3

Dyslexia in Hong Kong: Challenges and Opportunities

Chi-man Tsui, Cecilia W. P. Li-Tsang and Pui Yee Grace Lung
Department of Rehabilitation Sciences, The Hong Kong Polytechnic University
China

1. Introduction

This chapter aims to give a full picture of the development of the services for pupils with dyslexia in Hong Kong from the perspectives of the major stakeholders. The successes and challenges of developing dyslexic services in Hong Kong would inspire various stakeholders and in turn shed light on the formulation of the related policies and services elsewhere.

There are four main sections in this chapter which describe the past, current and future development of the services on dyslexia.

2. Awareness of dyslexia in Hong Kong

There has been a growing awareness of the issues of children with dyslexia in Hong Kong since the 1990s.

As dyslexia is often termed as "hidden disability" due to the discrepancy between the intellectual abilities and actual reading and writing performance, under-diagnosis and hence deprivation of early identification and early interventions such as appropriate educational and social support from teachers and parents usually exist (Department of Social Work and Social Administration, 2005).

Currently, there is no reliable prevalence rate of dyslexia. As the knowledge on dyslexia of the major stakeholders is limited, the report rate of dyslexia remains low in Hong Kong. However, over 80% of primary and secondary school teachers come into contact with dyslexic students in their classes. Although primary and secondary school teachers have adequate basic knowledge on dyslexia, the majority desired more in-depth training on its nature and management (Hong Kong Christian Service, 2005). This reflects that there has been a lack of training on dyslexia for personnel working with children which may have made early identification and subsequent interventions of dyslexia less possible.

A study showed that 62.5% of parents suspected that their children were suffering dyslexia, with only 21.6% being identified by their teachers. About 70% and 25% of students were assessed in Child Assessment Centers and in schools (either by Education Bureau, EDB, or school-based educational psychologists) respectively. The long waiting time for assessment services was also an issue. About one-third of students waited for 3 to 6 months; nearly 40%

had to wait for 6 months to one year, and more than 10% even needed more than one year. As a result, parents ought to shoulder a crucial gate-keeping role in early identification so as to initiate the subsequent professional assessment and interventions (Ngan-Keung, 2008).

When parents suspect their children of dyslexia, it is quite common and natural for them to want to know more about its causes, treatment/interventions and prognosis. Accurate and reliable information on dyslexia is best provided by well informed professionals. While various personnel are involved in identification of dyslexia, nurses are usually one of the most readily accessible frontline professionals who provide advices for children's health-related problems. Hence, nurses with knowledge on dyslexia act as a gate keeper for early detection of dyslexia before referring suspected children for further assessment. In Hong Kong, the Student Health Service of the Department of Health (DH) provides comprehensive health programs for primary and secondary school students according to their needs at various developmental stages. Nurses there are responsible for physical examination and health assessment, individual counseling and health education activities as well as referring those with problems to Special Assessment Centre or specialties for further assessment and management. Children suspected of dyslexia can be referred for comprehensive child assessment provided by DH, EDB or private agencies (Hong Kong Department of Health, 2006).

In response to the need to investigate the knowledge on dyslexia among health-care professionals, there was a study (Tsui, 2007) to get a profile of Hong Kong nursing students' knowledge on dyslexia by using ten true/false questions covering basic knowledge on dyslexia. It aimed to find out the implications for nursing education for both nursing students and practicing nurses as well as for current and future nursing practices. Those ten questions which were also adopted in an earlier study on Hong Kong teachers' dyslexia knowledge were designed by Dr. Catherine Lam, a leading advocate for dyslexics in Hong Kong and the consultant of Child Assessment Service of Department of Health. The comparison of the knowledge of the nursing students and the teachers in the two studies respectively was also made. With each correct answer of the ten questions scoring one, the mean was 7.71 in the study on nursing students which was lower than that in the study on teachers. More than 90% of the teachers gave a correct answer in eight out of ten questions whereas of the nursing students scored more than 90% in only three out of ten questions. Performance of the teachers was better than that of the nursing students in three questions. They were "Dyslexia is related to a lack of parents' supervision", "Dyslexia is related to a lack of motivation for learning" and "Dyslexia will usually improve when student grows up". The answers of all these questions were "false". This was expected as teachers were more informed about such situations. They usually had regular contact with parents for discussing students' academic performance. They were probably aware that no strong correlation existed between parents' supervision and the occurrence of dyslexia. In other words, dyslexia did occur irrespective of whether parent supervision was adequate or not. Similarly, teachers could readily notice that dyslexia occurred and did not improve though there were children who were eager to learn. As for Question "Medication is effective for dyslexia", over 90% of the teachers in that study but only 74.4% of the nursing students in the present study answered the question correctly (realising the statement was false). Nursing students were expected to be more familiar than teachers with drug therapy but surprisingly over a quarter of them had the misconceived notion that medication was

effective in the treatment for dyslexia. Considerable lower percentage of respondents in both studies gave correct answers to other two questions, namely, "Hyperactive students will have various degree of dyslexia" and "All dyslexic students suffer problem of inattention". The correct answers for both should be "false". The possible explanation for the misconception is likely to be the common occurrence of attention-deficit/hyperactivity disorder (ADHD) and dyslexia and the relationship between the two disorders being mistakenly perceived to be causal instead of comorbid. The comorbidity of ADHD and dyslexia is well recognised. A meta-analysis study indicates that pharmacological interventions (mainly the use of stimulants) are more effective than non-pharmacological interventions in treating ADHD but still not significant in improving academic performance. As ADHD is wrongly perceived to be the cause of dyslexia and medication is found to be effective for ADHD, one may conclude that medication will thus be effective for dyslexia. The possible reason of better performance of teachers in this question is that they may misunderstand that the medication prescribed is used for the co-existing ADHD problems. Hence, when the teachers notice that dyslexic problems cannot be improved by the medication, they may well believe that the medication is ineffective for dyslexia.

3. Actions taken in the past two decades in Hong Kong

3.1 The Hong Kong Association for Specific Learning Disabilities (HKASLD)

The following parts summarize the report written by the chairperson of a renowned parent group, HKASLD (Ngan-Keung, 2008).

HKASLD is a parent self-help group established in 1998. Before the 1990's, either the government or the general public had very little attention on specific learning disabilities (SLD). Even parents and teachers were not aware that academic underachievement might be due to SLD. Worse still, children with SLD were regarded as lazy and hence ignored and neglected in schools. In view of this, a group of parents organized HKASLD with the following aims:

- creating a better and fairer school environment for their own children;
- improving education policies pertaining the provision of assistance to children with SLD;
- providing both emotional and instrumental support to other parents;
- implementing educational events for the general public.

After more than a decade of development and experiences, the objectives of HKASLD become more structural and precise. They include:

- to facilitate self-help and mutual-help among parents in order to better assist each other in solving problems faced the children with SLD;
- to promote the general public understanding and acceptance towards children with SLD and hence eliminate the discrimination;
- to encourage professional research;
- to advocate for better learning environments for children with SLD.

The work of HKASLD is comprehensive which includes parent support and education, advocacy, children and youth development, and public education.

Parent support and education:

- parent sharing, learning skill workshops and family activities in various districts;
- parent hotline, professional counseling services and newsletter publication;
- parent training workshops, seminars for policy development and introduction of new resources;
- SLD Online Discussion Board for parents

Advocacy:

Regular meetings with government bureaux and departments, agencies and other stakeholders to discuss the following issues -

- better monitoring and support systems in primary schools;
- funding and resources support for secondary schools;
- teacher training;
- support for further education such as Vocational Training Council courses;
- pre-employment training and employment support.

Children and youth development:

- gymnastic classes, football programs, hiking, etc. in various districts;
- leadership training for teenagers with SLD;
- English improvement project for teens;
- seminars on studying and learning skills.

Public education:

- media interviews;
- "Wordless Gala" every two years;
- website;
- community and school talks.

3.1.1 Major milestones

In 2000, HKASLD succeeded to advocate for the Equal Opportunities Commission (EOC) to include SLD in the Code of Practice on Education under the Disability Discrimination Ordinance (DDO).

In 2002/2003, the parents there made a request to the Hong Kong Examination and Assessment Authority (HKEAA) to provide public examination accommodations to SLD students. HKEAA then prepared and disseminated a special pamphlet informing schools and parents of the eligibility and procedures for SLD students to apply for accommodations in the Hong Kong Certificate of Education Examination (HKCEE) and the Hong Kong Advanced Level Examination (HKALE).

In the subsequent years, the Education Bureau (EDB) published various teaching, support and assessment guidelines for local primary schools, and started organizing a number of teacher training workshops on SLD.

In 2003/2004, a "New Funding Model" was launched by the EDB. $10,000 or $20,000 financial subsidies (the latter for students requiring individualized education programs) were provided to primary schools.

In short, HKASLD successfully made the turning point which included the inclusion of SLD under DDO and the distribution of leaflets on SLD services by the Hong Kong Examination and Assessment Authority in 2000's. Since then, the schools and society progressively have more understanding of dyslexia.

3.2 EDB

Another crucial stakeholder is EDB. The Deputy Secretary for Education (School and Professional Development Branch) of EDB made a critical review on its development on dyslexic services (Ip, 2010).

The following are the three stages on the development of educational services for students with dyslexia:

Initial stage – 80s' and 90's

The significance of addressing the educational needs of dyslexic students started being acknowledged. Some simple assessment tools and group remediation programs were in trial.

Second stage – Year 2000

The first norm-referenced screening tool for primary school students was published. This checklist helped teachers to screen for pupils with possible dyslexia. The first professional assessment tool for psychologists to diagnose dyslexia in primary school pupils was also published. These made teachers and public more aware of dyslexia which in turn enabled early identification and interventions.

Third stage – from 2000 onwards

Expansion and fine-tuning of the services are in place.

3.2.1 Major developments of the multi-focus model

- Teacher training
  Five-year professional development framework launched in the 2007/2008 school year aims to let 10% of teachers in each ordinary school complete the Basic Course (30-hour), a minimum of three teachers complete the Advanced Course (90-hour) on catering for diverse learning needs, and at least one Chinese Language teacher and one English Language teacher complete the Thematic Courses (60 hours each) on specific learning difficulties respectively.
- Whole-school policies
  Schools should enforce and regularly review the measures including but not limited to enhancement of staff awareness and understanding on dyslexia, establishment of School Support Team, identification and assessment procedures, implementation of interventions, accommodations in classroom learning and examinations, and engagement of parents.
- Funding and professional support for schools
  EDB recommends the adoption of the following 3-tier intervention model as a framework for flexible use of funding to address the varying degrees of needs of the students:

Tier-1 support - preventive in nature; quality language teaching in the classroom for all students; managing early signs of learning difficulties.
Tier-2 support - "add-on" intervention for students with persistent learning difficulties; small group learning, pull-out programs, etc.
Tier-3 support – focusing on a relatively small number of students with the need of intensive support, special accommodations, specialist support, etc. due to higher severity of learning difficulties.

- Development of expertise and specific learning resources
  With a budget of over $150 million, the 5-year READ & WRITE initiated in 2006 has achieved a number of successes including the development of a prevention program at kindergarten level, publication of new assessment tools and evidenced-based learning resources for both primary and secondary students with dyslexia, implementation of the training for a target of 5000 primary school Chinese language teachers, and introduction of a district support model for parents.
- Cross-sector collaboration
  EDB has collaborations with a number of other stakeholders including DH (on assessment); schools, tertiary institutions and non-government organizations (NGOs) (on resource development and service provision); HKEAA (on special public examination arrangements); Vocational Training Centres (on special arrangements for admission); and HKASLD (on provision of parents' advice).
- Promotion of public awareness
  Promotion of understanding and acceptance towards dyslexia is continuously done through mass media, leaflets and web-based information.

3.3 HKEAA

In response to the concerns about the implementation of the special examination arrangements for students with dyslexia, a direct investigation was conducted by The Ombudsman in 2007, under The Ombudsman Ordinance (Office of The Ombudsman, 2008). The following issues about special examination arrangements for students with dyslexia were examined:

- special arrangements for internal examinations and assessments in primary and secondary schools for students with dyslexia;
- the roles of EDB and the former Education and Manpower Bureau in providing these special arrangements;
- special arrangements made by the HKEAA for public examinations for these students;
- coordination regarding the provision of the arrangements among EDB, schools and HKEAA, and between government and NGOs;
- promotion of awareness of the practice of such special arrangements among parents, students, teachers and school authorities.

3.3.1 The necessity to adopt special examination arrangements

The government policy embarked the provision of special examination arrangements for students with dyslexia. The EOC issued DDO Code of Practice on Education. It states that reasonable accommodation in the existing programs, services, facilities and benefits must be

given to satisfy the needs of these students, without unjustifiable hardship. Special examination arrangements are regarded as reasonable accommodation. They aim to remove the disadvantages induced by dyslexia rather than related to the knowledge or skills being examined. The premises include having no unfair advantages over other students and no interferences with the assessment objectives.

3.3.2 Special arrangements in internal examinations

In addition to taking reference from the guidelines such as "Principles and Strategies for Assessment for Students with Special Educational Needs in Ordinary Schools" published by EDB in 2004, special arrangements in internal examinations have to be made by schools according to the difficulties of the individual students, and the advice from educational professionals such as educational psychologists. As schools are supposed to be accountable for such arrangements, EDB can be approached for assistance if parents find any disagreement between them and the school. The examples of the special arrangements include:

- extending examination time;
- enlarging the spaces in answer sheet for writing answers;
- enlarging the font size of examination papers;
- reading out the questions to students for non-language subjects;
- allowing use of a special room under separate invigilation;
- alternative method of answering (e.g. oral response, circling the answers);
- use of computer for word processing; and
- supervised breaks

3.3.3 Special arrangements in public examinations

Students with dyslexia can apply to HKEAA for special arrangements in public examinations (HKCEE for Secondary 5; HKALE for Secondary 7). The "early application" and "second phase application" are open in September/October of the academic year in Secondary 4 and 6, and Secondary 5 and 7, respectively. In addition to completion of an application form, an up-to-date assessment report (with records of special arrangements in his/her school) duly signed by a qualified psychologist and the school head is also necessary. More precise specifications on the requirements of the report are suggested. First, the "qualified psychologist" must be an educational or clinical psychologist with professional practice training. Second, "up-to-date" assessment report refers to the one done within three years prior to the public examination. Third, the psychologist signing the report should be the one who confirms that the applicant has dyslexia and needs special arrangements in the public examination. Last, conclusion has to be drawn on the recommended types of special arrangements. The examples of the special arrangements include:

- providing extra time;
- allowing writing on only one side of an answer book, or on alternate lines or circling multiple-choice answers on a question paper;
- providing special format question papers, e.g. one-side printing or enlarged fonts;
- specially arranged centre (e.g. in a classroom instead of a hall);
- special seating in a centre (e.g. near the front or back of an examination centre);

- supervised breaks in examinations lasting 90 minutes or more; and
- other special arrangements such as use of computer in answering questions

The HKEAA Task Group on Special Examination Arrangements is responsible for deciding to approve or reject the application. Candidates dissatisfied with the decision can appeal by giving reasons and supporting documents to The Appeal Panel for Special Needs. They would be notified of the appeal result prior to the examination.

3.4 Rehab Clinic, The Hong Kong Polytechnic University

In view of the pressing needs to fulfill the demands of the services on dyslexia, the Clinic has launched the occupational therapy interventions for school-age children with dyslexia.

In Hong Kong, children start their Chinese and English handwriting training in the pre-school age. Writing Chinese characters is different from other written language. Chinese handwriting appears to be more critical since Chinese characters are as logographic nature. It is more complex as the skills involve multiple stroke sequence and direction (Lam, Au, Leung, & Li-Tsang, 2011). Chinese characters are composed of many sharp turns of stroke and demand frequent pen lifts (Tseng, 1998). It also involves advanced visual motor and visual sensory processing skills. Hence, children are frequently referred to occupational therapists for handwriting difficulties. The interventions with a combination of approaches based on children individual problems include:

- visual perceptual and visual motor training to improve children abilities to discriminate the fine differences in the form and position of strokes in the Chinese characters
- sensory integration therapy emphasizing tactile and vestibular input to attend and focus
- training on fine motor accuracy to assist children with low muscle tone, postural instabilities, weakness on hand grip strength and hand coordination.
- learning keyboard typing as an alternated way to assist children in managing the written works

3.4.1 Visual perceptual training

Visual perception is an important ability that enables one to make sense out of what is seen (in contrast to visual acuity tests that merely determine something seen by the individual). It is one of the essential components for learning Chinese handwriting, especially for Hong Kong children who are required to have a good legibility on the handwriting in their learning culture. Besides, Chinese characters are logographic nature. Its stroke pattern sequence and direction are more complex. Children should have good visual spatial skills in order to write the characters with good positioning of strokes and proportioning of radicals in a squared-area. The following areas are the main components on our visual perceptual training:

Training on visual memory

Some children have difficulties in memory which preserves some characteristics of senses pertaining to visual experience. They need longer time to capture and memorize new characters and symbols.

Training on visual form-constancy

Some school-age children have weakness to mentally turn and rotate objects or picture. This skill is essential to distinguish differences in size, shape, and orientation of Chinese characters, especially those not printed in a normal horizontal alignment or in different font sizes. Training on visual form- constancy can improve their reading speed and accuracy.

Training on visual sequential-memory

This helps to improve children abilities to conduct visual decoding and encoding. This is an essential component for English spelling.

Training on visual spatial relationship

Some children have difficulties in perceiving the positions of objects in relation to oneself and other objects. Children with visual spatial problems will have poor alignment and spacing in the written outputs.

Training on visual closure

Children with problems in visual closure have weaknesses to identify a whole figure when only fragments are presented.

Training on visual discrimination

Visual discrimination skills involve the ability to perceive words accurately by noting similarities and differences in words. This is an essential ability for the children to differentiate complex figures among different Chinese characters.

Training on figure ground perception

Figure ground perception is the tendency to discriminate between target and background stimuli. The stimulus perceived as the target is regarded as the figure. The other stimuli not perceived as the target make up the background, or ground. It is important for children to capture important content in a reading paragraph.

Training on visual motor skill

Visual motor skills have been defined as "the ability to integrate the visual image of letters or shapes with the appropriate motor response" (Schneck, 1996). These skills have been shown to be highly associated with other functional activities like handwriting. Besides, visual-motor skills can be multifaceted and influenced by number of factors, including pencil grip, fine motor skills, eye-hand coordination, kinesthesia, motor planning, and visual perceptual skills. Activities involving visual scanning and visual tracking like mazes, driving game, throwing, and cycling can improve visual motor skills.

3.4.2 Sensory integration

While traditional handwriting tasks involve paper work and require children to be seated, sensory integration and multisensory modalities become one of the core treatment programs for the school-based occupational therapy. Although the research on the effectiveness of a multisensory approach has been sparse and the results of finding are inconsistent (Harris & Livesey, 1992; Lockhart & Law, 1994; Oliver, 1990), a study in United States found that

approximately 90% of school-based occupational therapists responded used multi-sensory approach when treating students with handwriting problems (Woodward & Swinth, 2002).

In school, occupational therapists design activities which are rich in tactile, vestibular and proprioceptive stimulation can increase body awareness, motor planning and attention. Besides, activities with proprioceptive stimulation can assist children in improving their muscle control which is essential for a good pencil grip and a good posture for handwriting tasks. Here are some activities with multisensory modalities aiming to improve children handwriting abilities:

- "Sky writing" –writing letter in the air
- finger tracing in a bag of hair gel
- black construction paper covered with salt
- block design
- writing with chalk and chalkboard
- colored writing lines representing the sky, grass and dirt
- design copying on paper strips and masking tape on the floor
- writing on a tray of rice or sand with a finger
- parquetry
- shape tracing with vision occluded
- tracing letter over transparency
- verbal cues while writing
- finger writing with shaving cream
- wrist weights

3.4.3 Training on fine motor accuracy

In addition to visual-perceptual problems, fine motor development problems also affect children handwriting. Motor skills are remediable through practice in many cases. If children have weak hand muscles, poor wrist control or in-hand manipulation skills, the skills can be strengthened through various fine motor activities designed by occupational therapists such as playing guitar or threading.

Empirical evidence also shows that pencil grips would affect children's handwriting legibility and speed (Schneck, 1988). The lateral quadrupod and four-finger pencil grips are found to be as functional as the dynamic tripod, lateral tripod, and dynamic quadrupod pencil grips (Koziatek & Powell, 2003). Besides, occupational therapists have to prescribe a pencil grippers or adaptive pencils to those with immature pencil grip. This can faciltiate and improve their hand wirting legibilty as well as their wirting speed.

3.4.4 Mastery of keyboard typing

Children with poor handwriting often score a lower grade on the content of their written work. Relationship between poor handwriting and difficulties has also been shown in many other areas of academic learning (e.g. spelling, writing composition and grammar) (Berninger, Mizokawa & Bragg, 1991; Campbell, 1973). Students with learning disabilities have difficulties in writing which needs to be adequately configured, aligned and spaced in a timely manner. As computers are more available nowadays, word processing is another

option for students who struggle with handwriting problems. Although there is no study proving that children with dyslexia have better performance on keyboard writing, students are able to keyboard faster than handwriting. Among the slowest writers, 75% achieved more text production with keyboard than with handwriting (Rogers, Case-Smith, 2002). These results indicated that keyboarding performance requires distinctly different skills from handwriting. Keyboarding can increase and improve a student's written output in their academic study. Hence, students with learning difficulties are suggested to learn both handwriting and keyboard writing skills. The mastery of handwriting as well as keyboarding is critical for success in school and work.

4. Appraisal of the work done in Hong Kong

The following parts summarize the critique made by Ngan-Keung (2008) on the adequacy and effectiveness of the efforts paid to the dyslexic services.

The actions aiming to satisfy the ever rising parental and professional needs include:

- publication of Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Primary School Students and The Hong Kong Specific Learning Difficulties Behaviour Checklist (for Primary One to Primary Four Students)
- development of support guidelines and teacher training workshops at foundation level by EDB
- launch of new funding system for primary schools to support dyslexic students

These actions were somehow successful which could be reflected by the increase in the awareness among primary school teachers and social workers and hence better acceptance of towards the dyslexia students and provision of some simple accommodations in classes and examinations.

However, most if not all efforts were put on primary education only. This might be due to the misconception that dyslexia is merely a short-term learning difficulty. There is nothing to concern about further education or employment.

In view of this, parents started advocating for tailor-made policies from government and more collaboration among various government departments and concern groups. With many struggles, there have been a number of achievements. SLD has finally been included in the Hong Kong Rehabilitation Programme Plan. The Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Junior Secondary School Students was published in 2007. More awareness has also been attained among secondary schools, Labor and Welfare Department, and community rehabilitation centers on the importance of lifelong support to the individuals with dyslexia.

Nevertheless, there is still much room for improvement.

The school support to students with dyslexia remains very insufficient and ineffective. It could be attributed to the lack of knowledge and teaching methods in teachers and lack of resources and guidance in schools from the government. Both students and parents thus suffer a lot. Students have poor confidence and self-esteem. Some of them had emotional and psychological problems and even committed suicide. Parents' burdens (both psychological and financial) had never been small. A study revealed that about 55% of

parents had negative thoughts during taking care of children with dyslexia, more than 40% had insomnia and depression, and as high as 30% needed to receive professional counseling. Worse still, these psychological issues did not get proper and prompt attention. As for financial aspect, additional expenses are inevitably required for caring children with dyslexia. The same study showed that 80% of families needed to spend extra money for the study skills workshops, tutorial groups, and occupational therapy and/or physiotherapy interventions. The average extra money spent per month ranged from HK $1001 to $2000. Families with children with dyslexia are not entitled to receive any financial subsidies from government or EDB. While the New Funding Model grant launched in primary schools adopts a whole-school approach to create a supportive learning environment for dyslexic students (such as special teaching, and accommodations in classes, school examinations and public examinations), no assurance system is developed for measuring the extent that the students can benefit from it such as improvement in academic performance or personal confidence and motivation. Alarmingly, only 13.7% of parents realized that their children were receiving support under the Model. Worse still, as many as 40% of the parents did not find the support useful or simply knew nothing about such school subsidy. Due to such unclear intervention and insufficient communication between schools and parents, parents have to try to seek other sources of support in which community is a choice. In view of this great demand, NGOs and private centers are offering more and more services such as assessment, learning or studying skills tutorials, emotional management programs, self-confidence development programs, potential development programs, and multi-sensory training etc. The trainers are merely social workers and other non-professionals, and the targets are primary school students only but not including those senior ones.

Unfortunately, the services offered by NGOs are not satisfactory. Despite the fact that only half of the respondents were aware of the services offered by the nearby NGOs, half among those who knew the services refused to use the services due to bad outcomes and poor quality of the trainers.

There are other drawbacks in current services including but not limited to the followings:

- limitations in the identification tools and teaching materials in Chinese
- narrow support to the education system (confining to primary schools)
- immaturity of the service models and broken policies in education, medical and employment
- ineffective and inconsistent support from schools (without good system for monitoring the allocation of the resources to warrant an equal opportunity learning environment for all students with special needs leading to conflicts between schools and parents)

Hence, there is a very urgent need to formulate and strictly enforce good school policy. The continuum of support should be made possible where services have to be ranged from pre-schools, primary schools, secondary schools, vocational training institutes, universities to employment markets. Evidence-based teaching methods and materials for Chinese students with dyslexia would enhance the effectiveness and cost-effectiveness of the interventions. Updated and advanced training has to be provided to the personnel engaged including principals, teachers, educational psychologists, clinical psychologists, occupational

therapists and social workers. Both instrumental (e.g. financial) and emotional needs of parents should be acknowledged and addressed.

5. Ahead

Having gaining the experiences over the past two decades, evidence-based practice is regarded as an important direction for the future development of dyslexic services.

5.1 Writing Chinese and English words

Each written language has its unique characteristics and format according to its origin and development. Alphabetic languages emphasize on smoothness and continuity in their written forms, whereas Chinese characters contain sharp turns of stroke and demand frequent pen lifts (Tseng, 1998). As mentioned earlier, the problem of handwriting would appear to be more critical as Chinese characters are typically characterized by its logographic nature and its complexity with multiple stroke sequence and directions (Lam et al, 2011). The configuration of stroke patterns in Chinese characters do not give any clue in where to start and which stroke to follow while writing a character. Writing in Chinese also involves complex geometric figuration and stroke arrangement within a squared-area. Different composition, proportion and orientation of the parts in Chinese characters can form different characters and carry total different meanings and pronunciation. Therefore, research should focus on evaluation and training of students with dyslexia in writing Chinese characters.

5.2 Objective evaluation of handwriting performance

In the past decade, educators and health professionals often relied on subjective judgment to comment and assess handwriting performance of students. Some researchers and educators tried to evaluate handwriting performance of students using speed and accuracy as the criteria to define good and bad writing (Tseng & Chow, 2000; Tseng & Hsueh, 1997). Most of these handwriting assessments mainly emphasized on the handwriting speed. They could not provide information regarding the process including pen pressure while writing, writing time, pause time (air time) etc. These factors could reflect the underlying problems of handwriting (Rosenblum et al., 2006a; Rosenblum, et al., 2006b). Researchers in recent years also suggested that the process of handwriting is also an important area to explore the underlying problems in handwriting, which can be helpful in identifying specific handwriting difficulties (Rosenblum et al., 2003).

A commercial software system "Optimized Action Sequence Interpreter System (OASIS)" was developed to measure the handwriting speed, pen in air and ground time using the tablet (Smits-Engelsman, et al., 2003). However, this system is rather cumbersome and not user friendly. Another software, the Penmanship Objective Evaluation Tool (POET) was developed by Rosenblum and her team in Israel. The POET can be used to capture the data generated from the WACOM tablet to assess the writing speed, ground time, pen in air time, and pen pressure during the process of writing. Nevertheless, the POET software was not commercially available and only meant for conducting research studies in this area because the system adopted the Mathlab software. There is a strong need to validate an objective and

user friendly handwriting evaluation tool for local students who write Chinese most of the time.

5.3 Validation of Chinese Handwriting Assessment Tool (CHAT)

Recently, the Chinese Handwriting Assessment Tool (CHAT) was developed by a group of researchers from two local universities in Hong Kong led by Li-Tsang (2011). The CHAT was built up to assess the handwriting performance of primary school children in Hong Kong. A total of 322 primary school students were invited to participate in the pilot study of CHAT project. It showed that the CHAT is a reliable and valid tool for assessment of the Chinese handwriting performance of young students.

The research team was further funded by the Quality Education Fund (QEF), Hong Kong Special Administrative Region to support a project to build up the local norm for primary school students in Hong Kong. The objectives of this project were to (1) develop an objective CHAT for assessing handwriting performance and collect the normative data of local Chinese children aged between 6-10 years; (2) screen and assess the handwriting performance and performance components of children with handwriting difficulties using the CHAT system; (3) identify specific deficits of children in the areas of phonological and morphological function, visual motor function, visual perceptual function and sensory-motor function, using standardized assessments; and (4) transfer the training program to teachers and parents if proven effective.

A total of 1136 primary school students were recruited using stratified sampling methods. Six schools were selected from the list of primary schools downloaded from the website of the EDB. In each school, one class (around 30 students in each class) from each grade (Grade 1 to Grade 6) was selected to join the study. Upon the consent of parents/guardians, the students were invited to join the assessment. There were 642 boys (56.5%) and 494 girls (43.5%). The age of the participants varied from 6.06 to 14.20 years. Between Grade 1 and Grade 6, the distribution of subjects was quite even, with a variation of 15.3% to 19.7% of the sample. Handwriting speed, total handwriting time, ground time, air time, mean pen pressure, standard deviation of pen pressure in copying, size of characters and its variation were recorded for each student during the data collection. Results indicated that P6 students wrote faster than P1 students. There was a steady progression of handwriting speed from P1 to P6. No gender difference was found in terms of the handwriting performance. The normative data was subsequently obtained for students studying from P1 to P6 level. The normative data was then published in the CHAT: Process Tool User Manual (Li-Tsang, 2011).

5.4 Handwriting performance of primary school students with and without dyslexia

A recent study was conducted to investigate the Chinese handwriting performance of typical children and children with dyslexia in Hong Kong primary school, and to examine whether speed and accuracy of handwriting could reliably discriminate these two groups of children. A total of 137 children with dyslexia and 756 typical children were recruited from main stream primary schools. They were requested to copy 90 Chinese characters using the CHAT. The process of handwriting was recorded and the stroke errors in writing were analyzed using the CHAT system (Lam et.al, 2011)

Results indicated that children with dyslexia wrote significantly slower, with greater character size and variation in size ($p < .05$) than the typical children of same age group. They also wrote with significantly lower accuracy ($p < .05$), i.e. they made more mistakes in writing. Commonly observed writing errors among the dyslexic group were "missing strokes" meaning missing one or more strokes in one word and "concatenated strokes" meaning two strokes were joined together.

From the discriminant analysis, writing speed and accuracy were found to be the satisfactory discriminators that could discriminate students with dyslexic, with reasonably good classification accuracy of over 70% for every grade. Those students with poor handwriting abilities also had problems of fine motor skills, kinesthetic abilities, visual perceptual skills and ocular motor control.

5.5 Training of dyslexic students with specific handwriting difficulties

Another study was conducted to evaluate the effectiveness of an Interactive Computerized Handwriting Training Programme (ICHTP) on the handwriting performance of the students with handwriting difficulties. The ICHTP was first developed in 2004 through the support of the QEF. It consists of 3 parts for training, namely, training of visual perception, training of visual motor integration and training of controlled grip.

A total of 139 students (P1 to P6) with special education need or screened to have handwriting problems by CHAT was recruited to join the ICHTP. They received a series of 8 sessions of training together with the pre-intervention session and the post-intervention assessment under the supervision of a qualified occupational therapist.

Among the measurements for handwriting performance, handwriting speed was significantly improved after the training for the training group. Significant decrease in average pen pressure was also noted in both groups of management. However, no significant improvement was found in the measures of time ratio, accuracy, character size variation and number of characters exceeding grid. This indicated that children displayed a better force modulation so that they could be less prone to fatigue in handwriting. Visual perceptual and ocular motor skills also showed improvement after training and these are some of the important abilities in recognizing and perceiving word structure. In addition, the training program appeared to improve the ocular motor skills, which also helped in reducing chance of skipping the lines and words.

5.6 Provision of special examination arrangements for students with dyslexia

As mentioned earlier, all Secondary Seven students have to get high grades in HKALE in order to enter universities. The competition is huge and only 15% of the candidates can get the university quota for studies. For students with dyslexia, they would be granted with extra time allowance if they have diagnosis of the dyslexia by educational psychologist. However, to them, by adding extra time to complete the test may not solve their problem of reading and writing for the examination. They may make a lot of mistakes while writing, or they may have very slow handwriting speed.

Therefore, a study was conducted to identify factors that might contribute to the handwriting performance of students with dyslexia. Some of the factors which could affect

the handwriting performance, namely gender, grades, types of subjects selected, were also analyzed. Fifty participants (age range: 15–19-years-old) were recruited from one mainstream secondary school and 20 participants (age range: 17–24-years-old) were recruited from two secondary schools for students with dyslexia. They were asked to perform three consecutive handwriting tasks: copying 90 characters using the computerized CHAT, an English passage copying task, and a Chinese passage copying task. The data indicated that students with dyslexia were significantly slower in copying both Chinese and English characters in passages when compared to the typical students.

Significant differences in the measures of writing speed, air/ground time ratio, standard deviation of speed, standard deviation of size per character, and number of stroke errors measured by the CHAT were found between the two groups of students. Further analysis on the data of typical students indicated no significant difference in handwriting speed among students from different classes (i.e. arts or science) on copying Chinese and English passages, and on individual Chinese words (from CHAT). It was interesting to note that no significant correlation was found in their handwriting speed measured by the three writing tasks, i.e. Chinese, English and individual words.

In short, the CHAT is found to be a valid and reliable tool for assessment and documentation. Local normative data has been collected from 1136 students. In addition, the CHAT can be used to identify students who are at risk of handwriting difficulties, particularly for students with dyslexia. With the normative data for comparison, those students with specific handwriting difficulties can be identified and screened at a much earlier stage when they enter the primary education system. Once a student is identified with handwriting challenge, suitable therapeutic and training program can help to enhance their handwriting skills such that they can better cope with the academic work at schools. Through the systematic training on visual perception, visual motor integration and force modulation, students' handwriting abilities can be improved.

The CHAT should further be developed into an objective evaluation tool to explore the handwriting accuracy such that most of the errors can be identified and corrected through professional training or specific intervention by therapists. The results can also help to provide more objective evidence to make recommendations for making special examination arrangements for students with dyslexia or other special needs.

6. Conclusion

To sum up, services on dyslexia in Hong Kong have been getting steady improvement over the past two decades. Nevertheless, there is still a long way to go. Hope the sharing in this chapter would arouse further attention and discussions on this pressing area and in turn synergize efforts to create better lives for students with dyslexia and their parents.

7. Acknowledgements

Special thanks to HKASLD for the input of some invaluable ideas, and LEE Yu Ngan for the proofreading.

8. References

Berninger, V., Mizokawa, D., & Bragg, R. (1991). Theory-based diagnosis and remediation of writing disabilities. Journal of School Psychology, 29, 57–79.

Campbell, D. D. (1973). Typewriting contrasted with handwriting: A circumvention study of learning disabled children. Journal of Special Education, 7(2), 155–168.

Department of Social Work and Social Administration (2005). Towards Building an Educational and Assessment Accommodation Service Model for Children with Specific Learning Disabilities (SLD) and Their Families. Hong Kong: The University of Hong Kong.

Harris, S. J., & Livesey, D. J. (1992). Improving handwriting through kinaesthetic sensitivity practice. Australian Occupational Therapy Journal, 39, 23–27.

Hong Kong Christian Service (2005). The First Teachers' Survey on the Problems of Students with Dyslexia in Hong Kong. Hong Kong: Hong Kong Christian Service School Social Work Service.

Hong Kong Department of Health (2011). Child assessment service. Retrieved on September 15, 2011: http://www.dhcas.gov.hk

Ip, B. (2010). Educating children with dyslexia: What we have achieved together in the past ten years. Hong Kong Journal of Paediatrics, 15, 285-288.

Koziatek, S. M., & Powell, N. J. (2003). Pencil grips, legibility, and speed of fourth-graders' writing in cursive. American Journal of Occupational Therapy, 57(3), 284-288.

Lam, S.S.T., Au, R.K.C., Leung, H.W.H., Li-Tsang, C.W.P. (2011). Chinese handwriting performance of primary school children with dyslexia. Research in Developmental Disabilities 32: 1745-1756.

Li-Tsang, C.W.P. (2011). QEF Report for the Project "A Chinese handwriting Assessment Tool (CHAT) for Assessing & Evaluating Handwriting Performance of Primary School Children in Hong Kong".

Lockhart, J., & Law, M. (1994). The effectiveness of a multisensory writing programme for improving cursive writing ability in children with sensorimotor difficulties. Canadian Journal of Occupational Therapy, 61, 206–214.

Ngan-Keung, I.W.L. (2008). Public awareness, community services and parent support. Hong Kong Journal of Paediatrics, 13, 213-217.

Office of The Ombudsman (2008). Direct Investigation on Special Examination Arrangements for Students with Specific Learning Difficulties. Hong Kong: Office of The Ombudsman.

Oliver, C. E. (1990). A sensorimotor program for improving writing readiness skills in elementary-age children. American Journal of Occupational Therapy, 44, 111–116.

Rogers, J., & Case-Smith, J. (2002). Relationships between handwriting and keyboard perforamcen of sixth-grade students. The American Journal of OCcupationl Therapy, 56(1), 34-39.

Rosenblum, S., Chevion, D., Weiss, P. L. T. (2006a). Using data visualization and signal processing to characterize the handwriting process. Pediatric Rehabilitation, 9, 404–417.

Rosenblum, S., Dvorkin, A. Y., Weiss, P. L. T. (2006b). Automatic segmentation as a tool for examining the handwriting process of children with dysgraphic and proficient handwriting. Human Movement Science, 25, 608–621.

Rosenblum, S., Weiss, P. L., Parush, S. (2003). Product and process evaluation of handwriting difficulties: A review. Educational Psychology Review, 15, 41–81.

Schneck, C. M. (1988). Developmental Changes in the Use of Writing Tools in Normal 3.0 to 6.11 Children and First Grade Children with Handwriting Problems. Boston, MA: Sargent College of Allied Health Professions, Boston University.

Schneck, C. M. (1996). Visual perception. In L. Case-Smith, A. S. Allen, & P. Pratt (Eds), Occupational Therapy for Children (3rd ed., pp. 357-386). St. Louis: Mosby.

Smits-Engelsman, B. C. M., Wilson, P. H., Westenberg, Y., Duysens, J. (2003). Fine motor deficiencies in children with developmental coordination disorder and learning disabilities: An underlying open-loop control deficit. Human Movement Science, 22, 495–513.

Tseng, M. H. (1998). Development of pencil grip position in preschool children. Occupational Therapy Journal of Research, 18, 207-224.

Tseng, M. H., Chow, S. M. K. (2000). Perceptual-motor function of school-age children with slow handwriting speed. American Journal of Occupational Therapy, 54,83–88.

Tseng, M. H., Hsueh, I. P. (1997). Performance of school-aged children on a Chinese handwriting speed test. Occupational Therapy International, 4, 294–303.

Tsui, C.M. (2007). Hong Kong nursing students' knowledge on dyslexia: Implications for nursing education and clinical practices. Hong Kong Journal of Paediatrics, 12, 248-252.

Woodward, S., & Swinth, Y. (2002). Multisensory approach to handwriting remediation: perceptions of school-based occupational therapists. The American Journal of Occupational Therapy, 56(3). 305-312.

Learning Disabilities

Edited by Dr. Wichian Sittiprapaporn

ISBN 978-953-51-0269-4
Hard cover, 364 pages
Publisher InTech
Published online 14, March, 2012
Published in print edition March, 2012

Learning disability is a classification that includes several disorders in which a person has difficulty learning in a typical manner. Depending on the type and severity of the disability, interventions may be used to help the individual learn strategies that will foster future success. Some interventions can be quite simplistic, while others are intricate and complex. This book deserves a wide audience; it will be beneficial not only for teachers and parents struggling with attachment or behavior issues, but it will also benefit health care professionals and therapists working directly with special needs such as sensory integration dysfunction.

How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Chi-man Tsui, Cecilia W. P. Li-Tsang and Pui Yee Grace Lung (2012). Dyslexia in Hong Kong: Challenges and Opportunities, Learning Disabilities, Dr. Wichian Sittiprapaporn (Ed.), ISBN: 978-953-51-0269-4, InTech, Available from: http://www.intechopen.com/books/learning-disabilities/dylexia-in-hong-kong-challenges-opportunities

INTECH
open science | open minds

InTech Europe
University Campus STeP Ri
Slavka Krautzeka 83/A
51000 Rijeka, Croatia
Phone: +385 (51) 770 447
Fax: +385 (51) 686 166
www.intechopen.com

InTech China
Unit 405, Office Block, Hotel Equatorial Shanghai
No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821