University: The University of Hong Kong (HKU)
Unit of Assessment (UoA): 24 - Psychology

Title of case study: Changing the educational future of 10% of Chinese-speaking students in Hong Kong through effective identification of and intervention in developmental dyslexia

(1) Summary of the impact
Developmental dyslexia in Chinese populations has long been neglected. Prof. Connie Ho and her team developed the first standardized Chinese dyslexia assessment instruments, now used by all professional psychologists in Hong Kong. Prof. Ho's team also developed the Chinese Tiered Intervention Model (CTIM) of literacy learning, incorporating a curriculum and standardized assessment materials. More than 200 Hong Kong primary schools (about 50%) have implemented CTIM, significantly improving cognitive-linguistic and literacy skills. Prof. Ho's work has made a major impact on professional practices and government policies to support dyslexia. It has also been influential in other Chinese-speaking regions and in parts of Europe.

(2) Underpinning research
Developmental dyslexia, a lifelong genetic-based reading and writing disorder, has been investigated primarily in Western countries with alphabetic writing systems with phonological deficit found to be the main cause of literacy difficulties. However, relatively few studies have examined dyslexia-related cognitive deficits in Chinese people, partly because of early surveys suggesting a low incidence of dyslexia. Given the distinctive orthographic and language features of Chinese, non-phonological cognitive deficits may contribute to dyslexia in Chinese readers. Prof. Ho, an HKU faculty member since 2000, has been investigating causes of dyslexia in Chinese for more than 20 years. She has served as director of both the Master and Doctoral Programmes in Educational Psychology and has led a research team on studying specific learning difficulties. She found that about 10% of the school population in Hong Kong suffers from dyslexia, with a cognitive profile somewhat different from that found with alphabetic languages. The research findings have important direct implications for identification of and intervention in dyslexia.

a.   Cognitive Profile of Dyslexia in Chinese Students
Early, valid and reliable identification of dyslexia is crucial. Using the Simple View of Reading (SVR) framework, Prof. Ho's team has examined early cognitive predictors and developmental profiles of dyslexia in Chinese from preschool to secondary school. In the SVR, word recognition and language comprehension are the two core components essential for reading comprehension and their relative contributions may vary across different developmental stages.

The results of Prof. Ho's four-year longitudinal study in 2014 showed that Chinese preschool children who were weak in oral language skills, phonological skills, morphological awareness and rapid naming were at a greater risk of becoming dyslexic later in primary school [3.1]. These results have informed the development of standardized preschool screening instruments in Hong Kong.

The team found that at junior primary school levels, the dominant cognitive deficits in Chinese dyslexia were rapid-naming deficits (50%) and visual-orthographic deficits (37-39%), while phonological deficits constituted only 15% of the dyslexic sample [3.2]. This supported the view that visual-orthographic skills rather than phonological ones were particularly important for learning to read Chinese. When children read text at senior primary school grades, language skills such as oral vocabulary, word semantics, and discourse skills were found to be important in predicting reading comprehension [3.3]. In secondary schools, Chinese dyslexic adolescents were characterized by similar deficits in rapid naming, morphological awareness, syntactic skills and

discourse skills [3.4]. These findings helped the team develop diagnostic instruments and effective intervention models and materials.

b. *Behavioural Characteristics of Dyslexia in Chinese Students*
Students with dyslexia also exhibit certain observable behavioural characteristics. Prof. Ho's team found in a study that primary school students at risk of dyslexia showed behaviour characteristics associated with two domains: reading/writing problems and sequencing/spatial difficulties [3.5]. These findings have helped her team to develop a teacher rating behaviour checklist for screening primary school students at risk for dyslexia.

For a similar study in 2014 with secondary students, Prof. Ho's team reported seven behavioural domains (reading, writing, composition, memory and organization, learning motivation, internalizing and externalizing behaviours), all of which correlated significantly with performance in literacy and related cognitive skills [3.6]. These findings have enabled the team to develop a teacher rating behaviour checklist for the screening of literacy problems among Hong Kong adolescents.

(3) References to the research
3.1 **Ho, C. S.-H.** (2014). Preschool predictors of dyslexia status in Chinese first graders with high or low familial risk. *Reading and Writing, 27*, 1673-1701.
3.2 **Ho, C. S.-H.**, Chan, D., Tsang, S.-M., & Lee, S.-H. (2002). The cognitive profile and multiple-deficit hypothesis in Chinese developmental dyslexia. *Developmental Psychology, 38*, 543-553.
3.3 Chik, P. P.-M., **Ho, C. S.-H.**, Yeung, P.-S., Wong, H. Y.-K., Chan, D. W., Chung, K. K.-H., & Lo, L.-Y. (2012). Contribution of discourse and morphosyntax skills to reading comprehension in Chinese dyslexic and typically developing children. *Annals of Dyslexia, 62*, 1-18.
3.4 Chung, K. K.-H., Lo, J. C.-M., **Ho, C. S.-H.**, Xiao, X., & Chan, D. W. (2014). Syntactic and discourse skills in Chinese adolescent readers with dyslexia: A profiling study. *Annals of Dyslexia, 64*, 222-247.
3.5 Chan, D. W., **Ho, C. S.-H.**, Tsang, S.-M., Lee, S.-H., & Chung, K. K.-H. (2003). Reading-related behavioral characteristics of Chinese children with dyslexia: The use of the teachers' behavior checklist in Hong Kong. *Annals of Dyslexia, 53*, 300-323.
3.6 Ching, B. H.-H., **Ho, C. S.-H.**, Chan, D. W., Chung, K. K.-H., & Lo, L.-Y. (2014). Behavioral characteristics of Chinese adolescents with dyslexia: The use of teachers' behavior checklist in Hong Kong. *Applied Psycholinguistics, 35*, 1235-1257.

From 2006 to 2019, Prof. Ho's research has been supported by the Collaborative Research Fund (HK$14.2 million), General Research Fund (HK$6.8 million) from the Hong Kong's Research Grants Council and the Hong Kong Jockey Club Charities Trust (HK$53.8 million).

(4) Details of the impact
a. *Facilitating effective identification of students with dyslexia*
Prof. Ho's team developed the first and only standardized assessment tools for Chinese dyslexia. These tests are being used across Hong Kong by all practising psychologists making diagnoses of dyslexia. Before publication of the Chinese dyslexia test, the reported incidence rate of dyslexia in Hong Kong was very low (fewer than 100 cases per year). Prof. Ho's team has developed standardized behaviour checklists for screening, and literacy-related tests for the diagnosis of dyslexia. With earlier editions of the dyslexia test published in 2000 and 2007, the most recent edition of the test, "The Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Primary School Students – Third Edition [HKT-P(III)]" was published in 2015 [5.1]. These screening and assessment tools are widely accepted and endorsed by the Hong Kong Education Bureau (EDB) [5.2] and the profession. By 2015, the EDB distributed the behaviour checklists to all 537 local primary schools and 473 secondary schools. Various educational websites, including that

of the EDB, have cited the checklists [5.3]. More than 720 professional psychologists from different sectors in Hong Kong (including government departments, schools, and NGOs) use HKT-P(III) to identify students with dyslexia [5.1 & 5.2].

Prof. Ho's team and project partners have provided extensive training on effective identification of and intervention in dyslexia. By 2015, 169 educational psychologists, 2,500 preschool principals and teachers and 5,000 primary school teachers had completed a programme of training courses, workshops and seminars [5.4]. The standardized instruments and the training have helped teachers and psychologists identify students with dyslexia much more effectively than before. In 2015/16, about 19,400 dyslexic students in P1 to S6 have been identified and received timely intervention [5.5].

b. *Improving intervention and support systems for dyslexic students*
The curriculum and assessment of the CTIM have significantly improved the support systems at primary school levels in Hong Kong. Recognizing the effectiveness of CTIM, by 2016 the EDB has implemented it in more than half of all local primary schools [5.2]. The effects of CTIM intervention are significant. Teachers indicated in interviews that the curriculum provided a comprehensive and systematic quality instruction approach to Chinese-language learning. They found the curriculum particularly helpful in improving student ability in text comprehension [5.4]. Students also indicated that the CTIM intervention effectively boosted their vocabulary knowledge, school performance and confidence. The multi-sensory and activity features strongly motivated their interest in learning Chinese [5.4]. Between 18 and 58% of poor readers in Tier 2 and 7% of dyslexic readers in Tier 3 remedial groups, who originally fell below Hong Kong's Chinese literacy benchmark, reached the benchmark after receiving the CTIM intervention [5.6]. In addition, various curriculum and intervention packages published in Hong Kong for dyslexic students [5.7 & 5.8] have made reference to Prof. Ho's work as a theoretical basis for the development of their intervention materials. The EDB has recognised that Prof. Ho "has made possible the improvement in the assessment and education services for students with dyslexia with her professional knowledge, foresight and excellent planning and organisation skills to achieve the plans for betterment of students in Hong Kong". [5.2]

c. *Impact on public knowledge and awareness in Hong Kong*
Prof. Ho's work has increased public knowledge and awareness of effective identification of and intervention in dyslexia in Hong Kong through media reports [5.4], including a TV programme in 2013 featuring the research impact [5.9], and key education websites (e.g., HKEdCity) [5.10]. An official HKU website providing information and resources about dyslexia from the team had been visited more than 88,000 times by 2019 [5.1].

For dyslexic students sitting for public examinations, an assessment report based on the Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Junior Secondary School Students (HKT-JS) – the dyslexia test for secondary students developed by the team – is a major part of the documentation required to support applications to be accommodated in public examinations [5.11].

d. *Providing key references to international practices*
In terms of global impact, Prof. Ho's dyslexia behaviour checklists are a key reference for similar developments in some European countries. For instance, researchers from the Netherlands sought Prof. Ho's advice on developing a questionnaire for adults with dyslexia. In constructing their questionnaire, they made reference to her adult behaviour checklist, "The Hong Kong Reading and Writing Behaviour Checklist for Adults" [5.12]. Several Spanish and Portuguese researchers also adapted and standardized the primary school behaviour checklist for use in Spain and Portugal. Currently the adapted behaviour checklist is still being used for screening primary school children with learning difficulties by the Ministry of Education of the Canary Islands in Spain [5.13-5.15].

Prof. Ho's work also generated significant impact in several Chinese-speaking regions. For instance, the Singapore Ministry of Education is using input from Prof. Ho to develop its own standardized assessment test for identifying students who are experiencing difficulties in learning to read Chinese. The Ministry said the "sharing of knowledge with Ministry of Education Singapore's senior management and curriculum planners … will also go a long way in helping (them) with policy decision-making and curriculum planning" [5.16].

(5) Sources to corroborate the impact

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5.3. https://www.edb.gov.hk/tc/edu-system/special/resources/serc/spld.html (EDB cited Ho's screening checklist for SpLD)

5.4. 喜閱寫意：賽馬會讀寫支援計劃成果結集編緝委員會(2015)。《喜閱寫意成長路：賽馬會讀寫支援計劃成果結集》。(Sections on professional training, effectiveness of CTIM, and reports by mass media, p. 114-115, 142-145)

5.5. https://www.legco.gov.hk/yr15-16/english/fc/fc/w_q/edb-e.pdf (Figures of students with SpLD in Hong Kong, Section 18 EDB, p. 462)

5.6. Ho, C. S.-H., Wong, Y.-K., Lo, C.-M., Chan, D. W., Chung, K. K.-H., & Lo, S.-C. (2014). Helping children with reading disability in Chinese: The response to intervention approach with effective evidence-based curriculum. In X. Chen, Q. Wang, & Y. C. Luo, Reading Development and Difficulties in Monolingual and Bilingual Chinese children (pp. 103-124). Springer

5.7. 喜閱寫意：賽馬會讀寫支援計劃─協康會幼兒語文學習工作小組(2014)。《聽說讀寫小寶盒─幼兒語文學習教材套 (加強版)》。香港，協康會。

5.8. 語文教育及研究常務委員會(2017)。《以認知語言學為基礎之高小中文寫作支援教材套》。香港，語文教育及研究常務委員會

5.9. https://www.ke.hku.hk/spotlight/ugc-s-tv-programme-on-kt-ke (About a TV programme featuring the impact of Prof. Ho's research)

5.10. https://www.hkedcity.net/sen/spld/basic/page_5292c930e34399b231000000 (HKEdCity with hyperlinks to Prof. Ho's behaviour checklist and training materials)

5.11. http://www.hkeaa.edu.hk/DocLibrary/Candidates/Special_Needs_Candidates/HKDSE_Application_Guide_2019_2020_HKDSE_Chi.pdf (Requirement of local standardized assessment for application of examination accommodation pp. 6, 18-20)

5.12. http://www.psitestuitgevers.nl/dyslexie/translations/ (An European adult behaviour checklist of dyslexia with reference to Prof. Ho's checklist)

5.13. Gil, V., Jimenez, J. E., Ho, C. S.-H., Rodriguez, C., Dominguez, C., Gonzalez, D., Crespo, P., & Morales, C. (2012) Validacion del "Hong Kong Specific Learning Difficulties Behavior Checklist" en poblacion Hispano-parlante para la deteccion temprana de dificultades de aprendizaje. In *Learning Disabilities: Present and Future.* Ediciones de la Universidad de Oviedo. *ISBN: 978-84-8317-936--9*

5.14. http://www.psie.cop.es/uploads/TENERIFE/Guia_deteccion_tempranaB[1].pdf Dirección General de Ordenación, Innovación y Promoción Educativa (2011). Guía para la detección temprana de discapacidades, trastornos, dificultades de aprendizaje y altas capacidades intelectuales. Consejería de Educación, Universidades, Cultura y Deportes. Dirección General de Ordenación, Innovación y Promoción Educativa.

5.15. Questionário para detecção precoce de dificuldades de aprendizagem da leitura, escrita e cálculo, em alunos que iniciam o 1º ano do Ensino Básico

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