科技部補助專題研究計畫報告

機器翻譯與外語學習之探索研究

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報 告 附 件 ： 出席國際學術會議心得報告

本研究具有政策應用參考價值：■否　□是，建議提供機關
（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）
本研究具影響公共利益之重大發現：□否　□是

中 華 民 國 110 年 09 月 08 日

中 文 摘 要 ： 摘要
　　機器翻譯（MT）工具已發展至一定程度，可以輔助語言教學和學習
。鑑於機器翻譯的潛力，本研究試圖指導以英語作為外語（English
as a Foreign Language）的大學二年級學生進行一學期由Google翻
譯輔助進行往復的翻譯修正，並探究以下四個面向：（1）學習者是
否能夠在Google翻譯的幫助下糾正錯誤，（2）Google翻譯是否改進
寫作，（3）Google翻譯在寫作流暢性、複雜性與正確性的哪些面向
能更好的幫助學習者，以及（4）在焦慮、動機信念與任務難度層面
，學生對Google翻譯的態度。實驗組與對照組皆完成前後測包括有
糾錯測試和論說文書寫。結果顯示在糾錯測試上，實驗組明顯優於
對照組。兩組在寫作不同面向上也有顯著進步，但組間並無發現顯
著寫作成績上的差異。在寫作流暢性、正確性與複雜性上有不一致
的結果。流暢度上，對照組在句子、子句和T單位計數方面表現更好
，但總字數上則沒有顯著不同。句法複雜性與準確性上，實驗組在
子句的平均長度展現出明顯更高的複雜度與顯著的準確性。最後
，學生在焦慮、動機信念和任務複雜性面向，對於使用Google翻譯
進行學習普遍持正向態度。

中 文 關 鍵 詞 ： 機器翻譯；Google翻譯；糾正錯誤；寫作表現；往復的翻譯修正

英 文 摘 要 ： Abstract
　　　　Machine Translation (MT) tools have advanced to a
level of reliability such that it is now opportune to
consider their place in language teaching and learning.
Given their potential, the current study sought to instruct
EFL college sophomores to engage in recursive editing
afforded by Google Translate (GT) for one semester, and
investigated (1) whether the learners were able to correct
errors assisted by GT, (2) whether GT facilitated better
writing, (3) which aspects of writing, fluency, complexity
or accuracy GT better assisted the learners with, and (4)
the students' attitudes toward GT. A quasi-experimental
approach was adopted where the experimental group received
training in recursive editing while the control group did
not. Both groups completed an error-correction test and an
essay task pre and post intervention. The experimental
group completed an additional questionnaire post
intervention. The results showed that the experimental
group significantly outperformed the control group on the
error correction test. Both groups also showed significant
increases in the different aspects of writing evaluated
however, a significant difference between the groups was
not found. The evaluation of writing fluency, accuracy, and
complexity yielded a mixed picture. The control group
demonstrated significantly better fluency in terms of
sentence, clause, and T-unit counts but not total word
count. The experimental group demonstrated significantly
higher syntactic complexity in terms of mean length of

clause. The experimental group also performed significantly better on post-intervention accuracy. Finally, the students were generally positive about using GT to learn in terms of anxiety, motivational belief, and task complexity.

英文關鍵詞：Machine Translation; Google Translate; error correction; writing performance; recursive editing

機器翻譯與外語學習之探索研究
Recursive editing with Google Translate: The impact on writing and error correction

Abstract

　　Machine Translation (MT) tools have advanced to a level of reliability such that it is now opportune to consider their place in language teaching and learning. Given their potential, the current study sought to instruct EFL college sophomores to engage in recursive editing afforded by Google Translate (GT) for one semester, and investigated (1) whether the learners were able to correct errors assisted by GT, (2) whether GT facilitated better writing, (3) which aspects of writing, fluency, complexity or accuracy GT better assisted the learners with, and (4) the students' attitudes toward GT in terms of anxiety, motivational beliefs, and task difficulty. Both the experimental and control groups completed an error-correction test and a response essay task pre and post intervention. The results showed that the experimental group significantly outperformed the control group on the error correction test. Both groups also showed significant increases in the different aspects of writing evaluated however, a significant difference between the groups was not found. The evaluation of writing fluency, accuracy, and complexity yielded a mixed picture. The control group demonstrated significantly better fluency in terms of sentence, clause, and T-unit counts but not total word count. The experimental group demonstrated significantly higher syntactic complexity in terms of mean length of clause. The experimental group also performed significantly better on post-intervention accuracy. Finally, the students were generally positive about using GT to learn in terms of anxiety, motivational belief, and task complexity.

Keywords: Machine Translation; Google Translate; error correction; writing performance; recursive editing

摘要

　　機器翻譯 (MT) 工具已發展至一定程度，可以輔助語言教學和學習。鑑於機器翻譯的潛力，本研究試圖指導以英語作為外語 (English as a Foreign Language) 的大學二年級學生進行一學期由 Google 翻譯輔助進行往復的翻譯修正，並探究以下四個面向：（1）學習者是否能夠在 Google 翻譯的幫助下糾正錯誤，（2）Google 翻譯是否改進寫

作，（3）Google 翻譯在寫作流暢性、複雜性與正確性的哪些面向能更好的幫助學習者，以及（4）在焦慮、動機信念與任務難度層面，學生對 Google 翻譯的態度。實驗組與對照組皆完成前後測包括有糾錯測試和論說文書寫。結果顯示在糾錯測試上，實驗組明顯優於對照組。兩組在寫作不同面向上也有顯著進步，但組間並無發現顯著寫作成績上的差異。在寫作流暢性、正確性與複雜性上有不一致的結果。流暢度上，對照組在句子、子句和 T 單位計數方面表現更好，但總字數上則沒有顯著不同。句法複雜性與準確性上，實驗組在子句的平均長度展現出明顯更高的複雜度與顯著的準確性。最後，學生在焦慮、動機信念和任務複雜性面向，對於使用 Google 翻譯進行學習普遍持正向態度。

關鍵字：機器翻譯；Google 翻譯；糾正錯誤；寫作表現；往復的翻譯修正

出席國際學術會議心得報告

日期：2020 年 _11_ 月 _16_ 日

計畫編號	108-2410-H-003-050-		
計畫名稱	機器翻譯與外語學習之探索研究		
出國人員姓名	張珮青	服務機構及職稱	師大英語系副教授
會議時間	2020 年 11 月 16 日至 2020 年 11 月 24 日	會議地點	線上會議
會議名稱	46th Annual International Conference on Language Teaching and Learning (JALT 2020)		
發表題目	A multimodal approach to enhancing EFL college students' reading comprehension and meaning-making potential		

與會心得

I summarized and organized the talks I attended into two main strands: Research and pedagogical oriented talks because these are the two main areas which I need the most updated inputs.

Research oriented talks:

(1) Graphical Data Analysis

This talk introduced many different ways to present data, using the *R* language. This is, however, not the language I know how to write but I saw its potential in presenting data in diverse ways and so it may be a potential tool to use in my future research.

(2) Effects of Collaborative Dialogues and Think-Aloud

This study investigated collaborative dialogues and think-aloud protocols in aiding EFL learners' writing performance. It was found that collaborative dialogues were more helpful in helping the learners to polish their writing than think-aloud protocols.

(3) Introductory Workshop on Q-Methodology

Q-methodology is a way to analyze verbal data, such as interviews. The talk introduced a very systematic way to analyze verbal data and therefore can offer convincing qualitative results. It takes time, however, to learn about this methodology, which is reasonable given its rigorous approach to data analysis and so is also something I'd like to be able to put to use in the future.

(4) An Investigation Into Language Mindsets

This study explored senior high school students' language mindsets and the factors affecting the shaping of their language mindsets. The findings derived from questionnaire reveal there are no significant differences in language mindsets between male and female students. Low-achievers tended to score toward fixed-mindset. The interview findings show that students' language mindsets are domain-specific and factors affecting their language mindsets include influences from their parents, peers and past learning experiences, especially failures.

(5) Multimodal Knowledge-Building in EFL

The talk is highly technical and is based on the presenter's doctoral dissertation. It is highly research oriented and I felt it difficult to click.

Pedagogical design oriented talks:

(1) Differentiated Instruction in the ELT Classroom

I benefited a lot from this talk. This is a very practical session which I can model on in the regular sophomore English classes I offer. I learned about different ways to engage students of different proficiency levels. For example, for higher proficiency level students, they can take more authentic materials and freely brainstorm. For lower proficiency students, simplified materials aided by more visuals or graphic

organizers may help.

(2) Learner-Generated Materials Based on TED Talks
In this poster session, we exchanged ideas about using TED to teach college students. The presenter gave her students more responsibility in leading the class to learn by having them design questions and activities to teach a class. The process of designing questions and activities was quite challenging and so her students learned a lot. This is something I'd like to do in the future.

(3) Digital Storytelling With Google Earth

Another very useful talk. Google Earth can be used to create maps to introduce in English places to dine, historic sites, leisure activities and many many more. It also seems to be quite hands-on without a lot of prior knowledge. This is definitely something I'd like to incorporate into my own classes.

(4) Teacher Development Through Podcast Engagement
The talk introduced me to the educational use of Podcast. This talk focuses on the use of Podcast in professional development but I wanted to see its potential in teaching. Through dialogues, Podcast can enable reflection. It is also a good tool to disseminate knowledge, if a group of audience is built. I have not yet been convinced of using Podcast. To me, it is like radio talk show and learning by listening to me is still one-way.

(5)The Neuroscience of Language Learning
This is one of the most intriguing and inspiring talks. First, intelligent kids take time to look "intelligent" and before their intelligence is fully developed, they might look "slow". Second, learning has to go hand in hand with learners' emotion or experience. Without these, learning won't happen. Third, novelty in learning is also highly appreciated. Novelty induces pleasure and stimulate learning. These informed my pedagogical design in my classes to happen in Fall, 2021.

(6) Improving EL engagement through podcast production
Another very practical poster session. We were introduced to the facilities to acquire,

like, the mic to get, Fifine 669 mic, Audacity or Garageband for recording. The website provided by the presenter gave me a good idea of how it is like in producing podcasts for educational purpose. Still, it sounds just like radio talk shows so I feel I need to find a way to adapt it for my own purpose.

發表論文全文或摘要

A multimodal approach to enhancing EFL college students' reading comprehension and meaning-making potential

Abstract

This study explores how linking text and image modalities in language learning may support reading comprehension and richer meanings to be generated among EFL sophomore students. The ideational metafunction in Systemic Functional Linguistics is targeted, which represents experiential meanings and reality in language, and deals with 'processes', or verbal groups, and 'participants', or nominal groups in texts and images. The visual-verbal relations are accounted for through identifying six sense relations, 'repetition', 'synonymy', 'antonymy', 'hyponymy', 'meronymy' and 'collocation' (Royce, 1998). An experimental approach was adopted. The experimental group received instruction related to the ideational meanings and the six sense relations to enhance comprehension and meaning-making. The instruction for the control group was mostly textual mode based. In addition, students in both groups were communities of learners who learned through frequent collaboration. The experimental group in particular collaborated in co-creation of artifacts combining images and texts. The result show that significant difference in overall reading comprehension scores between the groups is not found; however, specifically in the questions designed to test image-text comprehension, the experimental group improved while the control group went backward. Qualitatively, responding to image prompts, both groups produced considerably richer and more precise meanings in the posttest. However, the experimental group did better in moving beyond simple *Repetition* of participants or processes depicted in the image. More often, they resorted to *Collocate* (i.e., ideas that naturally co-occur) and *Antonym* (i.e., making contrast), other than *Repetition*, in interpreting the images and

so presented richer meanings than the control group.

108年度專題研究計畫成果彙整表

計畫主持人：張珮青			計畫編號：108-2410-H-003-050-	
計畫名稱：機器翻譯與外語學習之探索研究				

成果項目			量化	單位	質化 （說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等）
國內	學術性論文	期刊論文	0	篇	
		研討會論文	0		
		專書	0	本	
		專書論文	0	章	
		技術報告	0	篇	
		其他	0	篇	
國外	學術性論文	期刊論文	1	篇	Re-submitted to the journal of Computer Assisted Language Learning.
		研討會論文	1		To be submitted to the Computer Assisted Language Learning conference (open for submission the end of 2021 or the beginning of 2022)
		專書	0	本	
		專書論文	0	章	
		技術報告	0	篇	
		其他	0	篇	
參與計畫人力	本國籍	大專生	0	人次	
		碩士生	2		Two master's students helped with developing instructional materials, organizing data, locating literature, disseminating research, and running administrative process of the project.
		博士生	0		
		博士級研究人員	0		
		專任人員	0		
	非本國籍	大專生	0		
		碩士生	1		Helped with organizing, analyzing, rating and coding data, and finding literature, etc.
		博士生	0		
		博士級研究人員	0		
		專任人員	0		

其他成果 （無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。）	