

EMERGING ECOLOGY OF A SIGN BILINGUALISM AND CO-ENROLLMENT CLASSROOM: A QUALITATIVE ANALYSIS

WONG, Fay¹; TANG, Gladys¹; YEUNG, Pui-Sze²; YIU, Kun-Man, Chris¹

¹Centre for Sign Linguistics and Deaf Studies, The Chinese University of Hong Kong

²Faculty of Education, The University of Hong Kong

contact: gtang@cuhk.edu.hk

Received: 15.01.2022.

Accepted: 16.09.2022.

ORIGINAL RESEARCH ARTICLE

UDK: 81'221.24:81'246.2

376-056.263

doi: <https://doi.org/10.31299/hrri.58.si.3>

Abstract: *This study documents the views and attitudes of stakeholders of the Hong Kong's Sign Bilingualism and Co-enrollment (SLCO) Education Programme established in 2006, to identify an emerging ecology based on the SLCO classrooms in a primary school in which deaf and hard-of-hearing (DHH) as well as hearing participants, teachers and students alike, collaborated to create an inclusive culture in the school environment. Qualitative data were collected using two focus group discussions, each with six DHH students and six hearing students, and individual interviews with eleven parents of DHH and hearing students and six Deaf and hearing teachers. The data generated seven themes: positive impacts of sign language (i.e. HKSL), translanguaging, differences in English and Chinese achievement, positive attitudes towards co-enrollment, increase in students' self-confidence, friendship and equal partnership, and importance and challenges of co-planning. Analysing these themes within the framework of evaluating inclusive education along the parameters of participation, achievement, and value of person as advanced in Anderson, Boyle and Deppeler (2014), we identified six dimensions to characterise the inclusive ecology of the SLCO classroom.*

Keywords: *sign bilingualism, co-enrollment, deaf education, inclusive education classroom ecology, ecological systems theory*

1. INTRODUCTION

This study examines the ecology of co-enrollment classrooms in the Hong Kong context. The global inclusive education trend has encouraged more parents to enroll their DHH children in mainstream education. Early studies investigating degrees of integration of DHH students in mainstream classrooms reported a sense of loneliness since many of them had few opportunities to interact with their hearing peers due to speech and language limitations (Antia & Kreimeyer, 1994; Saur et al., 1987; Stinson, Whitmire, & Kluwin, 1996). Xie, Potmesil and Peters (2014) conducted a systematic review of literature on the conditions of DHH students' interactions with their peers in an inclusive setting. They found a correlation between positive classroom ecology and students'

academic performance, social competence and peer relationships in some earlier studies by Brophy-Herb et al. (2007) and Howes (2000). This literature review reveals that classroom ecology influences DHH students' success in education.

Co-enrollment education attempts to resolve this classroom learning situation by removing the barriers of communication by adopting sign language in addition to speech and promoting collaboration in teaching and learning through the support of Deaf and hearing teachers. Such an approach is underscored by the educators' awareness of the specific language and learning needs of DHH children while attempting to provide reasonable accommodations to support their education. The first known co-enrollment program was the TRIPOD Model School Program, established in California, the United States, in 1982 (Kirchner, 2004, 2019).

Since then, diverse models of co-enrollment education have been developed in different countries; yet all converge on an emphasis on bringing a critical mass of DHH and hearing students to co-learn within the same classroom. The TRIPOD Program encouraged the provision of a full curriculum with equivalent academic standards for all students through collaborative teaching between a Deaf teacher or a hearing teacher with proficient signing skills and training in deaf education, and a hearing teacher. Marschark et al. (2019) documented globally existing co-enrollment programs, with reports indicating diverse programming strategies. Some programs strived to achieve full inclusion at as many levels of schooling as possible, supported by co-teaching between a Deaf or a hearing teacher who signed fluently and a general education hearing teacher (e.g. Kreimeyer et al., 2019; Yiu et al., 2019).

Abbate (2019) advanced a dual-campus concept connecting a school for the deaf with a cluster of regular partner schools where DHH students belonging to the deaf school were placed in the general education classrooms based on their evolving language needs, subjects pursued, and academic achievement at specific stages or routines of their education. In another study, co-enrollment classrooms included DHH students and hearing peers who were siblings of the DHH students or hearing children of deaf adults (CODAs). This student composition nurtured a naturalistic bimodal bilingual environment and a Deaf-hearing culture (Baker et al., 2019). Various forms of communication are used within co-enrollment programs, with many of them reporting the use of sign interpreters (e.g. Torigoe, 2019; de Klerk et al., 2019), whereas others adopt signing that ranges from natural sign language (Kramreiter & Krausneker, 2019; Yiu et al., 2019) to total communication (Kirchner, 2019). Few studies reported on academic outcomes of co-enrollment education, and for those that did, the results were mixed. In this paper, we will report on two such studies. The first one by Baker et al. (2019) found DHH students from co-enrollment education demonstrating better learning outcomes than DHH students from other settings. The second study involved a sign bilin-

gual approach to co-enrollment, where the co-enrolled students' learning outcomes were better or equivalent to their hearing peers within the same classroom (Kramreiter & Krausneker, 2019).

As far as Hong Kong is concerned, a team of researchers who established the Sign Bilingualism and Co-enrollment (SLCO) in Education Programme in 2006 have conducted a number of studies to document the progress of DHH children studying in the Program. Tang, Lam & Yiu (2014) compared the development of HKSL, Cantonese, and written Chinese of twenty DHH children between 7;7 and 13;5 years old. They found a positive correlation in the development of the languages over time, suggesting no adverse effects when DHH children acquired HKSL alongside oral Cantonese and written Chinese in this specific educational context. To examine the nature of meta-linguistic differentiation of the languages these students were exposed to in the learning environment, Tang, Yiu, and Lam (2015) recruited eighteen DHH children from Primary 4 to Secondary 1 of the SLCO Program with ages ranging between 9;8 and 15;0 and examined whether they could differentiate HKSL from manually coded Chinese, an artificial signing system reflecting the grammar of oral Cantonese or written Chinese, but not HKSL. Based on findings of a language differentiation task between HKSL and oral Cantonese, the researchers observed that two-thirds of the DHH children could differentiate the stimuli presented in HKSL from those shown in manually coded Chinese with oral Cantonese mouthing. Additionally, stimuli presented deliberately without oral Cantonese mouthing were found more difficult for the children to differentiate. To account for the findings, the researchers argued that early and consistent exposure to HKSL in the SLCO learning environment positively impacted bimodal bilingual children's ability to identify the relevant linguistic input for acquisition in HKSL and oral Cantonese. Findings from a questionnaire survey showed that 83.33% of them claimed they knew the grammar of HKSL and manually coded Chinese was different. Yiu, Tang, and Ho (2019) adopted a classroom process approach to document the views and attitudes of participants in the SLCO system. Based

on classroom observations and experiences in program implementation over a period of twelve years, they identified ‘four pillars’ for implementing SLCO education in Hong Kong, namely 1) a whole-school approach toward promoting Deaf and hearing collaboration; 2) involvement of Deaf individuals in school practices; 3) an enriched linguistic context to support bimodal bilingual development of DHH and hearing students, and 4) DHH and hearing students’ active participation in school and social activities. The authors provided quotations from SLCO administrators, teachers, DHH and hearing students as well as parents to illustrate how these four pillars worked together to create a form of education without barriers. The current study can be perceived as an extension of Yiu, Tang & Ho’s study by investigating different observable behavioural outcomes of the participants in the SLCO classroom to establish the classroom ecology of SLCO education empirically.

While co-enrollment programs are emerging across multiple countries, it is difficult to directly compare learning outcomes. These programs may include unique combinations of variables stemming from the social context, system of education and Deaf involvement, variety of signing, etc., which potentially shape or steer the development of co-enrollment programming in specific directions leading to different expectations and outcomes especially in terms of the language and cultural aspect of a co-enrollment classroom. Depending on its make-up, such a classroom potentially involves more than one language and teacher, plus a group of students with different hearing statuses and language backgrounds. All these factors in various combinations lead to a unique classroom ecology that impacts the extent to which DHH students benefit from inclusive education. In this paper, we will report on a study in which we aimed to investigate this phenomenon by perceiving the SLCO classroom as a *habitat* or an *ecosystem* and examining how its anthropological and cultural dimensions constitute an ecology that characterises this type of education situation. Specifically, we documented the multifaceted experiences of the participants in the SLCO Program and examined how the embedded

events and practices led to their actions or reactions within their unique ecological system. We invited three groups of participants - students, teachers, and parents - to contribute their views on SLCO education. Collecting data through focus group discussions and individual interviews, we examined the participants’ comments with reference to a framework for evaluating inclusive education - participation, achievement and value of person - developed by Andersen et al. (2014).

The paper is organised as follows. We first provide a brief introduction to the concept of classroom ecology. Secondly, we briefly describe the establishment and development of the SLCO Program in Hong Kong, to be followed by a report on how the research team identified seven themes based on the comments, which were then synthesised into six dimensions that characterise the classroom ecology of SLCO education in the Hong Kong context.

1.1 Classroom Ecology and Inclusive Education

The concept of *classroom ecology* originated from the insights of Kounin (1970) in the late 1960s. Central to this concept is *habitat*, defined as “the physical niche or context with characteristic *purposes, dimensions, features, and processes* that have consequences for the behaviour of occupants in that setting” (Doyle, 2013, p.98). According to Doyle (op. cit.), a classroom reflects a set of essential *dimensions* demonstrating a complex social situation. It is multidimensional as it encompasses events, tasks and activities, people with different preferences and abilities, and resources; it features simultaneity as many things could potentially happen at the same time; it shows immediacy since the classroom is a venue for a rapid flow of events and teacher/student exchanges; it may be unpredictable in terms of the direction of the flow of events and tasks; it creates a sense of publicness as the teacher is a ‘public figure’ in the eyes of all the students in class as they can see how the teacher treats them as against their classmates; and last, it marks a history of experiences and routines leading to specific norms and expectations of the classroom with a systemic structure.

Given this general framework of how participants and practices shape the ecology of a classroom, it is worthwhile seeing how it might be applied to construct the ecology of an inclusive classroom. According to UNESCO (2005, p.13), inclusive education is “a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education”. Anderson et al. (2014) highlighted the evolving nature of the general concept of inclusive education, from one that emphasises accommodating students with disabilities to a much broader interpretation that encompasses the delivery of equitable distribution of quality education to *all* children. They further pointed out that from the individual learner’s perspective, the literature on inclusive education consistently alluded to the parameters of *participation*, *achievement* and *value of person* to determine effective inclusive education. Participation requires the learner to learn alongside others and collaborate to build and share learning experiences. Achievement is not defined strictly in terms of academic outcomes but against a specific set of well-articulated learning goals. As for value of person, Andersen et al. cited Aspin (2007, p. 32), who described “value of person as being when one is accepted, respected and seen as important and capable of doing. It is demonstrated through action and relationships with others.” They further argued that inclusive education should look different among students from diverse classrooms, schools or educational contexts. In other words, inclusive education could potentially generate distinctive classroom ecologies subject to the characteristics of the participants and the extent to which participation, achievement and value of person interact with each other to bring about a set of dimensions and processes that characterise the classroom as an ecosystem.

The concept of classroom ecology has been further expounded in Siedentop (1988), who depicts the behavioural dynamics of classrooms in a way that helps teachers and researchers interpret, predict and respond to those dynamics. This approach focuses on teachers and students as they

interact to fulfil specific learning outcomes. It is a study about the life of a classroom as it naturally unfolds through the processes co-constructed by the participants involved. In a sense, it represents a social anthropological approach where a general picture of the classroom as an ecosystem can be depicted and characterised as it evolves.

For deaf education, the ecology of deaf and mainstream classrooms is quite different in many aspects, such as the size of instructional groups, direct/in-direct communication access, use of amplification or hearing assistive devices, etc. Focusing on the classroom ecology experienced by DHH students in mainstream integrative education, most studies focus on accessibility and the physical environment (Guardino & Antia, 2012; Dye & Bavelier, 2010; Guardino & Fullerton, 2010; Schilling & Schwartz, 2004). Mainstream classrooms involving DHH students and adopting spoken language only have highlighted barriers to inclusion. As said, the classroom instructional processes and communication patterns among teachers and hearing peers are complex for DHH students to pick up or contribute to the discourse. Berndsen and Luckner (2012) mentioned some difficulties faced by DHH students in mainstream education classrooms. For instance, they failed to follow the rapid turn-taking, quick change of topics and higher order questions during teacher/student interactions. Sometimes the barriers are generated by one’s beliefs and attitudes towards deafness and sign language, a lack of knowledge of DHH children’s language needs and inadequate training of teachers for the deaf (Luckner & Friend, 2008). Specifically, Berndsen and Luckner (2012) reported that mainstream teachers felt overburdened with identifying techniques to support DHH students. Some teachers might lack the motivation to teach DHH students due to a lack of training in deaf education.

As research has seldom touched upon the ecology of a mainstream co-enrollment classroom, there is a need to identify the associated dimensions of such a learning context and assess to what extent they are indicative of an ecosystem effective for inclusive education. In this respect, one could find very little research that touches upon

this type of classroom. A four-year participant observation study on a sign bilingual classroom from Primary 1 to Primary 4 in a regular elementary school in Austria was reported in Krausneker (2008). In the spirit of co-enrollment programming, this sign bilingual classroom admitted two DHH and twelve hearing students co-taught by a Deaf teacher using Austrian Sign Language and a hearing teacher using German. A sign interpreter was also recruited to mediate between the Deaf teacher and the hearing teacher in daily operations. During lessons, parallel teaching in Austrian Sign Language and German was the general mode of delivery. Results indicated that the two DHH students whose first language was sign language could be educated using a full curriculum and obtained academic scores above the class average. Moreover, the presence of a Deaf teacher and a sign language also broadened the hearing students' knowledge of sign language as a language of communication in class with their peers and the Deaf teacher, which ultimately enhanced Deaf cultural competence among the students.

A later report by Metz (2013) explored the relationship between academic engagement and classroom ecology in a co-enrollment classroom. This study examined students' academic engagement in two multi-aged co-enrollment classrooms of the same program previously reported in McCain and Antia (2005). One of the co-enrollment classrooms was in a kindergarten setting, and the other was in the upper grade of an elementary school. The co-enrollment classrooms were supported by a general education teacher, a teacher for the deaf who could sign, and two sign language interpreters. Metz (2013) identified some dimensions that characterized the co-enrollment classroom: smaller instructional groups, direct communication access to teachers and peers who sign, and widespread use of hearing assistive devices. She further found that the DHH students in this setting were as academically engaged as their hearing peers, although they responded less when compared to their hearing peers. Last, she found a positive correlation between these classroom dimensions and degrees of academic engagement. Both Krausneker and Metz's studies offer a metho-

dological framework for researchers to approach the co-enrollment classroom from an ecological perspective through extracting and interpreting observations on classroom processes as well as views and attitudes of stakeholders to build a set of dimensions that characterise a co-enrollment classroom as an ecosystem.

1.2 The Current Study - Co-enrollment education in the HK context

As said, one objective of the current study is to uncover the ecology of the co-enrollment classroom as organised by the SLCO Program of Hong Kong. Since the classroom ecology of inclusive education is predicted to be different among students in different educational settings, there is a need to identify the various dimensions of a co-enrollment classroom because this educational approach presents itself as an option to address inclusive education for DHH children in mainstream education. What underscores this type of inclusive education may serve as a reference for the future development of co-enrollment education.

1.3 Establishment of the SLCO Program in Hong Kong

September 2006 saw the establishment of the SLCO Program in Hong Kong. Since then, it has developed within the general framework of mainstream pre-school to secondary education until the DHH students sit for a public examination for university entrance. It aims to initiate evidence-based practice in deaf education by introducing an option that combines theories of sign-bilingualism and co-enrollment in educating DHH children as an option alongside the oral-aural approach in Hong Kong (Yiu & Tang, 2014). Each year, the Program arranges for about 5 to 6 DHH children to enter the system at the kindergarten level, who will study with a class of 15 hearing students co-taught by a Deaf teacher and a hearing teacher while other classes at the same grade remain as regular classes. The primary school program started in 2007, one year after the Program commenced at a kindergarten. Before its launch, a trip to visit

the TRIPOD Program in the US was organised, attended by two teachers from the primary school and Deaf and hearing teachers of the SLCO research team. Upon returning to Hong Kong, the school was determined to create a Deaf-friendly environment in the SLCO classroom.

In the SLCO classroom, the Deaf teacher serves the role of a professional teacher for the whole class. Additionally, the Deaf teacher is the one who primarily provides input in Hong Kong Sign Language (HKSL) to all participants in the SLCO classroom. The goal of the Program is to ultimately involve a Deaf teacher and a general education hearing teacher to co-plan and co-teach the lessons daily, one adopting HKSL and the other oral Cantonese. At the beginning of the SLCO Program, a SLCO hearing teacher proficient in HKSL also entered the SLCO classroom. The role of this teacher was to oversee the co-planning and co-teaching and to bridge the communication between the general education hearing teacher and the Deaf teacher since the former did not have sufficient HKSL to communicate with the latter in implementing teaching initially. The three teachers also held meetings to evaluate teaching effectiveness after the lessons. None of the general education hearing teachers knew any HKSL before they started teaching in the SLCO Program. Owing to the local policy of subject specialisation, a different general education hearing teacher led each school subject. For this reason, the Deaf teachers had to team up with different general education hearing teachers in the SLCO classroom. For the SLCO system, DHH children who entered the mainstream kindergarten followed a regular curriculum prescribed by the government and were promoted to primary and secondary education. All educational settings under the SLCO Program adopted the whole school approach in building the SLCO system and shared the mission of promoting inclusiveness in school and society.

1.4 Language of Communication in the SLCO Environment

In response to the HK Government's language policy of "Biliteracy and Trilingualism", Canton-

ese, Mandarin Chinese and English are adopted in education. In primary education, oral Cantonese is generally used as a medium of instruction in most subjects except English. However, the form of written Chinese that students are exposed to is based on the grammar of Mandarin Chinese, not oral Cantonese, although it is read aloud using Cantonese pronunciation. Recently, the government has promoted use of Putonghua as a medium of instruction for Chinese lessons to align the language between oracy and literacy. In the SLCO classroom and the school environment at large, HKSL is added to the linguistic repertoire of the students. The SLCO Program regards direct communication between the classroom participants as the most effective way to nurture partnership in teaching and learning and to inculcate a sense of identity or membership in this specific learning environment. In terms of the medium of instruction, the SLCO classroom adopts the policy of one-teacher-one-language, enacted by a hearing teacher who uses oral Cantonese and a Deaf teacher who uses HKSL. Sometimes, fingerspelling during the English lessons and sign-supported Chinese during the Chinese lessons are adopted for pedagogical purposes. Therefore, under normal circumstances in the SLCO classroom, the Deaf teacher uses HKSL when communicating with the hearing students, DHH students and the general education hearing teacher. On the other hand, students are free to choose the language and mode of communication when interacting with classmates and teachers, subject to the perceived language abilities of their communication partner. As such, it is not uncommon to find frequent code-switching between HKSL and oral Cantonese in the SLCO classroom at multiple levels of communication simultaneously by the Deaf and hearing teachers with their DHH and hearing students and among the students themselves.

2. METHODOLOGY

To identify the ecology of the SLCO classroom in the Hong Kong context, the project adopted focus group discussions and individual interviews as a methodology (Green et al., 1988). Six DHH and six hearing student groups were invited to

join a focus group discussion led by the first author. The focus group discussions were conducted by the first author, who is hearing but fluent in HKSL. Since the primary mode of communication of all six DHH children is HKSL, the focus group discussions was conducted in HKSL. Similarly, the hearing children's first language – oral Cantonese – was adopted to be the language for the focus group discussion.

Teachers and parents were invited to attend an interview conducted by the first author individually. All focus group discussions and individual interviews were semi-structured, with a few questions prepared beforehand to allow the participants to express their views on a set of characteristics observed to have emerged during the establishment of the SLCO classroom. Topics of such questions included Deaf-hearing teachers co-teaching, DHH-hearing students co-learning, a critical mass of DHH students, and the adoption of both a sign language and a spoken language in daily communication (A list of questions for the semi-structured interview can be found in Appendix A). The interviews with the teachers and parents were conducted in an informal style with a fluid structure, thus enabling the creation of a discourse which might sometimes unearth characteristics that the researchers overlooked. The interviews were conducted near the end of the school term. At the time of the study, all twelve student participants, six DHH and six hearing, were studying at Primary 3 and their ages ranged between 8;2 and 10;11.

For the focus group discussions, the students were grouped according to their hearing status since this study aimed to explore whether there was an effect of students' hearing status on the ethos and culture of the classroom context. Practically, separating the students using their hearing status enabled the researchers to corroborate the views expressed independently by the two groups of students. Additionally, using a language that they perceived to be stronger in articulating their thoughts and feelings during the discussions was also considered essential because we intended to encourage them to share their insights about the various aspects of the SLCO classroom, especial-

ly direct communication, learning conditions and peer relationships. Additionally, a focus group discussion format allowed the researchers to see the extent of converging or diverging views among the students and how open these students were towards each other's comments.

The data analysis involved three steps: transcription, coding and mapping. Specifically, the focus group discussions and individual interviews were videotaped and transcribed independently by the first author and two SLCO teachers/researchers. The first author was fluent in HKSL, Cantonese and English. As for the two SLCO teachers/researchers, one was a Child of Deaf Adults (CODA) who was fluent in HKSL, Cantonese and English and familiar with the SLCO Program; the other was hearing but fluent in HKSL. Since both SLCO teachers/researchers did not teach the students being interviewed, they could transcribe the data without any biased opinions towards the DHH and hearing students. The transcriptions from the three researchers were compared, and group discussions resolved disagreements about the transcriptions. Then, the transcriptions were entered into the software program Nvivo 9 to code frequently mentioned themes. Next, the first author and the hearing teacher/researchers scrutinized the outputs from the software to establish the themes and crosschecked the transcriptions against the outputs with the CODA teacher/researcher, to confirm their decisions. The coded themes were then mapped onto the three determinants of effective inclusive education by Anderson et al. (2014): participation, achievement, and value of person. Disagreements regarding coding or mapping of themes were discussed among the first, second and fourth authors. Finally, six dimensions that characterised a SLCO ecosystem for inclusive education were generated based on the seven themes and the three determinants in Andersen et al. (2014).

2.1 Participants

The focus group discussions and individual interviews involved six DHH and six hearing student participants who already had three years of SLCO experiences, eleven parents and six teach-

Table 1 Demographic Characteristics of DHH and Hearing Students

Participant code (initials)	Gender	Chronological age at the time of study	Hearing status	Amplification	Age of amplification	Parents' hearing status
DHH Student A (XY)	F	10;6	Profound bilateral	HA(bilaterally)	L/R: 0;3	Hearing
DHH Student B (WK)	M	10;11	Profound bilateral	HA(bilaterally)	L/R: 3;2	Hearing
DHH Student C (TH)	M	9;8	Profound bilateral	HA(bilaterally)	L/R: 4;0	Hearing
DHH Student D (YF)	M	8;10	Profound bilateral	CI(L) HA(R)	L: 2;6 R: 1;6	Hearing
DHH Student E (YW)	F	8;6	L:mild R:profound	No amplification used	L/R: N/A	Hearing
DHH Student F (MY)	F	8;8	Severe bilateral	HA(bilaterally)	L/R: 2;7	Deaf
Hearing Student A (YY)	F	8;9	N/A	N/A	N/A	Hearing
Hearing Student B (KY)	M	8;3	N/A	N/A	N/A	Hearing
Hearing Student C (KK)	M	9;6	N/A	N/A	N/A	Hearing
Hearing Student D (TK)	M	8;11	N/A	N/A	N/A	Deaf
Hearing Student E (HC)	F	8;2	N/A	N/A	N/A	Hearing
Hearing Student F (HY)	F	8;9	N/A	N/A	N/A	Hearing

Notes. HA = hearing aid. CI = cochlear implant.

ers (Deaf and hearing) who had taught these students. The DHH and hearing students belonged to the second cohort of the SLCO Program. We did not select students from the first cohort because the first year of implementing the SLCO Program was quite exploratory, with considerable modifications in terms of classroom pedagogy and class/school communication system. Therefore, recruiting participants belonging to the second cohort of the SLCO Program was considered more desirable because the Program had become stable, and all teachers were familiar with the philosophy of the SLCO approach a year later.

2.1.1 Student Participants

Table 1 shows the backgrounds of the six DHH and six hearing students. To protect the students, code initials are used in the table. These children's ages ranged from 8;2 to 10;11 at the time of the study. All except one were born to hearing parents and did not receive exposure to HKSL until their parents enrolled them in the SLCO Program. All the DHH children had a sensorineural hearing loss; one of them wore a cochlear implant and five hearing aids. The hearing students were classmates of these DHH students.

All six DHH students entered the SLCO Program at KG3, the last year of kindergarten education. They were promoted to the SLCO-Primary Program and continued to acquire HKSL through daily immersion. Six hearing students who were classmates of the DHH students were invited to participate in a separate focus group discussion. These six hearing students entered the system of SLCO education when they were enrolled as Primary1 students. The DHH and hearing groups had been studying together for three years at the time of the focus group discussions. Note that the hearing peers had received extra training in HKSL at school by a Deaf teacher. Additionally, they developed HKSL through daily interactions with their DHH peers in the SLCO classroom/school context.

2.1.2 Parent Participants

Eleven parents, including five parents of DHH and six parents of hearing students, primarily mothers, were interviewed individually. Whereas the interview language was oral Cantonese with parents who were hearing, HKSL was used with Deaf parents of a DHH student. Except for the Deaf parents, all hearing parents of DHH and hearing students were neither in contact with the Deaf Community nor exposed to HKSL previ-

ously. Hearing parents of DHH children only started to learn HKSL with their child because they wanted to communicate with them more effectively at home. HKSL classes were organised for these parents before their DHH child joined the program. At school, HKSL courses continued and were sometimes joined by hearing parents of hearing students. Nevertheless, over time few parents of DHH students could sign as proficiently as their child, and they tended to use speech in family interactions. Nonetheless, one should point out that some parents' signing skills became so fluent that they volunteered to interpret for their child or other Deaf members of associations.

2.1.3 Teacher Participants

All six Deaf and hearing teachers who taught the SLCO classes from Primary One to Three were interviewed individually. As said, there could be a team of two to three teachers in the SLCO classroom: a general education hearing teacher, a SLCO hearing teacher proficient in HKSL who had already received training in the SLCO approach, and a Deaf teacher native to HKSL but generally graduated from secondary education only. As said, the three teachers teamed up to teach one school subject. When the general education hearing teacher's signing skills improved and both teachers' knowledge of collaboration became stable, the SLCO hearing teacher would leave them to co-teach the lessons independently. Table 2 shows the backgrounds of the teachers who were interviewed.

In addition to in-house training conducted by the research team at The Centre for Sign Linguistics and Deaf Studies, four teachers continued to further their education in related fields, including sign linguistics, sign language teaching, sign interpretation, and professional teacher training. Over time, one of the Deaf teachers graduated with a formal degree in special education.

3. RESULTS

Table 3 references Andersen et al.'s (2014) three parameters for evaluating inclusive education – participation, achievement and value of person. Seven themes were identified and analysed based on the data generated by focus group discussions and interviews (see column two of Table 3). These themes were *positive impacts of sign language (i.e. HKSL), translanguaging, differences in English and Chinese achievement, positive attitudes towards co-enrollment, increase in students' self-confidence, friendship and equal partnership, and importance and challenges of co-planning*. We then synthesised these seven themes into six dimensions that underlie the SLCO classroom ecology. In the following sections, we will elaborate on the themes one by one, substantiated by relevant quotations from the participants, followed by a discussion on the six dimensions categorised according to Andersen et al.'s (2014) three parameters.

Table 2. Demographic Characteristics of Teacher

Participant	Gender	Age when participating in interviews	Hearing status	Highest level of education
SLCO hearing teacher of English	F	37	Hearing	Master
SLCO hearing teacher of Chinese	M	30	Hearing	Master
General education hearing teacher of English	M	29	Hearing	Post-secondary Diploma
General education hearing teachers of Chinese	M	30	Hearing	Undergraduate
Deaf teacher of English	F	21	Profound bilateral	Post-secondary Diploma
Deaf teacher of Chinese	F	21	Profound bilateral	Post-secondary Diploma

Table 3. Framework of analysis based on Andersen et al. (2014)

Parameters to evaluate the ecology of an inclusive classroom	Seven Themes	Six Dimensions of the SLCO Classroom Ecology
Participation	Theme 4: Positive Attitudes towards Co-enrollment Theme 6: Friendship and Equal Partnership	1. Critical mass of DHH students
	Theme 2: Translanguaging Theme 1: Positive Impacts of Sign Language (i.e. HKSL)	2. Development of bimodal bilingualism to achieve direct communication
Achievement	Theme 4: Positive Attitudes toward Co-enrollment	3. Readiness for school reform
	Theme 1: Positive Impacts of Sign Language (i.e. HKSL) Theme 4: Positive Attitudes towards Co-enrollment Theme 7: Importance and Challenges of co-planning	4. Collaborative teaching practices
	Theme 1: Positive Impacts of Sign Language (i.e. HKSL) Theme 2: Translanguaging Theme 3: Differences in English and Chinese Achievement	5. Unique linguistic repertoire
Value of person	Theme 5: Increase in Students' Confidence Theme 6: Friendship and Equal Partnership	6. Identity and school membership

Theme 1: Positive Impacts of Sign Language (i.e. HKSL)

Many mainstream classrooms that permit the use of sign language to support DHH students’ learning usually call in a sign interpreter to mediate between the DHH students and the hearing teachers or students. However, multiple studies highlight the difficulties DHH students still face in group activities and direct classroom interactions even when a sign interpreter is in the mainstream classroom (Antia, 1985; Garrison et al., 1994; Stinson, Liu, Saur & Long, 1996). Since the SLCO classroom emphasised direct communication among participants via either HKSL or spoken languages, verifying how the students reacted to such a language situation is essential. A preamble to the current investigation is the concern of many parents and educators about whether sign language inhibits the spoken language development of DHH children (Davison et al., 2014). Positive impacts have been argued for by Hoffmeister and his colleagues (2022), Hoffmeister (2000), Scott and Hoffmeister (2016) and Wolbers et al. (2014). These studies showed that native American Sign Language (ASL) signers’ sign language proficiency potentially supports their English reading and writing development. Therefore, in the current study, introspective data from the participants in the SLCO classroom might offer some indirect

evidence about the impact of HKSL on the spoken language development of DHH and hearing children, specifically their development of written Chinese grammar and vocabulary.

Generally speaking, the semi-structured focus group discussions revealed that both DHH and hearing students were quite adaptable in using a range of languages in and out of the SLCO classroom. They were taught in both HKSL and one of the oral languages, Cantonese, Putonghua and English, depending on the official medium of instruction within specific subjects. Additionally, the SLCO Program was perceived positively by the participants - students, teachers and parents - to be indicative of a classroom ecology that manifests ‘value of person’ in an inclusive education system and the development of teachers’ professionalism (see below). During the focus group discussions, all students, parents and teachers (both deaf and hearing) mentioned the positive impacts of using HKSL in supporting communication and learning.

Teachers

When the SLCO Program was initiated in the mainstream primary school in 2007, just a year after it had started in a kindergarten in 2006, many general education hearing teachers had little knowledge of HKSL, nor had they acquired the know-how of co-teaching with a Deaf teacher.

As a consequence, the SLCO Program adopted a tripartite system in which an additional hearing teacher proficient in HKSL (i.e. SLCO hearing teacher) was called in to serve as a pedagogical mentor to both the DHH teacher and the mainstream hearing teacher and to be a language support/interpreter to bridge communication in the pedagogical process. Over time the HKSL skills of the general education hearing teacher improved, and these teachers commented that co-teaching with a Deaf teacher had become much more effective because there could be direct communication between the Deaf teacher and the general education hearing teacher in co-planning and co-teaching lessons. They further commented that when HKSL became fully functional in the classroom, it benefitted DHH and hearing students since it made direct teaching much more efficient. All the general education hearing teachers enjoyed learning HKSL and were prepared to apply it in their teaching.

'The happiest thing is to learn and apply HKSL to my teaching. In the beginning, I didn't even know how to sign one word. Through interacting with DHH students and Deaf teachers daily, they taught me to sign. I am so proud that I can now teach my DHH students in HKSL. I am so happy to witness the improvement in all the students.'

~General education hearing teacher of English.

'Sometimes there is a delay in communication when I pass information from the general education hearing teacher to the Deaf teacher using HKSL. I prefer co-teaching between Deaf and hearing teachers when the hearing teacher's signing improves. I think through Deaf-hearing co-teaching, or if we do station teaching, the teaching process will become smoother.'

~ SLCO hearing teacher of Chinese.

Notwithstanding the positive impact of adopting HKSL in teaching, one or two general education hearing teachers commented that co-teaching was quite time-consuming as it re-

quired time for co-planning and co-evaluating before and after the lessons.

'Having two teachers co-teaching a class is more efficient than using three teachers, but co-teaching requires more time to co-plan and to let the general education hearing teacher get familiar with the signs to be adopted to impart the teaching contents.'

~General education hearing teacher of English.

Parents

Parents of DHH and hearing students all observed a positive impact of HKSL on their children's education. Three out of six parents of hearing students continued to learn HKSL out of interest. In all, the level of parental acceptance in adopting HKSL to support DHH children's education turned out to be relatively high, not only among the parents of the DHH children but also parents of hearing children.

'My daughter's spoken language competence improved after learning HKSL, especially in her reading comprehension (written Chinese). Sometimes she even teaches me new Chinese vocabulary, for example, some terms for (Chinese) conjunctions and adjectives.'

~Parent of DHH student E.

'HKSL has helped my son to express himself more readily. Now we have more chances of family dialogues and understand each other better.'

~Parent of DHH student B.

'I think HKSL has helped my son to learn Chinese grammar. His Chinese literacy has improved a lot. It's magical that HKSL has boosted his English and Chinese grammar. I heard the teachers teach them (spoken language) grammar using HKSL.'

~Parent of hearing student C.

Students

All DHH and hearing students commented that they enjoyed using HKSL when interacting with each other. Most of the hearing students were enthusiastic about learning HKSL and were ready to switch to this language in classroom interactions with DHH classmates.

'I love to teach HKSL to my hearing friends. One of my hearing friends even signs better than me. He signs very fast, although sometimes the word order is wrong.'

~DHH student A.

'I like learning HKSL. I want to become a junior interpreter for my DHH friends. I feel thrilled being their interpreter during assemblies.'

~Hearing student B.

Theme 2: Translanguaging

García and Li (2015,140) defined translanguaging as: "the act performed by bilinguals of accessing different linguistic features or various modes of what are described as autonomous languages." In other words, translanguaging assumes no power hierarchies between languages, with individuals who may flexibly access two or more linguistic systems at their disposal. Although the medium of instruction in Hong Kong's education is English and Chinese, in the SLCO classroom, translanguaging enables the participants to perceive Chinese, English and HKSL as having equal linguistic status. Swanwick (2017) conceptualised translanguaging in deaf education as ways of seeing and responding to the language resources of DHH learners and teaching methods that recognise and promote bilingualism and multilingualism in the educational context. She also argued for the existence of bimodal bilingual translanguaging among DHH students and for the teacher to use translanguaging to achieve scaffolding to support students' learning. In three case studies of students in a sign bilingual setting, Swanwick (2016) found that translanguaging facilitated the DHH students and their teacher to apply British Sign Language and English in classroom talk flexi-

bly. As Swanwick (2016) argued, 'translanguaging' offers a conceptual framework to support sign bilingual education for the deaf and hard-of-hearing. It is perceived as an additive view of bilingualism where acquiring an additional language is argued to be beneficial and not detrimental to deaf children or the spoken language they are developing. This expansion of linguistic resources view recognises that individuals can be flexible in their use of language resources to create meaning in social interactions. Sign language becomes, metaphorically, the 'voice' of DHH students, through which they signal their equal status when participating in classroom/school activities. In this light, the SLCO classroom placed both HKSL and spoken languages on an equal footing and perceived them to be instrumental in supporting social interaction in the classroom.

The current findings revealed that students used language flexibly by code-switching between oral Cantonese and HKSL within specific language exchanges. This flexibility confirmed translanguaging as a natural and essential dimension in the SLCO classroom. Furthermore, translanguaging increased the participants' opportunities to access a variety of languages interchangeably, leading to an expansion of their linguistic repertoire, including the acquisition of HKSL by the hearing students and teachers and oral Cantonese and HKSL by the DHH students, not to mention the Deaf teachers' heightened sensitivity towards oral Cantonese and written Chinese.

Teachers

Teachers recognised students' flexible use of HKSL and spoken languages in the SLCO classroom with individual differences in language preferences. From their observations, the hearing peers were quite prepared to switch to HKSL in DHH-hearing interactions; but they would respond to their DHH peers in oral Cantonese when the latter selected that language. Some DHH students with better speech perception and oral language skills were more likely to choose oral Cantonese when interacting with their hearing peers and occasionally even among themselves. However, they were prepared to adopt HKSL

when they noticed their classmates' readiness to sign to them. Students with poor speech perception and articulation skills tended to use HKSL more frequently, although they were prepared to switch to oral Cantonese when necessary. In other words, it seems that the choice of language in social interaction in the SLCO classroom was partly determined by hearing status, the DHH students' Cantonese speech perception level and speech articulation abilities, as well as their perceived level of HKSL proficiency in their hearing classmates.

'Hearing students are willing to use HKSL, especially during group discussions. I usually put the hearing and DHH students in a group so they will help each other.'

~General education hearing teacher of Chinese

'Hearing students use HKSL too; of course, students vary in their signing skills, but I can say most of them are willing to use HKSL.'

~General education hearing teacher of English

'Initially, DHH and hearing students tended to use HKSL to chit-chat in class as they thought it wouldn't disturb others. I explained that there was no difference between HKSL and spoken language in keeping class disciplines. If you are firm, the students can stay focused on learning.'

~General education hearing teacher of English

'DHH students have no problems interacting with hearing students during lessons. Two of the DHH students preferred using oral Cantonese when interacting with their hearing peers and HKSL when interacting with other hearing classmates'

~SLCO hearing teacher of Chinese.

'Hearing students also seek my help. Sometimes they use HKSL; sometimes they just point to the questions and look at me.'

~SLCO Deaf teacher of Chinese.

'The hearing students are inquisitive about what I am signing in class. Sometimes when I sign to explain things to the DHH students, hearing students also look at my signing and learn from me.'

~SLCO Deaf teacher of English.

As for the teachers, they also realised that they were prepared to switch between languages to achieve pedagogical effects. This was seen especially when the teachers attempted to explain complex ideas in class, such as scientific terminologies or abstract grammatical points.

'Sometimes, I switch to HKSL to clarify complex ideas such as photosynthesis in class. When the DHH students understand the concept, I will point to the written text and read it aloud. Sometimes I ask the Deaf teacher to explain the ideas first because they know the difficulty the DHH students might experience from a Deaf perspective.'

~SLCO hearing teacher of Chinese

'When we teach English grammar, I ask the Deaf teacher to sign in HKSL and highlight the similarities and differences between the two languages. We then write them down on the blackboard or explain the grammar further in the pull-out sessions.'

~SLCO hearing teacher of English.

Parents

Although hearing parents of DHH students had primarily adopted oral Cantonese when interacting with their child at home, they were willing to learn some signs to facilitate communication. They also appreciated the bimodal bilingual functioning of their child at home and school. Such comments were frequently conveyed to the teachers at school, alleviating the school's worries that parents might resist allowing their child to learn an additional language, especially HKSL.

'HKSL helps my child understand what goes on in the classroom. She knows when to use which language. She uses HKSL in school most

of the time. She uses mouthing or Cantonese at home with her twin brother or me. Occasionally when we meet DHH adults on the street, she signs to them. Sometimes she even uses oral Cantonese with her DHH friends when they play together. She enjoys teaching written Chinese to DHH children younger than her.'

~ Hearing parent of DHH Student A.

While the primary home language of the two Deaf parents was HKSL, in the interviews they said they used both oral Cantonese and HKSL when interacting with their DHH child at home because they wanted their child not to miss out on oral Cantonese development. In other words, the child was already used to code-switching at home before entering school.

'We use two languages at home, sometimes a mix of the two languages. Sometimes I use mouthing to teach my child when she is doing homework. Her brother, who is also deaf, interacts with her in either HKSL or oral Cantonese.'

~Deaf parent of DHH student F.

Students

Four of the six DHH students said they preferred paying attention to the signing of the Deaf teacher in class to speech, and the remaining two said they would alternate their gaze between the two teachers. Four students commented that they would pose questions to the Deaf teacher or the hearing teacher in HKSL when they encountered difficulties. Yet, two DHH students said they preferred oral Cantonese to HKSL in classroom communication.

'Some of my hearing friends don't know HKSL, but I still love to play with them. I love to learn oral Cantonese language from them.'

~DHH student B.

As said, flexible language choice among the DHH and hearing students was an outcome of these children's improved bimodal bilingual proficiency. The data from focus group discussions

and interviews further showed that over time most hearing students could select an appropriate language to interact with their DHH peers, just like the DHH peers to their hearing peers. In other words, the hearing students felt that they behaved similarly to their DHH peers by assessing the context of language use in the classroom to adopt a language appropriate for interaction. Additionally, the hearing students perceived that they needed to use HKSL in classroom discussions to facilitate comprehension by their DHH peers.

'In the group discussion, I will try to sign to my classmates so that everyone in the group can join the discussion together.'

~Hearing student F.

'Sometimes I use HKSL to chat with my DHH friends, but they will reply in oral Cantonese! So we switch to speech. It depends; sometimes, we sign if it is very noisy.'

~Hearing student E.

Theme 3: Differences in English and Chinese Achievement

In Hong Kong, oral Cantonese is the native language of hearing students but a generally weaker language for DHH students. In contrast, English is always a second or foreign language for all students. The focus group discussions showed that the two groups of students displayed differences in their concern about achievement in English or written Chinese as a language subject. The DHH students said they needed more assistance than their hearing peers during the Chinese lessons, whereas both groups commented that they faced challenges learning English. On the other hand, the teachers and parents generally were more concerned about the DHH children's progress in learning English than Chinese, owing to the sociolinguistic situation in Hong Kong. A few parents raised concerns about their inability to speak or use English at home, which prevented them from supporting their DHH child's English learning.

'I think students have more difficulties learning English than Chinese. Many parents don't

know English and cannot teach their child at home.'

~SLCO hearing teacher of English.

'I am worried more about her progress in English because I don't know English to teach her this language. Sometimes her father teaches her, but he works till very late every day. I think she has improved this year, but I'm still considering enrolling her in some after-school tutorials.'

~D/HH parent of student F.

'D/HH students all have improvements in their language abilities and academic subjects. They seem to improve more in Chinese than in English.'

~SLCO hearing teacher of English.

Theme 4: Positive Attitudes towards Co-enrollment

Co-enrollment education embraces collaborative teaching and learning among the participants to achieve effective educational outcomes. Comments from the teachers revealed a positive attitude in teaching DHH and hearing children in the SLCO classroom. All participants, teachers and students alike, agreed that the sense of hearing loss as a disability is minimised in the SLCO setting since developing bimodal bilingualism implies the removal of communication barriers. Consequently, the DHH and hearing participants could learn from and support each other during the collaborative learning process. The frequent use of group work in the SLCO classroom encouraged DHH and hearing students to treat each other as equal partners in co-learning. They also tapped each other's strengths in different subjects to achieve a common learning goal and accepted each other's differences and limitations.

Teachers

All hearing teachers supported co-enrollment education for both DHH and hearing students. Although all reported that extra time and effort were initially required for co-planning lessons

and co-preparing visual teaching materials to support the learning of students with hearing loss, these efforts paid off in the end when they saw learning took place among the DHH and hearing students. Many recalled the challenge they faced when initially they had little knowledge of HKSL to communicate effectively and minimal skills for co-teaching with a teacher who was Deaf and signing.

'Teaching the co-enrollment class requires a lot of time and effort initially; you need to learn HKSL and co-plan with a Deaf teacher; however, it is gratifying in return. The sense of satisfaction and accomplishment is overwhelming.'

~General education hearing teacher of Chinese

'I think the school has supported us well. We have a team of teachers who support each other. We have regular meetings to review the flow of work and how we can streamline work and communication every week. We also observe each other's lessons and give feedback to each other. The school also supports us in attending HKSL courses.'

~General education hearing teacher of English

'I love teaching the students. I think they are the best students ever. They stay focused during the lessons. They react to my questions very quickly. They are thinking seriously but not daydreaming all the time. They love to ask me, "Why? Why? Why?" during class. Sometimes I have to give examples when explaining to them. But you can see they are eager to know more.'

~SLCO Deaf teacher of English

Parents

Both DHH and hearing parents highly valued their child's experiences in the SLCO classroom. According to them, their child's positive attitudes towards the learning context were not restricted to language or academic achievement (i.e. formal

learning) but also their appreciation for the value of diversity within the school environment (i.e. informal learning), leading to both hearing and DHH students' mutual respect towards each other's existence and mutual support they gave each other in education.

'I think this setting benefits both DHH students and hearing students. They can choose which language they want to adopt during class discussions or in comprehending lesson contents. Sometimes my daughter tells me what she has learned in school. She will pronounce the vocabulary in Chinese and sign the teaching contents to me. Starting from Primary 3, the teaching contents become more and more difficult. The co-enrollment setting has enabled her to gain a good foundation in Primary 1 and 2. My daughter has some DHH friends who are enrolled in other mainstream schools. They lag behind their hearing peers academically. They are left alone in the classroom. They just sit in the classroom for 8 hours a day. Even when they have difficulties, they have no means to communicate with others and tell them about their needs.'

~Parent of DHH Student A.

'My daughter didn't like to go to school before, but now she loves going to school. If there is a holiday, she will count down and long to go back to school to meet her friends.'

~Parent of hearing Student A.

'My son has learned to accept others who are different from him. I think it is an important attribute when he grows up and enters the society.'

~Parent of hearing Student C.

Students

All students commented that they liked the SLCO setting because co-teaching between a Deaf teacher and a hearing teacher supported their learning, which was unique but practical. DHH and hearing students said they loved learning and playing with their classmates.

Theme 5: Increase in Students' Self-Confidence

Some previous studies have observed that DHH children with bicultural identities are more likely to have positive self-esteem and attitudes towards their deafness (Yiu 1999, 2005; Bat-Chava, 2000). This theme emerged mainly after we had analysed the parents' interview data. Almost all parents of the DHH students stated that they observed an increase in self-confidence and independence with their children over time. The SLCO setting seemed to equip DHH and hearing students with essential skills, especially experiences in interacting with people of different hearing statuses.

'My daughter is more confident in speaking to hearing people. Her speech is a little unintelligible. Once, I saw she was confident enough to shout when people took her seat. She said, "This seat is occupied!" I think she has gained much self-confidence. Sometimes her brother doesn't dare to order in the restaurant, and she will volunteer to do the ordering for us all. Although she fails to speak clearly, she still tries to point and use gestures to communicate with the waitress. She has been learning to dance with her classmates even though she can't hear music at all. She enjoys dancing a lot.'

~ Parent of DHH Student A.

'I think my daughter is becoming more and more confident after entering the sign bilingualism and co-enrollment class. She loves to be an interpreter for other DHH or hearing peers.'

~ Parent of DHH Student E.

'He expresses himself more now. He will tell me if he feels tired or unhappy. He proactively speaks to other hearing children when he joins the drama activities outside school. He is more confident now. He even orders McDonald's himself.'

~Parent of DHH Student B.

'Sometimes she even interprets for me when we meet some hearing people. Once my phone had problems, she confidently helped me explain the problems to customer service. I think she has become very independent. She won't rely on others to help her.'

~D/HH parents of student F.

'DHH students take the initiative to seek clarifications from me whenever they have problems understanding my questions in class. I'm happy to see this improvement in classroom participation in them. Sometimes they even discuss English grammar structures with me.'

~SLCO hearing teacher of English.

Theme 6: Friendship and Equal Partnership

When asked about their favourite school experience, most students said it was meeting and chatting with friends. When DHH students were asked if they had any hearing friends, they all said they had many. When asked if they had any preferences about the hearing status of friends they liked to chat or play with, they replied that hearing status was not a criterion for developing peer relations. This finding echoed the observation of Yiu and Tang (2014), who observed a high degree of social interaction between both groups of students studying in the SLCO classroom. DHH students were never short of hearing peers in work and play. Removing communication barriers, the students behaved like any ordinary student in the class. With those they liked to study with, they mutually supported each other when facing some challenging learning situations in the classroom. When asked to name one best friend in class, five of the six DHH students gave the name of a hearing peer, while the sixth student said she couldn't name a best friend because all her DHH and hearing friends were equally important to her.

'I have many hearing friends, even friends from other classes.'

~D/HH student C.

'I love to dance and chat with my hearing and DHH friends. We can play and chat for a long time.'

~D/HH student A.

The hearing teachers also felt a strong partnership with the Deaf teacher in co-teaching, and this partnership had infiltrated the student body in the SLCO classroom.

'Now, sometimes I ask the Deaf teacher to lead some parts of the lessons. I observe that we are role models to our students as they learn from us as equal partners for co-teaching in the classroom. After all, it takes time to develop co-teaching practices, especially mutual understanding.'

~General education hearing teacher of English.

'Hearing students are ready to help DHH students during recess if DHH students have any questions about the teaching contents. Sometimes DHH students help hearing students in return.'

~SLCO hearing teacher of English.

'Sometimes hearing students help DHH students understand academic subjects, and sometimes DHH students help hearing students. I don't see any difference between them.'

~SLCO Deaf teacher of English.

'I think students naturally feel belonging to and play in small groups, but the groups are based on gender instead of hearing status. You know, girls tend to cluster together to chat about cosmetics, princesses, etc., while boys talk about video games and fighting games.'

~SLCO Deaf teacher of English.

Theme 7: The Importance and Challenges of Co-planning

All teachers stressed the importance and challenges of co-planning to facilitate co-teaching and address individual differences. The Deaf teachers,

however, said there existed significant individual differences in the teaching styles among the general education hearing teachers. When interviewing the general education hearing teachers, some found spending extra time on co-planning rather challenging due to their hectic teaching schedules. Some general education hearing teachers were more ready than others to learn HKSL from the Deaf teachers; hence co-teaching practices became more flexible and efficient over time. The latter group of hearing teachers observed that their investment of time and effort in co-planning resulted in an accelerated improvement of their signing skills and improved learning outcomes among their DHH and hearing students. All teachers commented that they co-planned before each lesson to effectively address the individual differences among their DHH and hearing students. Yet, Deaf teachers indicated difficulty coping with the diverse teaching styles of many general education hearing teachers. Although the general education hearing teachers at the school joined the SLCO Program voluntarily, it was their first time encountering Deaf people and learning HKSL for teaching, thus the initial challenges of incorporating this innovative pedagogy into classroom.

'Every hearing teacher has different abilities and attitudes. As they are all late learners of HKSL, their signing abilities vary. Some of them could be very fluent after three months of learning. Some stayed at the beginner's level, even teaching with us for a year.'

~SLCO Deaf teacher of Chinese.

'Some hearing teachers are willing to spend time on co-planning and co-evaluation after the lessons. You know, it's like making friends. You can't be best friends with everyone.'

~SLCO Deaf teacher of English.

Some SLCO Deaf teachers also highlighted individual differences in the general education hearing teacher's attitudes, HKSL proficiency, and teaching styles, potentially influencing, if not affecting, co-teaching effectiveness.

'Sometimes, the hearing teacher doesn't have enough time to co-plan with me. Also, the hear-

ing teachers' signing abilities vary. Sometimes their non-manuals or mouthings are hard to perceive. But, if I miss something in teaching, I will interrupt and ask the hearing general education hearing teacher to repeat or write it down on the blackboard so I can see and pick up the teaching again.'

~SLCO Deaf teacher of English.

'I think every teacher has a different style and teaching pace; it takes time for the three of us (in the SLCO classroom) to nurture trust and rapport.'

~SLCO hearing teacher of English.

Another consequence of co-planning is the Deaf teachers' awareness that they must improve their general education subject knowledge and professionalism. Deaf teachers stated they lacked pedagogy and co-teaching techniques during the interviews due to their previous deaf education experiences. They also indicated that they would like to pursue further education to acquire a teaching qualification.

'Hearing teachers sometimes let me take the main teaching role, but my teaching experience and knowledge were inadequate. I wish I had a chance to advance my teaching techniques through further education.'

~SLCO Deaf teacher of Chinese.

'Since we need to co-teach with various teachers of different subjects, I lacked some subject knowledge, especially in General Studies. Although I understand the concepts, I might not know the related subject-specific signs because I was previously taught these concepts in a spoken language in an oralist dominant environment.'

~SLCO Deaf teacher of English.

Deaf teachers had neither received training in deaf education or sign linguistics nor completed a general teacher preparation program. The constant exposure to a full curriculum broadened their academic horizon and triggered their desire to enrich their professionalism.

4. DISCUSSION

Seven themes emerged based on the focus group discussions with students and individual interviews with teachers and parents. To recap, they were (1) *positive impacts of sign language*, (2) *translanguaging*, (3) *differences in English and Chinese achievement*, (4) *positive attitudes towards co-enrollment*, (5) *increase in students' self-confidence*, (6) *friendship and equal partnership*, and (7) *importance and challenges of co-planning*. The first three themes address language use and learning, and the last four are about the SLCO practices and teachers' professionalism. In what follows, we will account for how the seven themes and their interactions contribute to six dimensions that characterise the SLCO classroom ecology, significantly how they shaped an inclusive culture of such a system. As said, we will adopt Andersen et al.'s (2014) three determinants of effective inclusive education: participation, achievement, and value of person in our characterisation (See Table 3). Before venturing into the identification of dimensions that characterise the ecology of a SLCO classroom, it needs to be pointed out that Andersen et al.'s (2014) framework assumes inclusive education as a social construct with multifaced relationships created by the participants within a set of nested societal systems which can be captured by Bronfenbrenner's (1974) Ecological Systems Theory. According to this theory, a child's interactions with the immediate environment, from home to school, such as with parents, teachers, peers and siblings, can be characterised as an ecology of a microsystem most influential to the child. The current study may be seen as an attempt to capture the characteristics of the ecology of this microsystem.

To some extent, this study also touches upon the mesosystem, the next higher system. Applying this theory to inclusive education, Andersen et al. (2014) argued that the microsystem contains a set of dynamic variables of formal and informal learning environments that a learner with special education needs situates themselves, including teachers, peers, physical learning spaces, classroom cultures and routines, resources and the playground. In SLCO education, the DHH

and hearing students are at the centre of the microsystem of learning with dynamic variables. The mesosystem thus captures the relationships and connections between these variables, which are continuously occurring, interacting and evolving, influencing the students at the centre of the microsystem, which is the SLCO classroom.

4.1 Participation

Two dimensions of the SLCO classroom ecology will be discussed under the parameter of participation: the critical mass of DHH students and the development of bimodal bilingualism to achieve direct communication. As mentioned, effective inclusion requires the learner's active engagement in all aspects of schooling, both academically and socially. Within an inclusive setting, DHH students collaborate with their peers and access a full curriculum commensurate with their hearing peers. From the perspective of SLCO education, a few dimensions of this classroom ecology could raise the level of DHH students' social and academic participation. First, the focus group discussions affirmed the impact of having a *critical mass of DHH students* (i.e., Theme 4: Positive attitudes towards co-enrollment, and Theme 6: Friendship and equal partnership) to study with hearing students. It is well-understood that in mainstream education for the deaf, the low incidence rate and geographic distribution of DHH children make it difficult to cluster them in one mainstream school.

Consequently, many of them enter the educational system as the only DHH person in the school environment and seldom participate fully in the classroom. In the SLCO classroom, the ratio of DHH students to hearing students is 1:3/4. Having a critical mass of DHH students in the same classroom enables interactions at different levels, deaf/hearing as well as deaf/deaf, within the microsystem, thus creating ample opportunities for students and teachers to nurture language and socio-emotional support towards each other.

Wong (2018) observed that DHH students' initiation moves gradually outnumbered their hearing peers towards the end of her 3rd year of

observation. Given that the DHH students had already acquired some HKSL during kindergarten, they were ready to check their understanding of the lessons with the Deaf teacher and their hearing peers. Yiu and Tang (2014) found that DHH and hearing students in the SLCO Program developed positive attitudes towards each other. Daily interactions in work and play eventually cultivated a mutually inclusive relationship between the DHH and hearing students, as reflected in the data from the focus group comments categorised under *friendship and equal partnership* (Theme 6: Friendship and equal partnership). Such positivism and mutual acceptance and respect towards each other emerged as a general characteristic of the SLCO classroom.

The second dimension is *the development of bimodal bilingualism to achieve direct communication (i.e., Theme 1: Positive impacts of sign language (i.e. HKSL)) as a catalyst to bolster communication and enhance participation of DHH and also hearing students*. Inside the SLCO classroom, bimodal bilingualism underlies interactions at various levels, i.e., hearing teacher/Deaf teacher, teacher/student and student/student interactions. In the SLCO classroom, strategies of deaf-deaf communication or deaf-hearing communication seem to evolve naturally through daily interactions, particularly as the HKSL skills of the hearing participants and the oral Cantonese skills of the DHH students improved over time. Wong (2018) also observed an increase in social interactions between the Deaf teacher and both DHH and hearing students towards the end of her observation period. This reflects the positive impact of involving Deaf teachers in the SLCO Program (Wong, 2018). The benefits of involving Deaf teachers in deaf education have been documented in previous studies, including enhancing DHH students' classroom participation and building their socio-cultural identities (Bailes, 2001; Evans, 2004; Singleton & Morgan, 2006; Ohna, 2009). An additional consequence of bimodal bilingual development among the participants of the SLCO system is the frequent adoption of translanguaging strategies (i.e., Theme 2: translanguaging). The participants in the SLCO

classroom had ample opportunities for translanguaging, which was also a natural consequence of boosting their bilingual processing skills. At the social level, they were practising how to react to the teacher's choice of language to satisfy social and pedagogical requirements within the microsystem. If viewed from a linguistic perspective, 'translanguaging' rests upon the premise that the bimodal bilingual students undergoing SLCO education acquire a linguistic repertoire that consists of knowledge of more than one language so they can strategically select a language, or constituents of a language, to communicate effectively to support their participation in classroom/school activities.

4.2 Achievement

Three dimensions of the SCLO classroom ecology will be discussed under the parameter of achievement: Readiness for school reform, collaborative teaching practices and unique linguistic repertoire. Anderson et al. (2014) defined achievement entirely from the learner's perspective, namely whether the system allows the learner to access learning goals that meet their individual needs within the bounds of the curriculum and an assessment system. When applied to the SLCO Program, we argue that achievement needs to be evaluated from both the teacher/school and the learner's perspective. Speaking of the teachers or the school in general, setting educational goals reflecting inclusive education via co-enrollment can be squarely perceived as a kind of school reform requiring the school/teachers' commitment to change long-established practices. Therefore, the third dimension, *readiness to reform* (i.e., Theme 4: Positive attitudes towards co-enrollment), demonstrates the school/teachers' positive attitudes towards reforming the school practices to meet the expectations of co-enrollment and defines the framework of achievement upon which they evaluate the degree of success in establishing such a system, especially in terms of devising educational accommodations to support learner accessibility and achievement. Other than those DHH students in the SLCO Program, most DHH children in Hong Kong are being mainstreamed

in kindergartens and elementary schools where the principals or teachers may not have sufficient prior knowledge about their educational and language needs, let alone the readiness to adopt sign language in mainstream education. Friend and Cook (2007) commented that co-enrollment requires a strong commitment from the participants to succeed. Commitment is defined in terms of the educators' readiness to adapt the school system to accommodate the needs of a cluster of DHH students and Deaf teachers at various levels. Accommodations include the teachers learning HKSL, reviewing their curriculum, creating effective classroom organisation, pedagogy, and evaluation against the background of educating DHH and hearing students. These accommodations are over and above the expectation due to the imminent change in the school ethos due to the presence of an additional language and a group of DHH participants.

The school within which the SLCO program is established was prepared to reform and add elements to create a Deaf-friendly environment in the classroom. The principal and teachers participated in training in Deaf Education by the SLCO research team, Deaf culture and some basic HKSL by a Deaf teacher before the project began. This initial training transformed the principal and teachers' knowledge and attitudes towards deafness and HKSL. To facilitate the speech perception of DHH students, teachers were taught how to use the FM system in the classroom and follow procedures to assist the DHH students in handling their hearing aids or implant devices. During term time, the school adopted a few measures to promote the use of HKSL for all teachers and students, such as organising activities to celebrate The UN's International Day of Sign Languages, giving Deaf teachers the duty of teaching a motto in HKSL to all students during morning assemblies, and organising programs to train hearing students become a junior interpreter for their DHH peers during school events. For the SLCO classes, teachers arranged a signing recess every day, during which everyone in the classroom was encouraged to interact in HKSL. This whole-school approach to devising school poli-

cies and practices to accommodate DHH students and Deaf teachers in the school environment highlighted the school's commitment and readiness to adopt innovative pedagogy for inclusive education. All these measures eventually relieved the pressure on parents of DHH students because they knew their child was accepted and supported in the mainstream school environment. Initially, when some parents of hearing children expressed scepticism about the school's change of educational and language policy due to the adoption of the SLCO Program, the principals were prepared to defend the school's inclusive policy but agreed to assign their child to a non-SLCO class. As the SLCO Program has become increasingly popular at school, such hesitation of parents toward the SLCO classroom vanished, and more and more of them requested that their hearing child be enrolled in the SLCO class leading to a long wait list, especially during primary admission every year. In a nutshell, the open-mindedness and commitment of the school principal and teachers to create a Deaf-friendly learning environment were pivotal to sustaining the SLCO Program.

What other educational goals did the teachers achieve? In the SLCO classroom, *collaborative teaching practices* constitute the fourth dimension (i.e., Theme 1: Positive impacts of sign language, Theme 4: Positive attitudes towards co-enrollment, & Theme 7: Importance and challenges of co-planning). In terms of the medium of instruction, the SLCO classroom adopted the policy of one-teacher-one-language, enacted by a hearing teacher who used oral Cantonese and a Deaf teacher who used HKSL. Comments from the interviews showed that both the general education hearing teachers and the Deaf teachers appreciated and saw the benefits of this language use policy as it allowed them the flexibility to use both languages to achieve pedagogical goals. This is quite unlike the typical mainstream classrooms that involve individual DHH students who need signing to support education. In Hong Kong, their rights to access HKSL are often ignored. In other countries, an interpreter may be called in, or it is common for the class teacher to adopt a total communication approach using signing and

speech simultaneously in delivering the lessons. In many regular inclusive education settings in Hong Kong, a teaching assistant may be called in to support students with special educational needs. However, the language of communication between the teaching assistant and DHH student is usually oral Cantonese due to the lack of awareness of the language needs of DHH students. The SLCO one-teacher-one-language approach removes the language barrier and promotes direct communication with a choice of language among all participants involved in the educational process.

Although co-teaching required time for planning, preparing and implementing the lessons together with another teacher who was Deaf and signing, the general education hearing teachers commented that such experiences were highly rewarding because these pedagogical processes enabled teachers to learn how to adapt their teaching styles and expectations about teaching outcomes to cater for diversity and mixed abilities in the classroom. As commented on by the teachers, the demand for time was resolved by the principal, who allowed them extra time in their daily schedule to co-plan lessons. Co-teaching experiences also opened up new knowledge for the Deaf teachers, who had previously received education exclusively in a deaf school setting with a reduced curriculum. In the SLCO classroom, they acquired experiences collaborating with a hearing teacher in teaching. Through this process, they were exposed to a wide variety of subjects and topics of a full curriculum which they had seldom had the opportunity to access before. For the students, adding a Deaf teacher in the SLCO classroom provided more social interaction opportunities in a different language and created positive perceptions about differences in the SLCO microsystem. For instance, teachers' co-teaching demonstrated to students various teaching methodologies, especially strategies people with different hearing statuses and cultural orientations would adopt when working together. Pedagogically, the SLCO classroom emphasised a student-centered approach to education. As shown in Theme 2 (Translanguaging), the focus group discussions revealed fre-

quent adoption of group work in the classrooms and both DHH and hearing students had equal participation in these activities. This finding contrasts with that of Iran-Nejad (1990) and Pintrich, Marx and Boyle (1993), in which DHH students often encountered difficulties in group-based activities designed to engage students in deep and meaningful learning within a typical mainstream classroom. Stinson and Liu (1999) further argued that these difficulties persisted even with a sign interpreter. However, in the SLCO classroom, direct communication among the participants created an open platform for students to collaborate to achieve the learning goals established by the teachers.

For the SLCO DHH and hearing students, a sense of achievement was observed when they demonstrated to others that they had acquired a *unique linguistic repertoire* (i.e., Theme 1: Positive impacts of sign language and Theme 2: Translanguaging), which is the fifth dimension of the SLCO classroom ecology. This dimension differentiates students in the SLCO classroom from typical primary students in Hong Kong because of such unique bimodal bilingual learning experiences within the SLCO setting. The SLCO classroom in Hong Kong is more complex than what has been reported in sign bilingual programs organised in other countries. In a conventional sign bilingual classroom, only one spoken language is used alongside a sign language. In the SLCO classroom in Hong Kong, three spoken languages are used alongside HKSL. The government's language policy of "Biliteracy and Trilingualism" stipulates that in the classroom, students are exposed to oral Cantonese, Putonghua and English in daily or official communication (Evans, 2013). Oral Cantonese is the language for everyday communication in almost all formal and informal settings. However, while Cantonese is the medium of instruction at school, learning of Putonghua, written Chinese and English are treated as school subjects in the regular curriculum. Against these backgrounds, the status of HKSL in the SLCO context is almost the same as oral Cantonese, a language for direct communication in the classroom and the playground. HKSL is consistently

used across all subjects and contexts in the school environment, alongside a spoken language.

Seen in this light, the SLCO classroom becomes a fertile ground for the participants' development of bimodal bilingualism, leading to a unique linguistic repertoire. As reported above, an earlier study by Tang, Lam and Yiu (2014) found a positive correlation in the language development of written Chinese, Cantonese and HKSL of a group of SLCO-DHH students. Tang, Li, Li, & Yiu (under review) reported that DHH students studying in the SLCO environment could potentially achieve a level of grammatical knowledge of written Chinese comparable to their SLCO hearing peers. So far, the evaluation of SLCO education in Hong Kong has focused only on HKSL, Cantonese and written Chinese development. As indicated by the comments of some teachers and parents of the SLCO Program, English achievement poses potential difficulties to the DHH students (i.e., Theme 3). Further research is necessary to uncover English learning by DHH children and how to best promote and support English language learning in the SLCO classroom.

Since 2006, SLCO-primary education expanded each year by adding one more grade into the system until it reached Primary 6, i.e. six SLCO classes at each grade from Primary 1 to Primary 6 out of thirty classes in the entire school. This expansion has resulted in the emergence of a bimodal bilingual community in an inclusive setting, with members who define themselves as "biliterate and quadrilingual", having HKSL as part of their unique linguistic repertoire. This community is composed of not only DHH students and Deaf teachers but also hearing teachers and students. This formation of a school community underlaid by bimodal bilingualism, not only for Deaf/DHH but also for hearing participants, leads to social inclusion in the educational setting and ensures active participation of DHH students. Future research is necessary to examine how DHH students who grow up in the SLCO classroom react to the use of oral Cantonese and HKSL ultimately. Previous observations from signing adults in HK found little use of oral Cantonese, certainly not to the extent the SLCO DHH students use this

language. It will be important to investigate how confidently these students use HKSL or a spoken language when interacting with the adult signing community.

To some extent, the student's tendency to code switch comfortably between languages makes them stand out from the older members of HK's Deaf Community, in which HKSL is the primary mode of daily communication and speech is seldom used. These DHH students may enter the Deaf Community with a modified identity because, in addition to HKSL, many of them have an adequate proficiency level in oral Cantonese. Such bilingual abilities will support them to interact not only with the Deaf Community but also with the hearing community. As for the SLCO hearing students, their participation in the Deaf Community is probably through their service as sign interpreters in future, since they learn HKSL at a very young age and perceive it as a functional language not only inside but also outside the school environment.

4.3 Value of person

The last parameter by which we determined effective inclusive education is the value of person. One dimension of the SCLO classroom ecology will be discussed under this parameter: Identity and School Membership. Value of person is interpreted as the value of knowing one's identity, knowing what one has to offer to others, as a DHH or hearing student or a peer knowing what to offer each other within the SLCO context. In the SLCO classroom, the perception and respect for differences shape a collaborative culture of how a hearing individual and a deaf individual can work together efficiently to achieve learning. Comments from DHH students as identified under Theme 5 (Increase in students' self-confidence) and Theme 6 (Friendship and equal partnership) revealed that the DHH students felt accepted and respected for who they were; they felt they held a place of value, and they believed that others appreciated their abilities to function within the system. Their confidence in expressing themselves and their feeling of being accepted lays the foundation for nurturing friendship and partnership in learning with

hearing students. These two themes constitute the sixth dimension – *identity and school membership*. The focus group comments of both students and teachers showed that peer interactions between DHH and hearing students were part of the regular daily communication. As a typical behaviour within the classroom, ongoing peer interactions reflected close interpersonal relations and a high degree of social integration between the two groups of students. The bimodal bilingual community within the SLCO classroom nurtured a sense of belonging among the DHH students, who accepted their hearing status and felt that they differed from their hearing classmates only by their hearing status and greater proficiency in using HKSL.

On the other hand, the hearing students did not pay much attention to the hearing status of their DHH peers. Instead, they perceived their DHH peers as users of HKSL, a language which they were eager to learn from them. Additionally, the expression of self-confidence by a DHH student in the interview data, as reported by her parents, was exemplary of how a SLCO classroom could manage to bolster DHH students' socio-emotional development. Many DHH students appreciated the opportunities to exchange information in school with their DHH or hearing peers and to share life values and experiences among themselves on the playground. Additionally, these DHH students commented that when they encountered difficulties in school or at home, they felt comfortable sharing such experiences with their Deaf teachers, whom they viewed as role models. Since many of the Deaf teachers were themselves members of the HK Deaf Community, they could connect the young DHH students with the adult members of the community. In other words, the hearing status of the participants did not seem to have a direct impact on the way they perceived their relationships with each other within this microsystem. Both groups of students commented that they cherished the value that they had something to offer and they also gained much in return, such as friendship and partnership in learning. Some students mentioned the development of long-term friendships and an expanded scope of

life experiences. As one teacher commented, interests shared by the same gender were an everyday basis of forming social groups at school, not hearing status. The fact that DHH students saw themselves as members of different social groups at school encouraged them to view themselves as an ordinary member of society, acquiring experiences by interacting with multiple social groups and contributing their talents to support DHH as well as hearing people in achieving a sense of collective attainment (Leung, 2010).

As discussed in the introduction, co-enrollment education creates a teaching and learning environment that integrates DHH and hearing students and teachers and provides ample opportunities for them to learn about one another's language skills, academic abilities, individual learning styles and personalities. The co-enrollment classroom reflects a set of dimensions or characteristics (e.g., classroom management and arrangements, the language of instruction, co-teaching and co-learning) which lead to the construction of ecology that appears to be unique in terms of patterns and language of classroom interactions, socio-emotional behaviours, respect for differences and diversity, among others.

5. CONCLUSIONS

This study has identified six dimensions which characterise a co-enrollment classroom ecology. They are (1) a critical mass of DHH students, (2) development of bimodal bilingualism to achieve direct communication, (3) readiness for school reform, (4) collaborative teaching practices, (5) unique linguistic repertoire, and (6) identity and school membership. These dimensions underscore the classroom processes and the development of interpersonal relationships among the participants within a co-enrollment setting. Following Siedentop (1988), we assume these six dimensions are not static but evolve as a function of their interactions in the microsystem. As such, the state of SLCO classroom ecology is perceived to be the outcome of a series of multi-faceted changes in these dimensions, with the child at the centre of the microsystem constantly responding to and influencing the system's evolution. Results of this

study show that SLCO education has benefitted both DHH and hearing participants, especially in terms of the development of a unique linguistic repertoire and mutual respect towards each other, the growth of professionalism among the Deaf and hearing teachers, and affirmation of DHH students' perceived identity through the use of HKSL and oral Cantonese in the inclusive classroom.

The dimensions extracted from the SLCO classroom ecology offer a framework for teacher

training in deaf education. Future teacher training programs for the deaf in mainstream education may include topics addressing Deaf culture, acquisition of natural sign language and bimodal bilingualism, adoption of sign language in an inclusive classroom, and Deaf-oriented co-learning and co-teaching teaching practices. Understanding these key concepts will benefit the education of DHH and hearing students in co-enrollment programs.

REFERENCES

- Abbate, L. (2019). Willie Ross school for the deaf and partnership campus: A dual-campus model of co-enrollment. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 257-276). New York: Oxford University Press.
- Anderson, J., Boyle, C., & Deppeler, J. (2014). The ecology of inclusive education: reconceptualising Bronfenbrenner. In H. Zhang, P. Chan & C. Boyle (Eds.), *Equality in education: Fairness and inclusion* (pp. 23-34). Rotterdam, The Netherlands: Sense Publishers.
- Antia, S. D. (1985). Social integration of hearing-impaired children: Fact or fiction? *The Volta Review*, 87, 279-289.
- Antia, S. D., & Kreimeyer, K. H. (1994). Full inclusion of deaf and hard of hearing children in public schools: When is it possible. In *The dean's forum for the advancement of knowledge and practice in education* (pp. 39-41). Tucson, AZ: University of Arizona.
- Aspin, D. (2007). The ontology of values and values education. In D. Aspin & J. Chapman (Eds.), *Values education and lifelong learning: Principles, policies, programmes*. Dordrecht, The Netherlands: Springer.
- Bailes, C. (2001). Integrative ASL-English language arts: Bridging paths to literacy. *Sign Language Studies*, 1, 147-174.
- Baker, M., Miller, C., Fletcher, E., Gamin, C., & Carty, B. (2019). Co-enrollment in Toowong, Australia. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 41-67). New York: Oxford University Press.
- Bat-Chava, Y. (2000). Diversity of deaf identities. *American Annals of the Deaf*, 145(5), 420-428.
- Berndsen, M., & Luckner, J. (2012). Supporting students who are deaf or hard of hearing in general education classrooms: A Washington state case study. *Communication Disorders Quarterly*, 33(2), 111-118.
- Bronfenbrenner, U. (1974). Developmental research, public policy, and the ecology of childhood. *Child development*, 45(1), 1-5.
- Brophy-Herb, H. E., Lee, R. E., Nievar, M. A., & Stollak, G. (2007). Preschoolers' social competence: Relations to family characteristics, teacher behaviors and classroom climate. *Journal of Applied Developmental Psychology*, 28(2), 134-148.
- Davidson, K., Lillo-Martin, D., & Chen Pichler, D. (2014). Spoken English language development among native signing children with cochlear implants. *The Journal of Deaf Studies and Deaf Education*, 19(2), 238-250.
- de Klerk, A., Hermans, D., Wauters, L., de Laat, L., de Kroon, F., & Knoors, H. (2019). The best of both worlds: A co-enrollment program for DHH children in the Netherlands. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 183-210). New York: Oxford University Press.
- Doyle, W. (2013). Ecological approaches to classroom management. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary Issues* (pp. 107-136). New York: Routledge.
- Dye M. W. G., & Bavelier D. (2010). Differential development of visual attention skills in school-age children. *Vision Research*, 50, 452-459.
- Evans, C. (2004). Literacy development in deaf students. *American Annals of the Deaf*, 149, 17-27.
- Evans, S. (2013). The long march to biliteracy and trilingualism: Language policy in Hong Kong education since the handover. *Annual Review of Applied Linguistics*, 33, 302-324.
- Friend, M., & Cook, L. (2007). *Co-teaching. Interactions: collaboration skills for professionals (5th ed.)*. Boston MA: Pearson.
- García, O., & Li, W. (2015). Translanguaging, bilingualism, and bilingual education. In W. E. Wright, S. Boun, & O. García (Eds.), *The handbook of bilingual and multilingual education* (1st ed.). Hoboken, NJ: John Wiley & Sons.

- Garrison, W., Long, G., & Stinson, M. (1994). The classroom communication ease scale: Development of a self-report questionnaire for mainstreamed deaf students. *American Annals of the Deaf*, 138, 132-140.
- Green, J. L., Weade, R., & Graham, K. (1988). Lesson construction and student participation: A sociolinguistic analysis. *Multiple Perspective Analyses of Classroom Discourse*, 28, 11-49.
- Guardino, C., & Antia, S. D. (2012). Modifying the classroom environment to increase engagement and decrease disruption with students who are deaf or hard of hearing. *Journal of Deaf Studies and Deaf Education*, 17(4), 518-533.
- Guardino C. & Fullerton E. K. (2010). Changing behaviours by changing the environment: A case study of an inclusion classroom. *Teaching Exceptional Children*, 42, 8–13.
- Hoffmeister, R. (2000). A piece of the puzzle: ASL and reading comprehension in Deaf children. In C. Chamberlain, J. Morford & R. Mayberry (Eds.), *Language acquisition by eye* (pp.143-163). Mahwah, NJ: Lawrence Erlbaum Associates.
- Hoffmeister, R., Henner, J., Caldwell-Harris, C., & Novogrodsky, R. (2022). Deaf children's ASL vocabulary and ASL syntax knowledge supports English knowledge. *The Journal of Deaf Studies and Deaf Education*, 27(1), 37-47.
- Howes, C. (2000). Social-emotional classroom climate in child care, child-teacher relationships and children's second grade peer relations. *Social Development*, 9(2), 191-204.
- Iran-Nejad, A. (1990). Active and dynamic self-regulation of learning processes. *Review of Educational Research*, 60 (4), 573.
- Kirchner, C. (2004). Co-enrollment: An effective answer to the mainstream debacle. In D. Power & G. Leigh (Eds.), *Educating deaf students: Global perspectives*. Washington, DC: Gallaudet University Press.
- Kirchner, C. (2019). TRIPOD: Answer to the seeds of discontent. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 25-40). New York: Oxford University Press.
- Kounin, J. S. (1970). *Discipline and group management in classrooms*. New York: Holt, Rinehart & Winston.
- Kramreiter, S., & Krausneker, V. (2019). Bilingual, inclusive, mixed-age schooling in Vienna. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 133-147). New York: Oxford University Press.
- Krausneker, V. (2008). Language Use and awareness in a bilingual setting. In Plaza-Pust, C. & Morales-Lopez, E. (Eds.) *Sign Bilingualism: Language Development, Interaction, and Maintenance in Sign Language Contact Situations* (pp.195-222). Amsterdam: John Benjamins.
- Kreimeyer, K. H., Drye, C., & Metz, K. (2019). The growth and expansion of a co-enrollment program: Teacher, student, graduate, and parent perspectives. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 277-300). New York: Oxford University Press.
- Leung, K. (2010). Beliefs in Chinese culture. In M. H. Bond (Ed.), *The Oxford handbook of Chinese psychology*, (pp. 221- 240). New York: Oxford University Press.
- Luckner, J. L., & Friend, M. (2008). Students with deafness and hearing loss. In M. Friend (Ed.), *Special education: Contemporary perspectives for school professionals* (2nd ed., pp. 306–339). Boston, MA: Pearson.
- Marschark, M., Antia, S., & Knoors, H. (Eds.). (2019). *Co-enrollment in deaf education*. Oxford, UK: Oxford University Press.
- McCain, K. G., & Anita, S. (2005). Academic and social status of hearing, deaf, and hard of hearing students participating in a co-enrolled classroom. *Communication Disorders Quarterly*, 27(1), 20-32.
- Metz, K. (2013). *Academic engagement of deaf and hard of hearing students in a co-enrollment program*. [Doctoral dissertation, University of Arizona]. ProQuest LLC.
- Ohna, S. (2009). Communication and participation in Chinese deaf schools: Experienced from a China-Norway collaboration on sign bilingual education. *Chinese Journal of Special Education*, 2009(4), 59-69.

- Pintrich, P., Marx, R., & Boyle, R. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research*, 63(2), 167.
- Saur, R., Popp-Stone, M. J., & Hurley-Lawrence, E. (1987). The classroom participation of mainstreamed hearing-impaired college students. *The Volta Review*, 89(6), 277-287.
- Schilling D. L., & Schwartz I. S. (2004). Alternative seating for young children with autism spectrum disorder: Effects on classroom behavior. *Journal of Autism and Developmental Disorders*, 34, 423–432.
- Scott, J. A., & Hoffmeister, R. J. (2016). American sign language and academic English: Factors influencing the reading of bilingual secondary school deaf and hard of hearing students. *The Journal of Deaf Studies and Deaf Education*, 22(1), 59-71.
- Siedentop, D. (1988). An ecological model for understanding teaching/learning in physical education. In *New horizons of human movements: Proceedings of the 1988 Seoul Olympic Scientific Congress*. Seoul: SOSCO.
- Singleton, J., & Morgan, D. (2006). Natural sign language acquisition within the social context of the classroom. In B. Schick, M. Marschark & P. Spencer (Eds.), *Advances in the sign language development of deaf children* (pp. 344-375). New York, NY: Oxford University Press.
- Stinson, M., & Liu, Y. (1999). Participation of deaf and hard-of-hearing students in classes with hearing students. *Journal of Deaf Stud Deaf Education*, 4(3), 191–202.
- Stinson, M., Liu, Y., Saur, R., & Long, G. (1996). Deaf college students' perceptions of communication in mainstream classes. *The Journal of Deaf Studies and Deaf Education*, 1(1), 40-51.
- Stinson, M. S., Whitmire, K., & Kluwin, T. N. (1996). Self-perceptions of social relationships in hearing-impaired adolescents. *Journal of Educational Psychology*, 88(1), 132.
- Swanwick, R. (2016). Scaffolding learning through classroom talk: The role of translanguaging. In M. Marschark & P. Spencer (Eds.), *The Oxford handbook of deaf studies: Language and language development*. Oxford: Oxford University Press.
- Swanwick, R. (2017). Translanguaging, learning and teaching in deaf education, *International Journal of Multilingualism*, 14(3), 233-249.
- Tang, G. Li, Q., Li, J., & Yiu, K-M, Chris. (under review). Chinese grammatical development of d/Deaf and hard-of-hearing children in a sign bilingualism and co-enrollment program.
- Tang, G., Lam, S., & Yiu, C. (2014). Language development of deaf children in a sign bilingual and co-enrollment environment. In M. Marschark, G. Tang, & H. Knoors (Eds.), *Bilingualism and bilingual deaf education* (pp. 313–341). New York: Oxford University Press.
- Tang, G., Yiu, C., Lam, S. (2015). Awareness of Hong Kong Sign Language and Manually Coded Chinese by Deaf Students. In Knoors, H., Marschark, M. (eds). *Educating Deaf Learners: Creating a Global Evidence Base*. Oxford University Press, pp.117-148.
- Torigoe, T. (2019). Learning together by deaf and hearing students in a Japanese primary school. In M. Marschark, S. Antia & H. Knoors (Eds.), *Co-enrollment in deaf education* (pp. 69-81). New York: Oxford University Press.
- UNESCO. (2005). *Guidelines for inclusive education*. Paris: UNESCO.
- Wolbers, K. A., Bowers, L. M., Dostal, H. M., & Graham, S. C. (2014). Deaf writers' application of American Sign language knowledge to English. *International Journal of Bilingual Education and Bilingualism*, 17(4), 410-428.
- Wong, F. (2018). *The interactional patterns of hearing, deaf/hard of hearing (D/HH) students participating in Hong Kong sign bilingual and co-enrollment classroom*. [Doctoral dissertation, University of Hong Kong]. HKU Theses Online (HKUTO).
- Xie, Y. H., Potmješil, M., & Peters, B. (2014). Children who are deaf or hard of hearing in inclusive educational settings: A literature review on interactions with peers. *Journal of Deaf Studies and Deaf Education*, 19(4), 423-437.

- Yiu, C. (1999). Self-concept of hearing impaired students integrated into regular classes: Its relationships to severity of hearing impairment and attitudes towards their disabilities. [Unpublished Bachelor's dissertation, University of Hong Kong]. HKU Theses Online (HKUTO).
- Yiu, C. (2005, July). Self-concept of hearing impaired students-integrated in regular classes: Its relationships to severity of hearing impairment and attitude towards their disabilities. Paper presented at the 20th International Congress on the Education of the Deaf, Maastricht, The Netherlands.
- Yiu, C., & Tang, G. (2014). Social Integration of deaf and hard-of-hearing students in a sign bilingual and co-enrollment environment. In Marschark, M., Tang, G., & Knoors, H. (Eds.), *Bilingualism and Bilingual Deaf Education*, 342-367. New York: Oxford University Press.
- Yiu, C., Tang, G., & Ho, C. C. M. (2019). Essential ingredients for sign bilingualism and co-enrollment education in the Hong Kong context. In M. Marschark, S. Antia and H. Knoors (Eds.), *Co-Enrollment in Deaf Education*, pp. 83–106. New York: Oxford University Press.

Appendix A

Questions for the Semi-structured Interviews and Focus Group Discussions

Interview questions for Deaf teachers:

- What is your view on the sign bilingualism and co-enrollment program in Hong Kong?
- What is the most challenging/frustrating thing in your process of teaching?
- What do you think you need to change/improve in teaching co-enrollment classes?
- How do you interpret your “role” in the classroom?
- What do you think is the role of different languages (sign and spoken) in teaching?
- What is your view towards your students? (Any difference between hearing or DHH students?)
- Can you describe your interactions with students in class?
- Could you tell me about incidents, occasions, or situations you feel rewarding in teaching?
- Do you refer to yourself as Deaf? To what extent do you think other hearing teachers (Hearing school teachers and Research Instructional officers) perceive you as Deaf?
- What difficulties have you faced promoting deaf awareness and sign language in school?
- What kind of training do you think is needed to equip your teaching?

Interview questions for hearing teachers:

- What is your view on the sign bilingualism and co-enrollment program in Hong Kong?
- What is the most challenging/frustrating thing in your process of teaching?
- What do you think you need to change/improve in teaching co-enrollment classes?
- How do you interpret your “role” in the classroom?
- What do you think is the role of different languages (sign and spoken) in teaching?
- What is your view toward your students? (Any difference between hearing or DHH students?)
- Can you describe your interactions with students in class?
- Could you tell me about incidents, occasions, or situations you feel rewarding in teaching?
- What kind of training do you think is needed to equip your teaching?

Interview questions for parents:

- What do you think about your son/daughter studying in the sign bilingualism and co-enrollment program?
- Has your son/daughter improved in studying the sign bilingualism and co-enrollment program? Can you give some examples?
- What language do you use with your son/daughter?
- Does your son/daughter like playing with DHH or hearing friends?
- Will you recommend your friends to study in the sign bilingualism and co-enrollment program? Why?

Focus group *discussion questions for students:*

- How do you feel studying in the sign bilingualism and co-enrollment program in Hong Kong?
- What do you like most about attending school?
- Who is your best friend?
- Do you like playing with DHH or hearing friends?
- What language do you use when playing or chatting with your friends?
- Did your friends help you during class? Can you give some examples?