5 — Type 5: Peer support-social strategies

According to the quantitative data, peer support-social strategies were among the two least frequently used types of strategies, with scores ranging from 2.58 to 2.67 only. These are strategies that involve cooperation with other language users or learners such as seeking help or sharing information. Despite the low scores obtained in the survey, actually one-third of the participants explicitly mentioned using these strategies when completing the digital story.

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 5: Peer Support-Social strategies				**11**	**15**	**3**	**4**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
F57	I ask someone to evaluate or correct my pronunciation.	2.64	1.19	10	11	1	1
F58	I ask someone to pronounce something for me.	2.67	1.31	3	4	0	0
F60*	I try to teach someone else about English pronunciation.	2.58	1.06	0	0	2	3

Table 35: *Students' reported use of peer support-social strategies in digital storytelling project*

Peer support-social strategies reported to be used by students included "asking someone to evaluate or correct my pronunciation" (Strategy 57). Students described inviting friends or family members, who often possessed qualities of being good language models or users from their perspective (e.g. being a native English speaker or someone majoring in English studies), to assess their pronunciation performance:

- *'I met my secondary school friend, a very good friend who is also a student of CUHK, and then we hadn't met for a long time and she came to my dormitory to visit me in order to introduce my recent life I showed her the story because she's an English major.' (Interview 03)*
- *'I asked another friend to listen to my digital story. Although it was quite embarrassing, they gave lots of useful advice like point out my wrong pronunciation of words and comment on my rhythm of speech.' (Reflection 02)*
- *'I asked other exchange student from Canada to check for me whether there are grammatical errors or wrong pronunciations.' (Reflection 06)*
- *'I asked my family to listen my recording and seeking their suggestion. I accepted their advice and recorded the imperfect part again.' (Reflection 09)*
- *'I asked my roommate to help me since he is an exchange student from United States and hence a native speaker, to not only point out my grammatical mistakes but also to correct my pronunciation.' (Reflection 30)*

Excerpt 20: *Representative quotes on students' use of Strategy 57*

The low average scores obtained from the survey could possibly be due to the manner in which the strategies were utilized during the project. Students often invited one-off help from friends to assess their performances or provide model pronunciation to them. The non-repetitive or non-recursive nature of such strategy use might have led to a low rating in quantitative form of data despite students' reports in the qualitative data.

Students also reported using the strategy "asking someone to pronounce something for me" (Strategy 58), and in the context of a digital storytelling project that often meant students invited a good language user with excellent pronunciation to perform their script for them in a read-aloud performance to serve as a quality model for shadowing and imitating:

- *I asked one of my Korean friend who lived in U.S for 7 years to read my script and I recorded his reading so I can listen to it. (Reflection)*
- *I found a friend which has good English pronunciation to teach me how to make the speech more attractive. I even invited him to record the script to me to let me know how I should perform in the digital story. (Reflection)*

Excerpt 21: *Representative quotes on students' use of Strategy 58*

While no students explicitly mentioned "trying to teach someone else about English pronunciation" (Strategy 60), likely because the reflection guide required students to describe the process of completing their own digital storytelling project so they dutifully left out details about help they offered to others' projects, reports of the strategy being used were nonetheless found in the interviews:

- *My partners were quite satisfied with my read-aloud rehearsal and did not have much to say about my oral delivery. In contrast, I did give my partners feedback on pronunciation. I drew their attention to correct ways how some of the words should be pronounced in their scripts. (Interview 02)*
- *I also helped my classmates. For example, Lily's [pseudonym] rehearsal was very flat and blend. So I told her that I thought it may sound too emotionless and it would be hard for her to engage the audience. (Interview 04)*
- *I am now tutoring some primary school students; I also teach them what I have learned through the digital story project. Some people may say that kids could learn pronunciation intuitively but I still think it's important they practice, so I would tell them about the basic pronunciation knowledge I now have and ask them to practice. So in a way I can see that I am paying more attention to pronunciation myself. (Interview 04)*

Excerpt 22: *Representative quotes on students' use of Strategy 60*

5.2.6 Rank 6 — Type 3: Affective strategies

Another least frequently used type of strategies was affective strategies, which are emotion and motivation related strategies such as anxiety awareness and reduction, self-encouragement and self-reward, with average scores ranging from 2.82 to 3.61 out of 5.

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 3: Affective Strategies				**5**	**5**	**2**	**2**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
E52	I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.	3.09	0.98	0	0	0	0
E53	I keep a sense of humour about my mispronunciations.	3.12	0.93	2	2	0	0
E55	I encourage myself to carry on when I encounter pronunciation difficulties.	3.61	0.86	3	3	1	1
E56	I reward myself for success or effort put into pronunciation improvement.	2.82	1.13	0	0	1	1

Table 36: *Students' reported use of affective strategies in digital storytelling project*

Scoring a moderate use frequency rate of 3.09, "having ways to relax and calm oneself when having difficulty with or feeling stressed about improving pronunciation" (Strategy 52) was not explicitly mentioned in either the reflections or the interviews. On the other hand, also scoring a moderate use rate of 3.12, "keeping a sense of humour about one's pronunciation" (Strategy 53) was referenced twice in students' reflections as follows:

- *'I felt like being a voice actor when I was recording and I found it was fun when I tried to adjust my pitch and speed to convey different emotions.' (Reflection 14)*
- *'To make the project attractive, I tried to imitate the accent of Chandler Bing, a character in the TV series Friends. I always laughed out loud before I finished recording the whole sentence. It made the process really interesting and fun.' (Reflection 30)*

Excerpt 23: *Representative quotes on students' use of Strategy 53*

Scoring the highest among the group was the strategy "encouraging oneself to carry on when encountering pronunciation difficulties" (Strategy 55). Expressions of self-encouragement or means to do so were revealed in the following quotes:

- *'I have watched a few videos before, which were teaching me how to be a better speaker. They really help me a lot and they help me build my confidence for keep doing this project.' (Reflection 12)*
- *'I now think I can do better in the future and change my tone of English speaking bit by bit.' (Reflection 03)*
- *'In this project I started to realize and know how to improve my English pronunciation. I need to listen to foreign news reports more and practice again and again. After this project I promise myself to improve my English speech within two years. At least before I graduate I have to become a good English user. I won't allow poor English to constrict my future.' (Reflection 19)*

Excerpt 24: *Representative quotes on students' use of Strategy 55*

Scoring the lowest among the group was the strategy "rewarding myself for success or effort put into pronunciation improvement" (Strategy 56). No students explicitly mentioned rewarding themselves in their written reflections and only one student tentatively suggested self-reward when probed by the interviewer in one of the interviews:

- *'[Interviewer: In the questionnaire you said you would reward yourself if you do well in pronunciation?]*
  Haha…yes…maybe I will buy myself a better breakfast the next morning.' (Interview 03)

Excerpt 25: *Quote on students' use of Strategy 56*

One possible reason for the relatively low use of this strategy is that students were sufficiently intrinsically motivated so they might not have felt the need to seek self-reward for putting efforts in the project, as revealed by reflections such as the following:

- *'I felt satisfied and like relieved when I got it completed, like a sense of completion. I was happy when I finished it.' (Reflection 04)*
- *'The final product was surprisingly nice and I felt competent.' (Reflection 08)*

Excerpt 26: *Quotes reflecting students' intrinsic motivation*

5.2.7 Rank 7 — Type 8: Compensatory-heuristic strategies

The final group was compensatory-heuristic strategies, which are strategies used by learners to compensate for limited knowledge such as making guesses or using temporary solutions or alternatives when failing to produce accurate target pronunciations. There appeared to be a discrepancy between results obtained from the quantitative and qualitative data. While quantitative data suggest rather frequent use of this group of strategies, scoring from 3.55 to 3.94, there were hardly any descriptions of or references to how these strategies were adopted in the digital storytelling project.

Pronunciation Learning Strategies		**DST survey data**		**Reflection data**		**Interview data**	
Type 8: Compensatory-Heuristic Strategies				**2**	**2**	**0**	**0**
Item	Pronunciation learning strategy	**Mean**	**SD**	**Sources**	**Ref**	**Sources**	**Ref**
C36	I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).	3.94	0.86	0	0	0	0
C37	When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).	3.55	1.18	0	0	0	0
C38	When I can't pronounce certain words correctly, I paraphrase (use other words with similar meanings).	3.64	1.19	2	2	0	0

Table 37: *Students' reported use of compensatory-heuristic strategies in digital storytelling project*

In particular, not a single mentioning of "making guesses of the pronunciation of unfamiliar words" (Strategy 36) and "using proximal articulation when unable to pronounce a given English sound" (Strategy 37) was identified in the written reflections as well as interviews. Only the strategy "paraphrasing when unable to pronounce certain words correctly" (Strategy 38) was referenced in two sources:

- *'When I was recording my DS, I edited my storyboard again to cut off some lengthy sentences and make the lines easier to read out by changing or removing some words.' (Reflection 14)*
- *'In high school I preferred to use some special words in my essays but I gave up all special words this time because a storytelling project is similar to giving a speech. Too many strange or unusual words will puzzle the audience and do damage to my oral delivery.' (Reflection 30)*

Excerpt 27: *Representative quotes on students' use of Strategy 38*

Interestingly, a student explained that she would opt for "active learning strategies" such as checking the dictionary to deal with pronunciation issues surrounding difficult words rather than adopting compensatory strategies of avoidance:

- *'If I used some words that I did not I was not sure how to pronounce, when I do the recording part I would go and check it up in the dictionary. Of course I would still use the words. I will not decrease the quality of my writing to fit the pronunciation. Because for me it is not difficult to find out the pronunciation of words. I can read the IPA and also listen to electronic dictionary.' (Interview 03)*

Excerpt 28: *Quote on avoidance of compensatory-heuristic strategies*

Overall speaking, the above results suggest that the introduction of digital storytelling as a language task in the English language classroom, especially when students are enrolling in a speaking course, could be conducive to the students' engagement in active use of Pronunciation Learning Strategies. In particular, it appears to elicit frequent use of functional practice strategies, metacognitive-independent study strategies, cognitive, formal rule-processing strategies and specific sensory-mechanical drilling strategies. It is also worth noting that the most frequently elicited strategy of functional practice was found to be more significantly correlated to pronunciation performance ability in Phase I of the study.

5.3 Results of Research Question 4: "In what ways does digital storytelling engage students in the use of Pronunciation Learning Strategies and affect their strategy choice?"

This section answers Research Question 4 by reporting and discussing the key themes that have emerged from the qualitative data regarding factors possibly affecting students' choice of and engagement with various Pronunciation Learning Strategies throughout the digital storytelling project.

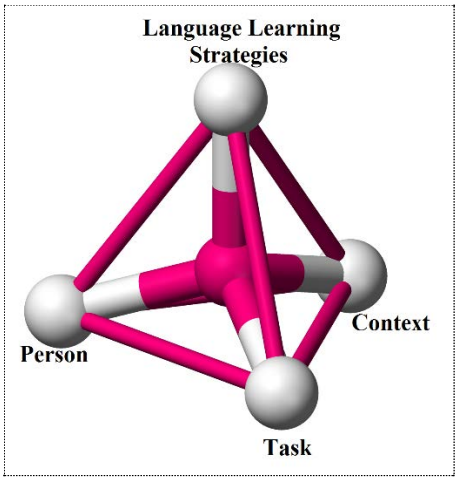

Figure 13: *A person-task-context-strategy tetrahedral model (Gu, 2003)*

"The choice, use and effectiveness of learning strategies depend on the task, the learner and the learning context" (Gu, 2003, p.11). Gu's (ibid) person-task-context-strategy tetrahedral model provides a more systematic framework to understand findings from Language Learning Strategies research:

- **Person:** The learner brings to the language learning situation a wide spectrum of individual differences such as age, sex, language aptitude, prior knowledge, motivation, self-image, personality and learning style. These person-dependent factors determine to a certain extent how a learner approaches a learning task and employs learning strategies.
- **Task:** The learning task is the end product in the learners' mind (here Gu adopts the more traditional, broader sense of task rather than the more recent and narrower definition of task as in task-based approaches). This conception includes the materials being learned as well as the goal the learner is trying to achieve by using these materials. Task-dependent factors including types of materials, task purposes and task difficulty levels call for different learner strategies.

- **Context:** The learning context refers to the socio-culturo-political environment including the teacher, the peers, the family support, the social climate or ethos, and the richness of input/output opportunities, which constrains the ways the learner approaches the learning tasks, whereby a learning strategy may be more valued or deemed inappropriate.

In the present study, an analysis of participants' self-reported experiences in their written reflections and follow-up interviews revealed a variety of task, person, and/or context-related factors which have impacted on their use of Pronunciation Learning Strategies throughout the digital storytelling project, hereby listed as follows:

i. DST as a learning task provides an ideal platform for putting learning acquired from course content into practice;

ii. audio-recording component of DST elicits recursive cycles of self-evaluation, practice and improvement;

iii. DST directs strong focus onto the pronunciation aspect of English speaking;

iv. DST engages students in active listening to English speaking models for imitation and comparison;

v. DST stimulates motivation for intense practice in pursuit for perfection in oral performance;

vi. (intrinsic) motivation drawn from significant life experiences and self-reflection placed at the centre of storytelling;

vii. (extrinsic) motivation drawn from awareness of audience needs and interpersonal bonding;

viii. digital stories display value as a tangible product and sense of authorship/ ownership;

These findings will be discussed with reference to excerpts from the qualitative data in the following section:

5.3.1 DST as a learning task provides an ideal platform for putting pronunciation knowledge acquired from course content into practice

First, the purpose and various functions of the digital storytelling project (Task) appeared to be highly commensurate with the materials and teaching input provided in a

speech-pronunciation course (Context) and the goals these materials were aimed to achieve. When it comes to the nature of language learning with regards to strategies deployment, there lies a distinction between "the knowledge aspect" (e.g. knowing a word) and the "skill aspect" (e.g. using a word) (Gu, 2003, p.2). This very learning process from "knowing" to "using" could be observed in the qualitative input of participants in Phase II of the current study — students had learned various pronunciation rules, i.e. knowledge acquired from the materials delivered throughout the course. And the DST task was observed to be providing an ideal platform for them to put this knowledge into practice, a process which was repeatedly mentioned by participants:

- *'Besides, I **recalled the knowledge learnt from class** to attempt to perfect my oral delivery.' (Reflection 09)*
- *'Since we would not pay attention to every word while we chat**, this project did provide a chance for us to put the knowledge in practice.**' (Reflection 15)*
- *'I felt enjoyable to do the assignment of Digital Storytelling. It was a kind of interactive and creative learning which **made me more impressive as we had to apply what we learn from the lesson** to create the story. The video production required different senses involved in creating story structure, writing scripts, use of voice, choosing appealing photos and background music, etc.' (Reflection 13)*

***Excerpt 29:** Representative quotes on task and context factors leading to active use of knowledge*

This explains the frequent use of both functional practice strategies (highest frequency as revealed in both the quantitative and qualitative data) and cognitive, formal rule-processing strategies (second highest frequency), with the latter activating students' "knowing" and the former eliciting their "using" of the pronunciation rules and features acquired from the course.

The high level of compatibility between a speech-pronunciation course as the learning context and a digital storytelling project as the learning task in eliciting Pronunciation Learning Strategies was evident from students' self-reports. Many students reported making active use of the English pronunciation rules and knowledge acquired in lessons in various ways as they attempted to complete the DST task; this included studying or revising the course notes and reference materials, checking the dictionary for the IPA of unfamiliar words, directing attention to selected pronunciation features and common errors covered in class, practicing chunking and pausing skills appropriately to achieve a natural rhythm, and so on:

- *'During preparation**, I reviewed what I learn from the lessons and apply the knowledge and oral skills into the script.** I tried to adjust my speed and speak in a polysyllabic tone with good control of stress and unstress. I tried putting stresses on the words in focus and chunking in appropriate position make my speech more natural and clear to the local English speaker. I have recorded for many times for each session to ensure the end-sound of the words such as "s", "st", "p" were pronounced. **The past tense sound of "ed" ending followed the rules to add an extra syllable** /Id/ such as "invited", "bonded", "comforted". "ed" added to words ending in unvoiced sounds ("changed", "tried", "prepared") are pronounced as /d/.' (Reflection 13)*
- *'Before I did my digital story, **I read through the notes in this course** and checked the dictionary for the correct pronunciation of words in my script. I found that **learning the rhythm of spoken English, chunking, sentence stress and enunciation is very useful** for me to improve my speaking and oral delivery skill in my digital story. For example, **I checked the pronunciation and stress pattern on the words**, "crucial" and "raincoat". By **checking the IPA of the words**, now I can speak the word accurately and monitor myself whether I am speaking in a correct way.' (Reflection 02)*
- *'**I did learnt how to pronounce the "-ed"** after different words as I was really bad at identifying the voiced and un-voiced sound while reading quickly**. As my story was written in past tense, it was a very good practice for that**. Also, **I tried to figure out the important words in the text** and pronounce the other words lightly as I always emphasize everything.' (Reflection 03)*
- *'As I know, this is an oral-improve courses, I have tried to pay effort on perfecting my oral delivery in the digital story. For example, **I have checked the international alphabet of many words** on Oxford Dictionary to find the accurate pronunciation**. I have also tried to apply what I learnt in the lesson into the digital story**, like be extra careful of the pronunciation of past tense and pay attention to the different pronunciations between noun and verb.' (Reflection 19)*
- *'Also, in recording my digit story, **I have used some concepts of improving oral delivery during the lesson. Chunking is one of the techniques I have used.** It is better to divide a whole sentence into several parts, having mini break within each phrases or clauses. I think that this concept is much easier to learn because what you need to do is to chuck your whole transcript into small parts. **I think the digital story project provide my good chances of putting what we have learned in the lecture into practice.**' (Reflection 20)*
- *'This assessment method is very effective in raising my awareness in my own speech including aspects such as pronunciation, sentence stresses, intonation and connected speech. This is also why I enjoy the process of recording narration so much! **Preceding the Digital Storytelling section are several lectures on pronunciation, sentence stresses, intonation and connected speech.** Since I have always wanted to speak more native-like English, **those lectures are very useful for me. Digital Storytelling has offered me chances to put what I have learnt from them into practice**.' (Reflection 32)*
- *'Although I have done some reading aloud during the writing process, before the recording I would 'still prepare by reading aloud the script a few more times, but this time I would read aloud paragraph by paragraph, and I would open the Microsoft Word while I did this and used different colours to highlight places to pay attention to**. For example, we learned about connected speech in class so I would use the red colour to highlight places where I needed to connect sounds**, like linking the words. Because in daily conversation you just won't pay attention to some sounds, but **when I prepared for the recording, for example, I would highlight the difference between the /t/ sound and the /d/ sound for 'ed' endings.** This would help me remind myself to say them correctly when I did the recording.*

- ***I would also look up the pronunciation of some vocabulary in the script*** *by checking the words online to make sure I know how to say them. Sometimes I take the pronunciation of some words for granted and assumed I know how to pronounce the word but when I checked the dictionary the IPA symbols suggested something else. [Q: So when you checked the words online would you look at the IPA or would you listen to the audio pronunciation?]* ***I would look at the IPA first because I know the symbols*** *but I would also listen to the audio to confirm. For example, the word 'dizzy', I originally pronounced it as a long vowel but after I looked it up I found that it should be a short vowel so I paid attention to it when I did the recording.* ***I would also check to make sure I have put the stress on the correct syllable of the word*** *because sometimes you would think the stress is on one syllable when in fact it should be on the next. For example, like the word Tibet, I think I have heard different people say it differently, and I needed to check to make sure I stress the right sound.' (Interview 02)*

Excerpt 30: *Representative quotes on specific examples of students' active use of course knowledge*

DST has been repeatedly acknowledged for its great potential to support literacy development of language learners yet research to date has focused primarily on verifying the effects of using DST to support the development of students' writing skills, such as reports from Abdel-Hack and Helwa (2014), Ranker (2008), and Sylvester and Greenidge (2009), while scarcely touched on its benefits on speech development. The findings of the present study therefore help offer evidence to encourage the use of DST as a learning task also in the speaking classroom in support of students' acquisition of speech and pronunciation skills.

5.3.2 Audio-recording component of DST elicits recursive cycles of self-evaluation, practice and improvement

Analysis of the data also suggests that the core component of a digital storytelling project whereby students need to complete an audio-recorded narration for the series of selected images provided strong support for strategies development as it essentially elicited recursive cycles of self-evaluation, practice and improvement. Qualitative data reveals that initial attempts made by students to complete the voice recording task very often led to self-realization or discovery of inadequacy in their own performance. Upon such revelations, students found listening to their own voice recordings to be an effective way of self-evaluation and self-monitoring, following which they would move on to intensive drilling and practices to self-correct the pronunciation problems or errors uncovered. Such cycles of self-review and improvement were often willingly repeated until students managed to close the gap between perception of their own performance and the targeted satisfactory standard. Throughout this reiterative process, students were thereby engaged in high use of metacognitive independent study strategies (for self-evaluation and monitoring) as well as sensory-mechanical drilling strategies (for overcoming inadequacy in pronunciation performance).

- *'The most difficult part was the recording.* ***I did not realize what my tone and pace were like when speaking English until I heard myself on audio recording. It sounded so strange at first that I had to practice many times in order to make sure each word was properly pronounced and linked to the next.*** *As a result, I recorded my voice multiple times until I thought the final product was perfect. Unlike an impromptu speech, a Digital Storytelling project leaves some room for me to improve my tone and volume.' (Reflection 01)*
- *'DS to me is a fresh way to learn.* ***Through recording my voice and listening to it again and again, I found that my voice and my pronunciation were so different from what I thought. I have recoded the script for at least three times per slide, each time trying to adjust my pronunciation, level of my voice as well as intonation.*** *DS is surely a good way for us to have more reflection on our own speaking through listening to ourselves and adjusting our speech.' (Reflection 05)*
- *'Some people love to watch English Movies and Hollywood films, I am one of them. With my listening skills, I can discriminate between English accent, American accent and Hong Kong accent.* ***When I listened to my recording, I could not stand my Hong Kong accent and tried to make it sounded more Western. I never knew that I was not very influent in English speaking until I spoke to the mic. Then I knew it was quite a disaster.*** *To sound more Western, I used the stress and connected speech that I had learnt in class. I also intentionally pronounce the short vowels sound shorter and long vowel sound longer. Generally, pronounce every vowel clearly. After my effort, then it did sound better and more Western.' (Reflection 10)*
- *'Being an Asian, when we speak English, the pronunciation is always a big problem. Sometimes, if we talked to others in English, we might not know our English speaking problem.* ***However, when I was doing the Digital Story, I absolutely felt that some of my pronunciation in English is not natural and correct, like the words "school", "light up" etc. Therefore, in order to solve this problem, when I was recording the scripts, I tried to repeat my pronunciation and listened to it carefully****.' (Reflection 27)*
- ***'I could listen to my recording and judge whether I missed any stresses or connected speech.*** *Mostly I missed out one to two connected speech or place wrong stresses on trivial words such as "of", "to" and "a"... I will try my best to put the stresses on the right words and connect words appropriately every time I record the narration.* ***It is in this process of re-recording that I became more and more aware of my sentence stress and connected speech.*** *I was also very excited when I eventually got all the stresses and connected speech right in a clear voice.' (Reflection 32)*
- *'Another difficulty with oral delivery is that* ***my intonation patterns for sentences were almost the same. Upon playback I found my own voice annoying, so I spent considerable time trying different patterns.'*** *(Reflection 33)*
- *Actually to me speed has always been a problem, even my mum said I talk too fast. So when I did the digital story,* ***I would listen to my own recording, and if I spoke too fast I would do it again and try to slow down****.' (Interview 02)*

Excerpt 31: *Representative quotes on task factor leading to self-evaluation*

In the qualitative data, many students shared their experience of self-discovery learning about imperfections in their English pronunciation during their initial attempts to

carry out the audio recording task for the DST project, reporting that they "did not realize what (their) tone and pace were like" until they listened to themselves and as they did they "found (their) voice so different from what (they) thought", felt that (their) pronunciation was "not natural and incorrect", "not very fluent", "annoying" or even "a disaster". Self-discoveries like these prompted them "to become more aware", "to practice many times", "to adjust (their) pronunciation" and "to make sure every word was properly pronounced" by repeating their recordings, "listening to it carefully" to "judge" their own delivery.

It can be seen that this form of self-evaluation appeared to cover a wide range of pronunciation features. Students judged their own oral delivery against a list of criteria, from clear enunciation of individual words in proper articulation, to correct placement of stresses, linking adjacent words in natural connected speech, and appropriate intonation patterns, even down to the speaking pace and choice of accent. A number of students mentioned the difference the DST project made in comparison to other speaking assessment tasks in terms of the room the task allowed for self-monitoring and improvement:

- *'Producing a digital story board is different from other kinds of English peaking assignments* ***because it provides a way for me to listen to myself, to judge myself and eventually to improve my work.*** *Not just while recording it, but also afterwards. It keeps my voice and I can come back to it whenever I want in the future. Impromptu speeches or oral presentations may leave some written records but can never provide that feature. In this sense, DST is very valuable.' (Reflection 08)*
- *'****While I was recording for the assignment, I found it a very good way to self-review my pronunciation. As I listened to each sentence or paragraph after I read it aloud, I could immediately hear what my pronunciation was like and fix any problem right away****. For example, I pronounced "horizon" wrongly by using a strong rather than weak vowel in the last part. I also kept amending sounds such as "ed" and other word endings to increase my accuracy.' (Reflection 30)*

Excerpt 32: *Representative quotes comparing DST and other speaking tasks in inducing self-evaluation*

One student's reflection clearly documented her initial reluctance to engage in the DST project due to her doubt of its effectiveness in improving her competence in pronunciation and speech and the process through which she eventually came round to engage in multiple attempts of recording for self-improvement:

- *'**I did not understand why I have to record my voice. Can't I just read the poem / story aloud in front of the class? Why do I have to make those special effects for the video?** That has nothing to do with English learning. I have neither a good camera nor a microphone. How do I make the video?*
- ***When I was doing the recording, I realized the reasons why the poem and the story have to be digital but not done by reading aloud.** Before I did the recording for 'IF', I watched a few videos in YouTube to see how the people read the poem, like which words to be stressed, where to pause and which sentences should be faster or slower. I tried to do the same as I saw in YouTube. **I found out that I did not pronounce every word correctly. Honestly, I have recorded every sentence of the DP and DS in an average of 10 times, not including practicing the sentences on my own. Every time I played back my recording, I could find words that I have pronounced them wrong or not in a natural way and I corrected myself.** After reading each sentence for 10 times, I know what I can do well and what I need to improve. This makes a difference from reading aloud, which I will not listening to voice over and over again. Recording can efficiently improve my pronunciation.' (Reflection 29)*

***Excerpt 33:** Representative quotes showing student's change of attitude through self-evaluation in DST*

Students' active use of metacognitive independent study strategies and sensory-mechanical drilling strategies were not only attributed to the nature of the digital storytelling task itself, but also facilitated by the appropriate software chosen for the recording purpose, as can be seen from the following student's testimony:

- *'I think mainly I paid a lot of more attention to pronunciation than usual. For example, I was very careful with the pronunciation of the "ed" endings in past-tensed verbs. I also looked at word stress. For example, the word 'consolation' has its stress on 'la' the third syllable, but originally that was not how I pronounced it. I not only listened to Yahoo dictionary but also other online dictionaries because it may not always be accurate. I also double checked the stress pattern in Google and in Cambridge dictionary to be sure. I really wanted to say it accurately. I did this before I recorded myself. But if I was hesitant while recording, I would also stop to double check, because **the software we used to do the recording, Photostory, allows you to stop after recording say one paragraph and then to repeatedly listen to yourself. So if I found problems when I listened to myself, I would stop and go online to check my pronunciation. I would also check my speaking speed. If I sounded too fast or too slow, then I would record it again.** It took me a lot of time to do this.' (Interview 04)*
- *'**I used the software photostory3 to do the recording and I found it quite user friendly** as it allowed me to do the recording one picture at a time, and **I could listen to myself to decide if I needed to re-do the recording before it was good enough for me to move onto the next picture.** I think I spent altogether like four hours to do the recording. (Interview 02)*

***Excerpt 34:** Representative quotes on selected software as a task-related contextual factor*

Incidentally, the data also reveals that students' engagement in the "cycles" of self-evaluation and correction and thereby their adoption of corresponding strategies varied in form and intensity. For example, some students did the voice recording one part of the script at a time and engaged in immediate self-review and eradication of mistakes whereas others did daily review of the whole recording throughout the project period. They also tended to set

target standards or pronunciation goals in various ways that they each felt comfortable with and confident in achieving, as evident in the following excerpts:

- *'**When I had recorded a part of the script, I played back to listen my pronunciation. I recorded the speech again when I found any mistake of my pronunciation.** In addition, I asked my family to listen my recording and seeking their suggestion. I accepted their advice and recorded the imperfect part.' (Reflection 09)*
- *'To make sure those particular pronunciations are all right, **I watched the video day by day and I realized every time I watched the video I could figure out my mistakes even though I thought it was perfect before the day I checked the video.** Therefore, doing this for 3 to 4 days I could fix all the mistakes in my video that I could find. Do not try to rush and take one or two hours every day was more effective and efficient than spending 6 or 7 hours to finish by a day because if you got tire you would easily lose lots of details.' (Reflection 06)*
- *'Another thing I would do to perfect my story is **to listen to my voice again and again like I would record a sentence of a difficult phrase I would record it and listen to try to hear because the audience may hear so I would like to correct it so as to make it more perfect.** Another thing I would like to do is when I think when I prepare for a presentation or recording I would read it loud because I think loud voice can pronounce a word more clearly that is my strategy.*
- ***So when I was pronouncing words, I would accept my pronunciation once I think it is close enough, quite similar to the dictionary's pronunciation. And once I accept it I will stop I would just think that's okay it is acceptable then I would move on to work on the intonation part.** So I think I was more focusing on the fluency part. The pronunciation part yes I will take care of it but not the most important part. Yeah and pausing is a great knowledge I think. I heard a lot of talks like TED talks and some great speakers always have some pause. But from my point of view my pause is not as long as their pause. When I did my digital story my pause when I think was enough. But after I finish the recording and I hear it again I think it is not enough so I would extend the pauses in order to have the same feeling of the talks by the great speakers. The pause I think is to you have taught us before to leave some open space for the audience to think and to digest my words.' (Interview 01)*

***Excerpt 35:** Representative quotes showing various manifestations of self-evaluation strategies among students*

These observations suggest that while the DST task in general engaged students in active use of a number of Pronunciation Learning Strategies, the manner in which such strategies were adopted still varied from one individual to the next. Students deployed of PLS in different ways to suit their respective proficiency levels and learning needs.

5.3.3 DST directs strong focus on the pronunciation aspect of English speaking

While the course coverage had an impact on the amount of pronunciation knowledge students could apply in the DST project thereby facilitating their use of corresponding Pronunciation Learning Strategies (see discussion under Section 5.3.1), the nature of the DST task itself also indirectly induced a strong focus of students' efforts in the pronunciation

aspects of English speaking. In comparison with other types of speaking tasks commonly adopted in language classrooms such as giving presentations, delivering impromptu speeches or enacting conversations or role-play, students reported noticing the distinct difference in the DST task in that it allowed the separation of various language functions when producing the product. While other tasks often divert students' attention away from pronunciation and oral delivery as students need to mentally attend to perfecting the content, structure, choice of vocabulary, accuracy of syntax or even body language such as eye contact or gesture simultaneously as they engage in English speaking, DST allows students to handle these various components one step at a time, creating sufficient space for students to focus their energy entirely on perfecting their pronunciation, as revealed in the following excerpts of student reflections and interviews. This also might help explain the high use frequency of functional practice strategies among students.

- *'In impromptu speech, we won't divert much of our attention to pronunciation because the capacity of mental processing is mainly occupied by word meanings, syntax and ideas. On the other hand,* ***while we are recording our narration, we are allowed more time and more chances to refine the pronunciation of our speech****.' (Reflection 32)*
- *'I think I spent a lot of time on the project but I don't think it was a waste of time. Like I said I actually quite enjoyed doing it. I think through the project I learned how to use English to express my experience and it made me force myself to expand my vocabulary, like instead of repeating that I was worried, what other words might I find to say I was worried.* ***Actually for doing other speaking tasks we would be mostly just focused on the content and the ideas to present, but in a digital story while the content is also important, we would also spend a lot of time on each individual sound instead of focusing entirely on content. We would check to make sure we are pronouncing words correctly and check our speed whether we are going too fast or too slow****.' (Interview 02)*
- *'****For other speaking tasks, like giving a short talk that we did in class, I would also do some preparation on like pronunciation or oral delivery, but certainly not to this level and not as thorough as this****. Because when you do the digital story, you have everything ready to help you take it step by step, like take it slow and do it right.* *I could try and re-try my pronunciation until I am satisfied with the outcome. For example, like connected speech, I would make an effort to do it. Like the line 'walk in the street' and 'kind and lovely' I paid attention to the connected speech. There may not be a lot of instances, but I had learned it and I would pay attention when I did the recording…Overall speaking it was a positive experience.* ***I mean very rarely would you have an opportunity to practice pronunciation like this, like doing it sentence by sentence. Even my tongue has improved in speaking English****!' (Interview 04)*

Excerpt 36: *Representative quotes showing task factor directing student focus to pronunciation*

In part of the discussion in an interview (see excerpt below), a student even likened the completion of a digital storytelling task to doing a television or radio broadcast in terms of the task nature where "the sound and the voice" become the focus, and commented on the

DST genre itself to be similar to audiobooks where they both "focus a lot on the pronunciation" to make "the atmosphere and plot" sound "real" to the audience:

- [Q: Would you have done it this way if it weren't a digital story? Say if it was a presentation task?]

  'Not really ***because the focus is different. Like if I have to deliver a speech and then I think the meaning and the argument is the focus, and then the pronunciation is very minor.*** *As long as the argument is fantastic and the audience feels that you give a new idea they will think it is a good speech but not focusing on pronunciation.* ***I mean the format of digital story has its own special features****, like digital story you don't have to present it lively say you don't have to think of gestures or body language but it's just about the sound the sound track. And then* ***just like TV broadcast and radio, the focus is on the sound and the voice****.'*

  [Q: So in other words because the medium is different, you focus more on vocal delivery to impress the audience?]

  *'****I think the genre of storytelling is also important, just like audiobooks for fictions, they focus a lot on the pronunciation to make it real*** *so that people like can feel the atmosphere and the plot.'*

  [Q: So the nature of story is important?]

  'Yes so you have to put more emotions in your voice. I think so. For if this is not narrative if this is argumentative then you will make it sound very formal.'

  [Q: Do you think the software has any role to play in helping you improve the oral delivery?]

  'The good thing about the software is that it includes some photos maybe because of the task it's compulsory to add photos, but then it makes you more "into" the story.'

  [Q: How about the recording part? Do you think it has any effect on the way you do the voice recording?]

  'I think if I just do it for recording only but no photos and then you have to imagine the situation and then to make yourself immerse in that kind of story you create it's more difficult to put in some emotion. But with the photos it seems that you are just describing what's in the photos and it's a lot easier. And you will have those emotions naturally seeing those pictures. The preview function is useful as well because you can preview the story photo by photo sentence by sentence so you don't have to complete the whole thing before you can see the final product.

  I never thought that this method is more efficient than the traditional one because the traditional one how to say ***for the traditional one sometimes people just focus on the meaning and how you can interact with the other speaker more than the pronunciation. As long as your pronunciation can be understood by the foreigner it doesn't matter if it is perfect. But for the Digital Storytelling task you can really focus on the pronunciation, the sound and the intonation like that.*** *In the conversation as long as the other can understand you they will not give you feedback they will not challenge your pronunciation, you will just go on the conversation.* ***But in Digital Storytelling the product will challenge you and then when you hear it the bad quality will give you feedback!****' (Interview 03)*

Excerpt 37: *Quote from student comparing DST task to genres of broadcasting nature*

5.3.4 DST engages students in active listening to English speaking models for imitation and comparison

The self-evaluation cycles aforementioned (in Section 5.3.2) also seem to have alerted students to the important role played by auditory stimuli in the pronunciation learning process. Whereas listening to themselves on recording might help students identify problems in their own pronunciation, they somehow realized listening to good speaking models could also serve as an effective way to close that gap as improvement in pronunciation and articulation can be achieved through imitation. Some students therefore mentioned attempts to listen to authentic English materials such as television shows or TED talks as preparation for their DST task:

- *'Another thing I would do it is **to listen to some dramas or reality shows how in real life how they will pronounce the whole phrase.** For example like 'isn't it?' 'Isn't it' is a casual phrase you would talk to a friend. So I would imitate the tone and I have done it in my digital story as well. **I heard a lot of talks like TED talks and some great speakers always have some pause.** But from my point of view my pause is not as long as their pause. When I did my digital story my pause when I think was enough. But after I finish the recording and I hear it again I think it is not enough **so I would extend the pauses in order to have the same feeling of the talks by the great speakers.** The pause I think is to you have taught us before to leave some open space for the audience to think and to digest my words. I think it's important.' (Interview 01)*

***Excerpt 38:** Quote on using quality pronunciation models*

However, it might not be easy to transfer speech features from an unrelated English text to the digital stories they had planned based on listening. So some students cleverly turned to a more direct solution — to "create" good speaking models by inviting friends whom they consider good English speakers to verbally perform their narrative for them through audio recording so they could have an actual exemplary speech model to mimic. This factor might therefore have contributed to students' use of peer support-social strategies:

- *'As a hardworking person, I benefit from the digital story a lot. **I asked my UK friend to read my passage once. I then heard her recorded sound track on my mp3 player and practiced after her. Of course the outcome is not really good and I still got a lot of Cantonese accents and many of my pronunciations are still wrong due to my inherited broken English from high school.***
- ***However, I started to realize and know how to improve my English pronunciation. I need to listen to foreign news reports more and practice again and again.** After this project I promise myself to improve my English speech within two years. At least before I graduate I have to become a good English user. I won't allow poor English to constrict my future. (Reflection 19)*

- *'Therefore, **I found a friend which has good English pronunciation to teach me how to make the speech more attractive. I even invited him to record the storyboard to me to let me know how I should perform in the digital story.** For example, the word "no", in the past, I always mispronounce the "n" consonant. I pronounced "NO" as Chinese word "捞". **My friend corrected me and mentioned I need to pronounce it with nose.** Sometimes, we will mispronounce the words which are very simple. Thus, I think this assignment made me concern more about the pronunciation and connected speech.' (Reflection 24)*
- *'Moreover, **before recording I had to find a way to make sure the prefect oral delivery. I asked one of my Korean friend who lived in U.S for 7 years to read my script and I recorded his reading. After listening his speaking for few times I circled the words that I was pronouncing wrongly.** I focused on practicing those circled words and started to record. After finish recording my video, **I asked other exchange student from Canada to check for me** whether there are grammatical errors or wrong pronunciations. Actually there were quite a lot of grammatical errors and **he told me when I should pause between sentences.** In addition, online dictionary helped me a lot, since I could read the IPA form of words that I do not use often. I believe the best thing I did to perfect my oral delivery was to take few days for recording.' (Reflection 06)*
- ***'I asked my roommate to help me since he is an exchange student from United States** and hence a native speaker, to not only point out my grammatical mistakes but also to correct my pronunciation. Considering my mainland background, I know there are many common oral mistakes I make in my speech.' (Reflection 30)*

***Excerpt 39:** Representative quotes on mimicry after good speaking models acquired through social capital*

Of course, it is noticeable that, compared with functional practice strategies, metacognitive independent study strategies and sensory-mechanical drilling strategies, this type of peer support-social strategies were reported less frequently used — while students' engagement in all these strategies might have been enhanced or motivated by task-related factors to various degrees, the latter was perhaps more heavily affected by person- and context-related factors in comparison. As can be seen from students' self-reports, their personal social network and the presence (or absence) of a potentially good English speaking model (very often exchange students or friends who have studied overseas for an extended period) largely determined the probability of use of such strategies. In other words, while students might have discovered the effectiveness of having a target model for mimicry through attempting the recording part of the task, whether they could further realize its potential by inviting help from others would eventually depend on their accessibility to social capital.

5.3.5 DST stimulates motivation for intensive practice in pursuit for perfection in oral performance

Another recurrent theme that appears to stand out from the data is the strong motivation shown by many students in making multiple attempts in completing the verbal

narration through repeated rehearsal practices and re-recordings in order to deliver a quality final product. In the data students often mentioned their strong urge and eagerness to "perfect" their pronunciation in the digital story, as shown in the following excerpts:

- *'I spent several hours on recording my voice narration despite the fact that the final product lasted only five minutes. This is* ***because I wanted to try my best to make every part perfect****.' (Reflection 30)*
- *'Moreover, I could really* ***attempt to perfect my pronunciation*** *in recording my DS because I could* ***redo a line for many times until I got a perfect one****.' (Reflection 14)*
- *'Another thing I would do* ***to perfect my story is to listen to my voice again and again*** *like I would record a sentence of a difficult phrase I would record it and listen to try to hear* ***because the audience may hear so I would like to correct it so as to make it more perfect****. Sometimes if the script for a picture is too long, and I stumble in the last few words* ***I would start all over again****... and I think oh my recording is good but I fail at the last word sometimes... it's something like that. I would do it one script at a time. When I finish recording one script I will not listen to it right away. I would do the whole story first, and then listen to the story once to um because it's a technical problem because if my voice is not as loud in every script there will be some lowering of voice. I would like to be a coherent voice.* ***So once I heard some faults in my inconsistency I would do it again to perfect it. So I think the highest attempt I have done for one picture is like five times. Maybe it's a lot but I would like to do it more times I would like to just notice what I have missed or mispronounce it and what the connected speech I have used****.' (Interview 01)*

Excerpt 40: *Representative quotes on high student motivation for intensive pronunciation practice*

This strong motivation to "perfect" their oral delivery in the digital story in turn contributed to the very high use frequency for functional practice strategies in general and particular sensory-mechanical drilling strategies. Students' reflections documented how driven they were to practice "again and again" or "many many times" until they felt that the pronunciation was up to standard and that they were finally "satisfied". The following are representative excerpts from students' self-reports. A student described how she had "unintentionally" repeated her work ten times in order to achieve the "good broadcasting quality" she had in mind. Another student confessed that despite her relentless efforts to perfect her narration upon multiple recording attempts she still lamented the less-than-perfect outcome as she watched the final product in class.

- *'I edit my voice recording few times, since **I wasn't satisfied** for my volume. Sometimes was softer, sometimes was harder and I need to control my rhythm and speak more naturally. Hence, I edit it few times. One oral delivery problem I found was that the tone of my sentences was not steady as I usually broke them up by stammering. **So I practiced the words I did not familiar with and practiced the sentences once and once again before recording**. But still there were some mispronunciations and the tone was some times strange as I tried hard to control the volume.' (Reflection 25)*
- *'I was hoping that the production would be in a good broadcasting quality, so my passion drove me to **record again and again to make it perfect. I unintentionally record 10 times for each sentence even for a word until I was satisfied.** Finally it took me 2 full days and burning 2 midnight oil to finish it. This practice intensity for a sentence can never be done in face to face conversation. **You cannot repeat and repeat one single sentence until your pronunciation is perfect when you are talking to friends.** They will find you annoying. This recording exercise allows you to perfect your pronunciation first before your real daily life speaking. I find myself more fluent when I am speaking English as I do not have to think about the pronunciation stuff anymore, the correct pronunciation just comes naturally.' (Interview 03)*
- *'It depends on the difficulty level of each sentence. **I remember there were a few long sentences that were most difficult and it took me like twenty takes to get their right. I tried many many times and still could not do it well.** I remember it took me a long time to re-do it before I could say it accurately. Because for a long sentence you can't do it flatly. Instead there will be ups and downs in your pitch and you need to pause at the right place. **I remember it took a long time to get it right**.' (Interview 04)*
- *'Maybe I would ask a few more people to read the draft of my script for their advice and feedback. Same for the speaking part, I would probably invite a few more people to listen to me and give my advice on my oral delivery before I actually did the recording. I mean, even when I have finished the digital story and we showed it in class I still found some mistakes in my recording, for example, in some places I still found that I could articulate more clearly and there was still room for improvement. **It took many recordings to come up with my final version but I don't know why I still found that there were places that I could really have spoken better when I watched the video, to be honest there were mistakes that even now I still feel uneasy about and still remember**.' (Interview 02)*

***Excerpt 41:** Representative quotes describing students' engagement in repeated functional practice*

Compared with the previously discussed three factors which are very much task-related and context-driven, the above factor concerning learner motivation appears to be a person-related factor at first glance — i.e. the personal "passion" in pursuing excellence, as one respondent put it, seems to have been the reason prompting the majority of the students to go through the otherwise tedious pronunciation practices without complaint. However, a more in-depth look at the data reveals that there might have been other factors contributing to students' high motivation.

5.3.6 (Intrinsic) motivation drawn from significant life experiences and self-reflection placed at the centre of storytelling

One possible source of motivation for students to strive to "perfect" their pronunciation and oral delivery seems to have come from the meaning-making experience acquired through storytelling. The digital storytelling task requires students to each construct a narrative which they will then serenade with images and vocal narration. Very often students would choose to tell a personal story based on their past experience and from the data most students reported creating digital stories based on significant life events that had exerted a great impact on them in various ways such as the following:

- *'My digital story topic was "My Way to Confidence", which describes a process of self-development. I want to review my past experience so that I would know clearly how to plan for my future and encourage myself to head forward...I definitely gained more understanding about myself. I reviewed my past experience related to courage and confidence.* ***By this opportunity I recalled what I did when facing a crowd of people and how I gradually took initiative in my life.*** *Now I have a clearer idea of what my life should be than before and what a person like me could do to compete with others in the future.* ***I am grateful to this project which allowed me to look deep in my life and I enjoy it very much****.' (Reflection 01)*
- *'The topic of my digital story is "a story of a fat boy****". The reason why I chose this topic is that I have a difficult time when I was a fat boy in primary school. Obesity had adverse impacts on my health, self-esteem and social networking****. So, I tried so hard to lose weight by doing lots of exercise and having plenty of healthy food. Undoubtedly, change is hard especially when it involves something you do several times each day like eating and drinking. But as long as you insist on your target and try your best to do it, you may find everything can change and impossible is nothing.' (Reflection 02)*
- *'The topic of my digital story is "My Little Angel". The "little angel" refers to my newly kept kitten. Her name is Leia.* ***I choose to write on her because she is important to me. Her appearance means a lot to me.*** *I am a cat lover since I was small. Yet, I did not keep a cat because I thought I was not mentally well prepared enough. I was very afraid one day it would get sick or pass away and I did not know how to handle this emotion.* ***The recent decision of keeping her proves that I have grown up to be a more responsible person and owner****.' (Reflection 07)*
- *'When I first time gathered ideas about my digital story, the experience of traveling popped up in my mind. It reminded me of an unforgettable experience in Lake Nam. We went through the difficulties hand in hand, and we were hugged by the starry sky which made me believe my grandmother is being with us all the time.* ***All of these experiences have been a turning point in my life****.' (Reflection 22)*
- *'When I first learned that I had to tell a story the first thing that came to my mind was my visit to Tibet was I remembered the starry sky I saw there. It so happened that I liked listening to the song 'Vincent' at the time, while the song also reminded me of the trip. So I decided to combine the two together,* ***establishing my digital story from that scene of the starry night to an emotional narrative, especially to express my gratitude for my grandmother, whom I missed very much.*** *The starry night of Tibet reminds me of the warmth of my grandmother and it gave me a lot of strength. I was hoping I can bring that strength to my audience through the digital story, especially to those who have also lost loved ones in their lives.' (Interview 02)*

Excerpt 42: *Representative quotes illustrating student motivation driven by storytelling*

These representative examples show that students were inclined to presenting stories either about significant life changes or transformation they had experienced that led to personal growth and important revelations, or about close bonding or key relationships they had built with their loved ones. When these key life events were placed in the centre of the storytelling project, the task has acquired meaning beyond an ordinary language assignment — students commented on how "meaningful" the oral delivery had become as they got more invested in telling these stories about themselves well:

- *'I have been very keen on improving my English since I was in secondary school. I love to talk with my English teachers (and even my classmates), and have some discussion about English learning. One of my beloved English teachers once told me that recording one's own voice is a good method to improve, but I thought it is meaningless to talk some passages again and again so I did not do it.* ***This story telling exercise makes the oral practice more meaningful as I have to create a story that I can use my own writing interest to express my ideas. It is also more meaningful than in terms of marks and grades****.' (Reflection 10)*
- *'When I was producing story,* ***I had a meaningful time to rethink the days I spent in military service and what I actually learned from it. Now, if there is someone ask me what was the memorable thing in your life, I would proudly tell the story I used in my digital story****.' (Reflection 06)*
- *'When it is the time to decide our theme of the digital story, Miss Olive asked us an inspiring question. What is the thing that impressed you most in your life? The time with my grandmother in the past suddenly came up in my mind. Yes, the time with my grandmother in my hometown is* ***the thing that impressed me most in my life and the time I was happiest in my life.*** *I have got a simple, primitive hometown in a poor village, I could play with my friend and family members there day by day and I have my grandmother who take care of me and raise me up. Although it is not a rich home, it brought me a memorable and impressed childhood. Facing the living problem in Hong Kong, I have heard many people work day by day to buy their dream home, I want to tell them, sometimes our dream home may not be the one we work for, but it may be the one we neglected in the past through this video.* ***Owing to the theme about my past and the meaningful message, I feel so excited and happy when I conduct this project****.' (Reflection 18)*
- *'****I just discovered that Digital Story has a special magic to let us tell true stories, so I honestly recorded my personal story****, as a summary of my university study. I made my title "dream and reality", because I yearn for the dreams appeared in my life. While reality refers to those practical choices I am compelled to make.* ***Although I could not fulfill my dream in my university study, I remind myself with the digital story that I never forget it****.' (Reflection 26)*

Excerpt 43: *Representative quotes on DST inducing meaning (and hence motivation) to oral delivery*

This opportunity to achieve meaning-making through sharing personal revelations and love for close friends or family in turn generated strong motivation for students to expend

considerable efforts engaging in intensive pronunciation practices hoping to "perfect" the voice of the story, as aptly pointed out in the following student reflections:

- *'I felt that doing a Digital Story is a best and efficient way to enhance students' speaking skills and pronunciation.* ***For instance, students would choose their favorite and interesting topics which might relate to their family, lover or other aspects of themselves, and they would put their effort to show their best performance in doing the Digital story****.' (Reflection 27)*
- ***'I enjoy the experience of DS because I can make something that related to me, for example, my experience with family or lover****. And it is different from completing other kinds of English speaking assignments because DS is a kind of active learning.* ***And so most of the students will try their best to speak as good as possible****.' (Reflection 28)*
- *'Since I was a storyteller in my secondary school life, I told people thousands stories, but none of mine. So when I had to figure out what to tell, I just began with my beginning of storytelling. Though it sounded really silly,* ***the experience of standing on stage for the first time while I was crying was very important to me. It felt so good to share this stupid story with others and knowing others stories too.*** *Besides that,* ***I found that others did their stories very well. I think this might be because of the story they were telling were that stories of their own lives.*** *And this really helped everyone to tell it in a relatively natural way with passion.' (Reflection 03)*

Excerpt 44: *Representative quotes on affective impact of interpersonal connections achieved in DST*

In their responses students repeatedly expressed that they considered the digital storytelling project a reflective activity — through constructing personal stories for the given task they essentially took a trip down memory lane to review their own past, which many reported to be a positive and enjoyable learning experience in the nature of self-discovery, as can be seen in the testimonies cited below. It is therefore not difficult to see why the DST task might have provided a good level of intrinsic motivation for students.

- *Actually, I enjoy the experience of producing the digital story very much.* ***Because producing the digital story is like a self-reflection of my life. When I was producing the digital story, it came to my mind lots of memories in the past…*** *I really learn a lot from this course not only the speaking and listening skill but also philosophy of the life. (Reflection 02)*
- ***DS is also a chance for us to examine something meaningful to ourselves that we may rarely consider in daily life.*** *For instance, I tried to examine my university life through doing this DS. Funny that I realize how my university life is not that dull and meaningless to me. After having reflection on it I found that I have actually established my own set of values through meeting people from different walks of life in my university life. It is like, if I hadn't entered CUHK, there wouldn't be the present me.* ***So I would say, DS is not just a tool for us to tell others about ourselves, but also tell us who we really are.*** *(Reflection 05)*

- ***I did enjoy much on this digital story, it provided a chance for me to know more of myself again and know more on others' stories.*** *(Reflection 18)*
- ***I tried to state some over confident sentences at the end of my story because I want to force myself to remind my goals and commit to the goals.*** *I have to start my action now. All in all, I strongly support Digital Storytelling. It is interesting unlike other boring projects. Also* ***it helps us to think about our live and share it with our classmates.*** *(Reflection 19)*
- *I really enjoyed the experience of producing digital story. It is not just about accomplishing digital story, it is about the self-reflection of our past and explore the brightness in future.* ***Lots of beautiful memories came to my mind again through producing my digital story. All of these told me that I am blessed and how lucky to be here today. Moreover, I gained more understanding about myself. I know there will be obstacles in my life, I will gain confidence and go through these barriers bravely. I hope I can be a confident, brave and unique girl in the future.*** *(Reflection 22)*
- ***From that moment, I enjoyed doing the Digital Story as it helped me to gain more understanding of myself and make my goal clearer,*** *as well as encouraging youngsters to fight for their dream. (Reflection 27)*

Excerpt 45: *Representative quotes on intrinsic motivation gained through DST as a reflective activity*

Among various possible sources of motivation, while one main source seems to be the value drawn from a deep engagement with the "self" afforded by the DST project as evidenced by the above quotations from students' reflections, another appears to be a connection or bonding with others via the digital story.

5.3.7 (Extrinsic) motivation drawn from awareness of audience needs and interpersonal bonding with peers

With a viewing session as the final leg of the DST project, many students appeared to have considered their work a means to introduce themselves and express their own ideas to their classmates. The fact that their digital stories would eventually represent each student among their peers could have been another source of motivation for putting in considerable efforts to engage in various PLS to perfect their work:

- *'Actually, I enjoy the experience of producing the digital story very much. Because producing the digital story is like a self reflection of my life. When I was producing the digital story, it came to my mind lots of memories in the past. Also,* ***I can share my digital story to my friend*** *that everything can change only if you try your best and don't give up. Also,* ***by watching digital stories from the other classmates, we can know more about each other*** *and it is very inspiring for both of us.' (Reflection 02)*
- *'The story is a brief summary of my life, introducing my personal history, my hobbies, and my ambitions. This topic was chosen because I regard DS as a good tool to let others know more about me, and before I have rarely chatted my classmates (who will now be my audience) so* ***I guess it should be a good opportunity to tell them more about myself****.' (Reflection 05)*

- *'Instead of treating this project as an assignment, I treated it as* ***an opportunity to introduce myself to my classmates.'*** *(Reflection 16)*
- *'Meanwhile,* ***it was delightful to hear different story from each classmates and got more acquaint with their personalities,*** *I could also learn from their experience and rethink my life and make changes.' (Reflection 13)*
- *'I did enjoy much on this digital story,* ***it provided a chance for me to know more of myself again and know more on others' stories****.' (Reflection 18)*
- *'I choose this topic because I believe that art has a healing power and indeed I found this power through my teaching. This experience made me more confident to continue my interest* ***so I hope to share this feeling to my classmates.'*** *(Reflection 23)*
- *I would rather say I really enjoyed completing the whole project.* ***I did not see the challenges as difficulties. Instead I viewed the task as a platform for me to tell my story.*** *I also enjoyed watching other people's digital stories. It was quite fun and helped me understand my classmates. For example, I did not expect Kelvin to enjoy music so much and have founded his own company to do gigs as he's usually so quiet in class. I was really impressed.* ***It feels like everyone has his own story to tell. So the task was really a platform for us to share it.'*** *(Interview 02)*

Excerpt 46: *Representative quotes on motivation induced by DST as platform to connect with peers*

In particular, the "performative" nature of the digital story and the arrangement of a viewing session helped establish a strong sense of a target audience. The data suggests that students were very much aware of the needs of an audience when recording their narration, which might have been yet another factor contributing to their motivation in employing various functional practice strategies in performing various pronunciation features and sensory, mechanical drilling strategies in perfecting their oral delivery through intensive training to achieve satisfaction. The following are a few representative quotes whereby students described the level of attention they paid to take care of the audience's need through employing appropriate pace, pitch, pauses, intonation and increasing fluency and accuracy in articulation:

- ***'Audience is one of the energy sources as well. If no one will watch and listen to your production, you will have less intention to practice*** *and do it well.' (Reflection 10)*
- *'I tended to tell the story in a peaceful way.* ***In order to leave the space for audiences to digest the questions, I spoke a little bit slower than I usually do.*** *In this way, I had to say out all the words correctly and clearly. It was quite a challenge for me. I underlined the words that I had to pay more attention during my story recording. I kept practicing and repeating until the final version was completed.' (Reflection 11)*
- ***'This is not just my story, I hope other classmates would realize that*** *there are angels around them too. We are all blessed and should express our gratitude to every moment…This was not difficult for me to come up with an idea of producing my digital story, what I found more difficult was narrative part.* ***How could I make other viewers feel the same while reading aloud my story?*** *(Reflection 22)*

- *'While this is an assignment **which there is audience, I have to make it as interesting as possible to not making my course mates sleepy.'** (Reflection 26)*
- *'Once I choose my topic of my digital story I start thinking of my script and my script is I don't know how to say just writing a script thinking of ideas like how to start from the beginning **how to get the audience attention and how to have a fluent pronunciation**, something like that, **to hope that the audience will not be bored by my script.***
- *The strategy I use to is read it out aloud and also to read it at a higher pitch because my voice is a bit low so I have a higher pitch in order to draw some attention from the audience that's the way I do.*
- *No not really I am not a perfectionist. At first I would like to have a higher grade because you need to have a clear, fluent performance to attract the professor attention to give you a good grade. **But I also consider the audience's feelings of my digital story because my voice is not as beautiful as a singer's so I would like to be considerate to the audience, really, to try to have some change to my voice in the pitch and difference in intonation in order to make my story to become a story,** not an essay.' (Interview 01)*

***Excerpt 47:** Representative quotes on extrinsic motivation driven by audience presence*

A perhaps less significant but rather interesting observation was that, while students seemed to have a heightened sense of a target audience, which usually manifests into a source of anxiety in other forms of speaking tasks, the time and space for practice as created by the format of DST appears to, in contrast, have the effect of reducing anxiety and allowing students to practice without being "too nervous":

- *'Moreover, I think digital story is a special learning activity because **I can well present our performance on English learning without nervous obstacle**. When we have a short talk or present a speech in class, we are too nervous that affecting our performance on English ability. When we are doing this digital story, we can do it alone at home without pressure from our classmates; it can show our English ability in a more direct, simple way.' (Reflection 18)*
- *'I like the DS most. I felt making the DS was just like sharing something interesting in Facebook. It was something personal, interesting and showing off what I've learnt in this course, so I tried to do my best. The listening exercise was useful in practicing listening but it might have to be a prolong one to give improvement but I might not have such time. **I was too nervous in giving a speech and I might not have enough practice it that I could not show off what I had learnt. I had much time in preparing DS and make me feel satisfied with the outcome.**' (Reflection 20)*
- *Also, recording my own voice let me know my strength and weakness. While I was quite embarrassed listening to my own voice. Therefore, **this is a happy experience, at least less stressed** and more freedom than a final exam! (Reflection 26)*

***Excerpt 48:** Representative quotes on anxiety reduction resulting from DST task format*

5.3.8 Digital stories displayed value as a tangible product and generated a sense of authorship/ownership

One related motivational factor seems to be the tangible format of a digital story. For example, many students dedicated their digital stories upon completion as a "gift" to themselves or their loved ones:

- *'After this semester, I am going to be graduated and **this video copy would be my graduation gift to leave me good memory to recall this service learning experience** in my university life in future.' (Reflection 13)*
- *'The topic of my digital story is about family. In my mind-set, family always come first. Therefore, I really **want to show my family how much they meant to me through this assignment.** Moreover, I think creating a video about them is the best way to let my family members to remember those happy memories.' (Reflection 24)*
- *'At first, I did not want to perform the "real me" in front of class as I seldom tell my story to others. Therefore, the decision of choosing the theme bothered me a lot. However, **I found that I should not think the digital story as an assignment; I can recognize it as a video that I want to show my family or friends.** Therefore, I chose the family trip in last summer as the topic of my digital story. I became so comfortable when I was preparing the digital story. Moreover, **I felt excited because I know my family will love this video as it is our collective memory**.' (Reflection 24)*
- *'For my personal reason, **I also want to use this video to thanks my teacher - Ms Tsui. She not only is my teacher, but also a one of my best friends.** On the other hand, I also want to reflect my past life and remind me that success wasn't easy at all time.' (Reflection 25)*
- *'**Actually showing my final products to my friends is already a reward to me**. Because at that time my friends were having the exam and were under a lot of pressure, **so I sent them this digital story as a little gift.** I did not expect to get a lot of reaction or response from them, but I did want to share it with them. **Like when you finished a product you really wanted to share with others**, not to mention this story was about them. They told me that the digital story recalled a lot of our lovely memories.' (Interview 02)*

***Excerpt 49:** Representative quotes on viewing DST as tangible product*

In other words, students appeared to view the DST project differently than other language tasks involving speaking performances on account of its tangible form and the strong sense of authorship and ownership therein. Instead of a one-off performance in class such as giving a presentation, many students considered the completed digital story to be a "token" of memory, which they would likely revisit or review in the future, as shown in the following excerpts from students' reflections:

- *'In general, I enjoyed this project quite a lot (I think it is the most interesting activity in the whole course). **I am going to keep a copy of my digital story as a memory and when I grow older like one day if I become a father, it must be interesting to watch the DS again** and refresh my memory again about myself during teenage period. I highly recommend you to keep this project in the course next year.' (Reflection 05)*

- *'I want to thank you here for giving me the chance to write a meaningful story about myself and make it into a video. I would never have thought of doing it if it wasn't part of the course. And* ***I am so glad I did it. Now I have something to keep that represents part of my college life.*** *So, did I enjoy the experience? Of course yes. I was able to sort out my feelings about something I really love and have had good memories and experiences about. By expressing my feelings and thoughts in a story to people who might not share the same knowledge with me about electronic dance music, I actually understood my own mind better.' (Reflection 08)*
- *'Producing a digital story board is different from other kinds of English peaking assignments because it provides a way for me to listen to myself, to judge myself and eventually to improve my work. Not just while recording it, but also afterwards.* ***It keeps my voice and I can come back to it whenever I want in the future.*** *Impromptu speeches or oral presentations may leave some written records but can never provide that feature. In this sense, DSB is very valuable.' (Reflection 08)*
- *'The theme of my DS is that life is a tremendous journey. Although it is sometimes harsh, one can enjoy it by overcoming the hard parts. I hope my hard but happy experience in the ride to Yuen Long could share this theme.* ***I also hope that it can remind me when I meet hard parts in my life in the future.*** *' (Reflection 21)*
- *'I was blessed and enjoyable to do the Digital assignment and* ***I believed that this story will remind me my true self and the value of my life in the future.*** *' (Reflection 27)*
- *'I enjoyed doing the video a lot and* ***hopefully I will enjoy watching it again ten years or twenty years in the future.*** *' (Reflection 30)*
- *'Because you went through the whole process as a creator so* ***by the end you have a much higher sense of ownership and achievement when you finish the product. And this digital story is not just a requirement, an assignment task, but also something about your own self, so you would be more engaged.*** *I really enjoyed doing it.' (Interview 02)*
- *'If you asked me if I enjoyed it, I would say before doing the task I had no idea what Digital Storytelling was, but as I tried to complete it I found that you really just need to put in the effort and it would be okay. I actually found it quite interesting.* ***I also thought it was important that the story could be kept as a token or memory****. [Q: Did it annoy you that the project seemed to take so long to finish? Like were you annoyed when you had to do it twenty times?] Not really because I was actually quite engaged in the project.* ***I felt satisfied and like relieved when I got it completed, like a sense of completion.*** *I was happy when I finished it.' (Interview 04)*

Excerpt 50: *Representative quotes on authorship and ownership of DST as a reviewable genre*

Students commented that the digital stories are tangible assets that keep their "voice" and their "memory" alive for years to come. It is likely that both the awareness of such comparative longevity or life expectancy of the speaking performance as preserved by the stories in digital video formats and the sense of ownership and achievement upon creating this product from scratch combined gave students yet another strong dose of motivation to perfect every aspect, speech production and pronunciation included, of the digital story.

5.3.7 An interplay of the above various factors

The above data analysis reveals that students' employment of Pronunciation Learning Strategies was affected by various task-related, context-related and person-related factors. The following excerpt from one of the interviews might help to present a somewhat holistic picture of how an interplay of these various factors affected the learner's acquisition of PLS and engagement in pronunciation learning through the DST project:

- [Q: In terms of difficulties, what were the major challenges that you have run into?]

  The challenge is the time is very little and then it's better to spread it instead of doing it in ten hours.

  [Q: So it's a time management issue?]

  Haha yes but this is my fault and my bad. But for the pronunciation part I think it's difficult to realize which sounds that you mispronounced and it's difficult to face the real you.

  [Q: Because you need to listen to your own self?]

  Yes and sometimes you have a false expectation of yourself.

  [Q: Was it different when you heard yourself? from what you expected?]

  No I didn't expect I spoke so bad in the first round. Maybe we have to warm up to change from the Chinese channel to the English Channel, maybe the pronunciation organs need to warm up first.

  [Q: So when you heard yourself you thought your sounded bad?]

  Yes like oh I sounded so Hong Kong!

  [Q: So how did you feel or what did you do?]

  I feel so bad because it's very difficult to accept the truth.

  [Q: Really? So emotionally there was difficulty too?]

  Yes like my pride is wounded. But luckily it's only myself who know it. Luckily it's not a public speech.

  Q: So if it were not a digital story, instead it was preparing for a public speech, do you think you would go through the same process?]

  I think no because you don't directly you wouldn't hear back what you said.

  [Q: So the recording helps?]

  Yes I would say it helps because I have been dealing with pronunciation for quite a time…quite a long time even before I take the course I listen to a lot of news and online resources and then I thought I shouldn't be that bad and then I found the outcome shows that what you think of yourself is different.

  [Q: Did it affect your confidence?]

  I think it affects your confidence at first but then as long as you perfect it it actually increase your confidence. Haha… although at the beginning the truth is very hard to accept.

[Q: How did you encourage yourself?]

The encouragement is that I can retake the recording a lot of times, just like the singer recording the CD, like instead of singing live. The bad outcome is the motivation that drives me to perfect it until it is comfortable I am comfortable with the quality to present it to the class.

[Q: So the audience is a factor? the fact that it will be presented to the classmates?]

Yes if we do not…if we did not have to show it to the whole class you just hand this product to the teacher and only she will be listening.

[Q: Did you show it to anyone else?]

I did show it to my roommate and some close friends.

[Q: Why?]

Because people ask me about the snail and whenever they ask I would say I did a story about the snail. So they will ask me to show them.

[Q: That's interesting. So because the story is related to your real life, when people ask about your life, the story comes into play. Did they give you comments?]

Yes they feel touched by the story because my roommate has a good heart. And then after that I met my secondary school friend, a very good friend who is also a student of CUHK, and then we hadn't met for a long time and she came to my dormitory to visit me. In order to introduce my recent life I showed her the story because she's an English major.

[Q: Overall speaking, how did you find the whole Digital Storytelling experience?]

I think it is an unexpected experience, unexpected that I didn't think pronunciation can be improved in this kind of method because I think for the traditional methods like meeting with friends and having conversations are the right methods. I don't… I never thought that there is a way I can do it by myself and can still improve even without someone sitting there to talk with me and then I can still improve it efficiently. I never thought that.

[Q: So you do feel that at the end you have improved?]

Yes. I feel that I have improved because how to say because I never bothered how I speak before doing that. I mean knowing the insufficiency of yourself is a big thing it's an important step in pronunciation. It's a wake-up call. I mean when the bell is rang your journey of pronunciation is completely different. It's more inspirational than like actually did something. I mean the way that it inspires me on how to learn pronunciation is more important than the actual words that I have learned and corrected the pronunciation in the digital story. (Interview 4)

Excerpt 51: Excerpt of interview illustrating an interplay of various factors driving PLS use in DST activity

5.4 Summary of Findings in Phase II

Phase II of the study investigated the potential benefits of introducing a digital storytelling task in enhancing the use of Pronunciation Learning Strategies among a group of students (*n = 33)* in a 12-week long English speaking course in a Hong Kong university. Upon completing the digital story, by the end of the two-month project period, all participants

completed a questionnaire and a guided written reflection while four were invited to attend an interview. Overall speaking, the data analysis affirms previous research findings that digital storytelling is a motivating learning activity for students, especially those with lower proficiency. And while most research studies in the past have focused on ascertaining the effectiveness of DST in motivating and supporting students' development of writing skills and generic skills, the analysis of the present study showed its positive potential in motivating students in pronunciation and speech development, in particular through active use of various Pronunciation Learning Strategies.

5.4.1 Summary of results to Research Question 3

The study attempts to answer Research Question 3 "What Pronunciation Learning Strategies do students use in a digital storytelling task in an English language classroom in a Hong Kong university?" by observing the frequencies and types of PLS used by students in their self-report data collected through a questionnaire, guided written reflections and interviews. Results indicated that students used all seven types of PLS surveyed though at different levels of intensity. Among the PLS, functional practice strategies and metacognitive-independent study strategies were most frequently used by students in the process of completing the DST task, followed by cognitive, formal rule-processing strategies and selected sensory-mechanical drilling strategies. On the other hand, peer support-social strategies scored relatively low in the questionnaire in comparison, but were mentioned by numerous students explicitly in their written reflections. This might be because students generally invited one-off assistance from friends so the non-recursive nature of such strategy use might have led to a seemingly lower rating in quantitative form despite the evident popularity of the strategy as reported in the qualitative data. Affective strategies and compensatory-heuristic strategies were the least used by students throughout the DST project.

5.4.2 Summary of results to Research Question 4

To answer Research Question 4 "In what ways does digital storytelling engage students in the use of Pronunciation Learning Strategies and affect their strategy choice?", qualitative data collected through students' written reflections and follow-up interviews were analysed to identify key themes regarding various person-, task- and context-related factors possibly affecting students' choice of and engagement with PLS throughout the DST project. Results revealed that as a learning task DST was highly commensurate with the context of a speech-pronunciation course. Various components of the DST task were found to be supportive of PLS use in that it elicited recursive cycles of self-evaluation, practice and improvement; directed

strong focus onto pronunciation aspects of English speaking; and engaged learners in active listening to exemplary speech models for imitation. Various aspects of the DST task were also found to provide sources of motivation for learners to engage more actively in PLS use. These included meaning-making at the centre of the storytelling activity; performative nature of DST affording an awareness of audience presence; and a strong sense of authorship and ownership deduced from digital stories as tangible products.

CHAPTER 6: CONCLUSION

This chapter concludes this dissertation by presenting a summary of the study's key findings, its contributions and limitations, finally followed by suggestions for future research.

6.1 Summary

This study attempts to investigate the use of Pronunciation Learning Strategies (PLS) among Hong Kong university students of English as a second/foreign language — at a theoretical level, it aims to gain a better understanding of the construct of strategic learning in English pronunciation and ascertain any correlation between PLS use and actual pronunciation performance (Phase I); at a pedagogical level, it aims to explore the potential of adopting digital storytelling (DST) as a learning activity in engaging students in active use of PLS in a university English language classroom (Phase II).

Phase I of the study investigated the types and frequency of PLS used by full-time undergraduate students enrolling in a local university in Hong Kong and any possible relationship between two primary variables, namely their strategy use and pronunciation ability. 451 participants completed a pronunciation learning strategies questionnaire, among whom 190 participants further completed a pronunciation performance test encompassing a read-aloud task and an extemporaneous speaking task conducted in a language laboratory. The survey data was subject to a factor analysis, which resulted in an 8-factor structure, with compensatory-heuristic strategies reported to be most frequently used followed by metacognitive-independent study strategies and sensory-mechanical drilling strategies. An inferential analysis suggests that there was a positive correlation between participants' use of PLS and their pronunciation performance ($r = 0.562$, $p < 0.001$).

Possible correlation between the two primary variables and a number of other secondary variables was explored through *t*-tests and Spearman's rank order correlation coefficient: it was found that female students tended to use PLS more frequently and also deliver better pronunciation performance than their male counterparts; students who had received previous training on phonetics or pronunciation also showed higher frequency of PLS use and better pronunciation performance than those without; whereas students who studied in EMI schools performed better in the pronunciation test than those from CMI schools without showing significant difference in their PLS use frequencies. Also, the amount of time spent on out-of-class practices and length of residence in English-speaking countries both showed positive correlations to pronunciation performance. Finally, a multiple linear

regression statistical analysis further suggests that students' use of functional practice strategies and communicative-interactive strategies as well as the medium of instruction during their secondary education remained significant predictors of pronunciation performance when the relative effect of all the above variables was modelled.

Phase II of the study explored the effectiveness of introducing a digital storytelling (DST) as a language task in two tertiary EFL classrooms to engage students in PLS use. 33 undergraduate students enrolling in a 12-week English language course were to complete a digital story as coursework. Data were collected through a post-course questionnaire, written reflection and follow-up semi-structured interviews to investigate students' use of PLS throughout the project period and factors affecting their strategy choice and use patterns. Results suggest that DST has successfully engaged students in the active use of a range of PLS. In particular, the format and specific components of DST were specifically conducive to the development of functional practice strategies, cognitive, formal rule-processing strategies, metacognitive independent study strategies and sensory mechanical-drilling strategies among students.

6.2 Contributions of the study

6.2.1 Phase I — theoretical and methodological contribution

Research on Pronunciation Learning Strategies to date has largely focused on expanding existing strategy taxonomies by uncovering new strategies adopted while efforts devoted to examining the underlying construct and validating categorization systems have been limited and often lacked rigor. This study is a pioneering attempt to examine the construct of PLS by subjecting a sufficiently large data set through factorial analysis. It is also one of the first studies to verify the correlation between learners' strategy use and their actual pronunciation performance through examining empirical evidence.

The study contributes to the understanding of strategic learning in pronunciation by uncovering an eight-factor structure. In the past two decades, PLS researchers have axiomatically categorized Pronunciation Learning Strategies based on the six general LLS categories established by Oxford (1990) "as a matter of course". Results of the current study suggest that such generalization viewing Pronunciation Learning Strategies as highly similar to if not the same as other Language Learning Strategies such as reading or writing skills may have been too hasty. Two categories of strategies unique to pronunciation learning, namely functional practice strategies and communicative-interactive strategies, are uncovered. It is

also found that while learners do employ strategies to strengthen memory in pronunciation learning, they are often manifested in the form of sensory-mechanical drilling strategies such as building muscle memory, which are again quite distinct from memory strategies such as mnemonics as used by learners to improve other aspects of language learning.

Based on the results from a factor analysis of data collected from 451 participants, the following taxonomy of Pronunciation Learning Strategies is drawn. It is hoped that with a more theoretically and methodologically sound basis, this 39-item taxonomy could be useful to future researchers interested in further exploring PLS use among different learner populations.

A Taxonomy of Pronunciation Learning Strategies	
Type 1: Functional practice strategies (FP) These are strategies used by pronunciation learners to focus on various pronunciation features when engaging in authentic, naturalistic language use, i.e. the learner actively practicing pronunciation when listening to or speaking the target language.	
1	I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).
2	When I speak English I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.
3	When I speak English I pay attention to place the word stress on the right syllables within words.
4	When I speak English I pay attention to divide thought groups and pause appropriately.
5	When I speak English I pay attention to decide where to make an emphasis in sentences to better express the meaning.
6	When I speak English I try to maintain connected speech by linking words together.
7	When I speak English I try to maintain an English rhythm and intonation to sound more natural.
8	When I listen to someone speaking English, I pay attention to and notice errors.
Type 2: Cognitive, formal rule processing strategies (CFRP) These are characterized by highly cognitive, information-processing strategies, which are internal to the pronunciation learner (often resulting in few observable behaviours) such as analyzing and reasoning, using resources to decompose target language input, assimilating target language data through reading, making mental summaries, decomposing target language input, and learning about and using the phonetic system and its rules.	
9	I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.
10	I learn about English pronunciation rules and take note of such information.
11	I do phonetic exercises, such as transcription exercises.
12	I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.
13	I study books or reference materials about English pronunciation rules.
14	I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation or presentation task).
15	I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.
Type 3: Affective strategies (AS) This group includes affective strategies which are emotion and motivation related strategies such as anxiety awareness and reduction, self-encouragement and self-reward.	
16	I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.
17	I keep a sense of humour about my mispronunciations.
18	I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).
19	I encourage myself to carry on when I encounter pronunciation difficulties.
20	I reward myself for success or effort put into pronunciation improvement.

Type 4: Sensory-mechanical drilling strategies (SMD) These are sensory strategies whereby the learner gets familiarized with the target pronunciation through mechanical drilling or repetition for muscle memory. These include drilling through either receptive senses (e.g. listening repeatedly to a pronunciation) or mechanical practice in bettering one's control over speech production organs to articulate accurate pronunciations.	
21	I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.
22	I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.
23	I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.
24	I practice saying words slowly at first and then faster.
25	I practice pronouncing words first in isolation and then in context.
26	I repeat after a model such as a native speaker, teacher, sound recordings, television or movie to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).
Type 5: Peer support-social strategies (PSS) This group also includes social strategies which involve cooperation with other language users or learners through seeking and providing help or sharing information.	
27	I ask someone to evaluate or correct my pronunciation.
28	I ask someone to pronounce something for me.
29	I work with other learners to practice, review or share information about English pronunciation.
Type 6: Communicative-interactive strategies (CI) These are strategies which involve improving pronunciation through directly conversing and interacting with other language users or learners with the target language in authentic communication.	
30	I practice talking with others in English to improve my pronunciation.
31	When I am conversing with someone speaking in English, I try to sound like an English speaker.
32	I actively seek opportunities to talk with others in English and practice my pronunciation.
Type 7: Metacognitive-independent study strategies (MIS) This group includes strategies that pronunciation learners can use independently of a partner or a class, to manage and support their own learning through self-monitoring and preparation for pronunciation or speaking tasks.	
33	I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.
34	I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.
35	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).
36	When I find I make a mistake in pronunciation, I try to correct myself immediately.
Type 8: Compensatory-heuristic strategies (CH) These are strategies to compensate for limited knowledge such as making guesses and using temporary solutions or alternatives when failing to produce accurate pronunciations.	
37	I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).
38	When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).
39	When I can't pronounce certain words correctly, I paraphrase (use other words with similar meanings).

Table 38: *A taxonomy of Pronunciation Learning Strategies based on an 8-factor structure*

Last but not least, this study is also among the first to investigate strategic pronunciation learning among general university students (as opposed to English majors) in an Asian context. Apart from examining the use frequency of PLS, the current study also adds to existing literature by looking at the relationship among PLS use, pronunciation performance and other learner factors.

6.2.2 Phase II — pedagogical contribution

Most PLS research has focused on surveying students' habit in using Pronunciation Learning Strategies outside class. While few studies have examined the impact of direct, explicit instruction of PLS in the L2 classroom, hardly any research has looked at students' engagement in PLS use in specific language learning tasks. The present study bridges this knowledge gap by investigating the effectiveness of digital storytelling in engaging students in active use of Pronunciation Learning Strategies. With the increasing use of digital technologies in the language classroom, digital storytelling has attracted attention from both researchers and frontline teachers yet most related literature has focused on its benefits in supporting writing skills development. This study is one of the first to examine its potential in supporting students' development of speaking, particularly their pronunciation skills.

By analysing data collected from multiple sources, the current study provides evidence that with the relevant contextual support (i.e. with DST being adopted in a speech-pronunciation classroom and students being provided with training on English pronunciation knowledge), the introduction of digital storytelling as a speaking task could be very conducive and motivating to students' engagement in Pronunciation Learning Strategies.

Based on the analysis of students' self-reported strategy use, the following flow chart summarizes the different types of strategies students could adopt at various stages along a digital storytelling project. It is hoped that this flow chart can inform practitioners and frontline teachers of English pronunciation or speech and encourage them to bring DST into their classroom.

Digital Storytelling project (Timeline)	Type of PLS	Pronunciation Learning Strategies used by learners
Preparation stage: Writing and marking up the script	CFRP	• Mark phonetic symbols on difficult/unfamiliar words
	CFRP	• Check the dictionary for the phonetic transcription of words with unfamiliar pronunciation
	CFRP	• Analyze the script using pronunciation rules learned in class
	SMD	• Repeatedly listen to a new or difficult word to memorize its pronunciation
	MIS	• Prepare for the task by highlighting difficult-to-pronounce words on the script
↓		
Rehearsal stage: Reading aloud practices	MIS	• Rehearse before carrying out the Digital Storytelling task
	CFRP	• Focus attention on particular sounds or features that are my weak areas
	CFRP	• Pay attention to similarities and differences between my native language and English pronunciation
	SMD	• Repeatedly pronounce a new or difficult word to memorize its pronunciation
	SMD	• Practice pronouncing words first in isolation and then in context
	SMD	• Repeat after a model such as a teacher or online dictionary to imitate the accurate pronunciation
	PSS	• Ask someone to pronounce difficult words for me
	PSS	• Ask someone to evaluate or correct my pronunciation
	AS	• Encourage oneself to carry on when encountering pronunciation difficulties
↓		
Rehearsal stage & Recording stage	FP	• Pay attention to articulate individual sounds (vowels and consonants) clearly and accurately
	FP	• Pay attention to place the word stress on the right syllables within words.
	FP	• Pay attention to divide thought groups and pause appropriately.
	FP	• Pay attention to decide where to make an emphasis in sentences to better express the meaning.
	FP	• Try to maintain connected speech by linking words together.
	FP	• Try to maintain an English rhythm and intonation to sound more natural.
↓		
Recording stage: Delivering voice-over for digital story	AS	• Use ways to relax and clam myself when facing difficulty or stress during pronunciation recording
	AS	• Keep a sense of humour about own mispronunciation
	SMD	• Relax and adjust face and jaw muscles to prepare for recording
	MIS	• Look for a good environment for completing the recording
	MIS	• Listen to own pronunciation on recording and correct own mistakes
	AS	• Reward myself for success and efforts put into pronunciation work

***Figure 14**: Flowchart of students' PLS use at different stages of completing the DST*

6.3 Limitations

6.3.1 Limitations in sampling and generalizability vs specificity

The first limitation relates to sampling. The participants in Phase I of the current study were selected mainly through convenience sampling whereby the distribution of questionnaire and completion of pronunciation tasks were achieved with the support of willing teachers and availability of language laboratories in corresponding class hours. Having said that, attempts were made based on principles of probabilistic sampling (to increase representativeness) and

purposive sampling (to maximize variation) (Punch, 2006, p.55; Punch, 2003, p.36) by including a sufficiently large sample size and to include participants from all years of study and all major faculties. However, the fact that all data were collected from a single university in Hong Kong would still mean that the generalizability of the results could be limited to a certain extent. For example, the university was the only one of the eight public universities across the territory that explicitly adopts a bilingual language policy.

As for Phase II of the study, all students enrolling in the speech-pronunciation course participated. Adopting a model of analytic generalization (Firestone, 1993), the data analysis and interpretation process was focused primarily on information that was relevant to the majority of the participants rather than experiences that were unique to particular participants. The results were limited therefore in the sense that observations of commonly experienced task- and context-related factors would be highlighted whereas factors attributed to individual differences among learners might have been downplayed. As Benson and Gao (2008) put it, such focus means that "at the level of interpretation the individuality of the students tends to be obscured by an emphasis on the ways in which these experiences influenced the group as a whole" (p.33). Also noteworthy was that while the course was open for elective enrolment by all students, it was a designated course which weaker students were required to complete for graduation. As such, the majority of the participants were those with lower proficiency considered to be in need of remedial help. So the resulting findings may not necessarily be transferable to stronger learners with higher proficiency.

6.3.2 Limitation in multiple research roles

The second limitation relates to the multiple research roles which might give rise to ethical and methodological implications. While a high level of objectivity may not be easily achievable by a teacher-researcher (especially in Phase II of the study), the issue of power relations was ever present. Though measures such as distributing questionnaires after the release of course grades were taken to assure student-participants that non-participation would not lead to repercussion (as detailed in Section 3.4.3.3), they might not be able to completely eliminate related anxiety. The fact that the written reflection was assigned as a required component of the graded digital storytelling project (though the writing itself was not scored) might also have imposed pressure on some students to provide exaggerated reports, which might in turn impact on the quality of the data.

On the other hand, even though there existed a much less intense power relation between the researcher/pronunciation assessors and the participants in Phase I of the study, a limitation could still exist such that the voice of a participant might be recognizable by one of the pronunciation assessors as her own student as a result of which the assessment might be affected by the raters' past memory (Angelovska, 2012, p.180).

6.3.3 Limitation in method of data collection

Most LLS research relies on learner's self-report on strategy use, collected through surveys, think-aloud protocols, recollective narratives or diaries and interviews, while other methods such as observation can be used to triangulate findings (Gao, 2010, pp.12-14). In Phase II of the present study whereby the aim was not only to investigate participants' PLS use patterns in a specific language task but also the possible factors affecting their choices, attempts were made to include multiple data collection methods including a post-project questionnaire, a written self-reflection and follow-up interviews to increase reliability. However, due to the nature of the task, which is a digital storytelling project that spanned two months in time and took place outside of the classroom (mostly in the comforts of the students' own home), it was not feasible to conduct observations for the purpose of triangulation.

6.3.4 Limitation in method of data analysis

Data reduction happens at two levels, namely "coding and meaning making" as well as "pattern-/relationship finding and theorizing". In this process of searching for objective knowledge, the researcher abstracts recurring patterns and makes generalizations by deciding what data to highlight and which to ignore, which is a highly subjective process (Gu, 2014, p.76). In Phase II of the current study, the limitation of researcher subjectivity in coding was therefore unavoidable even with the presence of a pre-determined taxonomy to aid the process, as "the iterative and reflexive process of coding and analysis reflects so much of the researcher, and determine what is coded, what is not, how things are categorized, and what insights and relationships are seen among those categories" (ibid, p.77). Having said that, the researcher did attempt to balance the subjectivity through following Gu's (ibid) advice, namely by triangulating the code tallies with results from a questionnaire survey to elicit data (ibid, p.78) and supplementing coding and tallying with "thick descriptions of person, task, context and conditional determinants of strategic learning" to better illustrate the complex nature and coordination of integrated, flexible and dynamic strategic behaviour (ibid, p.80).

6.4 Directions for future research

A number of avenues are open up for further studies in view of the limitations and findings of the current study. Firstly, this study is among the few that have investigated the relationship between PLS use and pronunciation performance and the first to examine these attributes of Hong Kong university students. Future studies could enlarge the sample to include students from different universities and other tertiary institutions to cover a wider range of proficiency level and pronunciation ability to further study and possibly affirm the positive correlation between the two variables. Meanwhile, the current study is also the first to reveal an eight-factor underlying structure by subjecting PLS use data to an exploratory factor analysis, showing a different classification system in comparison to the long-standing six-factor LLS structure as proposed by Oxford (1990) and adopted by the majority of PLS researchers. Further research is needed to verify this classification and thereby to provide support or further modify the proposed PLS taxonomy. Lastly, LLS research has expanded from exploring the relationships between strategy use and language learning successes to other learner factors such as motivation, personality and learning styles, which were not covered in the scope of the current study. Future research may further explore the impact of these learning factors on the choice and frequency of strategy use.

Phase II of this study aims to serve as an initial exploratory attempt to examine students' use of PLS "in response to a particular situation or task" (Benson & Gao, 2008, p.31), namely a digital storytelling project. Findings suggest that DST shows untapped potential in supporting pronunciation improvement in that the task appears to elicit students' use of various types of PLS both directly and indirectly. Such observation was arrived at through analysing students' written self-reflection collected after the completion of the project, which provided a snapshot of students' engagement with PLS. Future studies may explore factors affecting students' PLS use pattern and interactions among students' various PLS choice through eliciting more in-depth data. For example, by inviting students to reflect their strategy use through keeping a learning log or journal throughout the project period rather than recalling their experience afterwards may help provide a more comprehensive view into the phenomenon. Another possible avenue to gaining better understanding of how a learner navigates through creating a digital story with various PLS and the interaction between the use of PLS and other LLS would be to conduct case studies, which will also allow more focus on the individual learner (Benson & Gao, 2008, p.34).

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APPENDICES

Appendix A: An inventory of Pronunciation Learning Strategies from literature to date

Pronunciation Learning Strategies Inventory	
Nature of PLS	**Pronunciation Learning Strategies (PLS)**
Representing sounds in memory	1. I make up songs or rhymes to remember how to pronounce some words.
	2. I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.
	3. I use my own codes to remember how to pronounce some words.
	4. I memorize a word's pronunciation by making associations (e.g. by associating the word with another word or with sounds in my first language, or associating it with a previous occasion where I heard it).
Rote-learning	5. I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.
Reviewing	6. I regularly revise new words' pronunciation using some mechanical techniques (e.g. flash cards, creating word lists)
Exercising and observing speech organs	7. I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.
	8. I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.
Practicing pronunciation formally	9. I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.
	10. I practice saying words slowly at first and then faster.
	11. I practice pronouncing words first in isolation and then in context.
	12. I mentally rehearse how to say something before saying it aloud.
	13. I talk to myself (out loud or silently) and listen to my pronunciation.
	14. I repeat after a model such as a native speaker, teacher, sound recordings, television or movies to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).
	15. I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).
	16. I notice or try out different English accents.
	17. I use computer software/ Apps/ Internet resources to practice pronunciation
Practicing pronunciation naturalistically	18. I listen to the radio, television or movies to observe English speakers' speech production.
	19. I practice talking with others in English to improve my pronunciation.

	20. When I am conversing with someone speaking in English, I try to sound like an English speaker.
Focusing on segmental level of pronunciation	21. I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.
	22. I try to avoid producing inappropriate sounds from my native language.
Focusing on prosodic level of pronunciation	23. I pay attention to place the word stress on the right syllables within words.
	24. I pay attention to divide thought groups and pause appropriately when I read sentences.
	25. I pay attention to decide where to make an emphasis in sentences to better express the meaning.
	26. I pay attention to connected speech (linking words together).
	27. I pay attention to maintaining an English rhythm and intonation to sound more natural.
Analysing and reasoning	28. I make hypotheses and develop my own understanding of how English pronunciation works, even if sometimes I have to revise my understanding based on new information.
	29. I analyse English spoken texts using pronunciation rules I have learned.
	30. When I listen to someone speaking English, I pay attention to and notice errors.
	31. I pay attention to the similarities and contrasts between my native language and English pronunciation.
Doing exercises and taking notes	32. I learn about English pronunciation rules and take note of such information.
	33. I do phonetic exercises, such as transcription exercises.
Using resources for receiving and sending messages	34. I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.
	35. I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.
Making intelligent guesses	36. I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).
Overcoming limitations in pronunciation	37. When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (use proximal articulation).
	38. When I can't pronounce certain words correctly, I paraphrase (use other words with similar meanings).
Making adjustments	39. When others can't understand me, I would adjust my speaking volume or speed.
	40. I study books or reference materials about English pronunciation rules.

Finding out about English pronunciation	41. I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation task).
Selective/guided attention	42. I selectively focus my attention on pronunciation while listening to/speaking English. (directed attention)
	43. I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation. (selective attention)
Setting goals and arranging one's learning	44. I actively seek opportunities to talk with others in English and practice my pronunciation.
	45. I set goals for myself and plan my pronunciation learning to reach these goals.
Planning for a language task	46. I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.
	47. I rehearse before carrying out a speaking task to improve my pronunciation performance.
	48. When I study or practice English pronunciation, I look for a good learning environment.
Self-evaluating	49. I record myself to listen to and evaluate my own pronunciation.
	50. I monitor my own pronunciation when speaking to others in English.
	51. When I find I make a mistake in pronunciation, I try to correct myself immediately.
Lowering anxiety and managing stress	52. I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.
	53. I keep a sense of humour about my mispronunciations.
	54. I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).
Encouraging oneself	55. I encourage myself to carry on when I encounter pronunciation difficulties.
	56. I reward myself for success or effort put into pronunciation improvement.
Asking for help	57. I ask someone to evaluate or correct my pronunciation.
	58. I ask someone to pronounce something for me.
Cooperating with others	59. I work with other learners to practice, review or share information about English pronunciation.
	60. I try to teach someone else about English pronunciation.

Appendix B: References for items in Pronunciation Learning Strategies Collection

Oxford's Strategy Categorization (1990)		**Literature in which the listed PLTs have been previously discussed**									
Nature of PLS	**Pronunciation Learning Strategies (PLS)**	Peterson (1997)	Peterson (2000)	Vitanova & Miller (2002)	Derwing & Rossiter (2002)	Osburne (2003)	Eckstein (2007)	Sardegna (2009)	Pawlak (2010)	Wrembel (2011)	Calka (2012)
Representing sounds in memory	1. I make up songs or rhymes to remember how to pronounce some words.	p.79	p.25								
	2. I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.	p.79,90	p.25				p.100				p.153
	3. I use my own codes to remember how to pronounce some words.	p.79,90	p.25				p.100				p.153
	4. I memorize a word's pronunciation by making associations (e.g. by associating the word with another word or with sounds in my first language, or associating it with a previous occasion where I heard it).					p.136M					p.152
Rote-learning	5. I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.						p.100M				

Reviewing	6. I regularly revise new words' pronunciation using some mechanical techniques (e.g. flash cards, creating word lists)	p.80, 92	p.25M								p.152
Exercising and observing speech organs	7. I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.						p.100				p.153M
	8. I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.	p.80M				p.136M					p.152M
Practicing pronunciation formally	9. I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.	p.81	p.25	p.3							
	10. I practice saying words slowly at first and then faster.	p.81	p.25M								
	11. I practice pronouncing words first in isolation and then in context.	p.80									
	12. I mentally rehearse how to say something before saying it aloud.	p.81	p.25								p.153

	13. I talk to myself (out loud or silently) and listen to my pronunciation.	p.79								p.177	p.153
	14. I repeat after a model such as a native speaker, teacher, sound recordings, television or movies to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).	p.79, 80, 91		p.3M						p.179	
	15. I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).									p.179	p.153
	16. I notice or try out different English accents.		p.25M								
	17. I use computer software/ Apps/ Internet resources to practice pronunciation								p.197		p.153
Practicing pronunciation naturalistically	18. I listen to the radio, television or movies to observe English speakers' speech production.										
	19. I practice talking with others in English to improve my pronunciation.		p.25								p.153

	20. When I am conversing with someone speaking in English, I try to sound like an English speaker.						p.101				
Focusing on segmental level of pronunciation	21. I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.			p.2M		p.135M					
	22. I try to avoid producing inappropriate sounds from my native language.	p.81,93									
Focusing on prosodic level of pronunciation	23. I pay attention to place the word stress on the right syllables within words.					p.135M	p.100				
	24. I pay attention to divide thought groups and pause appropriately when I read sentences.					p.135M				p.179M	
	25. I pay attention to decide where to make an emphasis in sentences to better express the meaning.					p.135M				p.179M	
	26. I pay attention to connected speech (linking words together).									p.179M	
	27. I pay attention to maintaining an English					p.135M				p.179M	

	rhythm and intonation to sound more natural.										
Analysing and reasoning	28. I make hypotheses and develop my own understanding of how English pronunciation works, even if sometimes I have to revise my understanding based on new information.	p.87									
	29. I analyse English spoken texts using pronunciation rules I have learned.							p.61			
	30. When I listen to someone speaking English, I pay attention to and notice errors.						p.100				
	31. I pay attention to the similarities and contrasts between my native language and English pronunciation.	p.81M,87					p.100				p.153
Doing exercises and taking notes	32. I learn about English pronunciation rules and take note of such information.	p.81									p.153
	33. I do phonetic exercises, such as transcription exercises.										p.153

Making intelligent guesses	34. I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).						p.101				p.153
Overcoming limitations in pronunciation	35. When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (use proximal articulation).		p.26								p.153
	36. When I can't pronounce certain words correctly, I paraphrase (use other words with similar meanings).				p.159M		p.101M				p.153
Making adjustments	37. When others can't understand me, I would adjust my speaking volume or speed.				p.159M	p.136M	p.101			p.179	
Finding out about English pronunciation	38. I study books or reference materials about English pronunciation rules.		p.26								p.153
	39. I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation task).										p.154
Selective/guided attention	40. I selectively focus my attention on pronunciation while listening to/speaking	p.80,92	p.25							p.178	p.154

	English. (directed attention)										
	41. I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation. (selective attention)	p.82M,93	p.25								p.154
Setting goals and arranging one's learning	42. I actively seek opportunities to talk with others in English and practice my pronunciation.	p.82,89									p.154
	43. I set goals for myself and plan my pronunciation learning to reach these goals.										p.154
Planning for a language task	44. I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.	p.82M	p.26								
	45. I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.									p.178	p.153
	46. I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.										p.153

	47. I rehearse before carrying out a speaking task to improve my pronunciation performance.										p.153
	48. When I study or practice English pronunciation, I look for a good learning environment.						p.101				
Self-evaluating	49. I record myself to listen to and evaluate my own pronunciation.	p.80,92	p.26							p.177,178	p.154
	50. I monitor my own pronunciation when speaking to others in English.										p.154
	51. When I find I make a mistake in pronunciation, I try to correct myself immediately.						p.101M				
Lowering anxiety and managing stress	52. I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.				p.159M		p.101M			p.177	p.154
	53. I keep a sense of humour about my mispronunciations.	p.82,91	p.26								p.154
	54. I have fun with pronunciation, such as	p.82									

	speaking English with an L1 accent (i.e. from first language).										
Encouraging oneself	55. I encourage myself to carry on when I encounter pronunciation difficulties.						p.101M				p.154
	56. I reward myself for success or effort put into pronunciation improvement.										p.154
Asking for help	57. I ask someone to evaluate or correct my pronunciation.	p.81M,82	p.26				p.100			p.176	p.154
	58. I ask someone to pronounce something for me.	p.82,93	p.26				p.101				p.154
Cooperating with others	59. I work with other learners to practice, review or share information about English pronunciation.	p.82M,90	p.26							p.178	p.154
	60. I try to teach someone else about English pronunciation.	p.82,93									p.154

Appendix C: Pronunciation Learning Strategies Questionnaire - General version (PLSQ)

Pronunciation Learning Strategies Questionnaire

Olive Cheung (olivecheung@cuhk.edu.hk) September 1, 2015.

Thank you for doing this survey, which will take you roughly 20 minutes to complete.

Reference Number on your Consent Form: _____

Part I:

The survey below is designed to gather information about how you, as a student of English as a second or foreign language, go about learning English pronunciation. On the following pages, you will find statements related to English pronunciation learning. Please mark the responses (1, 2, 3, 4, or 5) that tells how true the statement is in terms of what you actually do when you are learning or trying to improve your English pronunciation.

1	Never or almost never true of me
2	Generally not true of me
3	Somewhat true of me
4	Generally true of me
5	Always or almost always true of me

1. Never or almost never true of me means that the statement is very rarely true of you; that is, you do the behaviour which is described in the statement only in *very rare* instances.

2. Generally not true of me means that the statement is usually not true of you; that is, you do the behaviour which is described in the statement *less than half the time*, but more in very rare instances.

3. Somewhat true of me means that the statement is true of you *about half the time*; that is, sometimes you do the behaviour which is described in the statement, and sometimes you don't, and these instances tend to occur with equal frequency.

4. Generally true of me means that the statement is usually true of you; that is, you do the behaviour which is described in the statement *more than half the time*.

5. Always or almost always true of me means that the statement is true of you in almost all circumstances; that is, you *almost always* do the behaviour which is described in the statement.

1. When you try to learn or improve your English pronunciation, have you used the following Pronunciation Learning Strategies (PLS)? Please insert 1, 2, 3, 4, or 5 in the blank to indicate how true the statement is in terms of what you actually do when you are learning or trying to improve your English pronunciation. You will also be asked to identify your three favourite strategies among the list by the end of the survey.

Section A.

1. I make up songs or rhymes to remember how to pronounce some words.
2. I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.
3. I use my own codes to remember how to pronounce some words.
4. I memorize a word's pronunciation by making associations (e.g. by associating the word with another word or with sounds in my first language, or associating it with a previous occasion where I heard it).
5. I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.
6. I regularly revise new words' pronunciation using some mechanical techniques (e.g. making flash cards, creating word lists).

Section B

7. I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.
8. I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.
9. I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.
10. I practice saying words slowly at first and then faster.
11. I practice pronouncing words first in isolation and then in context.
12. I mentally rehearse how to say something before saying it aloud.
13. I talk to myself (out loud or silently) and listen to my pronunciation.
14. I repeat after a model such as a native speaker, teacher, sound recordings, television or movies to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).
15. I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).
16. I notice or try out different English accents.
17. I use computer software/ apps/ internet resources to practice pronunciation.
18. I listen to the radio, television or movies to observe English speakers' speech production.
19. I practice talking with others in English to improve my pronunciation.
20. When I am conversing with someone speaking in English, I try to sound like an English speaker.
21. I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.
22. I try to avoid producing inappropriate sounds from my native language.
23. I pay attention to place the word stress on the right syllables within words.
24. I pay attention to divide thought groups and pause appropriately when I read sentences.
25. I pay attention to decide where to make an emphasis in sentences to better express the meaning.
26. I pay attention to connected speech (linking words together).
27. I pay attention to maintaining an English rhythm and intonation to sound more natural.
28. I make hypotheses and develop my own understanding of how English pronunciation works, even if sometimes I have to revise my understanding based on new information.
29. I analyse English spoken texts using pronunciation rules I have learned.
30. When I listen to someone speaking English, I pay attention to and notice errors.
31. I pay attention to the similarities and contrasts between my native language and English pronunciation.
32. I learn about English pronunciation rules and take note of such information.
33. I do phonetic exercises, such as transcription exercises.
34. I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.
35. I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.

Section C

_____ 36. I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).

_____ 37. When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).

_____ 38. When I can't pronounce certain words correctly, I paraphrase (i.e. use other words with similar meanings).

_____ 39. When others can't understand me, I would adjust my speaking volume or speed.

Section D

_____ 40. I study books or reference materials about English pronunciation rules.

_____ 41. I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation or presentation task).

_____ 42. I selectively focus my attention on pronunciation while listening to/speaking English.

_____ 43. I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.

_____ 44. I actively seek opportunities to talk with others in English and practice my pronunciation.

_____ 45. I set goals for myself and plan my pronunciation learning to reach these goals.

_____ 46. I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.

_____ 47. I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.

_____ 48. When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).

_____ 49. I record myself to listen to and evaluate my own pronunciation.

_____ 50. I monitor my own pronunciation when speaking to others in English.

_____ 51. When I find I make a mistake in pronunciation, I try to correct myself immediately.

Section E

_____ 52. I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.

_____ 53. I keep a sense of humour about my mispronunciations.

_____ 54. I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).

_____ 55. I encourage myself to carry on when I encounter pronunciation difficulties.

_____ 56. I reward myself for success or effort put into pronunciation improvement.

Section F

_____ 57. I ask someone to evaluate or correct my pronunciation.

_____ 58. I ask someone to pronounce something for me.

_____ 59. I work with other learners to practice, review or share information about English pronunciation.

_____ 60. I try to teach someone else about English pronunciation.

2. On top of the above listed Pronunciation Learning Strategies, did you employ <u>any other strategies or methods</u> in learning or improving your English pronunciation? Please describe them in the space below:

Part II: *This part asks for your background information.*

1. This term I am taking ELTU_____(Please state course code and/or title):
   ☐ as a required English elective (It is the only course I can choose to graduate)
   ☐ to fulfil graduation English requirement (It is one of the few ELT courses I can choose among to graduate)
   ☐ as a free elective (I do not need it to graduate)

2. How important is it for you to become proficient in the English language in general?
☐ Not so important ☐ Important ☐ Highly important

3. How important is it for you to become proficient in the English pronunciation in particular?
☐ Not so important ☐ Important ☐ Highly important

4. Have you learned English pronunciation or phonetics before?
☐ Yes / ☐ No

If your answer is Yes, please briefly state where and when you learned it:

_____

5. What aspects or elements of pronunciation do you consider to be the most important/ do you pay the most attention to when you learn to improve your English speech?

_____

_____

6. In your own assessment, how often do you spend time on practicing English pronunciation out of class?
☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Frequently

7. In your own assessment, how good is your English pronunciation?
☐ Poor ☐ Weak ☐ Average ☐ Good ☐ Excellent

8. Do you enjoy English learning?
☐ Yes ☐ No

9. Gender: _____

10. Age: _____

11. I am a year ___ ☐ undergraduate/ ☐ postgraduate student, and I am majoring in _____

12. I am from ☐ Hong Kong/ ☐ Mainland China (City:_____)/ ☐ Others:_____

13. My first language is ☐ Mandarin / ☐ Cantonese / ☐ Others:_____

14. I have learned English for _____ years

15. For my secondary education, I studied in
☐ a Chinese-as-medium of instruction school / ☐ an English-as-medium of instruction school

16. I have lived in an English speaking country before for ____ year(s)/ ____ month(s)

This is the end of the survey. Thank you very much for your contribution!

Appendix D: Pronunciation Learning Strategies Questionnaire - Course based version (C-PLSQ)

ELTU1107 Pronunciation Learning Strategies Questionnaire

Olive Cheung (olivecheung@cuhk.edu.hk)

Thank you for doing this survey, which will take you roughly 20 minutes to complete.

Reference Number on your Consent Form: _____

Part I:

The survey below is designed to gather information about how you, as a student of English as a second or foreign language, go about learning/ improving English pronunciation in the process of completing a digital story. On the following pages, you will find statements related to English pronunciation learning. Please mark the responses (1, 2, 3, 4, or 5) that tells how true the statement is in terms of what you actually did to improve your English pronunciation when you were completing your Digital Storytelling Project on the course.

1	Never or almost never true of me
2	Generally not true of me
3	Somewhat true of me
4	Generally true of me
5	Always or almost always true of me

1. Never or almost never true of me means that the statement is very rarely true of you; that is, you do the behaviour which is described in the statement only in *very rare* instances.

2. Generally not true of me means that the statement is usually not true of you; that is, you do the behaviour which is described in the statement *less than half the time*, but more in very rare instances.

3. Somewhat true of me means that the statement is true of you *about half the time*; that is, sometimes you do the behaviour which is described in the statement, and sometimes you don't, and these instances tend to occur with equal frequency.

4. Generally true of me means that the statement is usually true of you; that is, you do the behaviour which is described in the statement *more than half the time*.

5. Always or almost always true of me means that the statement is true of you in almost all circumstances; that is, you *almost always* do the behaviour which is described in the statement.

1. Throughout your Digital Storytelling Project, have you used the following Pronunciation Learning Strategies (PLS)? Please insert 1, 2, 3, 4, or 5 in the blank to indicate how true the statement is in terms of what you actually did when you were trying to improve your English pronunciation during the process of completing your Digital Storytelling Project.

You will also be asked to identify your three favourite strategies among the list by the end of the survey.

Section A. Privacy for out-of-class oral practice

1. When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or a place with good facilities).
2. I prepare by highlighting difficult-to-pronounce words in my notes.
3. I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.
4. I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.
5. I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.

Section B. Practicing aloud

6. I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.
7. I practice saying words slowly at first and then faster.
8. I practice pronouncing words first in isolation and then in context.
9. I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).
10. When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).
11. When I can't pronounce certain words correctly, I paraphrase (i.e. use other words with similar meanings).
12. I rehearse before doing the recording to improve my pronunciation performance.

Section C. Self-monitoring of speech

13. I record myself to listen to and evaluate my own pronunciation.
14. I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.
15. When I find I make a mistake in pronunciation, I try to correct myself immediately.
16. I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.
17. I keep a sense of humour about my mispronunciations.

Section D. Comparing performance with target models

18. I analyse the story script using pronunciation rules I have learned.
19. I pay attention to the similarities and contrasts between my native language and English pronunciation.
20. I try to avoid producing inappropriate sounds from my native language.
21. I ask someone to evaluate or correct my pronunciation.
22. I ask someone to pronounce something for me.
23. I try to teach someone else about English pronunciation.

Section E. Making changes and practicing the adjustments until accurate and fluent

24. I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.
25. I pay attention to place the word stress on the right syllables within words.
26. I pay attention to divide thought groups and pause appropriately when I read sentences.
27. I pay attention to decide where to make an emphasis in sentences to better express the meaning.
28. I pay attention to connected speech (i.e. linking words together).
29. I pay attention to maintaining an English rhythm and intonation to sound more natural.
30. I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.
31. I encourage myself to carry on when I encounter pronunciation difficulties.
32. I reward myself for success or effort put into pronunciation improvement.

2. Among the above listed Pronunciation Learning Strategies, which three were your favourite? Please indicate the strategy number (1-32) and briefly explain why you like it.

a. I like strategy no. ____ because

b. I like strategy no. ____ because

c. I like strategy no. ____ because

3. On top of the above listed strategies, did you employ any other strategies or methods in improving your pronunciation performance during the digital storytelling project? Please describe them in the space below:

Part II: This part asks you about your digital storytelling experience.

1. Did you edit your script a number of times before you finalize it for the voice recording?

☐ I prepared 1 draft only; no revision. ☐ I revised it once after the peer-review.

☐ I revised it 2-3 times. ☐ I revised it 4-5 times. ☐ I revised it 6 times or more.

2. How did you record your narration (voice-over for your pictures) for the digital story?

☐ I recorded the sentences for each picture one by one.

☐ I divided the story into a few parts and recorded one part after another.

☐ I recorded the entire story all at once.

☐ I recorded the entire story in one go but went back to revise some unsatisfactory individual sentences.

3. Did you generally record your narration more than once? If yes, how many times?

(The time you spent on recording different parts of your text may vary. You can simply estimate the average frequency of revision you generally need for finishing the recording of a sentence or paragraph.)

☐ Only once ☐ 2-3 times ☐ 4-5 times ☐ 6 times or more

4. How long did it take you to finish the DST project? Please state the time needed for each item. (How many hours / minutes did you spend?) Again, you may not have kept an accurate record of time spent so simply give a rough estimate.

- Brainstorming for topic: _____ *hour(s) and* _____ *minute(s)*
- Writing and editing the script: _____ *hour(s) and* _____ *minute(s)*
- Collecting photos and music: _____ *hour(s) and* _____ *minute(s)*
- Using PhotoStory 3 to record voice narration: _____ *hour(s) and* _____ *minute(s)*

5. To what extent do you agree with the statements below? *| 1. Strongly disagree | 2. Disagree | 3. Mildly disagree |* *| 4. Mildly agree | 5. Agree | 6. Strongly agree |*	1. SDA	2. DA	3. MDA	4. MA	5. A	6. SA
a) During the process of completing my digital story, I looked forward to viewing my finished product.						
b) I was interested in watching digital stories produced by my classmates.						
c) The digital storytelling assignment helped improve my English pronunciation and oral delivery.						
d) I found the software Photostory 3 easy to use.						
e) Overall speaking, I enjoyed the process of creating my digital story.						

Part III: *This part asks for your background information.*

1. This term I am taking ELTU_____(Please state course code and/or title):
☐ as a required English elective (It is the only course I can choose to graduate)
☐ to fulfil graduation English requirement (It is one of the few ELT courses I can choose among to graduate)
☐ as a free elective (I do not need it to graduate)

2. How important is it for you to become proficient in the English language in general?
☐ Not so important ☐ Important ☐ Highly important

3. How important is it for you to become proficient in the English pronunciation in particular?
☐ Not so important ☐ Important ☐ Highly important

4. Have you learned English pronunciation or phonetics before?
☐ Yes / ☐ No

If your answer is Yes, please briefly state where and when you learned it:

_____

5. What aspects or elements of pronunciation do you consider to be the most important/ do you pay the most attention to when you learn to improve your English speech?

_____

_____

6. In your own assessment, how often do you spend time on practicing English pronunciation out of class?
☐ Never ☐ Rarely ☐ Sometimes ☐ Often ☐ Frequently

7. In your own assessment, how good is your English pronunciation?
☐ Poor ☐ Weak ☐ Average ☐ Good ☐ Excellent

8. Do you enjoy English learning?
☐ Yes ☐ No

9. Gender: _____

10. Age: _____

11. I am a year ____ ☐ undergraduate/ ☐ postgraduate student, and I am majoring in _____

12. I am from ☐ Hong Kong/ ☐ Mainland China (City:_____)/ ☐ Others:_____

13. My first language is ☐ Mandarin / ☐ Cantonese / ☐ Others:_____

14. I have learned English for _____ years

15. For my secondary education, I studied in
☐ a Chinese-as-medium of instruction school / ☐ an English-as-medium of instruction school

16. I have lived in an English speaking country before for ____ year(s)/ ____ month(s)

This is the end of the survey. Thank you very much for your contribution!

Appendix E: Research Protocol submitted to institutional research ethics boards

Title of Protocol: Exploring learners' use of Pronunciation Learning Strategies in Hong Kong: An investigation on the potential benefits of using digital storytelling in an EFL speech-pronunciation classroom in a local university

Investigator: CHEUNG Yuet Ying Olive, part-time student (SID: P1250778, UoB; 53122270, HK SCOPE – Cohort 16), Doctor of Education Programme, Graduate School of Education

Supervisors: Dr Talia Isaacs (January 2015 – February 2017) and Dr Guoxing Yu (November 2017 onwards)

Relevant background and purpose:

Learning strategies are steps taken by students to enhance their own learning and they are especially important for language learning because they are tools that support active, self-directed involvement, an essential element leading to the development of communicative competence (Oxford, 1990). In line with the flourishing of strategies research against the backdrop of CLT development in the past forty years, learning strategies have become an accepted part of language education in the ESL classroom (Eckstein, 2007). However, unlike other aspects of language learning, pronunciation seems to have received the least attention in the development course of Language Learning Strategies research until very recently.

A review of literature reveals that most Pronunciation Learning Strategies (PLS) studies reported thus far were conducted in American or Polish universities while research subjects were often limited to English language or English education majors only. Also, these studies have largely adopted quantitative research approaches in measuring the frequency of PLS use in relation to pronunciation gain while little research has explored factors contributing to learners' choice and preferability of strategies. Furthermore, investigation on the use of particular tasks to support learners' use of PLS is absent.

In the hope of filling the research gap, the present investigation is designed to explore Hong Kong university students' use of Pronunciation Learning Strategies and its possible correlation to their pronunciation performance (Part I) and investigate the potential benefits of introducing digital storytelling as a speaking task in a tertiary EFL classroom with the aim of engaging students in active use of Pronunciation Learning Strategies (Part II).

Participant population:

About 100 students from a local university in Hong Kong will be invited to participate in Part I of the investigation and about 40 students enrolling in an English language course taught by the investigator and offered by the language centre in the same university will be invited to participate in Part II of the investigation. The exact number of participants for Part II will depend on the final enrolment figure in the course and students' willingness to participate as it is an elective course open for all undergraduate students on campus. Students' participation in the study will be voluntary and informed consent will be obtained.

Materials:

Part I:

Questionnaires. The Pronunciation Learning Strategies Questionnaire (attached – appendix 1) is designed based on Oxford (1990) and Peterson (2000) to assess students' use of various types of Pronunciation Learning Strategies in attempt to learn or improve English pronunciation as well as eliciting factors affecting their strategy use patterns. The questionnaire should take about 15-20 minutes to complete.

Read-aloud voice recording. Participants will provide pronunciation performance samples by having two speaking performances recorded, one a read-aloud of a narrative text of roughly 300 to 400 words in length and another a spontaneous response to a prompt asking them about a past experience. The recording should take about 10-15 minutes to complete.

Part II:

Digital Stories. A digital story is a form of narrative that consists of series of still images combined with a narrated soundtrack to tell a personal story (Lambert, 2002; Bull & Kajder, 2004; Davis, 2004; Banaszewski, 2005). Student participants will be completing a 5-minute long digital story as part of course work. Informed consent will be obtained from participants for the investigator to analyse pronunciation performance and narrative structures of their submitted digital stories.

Self-Reflection Reports. Student participants will be completing a written self-reflection by answering guiding questions (attached – appendix 2) as part of course work, some of which will ask about their use of Pronunciation Learning Strategies in the process of completing their digital stories. Informed consent will be obtained from participants for the investigator to analyse their reports.

Questionnaires. A modified version of the Pronunciation Learning Strategies Questionnaire (attached – appendix 3) will be administered to assess students' use of various types of Pronunciation Learning Strategies in the process of completing their digital stories. Items not pertaining to the digital storytelling task are removed while items further eliciting details on how students attempt to complete their stories are added. The questionnaire should take about 20 minutes to complete.

Interviews. Following the questionnaires, student participants will be invited to participate in a semi-structured follow-up interview where they will be asked to talk about their pronunciation learning experiences both on the digital storytelling project and outside class. The discussion will focus largely on factors affecting their preferences or habits on using different types of Pronunciation Learning Strategies.

Procedures:

Part I: Following approval by the teachers conducting language courses at different levels at the language centre, the consent form I (attached – appendix 4) will be distributed to students taking these language courses who agree to participate in the study and those who agree to participate will complete the sound recording and questionnaire I (i.e. appendix 1).

Part II: Students enrolling in the course will be invited to participate in the study and be informed that participation is entirely voluntary while non-participation will not lead to any repercussion or potential downgrading of their course grades. The distribution of the consent form II (attached – appendix 5) and questionnaire II (i.e. appendix 3) and indication of willingness to participate in follow-up interviews will be done immediately after course scores are released so that students do not feel the risk of displeasing the teacher-investigator or getting a lower course grade as a result of unwillingness to participate in the study.

Potential Benefits:

Although the participants may not get any direct benefit from participating in the study, they may better understand their current use of Pronunciation Learning Strategies and be introduced to strategies they do not know or sufficiently use. Meanwhile, their contribution will also help provide insights on pronunciation teaching and learning as well as the potential strengths and weaknesses of digital storytelling as a speaking task.

Risks:

The risks for participating in this study are minimal. It is possible that participants may feel shy or embarrassed talking about their pronunciation learning experience but other than that there are no other foreseeable risks.

Confidentiality:

All personal information will remain confidential. All data will be stored securely in a password-protected computer in a locked office on campus. Only the investigator will have access to these data.

References:

Banaszewski, T. (2005). Digital storytelling: Supporting digital literacy in grades 4-12. *Master's thesis, Georgia Institute of Technology*. Retrieved August 02, 2010 from http://techszewski.blogs.com/techszewski/files/TBanaszewski_DS_thesis.pdf

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Oxford, R. L. (1990). *Language Learning Strategies: What every teacher should know.* Boston: Heinle & Heinle.

Peterson, S. S. (2000). *Pronunciation Learning Strategies: A First Look*. Retrieved from http://eric.ed.gov/?id=ED450599

Appendix F: Student Informed Consent Form (Phase I)

Ref: _____

Consent to be a Research Subject

Title: Exploring learners' use of Pronunciation Learning Strategies in Hong Kong: An investigation on the potential benefits of using digital storytelling in an EFL speech-pronunciation classroom in a local university

Researcher: Olive Cheung

Contact details: (852) 3943 7427 / olivecheung@cuhk.edu.hk

Introduction

Olive Cheung is a full-time senior lecturer at the English Language Teaching Unit, Chinese University of Hong Kong and a part-time student on the Doctor of Education Programme at the Graduate School of Education, The University of Bristol. She is doing research on pronunciation learning of English learners.

You are invited to participate in her research study that investigates English pronunciation learning of university students in Hong Kong. The purpose of this study is to understand students' use of and preferences for Pronunciation Learning Strategies.

Procedures

If you agree to participate in this study, you will:

1. complete a questionnaire about your pronunciation learning experience, which should take you roughly 20 minutes; and

2. complete a speech recording by reading aloud a short text and answer a short question in English, which should take you roughly 15 minutes.

Risks/Discomforts

There are no risks from participating in this study. Your answers to the questionnaire will not affect your grades in ELTU courses in any way.

Benefits

You may not get any direct benefit from participating in the study, but it may help you better understand your current use of Pronunciation Learning Strategies and introduce you to strategies that you do not know or sufficiently use. Meanwhile, your contribution will also help provide insights on pronunciation teaching and learning in Hong Kong.

Confidentiality

All information you provide to the researcher will be kept strictly confidential. The results of this study may be presented at professional meetings and conferences or published in academic journals, but your name and identity will not be revealed.

Participation

Participation in this research is voluntary. You have the right to withdraw from the study or refuse to participate in its entirety at any time you wish. As aforementioned, your participation or non-participation will not affect your course grade.

Questions

If you have questions about this study or if you have questions regarding your rights as a research participant, you can contact the Survey and Behavioural Research Ethics Committee (SBREC) of the Chinese University of Hong Kong at (852) 3943 6239 / ssinfo@cuhk.edu.hk or the University Ethics of Research Committee (UERC) of the University of Bristol at gsoe-ethics@bristol.ac.uk .

Agreement to Participate in the Research

I have read the above study and have had an opportunity to ask questions, which have been answered to my satisfaction. I agree voluntarily to participate in the study as described.

Name of the participant:	_____	Class:	_____
Signature of the participant:	_____	Date:	_____

Approved on May 15, 2015 by the Research Ethics Committee, Graduate School of Education, The University of Bristol
Approved on May 27, 2015 by the Survey and Behavioural Research Ethics Committee, The Chinese University of Hong Kong

Appendix G: Student Informed Consent Form (Phase II)

Ref: _____

Consent to be a Research Subject

Title of study: Exploring learners' use of Pronunciation Learning Strategies in Hong Kong: An investigation on the potential benefits of using digital storytelling in an EFL speech-pronunciation classroom in a local university

Researcher: Olive Cheung

Contact details: (852) 3943 7427 / olivecheung@cuhk.edu.hk

Introduction

Olive Cheung is a full-time senior lecturer at the English Language Teaching Unit, The Chinese University of Hong Kong and a part-time student on the Doctor of Education Programme at the Graduate School of Education, The University of Bristol. She is doing research on pronunciation learning of English learners.

You are invited to participate in her research study that investigates English pronunciation learning of university students in Hong Kong. The purpose of this study is twofold: (a) to understand students' use of and preferences for Pronunciation Learning Strategies; and (b) to investigate the potential of digital storytelling as an English speaking activity that encourages the use of Pronunciation Learning Strategies.

Procedures

If you agree to participate in this study, you:

(a) will be granting the researcher permission to use the speaking recording and assignments you have produced for *ELTU1107 English Improvement Strategies for Listening and Speaking,* including your pronunciation exercises, speaking performances, digital story and written reflections, for research analyses;

(b) will complete a questionnaire about your pronunciation learning experience and digital storytelling experience, which should take you roughly 20 minutes; and

(c) may be invited to participate in a follow-up interview to discuss your above learning experiences if you are willing to provide the researcher with more input.

Risks/Discomforts

There are no risks from participating in this study other than, perhaps, you may feel shy or embarrassed talking about your pronunciation learning experience. Your answers to the questionnaire items or interview questions will not affect your course grades in any way. In fact, scores to all course assignments and tests will have been released to you before you are asked to fill in the questionnaire and/or attend the interview.

Benefits

You may not get any direct benefit from participating in the study, but it may help you better understand your current use of Pronunciation Learning Strategies and introduce you to strategies that you do not know or sufficiently use. Meanwhile, your contribution will also help provide insights on pronunciation teaching and learning as well as the potential strengths and weaknesses of digital storytelling as a speaking task.

Confidentiality

All information you provide to the researcher will be kept strictly confidential. The results of this study may be presented at professional meetings and conferences or published in academic journals, but your name and identity will not be revealed.

Participation

Participation in this research is voluntary. You have the right to withdraw from the study or refuse to participate in its entirety at any time you wish. As aforementioned, your participation or non-participation will not affect your course grade.

Questions

If you have questions about this study or if you have questions regarding your rights as a research participant, you can contact the Survey and Behavioural Research Ethics Committee of the Chinese University of Hong Kong at (852) 3943 6239 / ssinfo@cuhk.edu.hk or the University Ethics of Research Committee (UERC) of the University of Bristol at gsoe-ethics@bristol.ac.uk .

Agreement to Participate in the Research

I have read about the above study and have had an opportunity to ask questions, which have been answered to my satisfaction. I agree voluntarily to participate in the study as described.

Name of the participant: _____ Date: _____

Signature of the participant: _____

Approved on May 15, 2015 by the Research Ethics Committee, Graduate School of Education, The University of Bristol
Approved on May 27, 2015 by the Survey and Behavioural Research Ethics Committee, The Chinese University of Hong Kong

Appendix H: CUHK Survey and Behavioural Research Ethics Approval Form

THE CHINESE UNIVERSITY OF HONG KONG

Survey and Behavioural Research Ethics

Application Form

This Form is to be completed by researchers whose research studies involve survey, observation or collection of data on human subjects. Please read the ***Guidelines for Survey and Behavioural Research Ethics*** carefully before completing this Form.)

Project Title: Exploring learners' use of Pronunciation Learning Strategies in Hong Kong: An investigation on the potential benefits of using digital storytelling in an EFL speech-pronunciation classroom in a local university

Grant Applied/Applying (if applicable): N/A

Ref. No./Account No. (if applicable): N/A

Name of Principal Investigator: Cheung Yuet Ying *(Please underline the surname)*

Department/Unit: English Language Teaching Unit, The Faculty of Arts

Tel. No.: 3943-7427 E-mail Address: olivecheung@cuhk.edu.hk

Name of Course Instructor (if applicable): Cheung Yuet Ying

Programme and Year of Study (for students):

Student ID:

Summary of Research Proposal:
(- For expedited review, the summary of the research should be sufficiently detailed to show that it is entitled to this type of review.
- For full review, a detailed account such as grant application and its summary should be given.)

I. Background

Learning strategies are steps taken by students to enhance their own learning and they are especially important for language learning because they are tools that support active, self-directed involvement, an essential element leading to the development of communicative competence (Oxford, 1990). In line with the flourishing of strategies research against the backdrop of CLT development in the past forty years, learning strategies have become an accepted part of language education in the ESL classroom (Eckstein, 2007). However, unlike other aspects of language learning, pronunciation seems to have received the least attention in the development course of Language Learning Strategies research until very recently.

A review of literature reveals that most Pronunciation Learning Strategies (PLS) studies reported thus far were conducted in American or Polish universities while research subjects were often limited to English language or English education majors only. Also, these studies have largely adopted quantitative research approaches in measuring the frequency of PLS use in relation to pronunciation gain while little research has explored factors contributing to learners' choice and preferability of strategies. Furthermore, investigation on the use of particular tasks to support learners' use of PLS is absent.

II. Objectives

In the hope of filling the research gap, the present investigation is designed to explore Hong Kong university students' use of Pronunciation Learning Strategies (Part I) and investigate the potential benefits of introducing digital storytelling as a speaking task in a tertiary ESL classroom with the aim of engaging students in active use of Pronunciation Learning Strategies (Part II).

III. Procedures

Part I of the research concerns Hong Kong university students' general use of Pronunciation Learning Strategies, with the aim of exploring their Pronunciation Learning Strategies use patterns and frequency, factors affecting their choices over these strategies and possible correlation between strategy use patterns and pronunciation performance. To collect data for this exploration, about 100 students from a local university in Hong Kong will be invited to complete a questionnaire (the Pronunciation Learning Strategies Survey) and participate in a pronunciation performance assessment by recording their read-aloud of a given passage and spontaneous response to a prompt.

Part II of the research concerns students' use of Pronunciation Learning Strategies during the process of completing a particular task called digital storytelling, with the aim of exploring their Pronunciation Learning Strategies use patterns and frequency on the task, and features of the task that possibly affect their choices over these strategies. To collect data for this exploration, about 40 students from a local university in Hong Kong enrolling in a speech-pronunciation English enhancement course will be invited to participate in the study, whereby they will complete a digital story and a post-task reflective entry as coursework, after which they will complete a questionnaire (the Pronunciation Learning Strategies Survey, modified version) and participate in a follow-up interview.

IV. Data collection instruments

Part I:

Questionnaires. The Pronunciation Learning Strategies Questionnaire (attached – appendix 1) is designed based on Oxford (1990) and Peterson (2000) to assess students' use of various types of Pronunciation Learning Strategies in attempt to learn or improve English pronunciation as well as eliciting factors affecting their strategy use patterns. The questionnaire should take about 15-20 minutes to complete.

Pronunciation recording. Participants will be asked to read aloud a short text of about 350 words and give a spontaneous response to a prompt which asks them to recount a personal experience. The preparation and recording should take about 15 minutes.

Part II:

Digital stories. A digital story is a form of narrative that consists of series of still images combined with a narrated soundtrack to tell a personal story (Lambert, 2002; Bull & Kajder, 2004; Davis, 2004; Banaszewski, 2005). Student participants will be completing a 5-minute long digital story as part of course work. Informed consent will be obtained from participants for the investigator to analyse pronunciation performance and narrative structures of their submitted digital stories.

Self-reflection reports. Student participants will be completing a written self-reflection by answering guiding questions (attached – appendix 2) as part of course work, some of which will ask about their use of Pronunciation Learning Strategies in the process of completing their digital stories. Informed consent will be obtained from participants for the investigator to analyse their reports.

Questionnaires. A modified version of the Pronunciation Learning Strategies Questionnaire (attached – appendix 3) will be administered to assess students' use of various types of Pronunciation Learning Strategies in the process of completing their digital stories. Items not pertaining to the digital storytelling task are removed while items further eliciting details on how students attempt to complete their stories are added. The questionnaire should take about 20 minutes to complete.

Interviews. Following the questionnaires, student participants will be invited to participate in a semi-structured follow-up interview where they will be asked to talk about their pronunciation learning experiences both on the digital storytelling project and outside class. The discussion will focus largely on factors affecting their preferences or habits on using different types of Pronunciation Learning Strategies.

V. Ethical issues

Safety/well-being of participants; Right of withdrawal. The potential physical or psychological harms for participating in this study are minimal. There are no foreseeable risks other than, perhaps, participants may feel shy or embarrassed talking about their pronunciation learning experience.

Students will be reassured that their candid answers to the questionnaire items or interview questions will not affect their course grades in any way. To avoid students feeling coerced into providing overly positive answers in response to the two instruments, scores to all course assignments and tests will have been released to them before students fill

in the questionnaire and/or attend the interview. Students who do not wish to participate may also withdraw from the study safely at this point without worrying about repercussion on their course grades.

Anonymity/confidentiality. All personal information will remain confidential. Participants' input, including questionnaires and voice-recordings, will be coded for data analysis concerning correlation between the two sets of data. Participants' personal identity will thereby be protected by inputting code numbers on data rather than identifying names. Their identity will also be kept anonymous during data reporting in the resulting dissertation or any other research publications.

Potential benefits. Although the participants may not get any direct benefit from participating in the study, they may better understand their current use of Pronunciation Learning Strategies and be introduced to strategies they do not know or sufficiently use by going through the questionnaire. Meanwhile, their contribution will also help provide insights on pronunciation teaching and learning as well as the potential strengths and weaknesses of digital storytelling as a speaking task.

Information given to participants; Informed consent. Participants will be informed of the objectives, researcher-in-charge, procedures of data collection, and potential risks and benefits of the study. They will also be assured of confidentiality of their identity, right to withdraw from the study at any point, and possible channels for inquiries and complaints should they have concerns regarding their rights as research participants. All this information is communicated through the informed consent form to be distributed to all participants (See attached – Appendices 4 and 5).

Data storage. All data will be stored securely in a password-protected computer in a locked office on the university campus. Only the investigator will have access to these data.

1. Does the study use **only** publicly available data? No

2. Does the study involve **only** survey or observation of public officials? No

If you have checked "Yes" to any of the above items, you can skip items 3a to 3h and go straight to question 4 to apply for an expedited review.

3. Checklist to determine whether a full review is needed: No

a. Does the study involve subjects who are unable to give informed consent? No

(e.g. children, mentally handicapped people).

b. Will deception of subjects be necessary during the study? No

c. Will financial inducements (other than reasonable expenses and compensation for time) be offered to subjects? No

d. Does the study involve sensitive aspects of the subject's own behaviour such as illegal conduct, drug or alcohol use, and sexual conduct? No

e. If the observations on the subjects are disclosed, will it reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, or reputation? No

f. Could the study/experiment induce undue psychological stress? No

g. Is pain or more than mild discomfort likely to result from the study? No

h. Will the study involve prolonged and repetitive testing? No

If you have checked "Yes" to any of the above items, you must go through a full review. Please attach a detailed research proposal.

4. What data collection procedures will you be using? (Please summarize below.)
Please see Part III and Part IV of the research proposal above. Thank you.

5. Will consent form be used? Yes

If your response to this question is "Yes", please attach a copy of the consent form.

If your response is "No", please clearly state your reasons below.

Please see appendix 4 and 5. Thank you.

For survey on regular secondary school children only:

a. Does your study involve any of those sensitive issues listed in questions 3b to 3h?

b. Has the school consent been sought?

If your response to question (a) is "No" and question (b) is "Yes", consent form is exempted.

6. For non-anonymous surveys, please outline steps to be taken to insure confidentiality of data.

7. Does your application qualify for an expedited review: Yes

***Important*:**

- **For application for an expedited review, the researcher should attach a copy of the questionnaire or instruments to be used in the proposed research study. If it is unavailable, a detailed description should be provided.**
- **For project that needs full review, a research proposal should be attached**.
- **If it is not clear whether the research needs a full review, the researcher should refer to the Guidelines for Survey and Behavioural Research Ethics and seek advice from the Faculty sub-committee concerned or the Survey and Behavioural Research Ethics Committee as appropriate.**

8. Where to submit the application

- Faculties of Arts, Business Administration, Social Science, Medicine, Law, and Education: Faculty Sub-committee
- Faculties of Engineering, and Science: Survey and Behavioural Research Ethics Committee

==========

DECLARATION: The information provided above is to the best of my knowledge accurate. I shall take reasonable care to ensure that the project is conducted in accordance with the *Guidelines for Survey and Behavioural Research Ethics*. I will obtain approval from other research ethics committees within CUHK (e.g., Clinical Research Ethics Committee, Animal Research Ethics Committee) where appropriate.

_____ _____

Date Signature of Principal Investigator/researcher

==========

Endorsement by Department Chairperson/Unit Head

Comment:

Date: Signature:

Name:

==========

Appendix I: UoB GSoE Research Ethics Form

GSoE RESEARCH ETHICS FORM

Name(s): CHEUNG Yuet Ying Olive (SID: P1250778, UoB; 53122270, SCOPE – Cohort 16)

Proposed research project: Exploring learners' use of Pronunciation Learning Strategies in Hong Kong: An investigation on the potential benefits of using digital storytelling in an EFL speech-pronunciation classroom in a local university

Proposed funder(s): N/A

Discussant for the ethics meeting: Ms LEUNG Kit Chi Ella

Name of supervisor: Dr Talia Isaacs (Jan 2015 – Feb 2017) and Prof. Guoxing Yu (From Nov 2017)

Has your supervisor seen this submitted draft of your ethics application? Y/N

Please include an outline of the project:

Background

Learning strategies are steps taken by students to enhance their own learning and they are especially important for language learning because they are tools that support active, self-directed involvement, an essential element leading to the development of communicative competence (Oxford, 1990). In line with the flourishing of strategies research against the backdrop of CLT development in the past forty years, learning strategies have become an accepted part of language education in the ESL/EFL classroom (Eckstein, 2007). However, unlike other aspects of language learning, pronunciation seems to have received the least attention in the development course of Language Learning Strategies research until very recently.

A review of literature reveals that most Pronunciation Learning Strategies (PLS) studies reported thus far were conducted in American or Polish universities while research subjects were often limited to English language or English education majors only. Also, these studies have largely adopted quantitative research approaches in measuring the frequency of PLS use in relation to pronunciation gain while little research has explored factors contributing to learners' choice and preferability of strategies. Furthermore, investigation on the use of particular tasks to support learners' use of PLS is absent.

Objectives

In the hope of filling the research gap, the present investigation is designed to explore Hong Kong university students' use of Pronunciation Learning Strategies (Part I) and investigate the potential benefits of introducing digital storytelling as a speaking task in a tertiary EFL classroom with the aim of engaging students in active use of Pronunciation Learning Strategies (Part II).

Procedures

Part I of the research concerns Hong Kong university students' general use of Pronunciation Learning Strategies, with the aim of exploring their Pronunciation Learning Strategies use patterns and frequency, factors affecting their choices over these strategies and possible correlation between strategy use patterns and pronunciation performance. To collect data for this exploration, about 100 students from a local university in Hong Kong will be invited to complete a questionnaire (the Pronunciation Learning Strategies Survey) and participate in a pronunciation performance assessment by recording their read-aloud of a given passage and spontaneous response to a prompt.

Part II of the research concerns students' use of Pronunciation Learning Strategies during the process of completing a particular task called digital storytelling, with the aim of exploring their Pronunciation Learning Strategies use patterns and frequency on the task, and features of the task that possibly affect their choices over these strategies. To collect data for this exploration, about 40 students from a local university in Hong Kong enrolling in a speech-pronunciation English enhancement course will be invited to participate in the study, whereby they will complete a digital story and a post-task reflective entry as coursework, after which they will complete a questionnaire (the Pronunciation Learning Strategies Survey, modified version) and participate in a follow-up interview.

Ethical issues discussed and decisions taken:

Data collection

The following instruments will be used to collect data:

Part I:

Questionnaires. The Pronunciation Learning Strategies Questionnaire (attached – appendix 1) is designed based on Oxford (1990) and Peterson (2000) to assess students' use of various types of Pronunciation Learning Strategies in attempt to learn or improve English pronunciation as well as eliciting factors affecting their strategy use patterns. The questionnaire should take about 15-20 minutes to complete.

Pronunciation recording. Participants will be asked to read aloud a short text of about 350 words and give a spontaneous response to a prompt which asks them to recount a personal experience. The preparation and recording should take about 15 minutes.

Part II:

Digital stories. A digital story is a form of narrative that consists of series of still images combined with a narrated soundtrack to tell a personal story (Lambert, 2002; Bull & Kajder, 2004; Davis, 2004; Banaszewski, 2005). Student participants will be completing a 5-minute long digital story as part of course work. Informed consent will be obtained from participants for the investigator to analyse pronunciation performance and narrative structures of their submitted digital stories.

Self-reflection reports. Student participants will be completing a written self-reflection by answering guiding questions (attached – appendix 2) as part of course work, some of which will ask about their use of Pronunciation Learning Strategies in the process of completing their digital stories. Informed consent will be obtained from participants for the investigator to analyse their reports.

Questionnaires. A modified version of the Pronunciation Learning Strategies Questionnaire (attached – appendix 3) will be administered to assess students' use of various types of Pronunciation Learning Strategies in the process of completing their digital stories. Items not pertaining to the digital storytelling task are removed while items further eliciting details on how students attempt to complete their stories are added. The questionnaire should take about 20 minutes to complete.

Interviews. Following the questionnaires, student participants will be invited to participate in a semi-structured follow-up interview where they will be asked to talk about their pronunciation learning experiences both on the digital storytelling project and outside class. The discussion will focus largely on factors affecting their preferences or habits on using different types of Pronunciation Learning Strategies.

Ethical issues concerned:

Safety/well-being of participants; Right of withdrawal. The potential physical or psychological harms for participating in this study are minimal. There are no foreseeable risks other than, perhaps, participants may feel shy or embarrassed talking about their pronunciation learning experience.

Students will be reassured that their candid answers to the questionnaire items or interview questions will not affect their course grades in any way. To avoid students feeling coerced into providing overly positive answers in response to the two instruments, scores to all course assignments and tests will have been released to them before students fill in the questionnaire and/or attend the interview. Students who do not wish to participate may also withdraw from the study safely at this point without worrying about repercussion on their course grades.

Anonymity/confidentiality. All personal information will remain confidential. Participants' input, including questionnaires and voice-recordings, will be coded for data analysis concerning correlation between the two sets of data. Participants' personal identity will thereby be protected by inputting code numbers on data rather than identifying names. Their identity will also be kept anonymous during data reporting in the resulting dissertation or any other research publications.

Potential benefits/feedback. Although the participants may not get any direct benefit from participating in the study, they may better understand their current use of Pronunciation Learning Strategies and be introduced to strategies they do not know or sufficiently use by going through the questionnaire. Meanwhile, their contribution

will also help provide insights on pronunciation teaching and learning as well as the potential strengths and weaknesses of digital storytelling as a speaking task.

One concern arising from the ethics discussion was the potentially personal, sensitive and private nature of the content of participants' digital stories. Since students are informed of the presence of an in-class peer-viewing session by the end of the course, they should have chosen topics that they will feel sufficiently comfortable sharing with an audience. Despite this, it is important to keep in mind that students' willingness to share their personal stories with other students in class does not automatically entail their willingness to share the same information with a larger audience or even the public. Therefore, the same amount of caution will be taken to ensure that students' identity will be protected and kept anonymous should information concerning the content of the stories be discussed in the dissertation or subsequent publications. However, considering that the nature of the study, which focuses on pronunciation and speech performance, the risks of revealing students' identity through discussing detailed particulars of their personal, emotional or private information from analysing their narrative input in the digital stories should be minimal.

Information given to participants; Informed consent. Participants will be informed of the objectives, researcher-in-charge, procedures of data collection, and potential risks and benefits of the study. They will also be assured of confidentiality of their identity, right to withdraw from the study at any point, and possible channels for inquiries and complaints should they have concerns regarding their rights as research participants. All this information is communicated through the informed consent form to be distributed to all participants (See attached – Appendices 4 and 5).

Data storage; data protection act. All data will be stored securely in a password-protected computer in a locked office on the university campus. Only the investigator will have access to these data. Since data input including questionnaires and voice-recording will be coded with reference numbers rather than with participants' names directly attached, participants' identities will not be leaked even if the data were stolen in the worst case scenario. All data concerned will only be kept until the research project is completed and the study results are reported in the doctoral dissertation and other related publications resulting from this study, which should be no more than five years from the start of the study (and the expiry of the researcher' identity as an EdD student of UoB as indicated on her student identity card). All data collected will be destroyed then.

* * *

If you feel you need to discuss any issue further, or to highlight difficulties, please contact the GSoE's ethics co-ordinators who will suggest possible ways forward.

Signed:_____(Researcher) Signed: _____(Discussant)

CHEUNG Yuet Ying Olive LEUNG Kit Chi Ella

Date: April 22, 2015.

Appendix J: Pronunciation performance task

Ref: _____

Speaking Performance Task

You have 10 minutes to prepare for both parts of the task and 5 minutes to record your speech.

Part I: This part requires you to read aloud a short passage as meaningfully as you can.

Part II: This part requires you to describe a personal experience by responding to a prompt.

*** Before you start, please say aloud your Reference Number. ***

Part I: Reading aloud

An Adventure

Benny opened his eyes and gave a great stretch, unsure exactly where he was at first and then remembering: the Fonseca National Express.

"It smells like coffee in here," said the conductor, opening the window to allow the air in.

"It's my rucksack," explained Benny, sitting up and untying his seat belt before pulling it on, for the bag, filled to the brim with coffee beans, had been a parting gift from Eddy and Maggie, something to keep him grounded when he arrived in Rio. He'd been so tired when he arrived at the train station in Sao Paulo, but the journey must have refreshed him for he felt very alert now, as if he'd slept for days. Stepping down onto the platform, however, he was surprised to see a sign that said "Penn Station".

"Excuse me," he asked a passing policeman. "Which direction do I go for Rio Airport?"

"About five thousand miles that way, kid," the man replied, pointing towards the exit doors.

"Five thousand miles?" said Benny, gasping in astonishment. "Where am I exactly?"

"New York," said the cop. "The most magnificent city in the world."

"Actually, that's Sydney," said Benny, who might have been surprised to find himself in North America rather than South, but wasn't going to allow a mistake like that to go unchallenged. The policeman didn't seem to mind, however, simply shrugging his shoulders and moving on while Benny made his way out of the station, wondering how he ended up in New York of all places, and what on earth he should do next. He had obviously slept for the entire journey and his flight to Sydney had departed on time without him.

Benny was now completely alone on the streets of the huge city and wandered aimlessly around for an hour, down one avenue, across a side street, up another, through a plaza and out into a busy shopping area, a little taken aback by the height of buildings and the crowds that were making their way out of the countless passages.

Part II: Recount

Recall and speak about your happiest moment in life for about two minutes. Share your experience by describing what happened that brought your happiness.
(You may jot notes in the space below)

Appendix K: Pronunciation proficiency rubric for pronunciation assessment tasks

Scale descriptors for holistic assessment of pronunciation performance			
Scales		**Scale 1: Accuracy of Pronunciation at Segmental level**	**Scale 2: Communication of Meaning at Suprasegmental level**
5	**Excellent Command**	* **demonstrates a full range of pronunciation features at segmental level with precision and subtlety** • excellent articulation of vowels, consonants and diphthongs • errors are hardly ever detected • speech is always natural sounding, fully intelligible and effortless to understand	* **excellent communication of the meaning of the text at suprasegmental level** • accurate syllable stress and mastery of weak forms • rhythm, sentence stress and intonation sound very natural and always effectively convey the intended meaning • always recognize and present thought groups with appropriate pacing and pauses to facilitate understanding • speech is very fluid and hesitation is rare • shows sustained features of connected speech
4.5			
4	**Good Command**	* **demonstrates a wide range of pronunciation features at segmental level with mostly good control** • articulation of vowels, consonants and diphthongs is mostly clear, with occasional lapses only • errors are rare, and are isolated instead of systematic in nature • speech is generally natural sounding, highly intelligible and easy to understand • L1 accent may be detected but has little effect on intelligibility	* **good communication of the meaning of the text at suprasegmental level** • generally good control over syllable stress and weak forms, with occasional lapses only • rhythm, sentence stress and intonation sound natural and convey the intended meaning most of the time with rare lapses only • usually recognize and present thought groups with appropriate pacing and pauses to facilitate understanding • speech is generally fluid and hesitation is infrequent • shows mostly sustained features of connected speech
3.5			
3	**Acceptable Command**	* **demonstrates an acceptable range of pronunciation features at segmental level with mixed control** • articulation of vowels, consonants and diphthongs is generally clear, with lapses at times • mispronunciation of individual words or sounds reduces clarity and obscures meaning at times, with a small number of systematic errors • speech is basically intelligible despite occasional problems for the listener • L1 accent/ interference is detected and may exert strain on the listener in places	* **acceptable communication of the meaning of the text at suprasegmental level** • acceptable control over syllable stress although a small number of systematic unnatural sounding patterns and/or neglect of weak forms are evident • rhythm, sentence stress and intonation may sometimes be unnatural but generally convey the intended meaning, with lapses at times that may occasionally obscure the meaning for the listener • recognizes thought groups such that pacing and pauses are occasionally inappropriate • speech is fairly fluid and hesitation occurs at times • shows some features of connected speech but this is not sustained
2.5			
2	**Fair Command**	* **demonstrates a limited range of pronunciation features at segmental level** • attempts to articulate vowels, consonants and diphthongs are not always successful while lapses are frequent • there are many mispronunciations of words or sounds, which causes difficulty for the listener • speech is sometimes unintelligible and causes communication difficulty • L1 accent/ interference is evident and often exerts strain on the listener	* **fair communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically weak • rhythm, sentence stress and intonation are seldom used in a natural way and rarely communicate the intended meaning while inappropriate uses frequently cause communication difficulty on the listener (which may be characterized by monotonous or overly dramatic delivery) • limited success in sustaining sense groups such that pacing and pauses are often inappropriate or choppy • speech fluidity is low and hesitation is frequent • rarely shows features of connected speech
1.5			
1	**Poor Command**	* **demonstrates a very limited range of pronunciation features at segmental level** • generally poor articulation of vowels, consonants and diphthongs, with very low intelligibility • errors are frequent, which causes tremendous difficulty for the listener • speech is often unintelligible and causes communication break-down • L1 accent/ interference is evident and constantly exerts strain on the listener	* **poor communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically poor • rhythm, sentence stress and intonation are unnatural sounding and fail to communicate the intended meaning while frequent inappropriate uses lead to interference with communication • failure in sustaining sense groups by reading aloud words one by one instead of in meaningful groups • speech is awkward as delivery is choppy, fragmented or telegraphic and hesitation is frequent • pays no attention to features of connected speech
0.5			
0	**Not ratable**	* **No communication possible; no ratable language**	

Appendix L: References supporting design of the pronunciation assessment rubric

Scale descriptors for holistic assessment of pronunciation performance			
Scales		**Scale 1: Accuracy of Pronunciation at Segmental level**	**Scale 2: Communication of Meaning at Suprasegmental level**
5	**Excellent Command**	* **demonstrates a full range of pronunciation features at segmental level with precision and subtlety** [1] • excellent articulation of vowels, consonants and diphthongs • errors are hardly ever detected • speech is always natural sounding, fully intelligible and effortless to understand [1]	* **excellent communication of the meaning of the text at suprasegmental level** • accurate syllable stress and mastery of weak forms • rhythm, sentence stress and intonation sound very natural and always effectively convey the intended meaning • always recognize and present thought groups with appropriate pacing and pauses to facilitate understanding • speech is very fluid and hesitation is rare • shows sustained features of connected speech
4.5			
4	**Good Command**	* **demonstrates a wide range of pronunciation features at segmental level with mostly good control** [1] • articulation of vowels, consonants and diphthongs is mostly clear, with occasional lapses only [1] • errors are rare, and are isolated instead of systematic in nature • speech is generally natural sounding, highly intelligible and easy to understand [1] • L1 accent may be detected but has little effect on intelligibility [1]	* **good communication of the meaning of the text at suprasegmental level** • generally good control over syllable stress and weak forms, with occasional lapses only • rhythm, sentence stress and intonation sound natural and convey the intended meaning most of the time with rare lapses only • usually recognize and present thought groups with appropriate pacing and pauses to facilitate understanding • speech is generally fluid and hesitation is infrequent • shows mostly sustained features of connected speech
3.5			
3	**Acceptable Command**	* **demonstrates an acceptable range of pronunciation features at segmental level with mixed control** [1] • articulation of vowels, consonants and diphthongs is generally clear, with lapses at times • mispronunciation of individual words or sounds reduces clarity and obscures meaning at times, with a small number of systematic errors [1] • speech is basically intelligible despite occasional problems for the listener • L1 accent/ interference is detected and may exert strain on the listener in places	* **acceptable communication of the meaning of the text at suprasegmental level** • acceptable control over syllable stress although a small number of systematic unnatural sounding patterns and/or neglect of weak forms are evident • rhythm, sentence stress and intonation may sometimes be unnatural but generally convey the intended meaning, with lapses at times that may occasionally obscure the meaning for the listener • recognizes thought groups such that pacing and pauses are occasionally inappropriate • speech is fairly fluid and hesitation occurs at times • shows some features of connected speech but this is not sustained
2.5			
2	**Fair Command**	* **demonstrates a limited range of pronunciation features at segmental level** [1] • attempts to articulate vowels, consonants and diphthongs are not always successful while lapses are frequent [1] • there are many mispronunciations of words or sounds, which causes difficulty for the listener [1] • speech is sometimes unintelligible and causes communication difficulty • L1 accent/ interference is evident and often exerts strain on the listener	* **fair communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically weak • rhythm, sentence stress and intonation are seldom used in a natural way and rarely communicate the intended meaning while inappropriate uses frequently cause communication difficulty on the listener (which may be characterized by monotonous or overly dramatic delivery) • limited success in sustaining sense groups such that pacing and pauses are often inappropriate or choppy • speech fluidity is low and hesitation is frequent • rarely shows features of connected speech
1.5			
1	**Poor Command**	* **demonstrates a very limited range of pronunciation features at segmental level** • generally poor articulation of vowels, consonants and diphthongs, with very low intelligibility • errors are frequent, which causes tremendous difficulty for the listener • speech is often unintelligible and causes communication break-down [1] • L1 accent/ interference is evident and constantly exerts strain on the listener	* **poor communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically poor • rhythm, sentence stress and intonation are unnatural sounding and fail to communicate the intended meaning while frequent inappropriate uses lead to interference with communication • failure in sustaining sense groups by reading aloud words one by one instead of in meaningful groups • speech is awkward as delivery is choppy, fragmented or telegraphic and hesitation is frequent • pays no attention to features of connected speech
0.5			
0	**Not ratable**	* **No communication possible; no ratable language**	

With reference to [1] The speaking scale for IELTS speaking paper

Scale descriptors for holistic assessment of pronunciation performance			
Scales		**Scale 1: Accuracy of Pronunciation at Segmental level**	**Scale 2: Communication of Meaning at Suprasegmental level**
5	**Excellent Command**	*** demonstrates a full range of pronunciation features at segmental level with precision and subtlety** • excellent articulation of vowels, consonants and diphthongs • errors are hardly ever detected • speech is always natural sounding, fully intelligible and effortless to understand	*** excellent communication of the meaning of the text at suprasegmental level** • accurate syllable stress and mastery of weak forms • rhythm, sentence stress and intonation sound very natural and always effectively convey the intended meaning [2] • always recognize and present thought groups with appropriate pacing and pauses to facilitate understanding [2] • speech is very fluid and hesitation is rare • shows sustained features of connected speech
4.5			
4	**Good Command**	*** demonstrates a wide range of pronunciation features at segmental level with mostly good control** • articulation of vowels, consonants and diphthongs is mostly clear, with occasional lapses only • errors are rare, and are isolated instead of systematic in nature • speech is generally natural sounding, highly intelligible and easy to understand [2] • L1 accent may be detected but has little effect on intelligibility [2]	*** good communication of the meaning of the text at suprasegmental level** • generally good control over syllable stress and weak forms, with occasional lapses only • rhythm, sentence stress and intonation sound natural and convey the intended meaning most of the time with rare lapses only [2] • usually recognize and present thought groups with appropriate pacing and pauses to facilitate understanding [2] • speech is generally fluid and hesitation is infrequent • shows mostly sustained features of connected speech
3.5			
3	**Acceptable Command**	*** demonstrates an acceptable range of pronunciation features at segmental level with mixed control** • articulation of vowels, consonants and diphthongs is generally clear, with lapses at times [2] • mispronunciation of individual words or sounds reduces clarity and obscures meaning at times, with a small number of systematic errors • speech is basically intelligible despite occasional problems for the listener • L1 accent/ interference is detected and may exert strain on the listener in places	*** acceptable communication of the meaning of the text at suprasegmental level** • acceptable control over syllable stress although a small number of systematic unnatural sounding patterns and/or neglect of weak forms are evident • rhythm, sentence stress and intonation may sometimes be unnatural but generally convey the intended meaning, with lapses at times that may occasionally obscure the meaning for the listener [2] • recognizes thought groups such that pacing and pauses are occasionally inappropriate. [2] • speech is fairly fluid and hesitation occurs at times • shows some features of connected speech but this is not sustained
2.5			
2	**Fair Command**	*** demonstrates a limited range of pronunciation features at segmental level** • attempts to articulate vowels, consonants and diphthongs are not always successful while lapses are frequent • there are many mispronunciations of words or sounds, which causes difficulty for the listener • speech is sometimes unintelligible and causes communication difficulty • L1 accent/ interference is evident and often exerts strain on the listener	*** fair communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically weak • rhythm, sentence stress and intonation are seldom used in a natural way and rarely communicate the intended meaning while inappropriate uses frequently cause communication difficulty on the listener (which may be characterized by monotonous or overly dramatic delivery) [2] • limited success in sustaining sense groups such that pacing and pauses are often inappropriate or choppy [2] • speech fluidity is low and hesitation is frequent [2] • rarely shows features of connected speech
1.5			
1	**Poor Command**	*** demonstrates a very limited range of pronunciation features at segmental level** • generally poor articulation of vowels, consonants and diphthongs, with very low intelligibility • errors are frequent, which causes tremendous difficulty for the listener • speech is often unintelligible and causes communication break-down • L1 accent/ interference is evident and constantly exerts strain on the listener	*** poor communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically poor • rhythm, sentence stress and intonation are unnatural sounding and fail to communicate the intended meaning while frequent inappropriate uses lead to interference with communication [2] • failure in sustaining sense groups by reading aloud words one by one instead of in meaningful groups • speech is awkward as delivery is choppy, fragmented or telegraphic and hesitation is frequent [2] • pays no attention to features of connected speech
0.5			
0	**Not ratable**	*** No communication possible; no ratable language**	

With reference to [2] The speaking scale for the speaking paper of TOEFL

Scale descriptors for holistic assessment of pronunciation performance			
Scales		**Scale 1: Accuracy of Pronunciation at Segmental level**	**Scale 2: Communication of Meaning at Suprasegmental level**
5	**Excellent Command**	*** demonstrates a full range of pronunciation features at segmental level with precision and subtlety** • excellent articulation of vowels, consonants and diphthongs • errors are hardly ever detected • speech is always natural sounding, fully intelligible and effortless to understand	*** excellent communication of the meaning of the text at suprasegmental level** • accurate syllable stress and mastery of weak forms • rhythm, sentence stress and intonation sound very natural and always effectively convey the intended meaning [3] • always recognize and present thought groups with appropriate pacing and pauses to facilitate understanding [3] • speech is very fluid and hesitation is rare [3] • shows sustained features of connected speech
4.5			
4	**Good Command**	*** demonstrates a wide range of pronunciation features at segmental level with mostly good control** • articulation of vowels, consonants and diphthongs is mostly clear, with occasional lapses only • errors are rare, and are isolated instead of systematic in nature • speech is generally natural sounding, highly intelligible and easy to understand [3] • L1 accent may be detected but has little effect on intelligibility [3]	*** good communication of the meaning of the text at suprasegmental level** • generally good control over syllable stress and weak forms, with occasional lapses only • rhythm, sentence stress and intonation sound natural and convey the intended meaning most of the time with rare lapses only • usually recognize and present thought groups with appropriate pacing and pauses to facilitate understanding [3] • speech is generally fluid and hesitation is infrequent [3] • shows mostly sustained features of connected speech
3.5			
3	**Acceptable Command**	*** demonstrates an acceptable range of pronunciation features at segmental level with mixed control** • articulation of vowels, consonants and diphthongs is generally clear, with lapses at times • mispronunciation of individual words or sounds reduces clarity and obscures meaning at times, with a small number of systematic errors • speech is basically intelligible despite occasional problems for the listener • L1 accent/ interference is detected and may exert strain on the listener in places [3]	*** acceptable communication of the meaning of the text at suprasegmental level** • acceptable control over syllable stress although a small number of systematic unnatural sounding patterns and/or neglect of weak forms are evident • rhythm, sentence stress and intonation may sometimes be unnatural but generally convey the intended meaning, with lapses at times that may occasionally obscure the meaning for the listener • recognizes thought groups such that pacing and pauses are occasionally inappropriate [3] • speech is fairly fluid and hesitation occurs at times [3] • shows some features of connected speech but this is not sustained
2.5			
2	**Fair Command**	*** demonstrates a limited range of pronunciation features at segmental level** • attempts to articulate vowels, consonants and diphthongs are not always successful while lapses are frequent • there are many mispronunciations of words or sounds, which causes difficulty for the listener • speech is sometimes unintelligible and causes communication difficulty • L1 accent/ interference is evident and often exerts strain on the listener [3]	*** fair communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically weak • rhythm, sentence stress and intonation are seldom used in a natural way and rarely communicate the intended meaning while inappropriate uses frequently cause communication difficulty on the listener (which may be characterized by monotonous or overly dramatic delivery) • limited success in sustaining sense groups such that pacing and pauses are often inappropriate or choppy [3] • speech fluidity is low and hesitation is frequent [3] • rarely shows features of connected speech
1.5			
1	**Poor Command**	*** demonstrates a very limited range of pronunciation features at segmental level** • generally poor articulation of vowels, consonants and diphthongs, with very low intelligibility • errors are frequent, which causes tremendous difficulty for the listener • speech is often unintelligible and causes communication break-down • L1 accent/ interference is evident and constantly exerts strain on the listener [3]	*** poor communication of the meaning of the text at suprasegmental level** • control over syllable stress patterns and weak forms is systematically poor • rhythm, sentence stress and intonation are unnatural sounding and fail to communicate the intended meaning while frequent inappropriate uses lead to interference with communication • failure in sustaining sense groups by reading aloud words one by one instead of in meaningful groups • speech is awkward as delivery is choppy, fragmented or telegraphic and hesitation is frequent [3] • pays no attention to features of connected speech
0.5			
0	**Not ratable**	*** No communication possible; no ratable language**	

With reference to [3] Cambridge ESOL Common Scale for Speaking

- Designed by Olive Cheung with reference to rating scales published by major international speaking tests including:

[1] The speaking paper of IELTS

[2] The independent/integrated speaking paper of TOEFL

[3] Cambridge ESOL Common Scale for Speaking

[4] ACTFL Proficiency Guidelines 2012 on Speaking (not referenced)

[5] Common European Framework of Reference (CEFR) (not referenced)

Appendix M: Guiding questions on post-DST project self-reflection report

Digital Storytelling Project: Self Reflection Guide

Introduction

This is the final step in your DST project: You will complete a **Self-reflection** by **describing and reflecting on your learning experience throughout the process of creating your Digital Story.** You can write it either in the format of a journal entry (like a diary or blog post) or as a letter to your teacher.

In the process of recalling your experience with the project, you may note what you found difficult to do, how you have overcome the difficulties, what you have learned, as well as other personal feelings you have towards your own digital story.

If you find it difficult to gather ideas for this reflection exercise, you may refer to the following guiding questions. But you are not required to limit yourself to answering these questions.

Guiding Questions for Self Reflection

1. What was the topic of your Digital Story (DS)? Why did you choose this topic? Was there a central theme or message in your story? Does it have any special meaning to you?

2. Can you describe the process you went through in accomplishing your DS? Was it difficult to gather ideas and photos?

3. Did you edit your storyboard to improve your plot and edit the scripts to perfect the language? If so, in what ways? Can you give examples?

4. Did you attempt to perfect your oral delivery, in particular your pronunciation? If so, in what ways? Can you give examples?

5. Who was your peer-review partner? Did you find their advice helpful? Apart from your partner, did you ask for help from other people? What kind of help did you get?

6. What was the technical process of producing the DS like for you? Was it very complicated, or within easy grasps? Did you feel comfortable finishing the recording on your own?

7. As a learning activity, how is producing a DS different from completing other kinds of English speaking assignments you have done before, such as giving an impromptu speech or an oral presentation?

8. In retrospect, to what extent was DST a *reflective* or *creative* activity for you? (For example, did you gain more understanding about yourself—your talent, values, character, or meanings in life? Did you creatively edit the story so that it sounds more intriguing or interesting to viewers?)

9. Overall speaking, did you enjoy the experience of producing a DS? Why/ why not? (Feel free to say 'No' to this question. You won't be downgraded even if you did not enjoy the assignment!)

Appendix N: Guiding questions for semi-structured interview

Opening questions - for setting the tone and creating rapport – start with easy, personal or factual questions (Dörnyei, 2011, p.137)

1. What was the topic of your digital story? Why did you choose this topic? Was there a central theme or message in your story? Does it have any special meaning to you?

2. Can you describe the process you went through in accomplishing your digital story?

Content questions – eliciting experiences and behaviours, opinions and values, feelings, knowledge, sensory information, and/or background or demographic information (ibid, p.137)

3. How did you attempt to perfect your digital story?

4. In particular, what did you do to improve your oral delivery of the narration? Can you give examples?

5. Did you encounter any challenges or difficulties when trying to perfect your oral narration in the digital story? What did you do to overcome them?

6. Who was your peer-review partner? Did you find their advice helpful? Apart from your partner, did you ask for help from other people? What kind of help did you get?

Probes – enhancing emergent qualitative data by asking detail-oriented and clarification questions based on interviewee's input (ibid, p.138).

Final closing questions – bringing the interview to a close by allowing the interviewee the final say (ibid, p.138).

7. Overall speaking, how did you feel about the experience of producing a digital story?

8. If you were given another chance to do the project again, what would you have done differently?

9. Is there anything else you would like to add?

Appendix O: Factor matrix showing an 8-factor structure resulting from a factor analysis of the PLSQ results using maximum likelihood estimation (extraction method) and oblique Promax (rotation method)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
A1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A2	0.000	**0.602**	0.000	0.000	0.000	0.000	0.000	0.000
A3	0.000	0.000	0.000	0.000	0.394	0.000	0.000	0.000
A4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
A5	0.000	0.000	0.000	**0.703**	0.000	0.000	0.000	0.000
A6	0.000	0.000	0.000	0.364	0.000	0.000	0.000	0.000
B7	0.000	0.000	0.000	**0.405**	0.000	0.000	0.000	0.000
B8	0.000	0.000	0.000	0.346	0.000	0.000	0.000	0.000
B9	0.000	0.000	0.000	**0.697**	0.000	0.000	0.000	0.000
B10	0.000	0.000	0.000	**0.752**	0.000	0.000	0.000	0.000
B11	0.000	0.000	0.000	**0.604**	0.000	0.000	0.000	0.000
B12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B13	0.376	0.000	0.000	0.368	0.000	0.000	0.000	0.000
B14	0.000	0.000	0.000	**0.398**	0.000	0.000	0.000	0.000
B15	**0.422**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B17	0.000	0.307	0.000	0.000	0.000	0.000	0.000	0.000
B18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B19	0.000	0.000	0.000	0.000	0.000	**0.746**	0.000	0.000
B20	0.000	0.000	0.000	0.000	0.000	**0.451**	0.000	0.000
B21	**0.524**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B22	0.362	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B23	**0.718**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B24	**0.884**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B25	**0.873**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B26	**0.757**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B27	**0.800**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B28	0.000	0.364	0.391	0.000	0.000	0.000	0.000	0.000
B29	0.000	0.358	0.389	0.000	0.000	0.000	0.000	0.000
B30	**0.402**	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B31	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
B32	0.000	**0.617**	0.000	0.000	0.000	0.000	0.000	0.000
B33	0.000	**0.641**	0.000	0.000	0.000	0.000	0.000	0.000
B34	0.000	**0.682**	0.000	0.000	0.000	0.000	0.000	0.000
B35	0.000	0.000	0.000	0.000	0.000	0.000	**0.518**	0.000
C36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.682**
C37	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.823**
C38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	**0.399**
C39	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
D40	0.000	**0.742**	0.000	0.000	0.000	0.000	0.000	0.000
D41	0.000	**0.796**	0.000	0.000	0.000	0.000	0.000	0.000
D42	0.000	0.000	0.000	0.000	0.000	0.000	0.300	0.000
D43	0.000	**0.526**	0.000	0.000	0.000	0.000	0.000	0.000
D44	0.000	0.000	0.000	0.000	0.000	**0.733**	0.000	0.000
D45	0.000	0.382	0.000	0.000	0.000	0.000	0.000	0.000
D46	0.000	0.000	0.000	0.000	0.359	0.000	0.000	0.000
D47	0.000	0.000	0.000	0.000	0.000	0.000	**0.484**	0.000
D48	0.000	0.000	**0.576**	0.000	0.000	0.000	**0.471**	0.000
D49	0.000	0.000	0.304	0.000	0.000	0.000	0.000	0.000

D50	0.000	0.000	0.000	0.000	0.000	0.000	0.345	0.000
D51	0.000	0.000	0.000	0.000	0.000	0.000	**0.473**	0.000
E52	0.000	0.000	**0.651**	0.000	0.000	0.000	0.000	0.000
E53	0.000	0.000	**0.728**	0.000	0.000	0.000	0.000	0.000
E54	0.000	0.000	**0.721**	0.000	0.000	0.000	0.000	0.000
E55	0.000	0.000	**0.595**	0.000	0.000	0.000	0.000	0.000
E56	0.000	0.000	**0.541**	0.000	0.000	0.000	0.000	0.000
F57	0.000	0.000	0.000	0.000	**0.646**	0.000	0.000	0.000
F58	0.000	0.000	0.000	0.000	**0.819**	0.000	0.000	0.000
F59	0.000	0.000	0.000	0.000	**0.619**	0.000	0.000	0.000
F60	0.385	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Appendix P: Results of PLSQ with mean pronunciation strategies use scores and frequency distributions for all strategies categorized under eight factors

Rank	Item	Pronunciation Learning Strategy (PLS)	Mean	SD	1	2	3	4	5
		Factor 1: Functional practice strategies							
26	**B15**	I read aloud English passages (e.g. from textbooks, magazines, newspapers) or act out dialogues (e.g. from drama or stories).	**3.28**	1.12	6.4%	19.3%	27.9%	32.4%	14.0%
29	**B21**	I pay attention to articulate individual sounds (e.g. vowels, consonants) or syllables clearly and accurately.	**3.24**	1	5.3%	14.4%	41.0%	29.3%	10.0%
18	**B23**	I pay attention to place the word stress on the right syllables within words.	**3.41**	1	2.9%	14.9%	35.3%	32.4%	14.6%
15	**B24**	I pay attention to divide thought groups and pause appropriately when I read sentences.	**3.46**	1	2.9%	14.4%	30.4%	38.4%	14.0%
24	**B25**	I pay attention to decide where to make an emphasis in sentences to better express the meaning.	**3.33**	1	3.5%	15.3%	38.1%	30.4%	12.6%
21	**B26**	I pay attention to connected speech (linking words together).	**3.37**	1	3.5%	15.1%	34.4%	34.8%	12.2%
23	**B27**	I pay attention to maintaining an English rhythm and intonation to sound more natural.	**3.34**	0.99	3.5%	16.6%	34.1%	35.3%	10.9%
30	**B30**	When I listen to someone speaking English, I pay attention to and notice errors.	**3.15**	1.08	6.9%	21.5%	31.3%	30.8%	9.5%
		Factor 2: Cognitive, formal rule-processing strategies							
56	**A2**	I use phonetic symbols (e.g. International Phonetic Alphabet) to remember how to pronounce some words.	**2.28**	1.33	38.4%	24.8%	16.0%	11.1%	9.5%
47	**B32**	I learn about English pronunciation rules and take note of such information.	**2.69**	1.09	14.2%	31.5%	30.2%	19.3%	4.9%
58	**B33**	I do phonetic exercises, such as transcription exercises.	**2.08**	1.03	36.4%	31.9%	20.8%	9.5%	1.3%
39	**B34**	I check the dictionary for the phonetic transcription when I am unsure how to pronounce a word.	**2.92**	1.39	21.7%	20.0%	196.7%	22.6%	16.2%
60	**D40**	I study books or reference materials about English pronunciation rules.	**2.02**	1.07	39.5%	32.6%	17.7%	7.1%	3.1%
53	**D41**	I acquire a general knowledge of phonetics and revise this knowledge when needed (e.g. before doing a pronunciation or presentation task).	**2.51**	1.1	21.7%	27.9%	32.2%	14.2%	4.0%
34	**D43**	I selectively focus my attention on particular sounds or phonetic features when I practice pronunciation.	**3.03**	1	6.7%	22.0%	39.0%	26.2%	6.2%
		Factor 3: Affective strategies							
17	**D48**	When I study or practice English pronunciation, I look for a good learning environment (e.g. a quiet place or place providing useful facilities).	**3.44**	1.16	7.8%	12.0%	28.2%	32.8%	19.5%
37	**E52**	I have ways (e.g. breathing or laughter) to relax and calm myself when I have difficulty with or feel stressed about improving pronunciation.	**2.99**	1.1	10.0%	23.1%	32.8%	26.2%	8.0%
32	**E53**	I keep a sense of humour about my mispronunciations.	**3.06**	1.12	9.1%	22.4%	32.4%	26.2%	10.0%
41	**E54**	I have fun with pronunciation, such as speaking English with an L1 accent (i.e. from first language).	**2.92**	1.18	12.0%	25.9%	30.8%	20.2%	11.1%
13	**E55**	I encourage myself to carry on when I encounter pronunciation difficulties.	**3.48**	1.01	4.0%	11.3%	31.9%	38.1%	14.6%
52	**E56**	I reward myself for success or effort put into pronunciation improvement.	**2.56**	1.16	22.0%	27.7%	27.9%	17.3%	5.1%
		Factor 4: Sensory-mechanical drilling strategies							
8	**A5**	I repeatedly listen to or pronounce a new or difficult word over and over to memorize its pronunciation.	**3.73**	1.01	3.5%	7.8%	23.5%	42.1%	23.1%
50	**B7**	I relax and adjust muscles of my face and jaw (e.g. opening my mouth wide) when working on pronunciation.	**2.59**	1.15	20.4%	29.0%	27.3%	18.0%	5.3%
14	**B9**	I practice pronouncing sounds/words that are difficult for me over and over to improve my articulation.	**3.46**	1.03	4.0%	13.1%	31.5%	35.7%	15.7%
16	**B10**	I practice saying words slowly at first and then faster.	**3.45**	1.04	4.4%	14.6%	26.8%	40.1%	14.0%
19	**B11**	I practice pronouncing words first in isolation and then in context.	**3.38**	1.09	5.5%	14.6%	31.7%	32.4%	15.7%
11	**B14**	I repeat after a model such as a native speaker, teacher, sound recordings, television or movies to imitate the accurate pronunciation (i.e. shadowing/ delayed mimicry).	**3.59**	1.08	3.8%	13.3%	24.8%	36.8%	21.3%
		Factor 5: Peer support-social strategies							
45	**F57**	I ask someone to evaluate or correct my pronunciation.	**2.81**	1.19	15.5%	25.7%	29.9%	19.5%	9.3%
25	**F58**	I ask someone to pronounce something for me.	**3.33**	1.14	7.5%	16.9%	25.3%	35.9%	14.4%

49	**F59**	I work with other learners to practice, review or share information about English pronunciation.	**2.65**	1.11	18.0%	27.3%	31.3%	19.1%	4.4%
		Factor 6: Communicative-interactive strategies							
42	**B19**	I practice talking with others in English to improve my pronunciation.	**2.87**	1.06	8.4%	29.5%	36.4%	17.7%	8.0%
20	**B20**	When I am conversing with someone speaking in English, I try to sound like an English speaker.	**3.37**	1.09	5.1%	16.0%	32.2%	30.6%	16.2%
44	**D44**	I actively seek opportunities to talk with others in English and practice my pronunciation.	**2.82**	1.06	9.3%	31.9%	33.9%	17.5%	7.3%
		Factor 7: Metacognitive-independent study strategies							
2	**B35**	I listen to model pronunciation of online/electronic dictionaries when I am unsure how to pronounce a word.	**4**	1.07	3.5%	6.9%	15.5%	34.6%	39.5%
4	**D47**	I rehearse before carrying out a speaking task (e.g. giving a speech or presentation) to improve my pronunciation performance.	**3.93**	1.03	2.7%	6.4%	21.5%	34.1%	35.3%
3	**D51**	When I find I make a mistake in pronunciation, I try to correct myself immediately.	**3.98**	0.88	1.1%	3.8%	21.3%	43.7%	30.2%
		Factor 8: Compensatory-heuristic strategies							
1	**C36**	I make guesses of the pronunciation of unfamiliar words (e.g. based on their spellings).	**4.12**	0.83	1.1%	2.4%	15.5%	45.5%	35.5%
5	**C37**	When I cannot pronounce a given English sound, I pronounce a sound as similar to it as possible (i.e. use proximal articulation).	**3.92**	0.96	2.4%	4.7%	21.7%	41.0%	30.2%
6	**C39**	When others can't understand me, I would adjust my speaking volume or speed.	**3.83**	0.99	2.0%	9.1%	20.0%	41.7%	27.3%
		Other strategies excluded by factor analysis							
7	**C38**	When I can't pronounce certain words correctly, I paraphrase (i.e. use other words with similar meanings).	**3.74**	0.99	2.9%	7.8%	24.6%	42.1%	22.6%
9	**B13**	I talk to myself (out loud or silently) and listen to my pronunciation.	**3.69**	1.04	3.3%	9.8%	25.7%	37.5%	23.7%
10	**B12**	I mentally rehearse how to say something before saying it aloud.	**3.66**	1.06	3.3%	11.5%	24.6%	36.8%	23.7%
12	**B22**	I try to avoid producing inappropriate sounds from my native language.	**3.53**	1.01	3.5%	10.9%	31.0%	37.9%	16.6%
22	**B18**	I listen to the radio, television or movies to observe English speakers' speech production.	**3.35**	1.07	4.0%	18.6%	31.3%	31.0%	15.1%
27	**D42**	I selectively focus my attention on pronunciation while listening to/speaking English.	**3.26**	0.97	4.2%	16.4%	37.5%	99.8%	8.6%
28	**D50**	I monitor my own pronunciation when speaking to others in English.	**3.25**	1.05	5.3%	17.7%	35.9%	28.8%	12.2%
31	**A4**	I memorize a word's pronunciation by making associations (e.g. by associating the word with another word or with sounds in my first language, or associating it with a previous occasion where I heard it).	**3.13**	1.25	15.7%	13.3%	25.9%	32.6%	12.4%
33	**B31**	I pay attention to the similarities and contrasts between my native language and English pronunciation.	**3.03**	1.08	9.3%	20.4%	36.6%	25.5%	8.2%
35	**B17**	I use computer software/ apps/ internet resources to practice pronunciation.	**3**	1.29	14.0%	24.8%	23.7%	21.7%	15.7%
36	**A3**	I use my own codes to remember how to pronounce some words.	**2.99**	1.25	16.0%	19.3%	25.3%	28.6%	10.9%
38	**B28**	I make hypotheses and develop my own understanding of how English pronunciation works, even if sometimes I have to revise my understanding based on new information.	**2.92**	1.02	9.1%	23.1%	39.9%	22.4%	5.5%
40	**D46**	I prepare for English speaking tasks by highlighting difficult-to-pronounce words in my notes.	**2.92**	1.13	11.8%	25.1%	30.8%	24.6%	7.8%
43	**B16**	I notice or try out different English accents.	**2.86**	1.23	13.5%	30.6%	23.5%	20.8%	11.5%
46	**B29**	I analyse English spoken texts using pronunciation rules I have learned.	**2.71**	1.05	13.5%	30.2%	31.3%	21.7%	3.3%
48	**B8**	I pay attention to/ observe the articulatory gestures of my mouth, tongue, teeth and lips.	**2.67**	1.16	17.7%	29.5%	28.4%	17.3%	7.1%
51	**F60**	I try to teach someone else about English pronunciation.	**2.59**	1.19	22.4%	26.4%	27.5%	17.3%	6.4%
54	**D49**	I record myself to listen to and evaluate my own pronunciation.	**2.38**	1.22	29.7%	28.6%	22.4%	12.4%	6.9%
55	**D45**	I set goals for myself and plan my pronunciation learning to reach these goals.	**2.36**	1.1	25.7%	31.5%	27.5%	11.5%	3.8%
57	**A6**	I regularly revise new words' pronunciation using some mechanical techniques (e.g. making flash cards, creating word lists).	**2.18**	1.1	33.5%	30.8%	23.7%	8.0%	4.0%
59	**A1**	I make up songs or rhymes to remember how to pronounce some words.	**2.04**	1.07	41.0%	27.3%	20.8%	8.6%	2.2%

Appendix Q: Strategies use mean scores by gender based on 39 items on PLSQ

Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the male learners was equal to or significantly higher than that of female learners:

H_0 = The mean strategy use frequency for male learners is equal to or significantly higher than that for female learners

H_1 = The mean strategy use frequency for male learners is significantly lower than that for female learners

	t	***df***	***p-value***
Female vs. Male	3.194	336	0.001 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1			

Results of a one-tailed t-test comparing the mean strategy use frequency for male and female learners

H_0 was rejected at $p < .001$ and H_1 is accepted, so there is less than a 0.1% probability that the mean difference, $\bar{X}_F > \bar{X}_M$, occurred by chance alone. In other words, male learners' frequency of pronunciation strategy use is significantly lower than the use frequency of female learners.

Appendix R: Strategies use mean scores by medium of instruction based on 39 items on PLSQ

Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the EMI learners was equal to or significantly higher than that of CMI learners:

H_0 = The mean strategy use frequency for EMI learners is equal to or significantly higher than that for CMI learners

H_1 = The mean strategy use frequency for EMI learners is significantly lower than that for CMI learners

	t	***df***	***p-value***
EMI vs. CMI	1.063	279	0.289
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1			

Results of a one-tailed t-test comparing the mean strategy use frequency for male and female learners

Appendix S: Strategies use mean scores by previous training in phonetics/pronunciation based on 39 items on PLSQ

Following a two-tailed *t*-test initially verifying a difference between the two mean scores, a one-tailed mean comparison was made, using the *t*-test of the null hypothesis that the mean of the learners without phonetics training was equal to or significantly higher than that of previously trained learners:

H_0 = The mean strategy use frequency for previously phonetically trained learners is equal to or significantly higher than that for untrained learners

H_1 = The mean strategy use frequency for previously phonetically trained learners is significantly lower than that for untrained learners

	t	***df***	***p-value***
Phonetically trained learners versus untrained learners	3.404	448	0.001***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1			

Results of a one-tailed t-test comparing the mean strategy use frequency for male and female learners

H_0 was rejected at $p < .001$ and H_1 is accepted, so there is less than a 0.1% probability that the mean difference, $\bar{X}_F > \bar{X}_M$, occurred by chance alone. In other words, the frequency of pronunciation strategy use of learners without phonetics training is significantly lower than the use frequency of learners who have prior training in pronunciation.

Appendix T: Pronunciation performance mean scores by gender

	Pronunciation performance total score			
Gender	Highest	Lowest	Mean	SD
Overall ($n = 190$)	20	5.5	12.97	3.31
Female ($n = 111$)	20	6	13.60	3.08
Male ($n = 79$)	19.5	5.5	12.08	3.43

Mean scores of pronunciation performance by gender

A one-tailed mean comparison was made, using the t-test of the null hypothesis that the mean pronunciation score of the female learners was equal to or significantly lower than that of male learners:

H_0 = The mean pronunciation score for female learners is equal to or significantly lower than that for male learners

H_1 = The mean pronunciation score for female learners is significantly higher than that for male learners

	t	***df***	***p-value***
Male vs. Female	3.158551	156	9.521154e-04***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1			

Results of a one-tailed t-test comparing the mean pronunciation performance scores for male and female learners

H_0 was rejected at $p < .001$ and H_1 is accepted, so there is less than a 0.1% probability that the mean difference, $\bar{X}_F > \bar{X}_M$, occurred by chance alone. This means male learners' pronunciation performances mean score is significantly lower than the mean score of female learners. In other words, there appears to be gender difference when it comes to pronunciation ability whereby girls perform better than boys.

Appendix U: Pronunciation performance mean scores by previous training on phonetics and pronunciation

Previous training on phonetics/pronunciation	**Pronunciation performance total score**			
	Highest	Lowest	Mean	SD
Overall (n = 190)	20	5.5	12.97	3.31
With previous training (n = 88)	20	7	13.65	2.98
Without previous training (n = 102)	19.5	5.5	12.38	3.47

Mean scores of pronunciation performance by training received on phonetics or pronunciation

A one-tailed mean comparison was made, using the t-test of the null hypothesis that the mean pronunciation score of learners with previous training on phonetics or pronunciation was equal to or significantly higher than that of learners without prior training.

H_0 = The mean pronunciation score for learners with previous training on phonetics or pronunciation is equal to or significantly lower than that for learners without such prior training

H_1 = The mean pronunciation score for learners with previous training on phonetics or pronunciation is significantly higher than that for learners without such prior training

	t	***df***	***p-value***
With training vs. without training	2.727080	187	3.499009e-03 ***
Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘_’ 1			

Results of a one-tailed t-test comparing the mean pronunciation performance scores for learners having previous phonetics training with those without any previous training

H_0 was rejected at $p < .001$ and H_1 is accepted, so there is less than a 0.1% probability that the mean difference, $\bar{X}_{TRAIN} > \bar{X}_{W/O}$, occurred by chance alone. In other words, the pronunciation performances mean score of learners without previous phonetics training is significantly lower than the mean score of learners with such training. This means those having studied phonetics performed significantly better in pronunciation than those not having studied phonetics.

Appendix V: Pronunciation performance mean scores by medium of instruction (MOI) for secondary education

Medium-of-instruction for Secondary Education	**Pronunciation performance total score**			
	Highest	Lowest	Mean	SD
Overall (n = 190)	20	5.5	12.97	3.31
CMI (n = 62)	20	5.5	11.56	3.54
EMI (n = 128)	20	6	13.65	2.97

Mean scores of pronunciation performance by medium of instruction during secondary education

A one-tailed mean comparison was made, using the t-test of the null hypothesis that the mean pronunciation score of learners with English as a medium of instruction during secondary education was equal to or significantly lower than that of learners with Chinese as a medium of instruction.

H_0 = The mean pronunciation score for CMI learners is equal to or significantly higher than that for EMI learners

H_1 = The mean pronunciation score for CMI learners is significantly lower than that for EMI learners

	t	***df***	***p-value***
Emi vs. CMI	4.004961	103	5.864746e-05 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1			

Results of a one-tailed t-test comparing the mean pronunciation performance scores for learners receiving secondary education using Chinese as a medium of instruction with those using English as a medium of instruction

H_0 was rejected at $p < .001$ and H_1 is accepted, so there is less than a 0.1% probability that the mean difference, $\bar{X}_{EMI} > \bar{X}_{CMI}$, occurred by chance alone. In other words, CMI learners' pronunciation performances mean score is significantly lower than the mean score of EMI learners. This means those having studied their high school subjects using English performed significantly better in pronunciation than those having studied through Chinese.

Appendix W: Pronunciation performance mean scores by time spent on out-of-class practice

A Spearman's rank order correlation coefficient was computed to explore any correlation between learners' reported amount of time spent on out-of-class pronunciation practices on a scale of 1 to 5 (from never to frequently) and their pronunciation performance score.

	Spearman Rho (ρ)	***p-value***
Time spent on pronunciation practice vs. Pronunciation scores	0.3075099	1.590258e-05 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1		

Results of spearman's test on correlation between time spent on pronunciation practice and pronunciation scores

Results revealed a small, positive correlation between the two (*rho* = .308) with a moderate significance level ($p < 0.001$). In other words, there is a less than 0.1% probability that the observed correlation of .308 between learners' reported amount of time spent on pronunciation practices and their pronunciation performance scores occurred by chance alone. In other words, active engagement in out-of-class pronunciation practices in general provides positive support to improving a learners' pronunciation ability.

Appendix X: Pronunciation performance mean scores by length of residence in an English-speaking country

A Spearman's rank order correlation coefficient was computed to explore any correlation between learners' reported length of residence in any English-speaking countries (in number of months) and their pronunciation performance score.

	Spearman Rho (ρ)	***p-value***
Time spent on pronunciation practice vs. Pronunciation scores	0.2138302	0.003053142 **
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1		

Results of spearman's test on correlation between time spent on pronunciation practice and pronunciation scores

Results revealed a small, positive correlation between the two (*rho* = .214) with a moderate significance level ($p < 0.01$). In other words, there is a less than 1% probability that the observed correlation of .214 between learners' reported amount of time residing in an English-speaking country and their pronunciation performance scores occurred by chance alone. In other words, residence in an English-speaking country in general provides positive support to improving a learners' pronunciation ability.

Appendix Y: Simple linear regression on total pronunciation score and each of the eight factors

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 1 (Functional practice strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	3.64816	0.71198	5.124	7.39e-07 ***
Variable – Functional practice strategies	0.52909	0.03923	13.487	< 2e-16 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 2.363 on 188 degrees of freedom				
Multiple R-squared: 0.4918, Adjusted R-squared: 0.4891				
F-statistic: 181.9 on 1 and 188 DF, p-value: < 2.2e-16				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 2 (Cognitive and formal-rule processing strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	11.22712	0.79125	14.189	<2e-16 ***
Variable – Cognitive and formal-rule processing strategies	0.15383	0.06669	2.307	0.0222 *
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.269 on 188 degrees of freedom				
Multiple R-squared: 0.02752, Adjusted R-squared: 0.02235				
F-statistic: 5.321 on 1 and 188 DF, p-value: 0.02216				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 3 (Affective strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	8.84982	0.95568	9.260	< 2e-16 ***
Variable – Affective strategies	0.35128	0.07914	4.439	1.54e-05 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.153 on 188 degrees of freedom				
Multiple R-squared: 0.09485, Adjusted R-squared: 0.09004				
F-statistic: 19.7 on 1 and 188 DF, p-value: 1.514e-05				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 4 (Sensory-mechanical drilling strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	7.4763	1.1308	6.611	3.83e-10 ***
Variable – Sensory-mechanical drilling strategies	0.4556	0.0919	4.957	1.59e-06 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.117 on 188 degrees of freedom				
Multiple R-squared: 0.1156, Adjusted R-squared: 0.1109				
F-statistic: 24.57 on 1 and 188 DF, p-value: 1.594e-06				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 5 (Peer support-social strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	10.2592	0.7625	13.45	< 2e-16 ***
Variable – Peer support-social strategies	0.4442	0.1191	3.73	0.000254 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.198 on 188 degrees of freedom				
Multiple R-squared: 0.0689, Adjusted R-squared: 0.06394				
F-statistic: 13.91 on 1 and 188 DF, p-value: 0.0002536				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 6 (Communicative-interactive strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	6.5266	0.6826	9.561	<2e-16 ***
Variable – Communicative-interactive strategies	1.1337	0.1151	9.848	<2e-16 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 2.692 on 188 degrees of freedom				
Multiple R-squared: 0.3403, Adjusted R-squared: 0.3368				
F-statistic: 96.99 on 1 and 188 DF, p-value: < 2.2e-16				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 7 (Metacognitive-independent study strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	9.1302	1.2989	7.029	3.73e-11 ***
Variable – Metacognitive-independent study strategies	0.5108	0.1700	3.004	0.00302 **
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.238 on 188 degrees of freedom				
Multiple R-squared: 0.04581, Adjusted R-squared: 0.04074				
F-statistic: 9.027 on 1 and 188 DF, p-value: 0.003023				

Simple linear regression model performed on total pronunciation score and total strategy score of all items loaded on Factor 8 (Compensatory-heuristic strategies):

Coefficients:	**Parameter Estimate**	**Standard Error**	**t value**	**Pr (> t)**
Intercept	6.4271	1.1980	5.365	2.36e-07 ***
Variable – Compensatory-heuristic strategies	0.8626	0.1552	5.557	9.28e-08 ***
Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 '_' 1				
Residual standard error: 3.072 on 188 degrees of freedom				
Multiple R-squared: 0.1411, Adjusted R-squared: 0.1365				
F-statistic: 30.88 on 1 and 188 DF, p-value: 9.277e-08				