

基於認知神經科學的有效學習系統建立：從個人需求到數位學習新素養

**Building an effective learning system based on cognitive neuroscience:
From individual needs to E-learning new literacy.**

**Tzu-Hua Wang^{1,2*}, City C. Hsieh^{2,3}, Fu-Yuan Chiu^{1,2}, Hsin-Jen Julie Hsu^{2,4},
Hsiang-Chun Chen^{2,5}, Yu-Ting Tseng^{2,3} and Peter K.-H. Chneg²**

¹Department of Education and Learning Technology, ²Research Center for Education and Mind Sciences, ³Department of Kinesiology, ⁴Department of Special Education, ⁵Department of Early Childhood Education,

E-mail: tzuhuawang@mx.nthu.edu.tw

Over the last two decades, cognitive neuroscience has gained a better understanding of the neurological processes underlying human cognition, perception, and social interaction. Brain imaging, on the other hand, illustrates how education modifies the efficiency of brain connectivity. As cognitive neuroscience research technology has become more and more compatible with educational settings, researchers have been able to use research techniques for cognitive neuroscience to systematically explore cognitive mechanisms that affect language development in educational settings in order to help children with language disorders or learning disabilities. In the current project, the researcher came from the department of education and learning technology, kinesiology, special education, and early childhood education, and cognitive neuroscience has taken together to explore the following topic: (I) Improving social skill and learning effectiveness by immersive virtual learning environment on children with special needs; (II) The effect of exercise training on visuospatial attention and executive function on developmental coordination disorder child; (III) Knowing and facilitating the process of language acquisition on developmental language disorder child. (IV) Evaluation and Improvement of poor working memory on 5-7-year-olds child.

Based on the research findings, there are four achievements: (I) More than 30 college students have received training in 3D animation design and have created various virtual reality (VR) sequences. To complete the virtual classroom scene production, the team member collaborated with special education instructors in Hsinchu City and Taoyuan City; (II) In the first article in Taiwan to use a sports wristband to assess the physical activity and sleep quality of ASD children and typical development, it was discovered that children with ASD had lower levels of physical activity and sleep quality than other children [1]; (III). Part of the children were enrolled in two sub-projects to engage in language and motor skill assessments owing to the collaboration of the project team. According to preliminary study, around 33% of children suffer both language and motor skills impairments; (IV). Sub-project 4 has developed a change detection task (named as "Parking game"), which suitable for

preschool children (5-7 years old) as a tool to evaluate children's visual and spatial working memory capacity based on EEG.

Despite the fact that the project will only be here for two years, this team project is a five-year plan. These team members have applied for and been awarded a three-year grant from the Ministry of Education's Research Service Company initiative (15 million in total), which is titled: The Physiological Approach: Improving Attention and E-Learning System Optimization. For more information, please contact with Corresponding author.

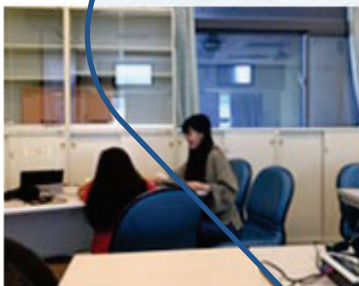
References

- [1] 謝錦城、黃慧珊、陳怡鈞、賴彥廷、黃曉令、曾鈺婷(2019)。泛自閉症障礙兒童與一般兒童身體活動量與睡眠品質之比較。大專體育學刊, 21(4)。【TSSCI 期刊】



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(I). The developmental effects of an immersive virtual learning environment for the children with autism spectrum disorder.



Hsin-Jen Julie Hsu

(III). Children's language disorders: Neuro-learning mechanism, comorbidity, teaching effectiveness

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(II). The comparison of physical activity and sleep quality between autism spectrum disorder and typically child..



Project_PI Tzu-Hua Wang

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(IV). The event-related potential markers of developmental effects of children's visual working memory capacity

