Coherence and Cohesion in an ESL Academic Writing Environment: Rethinking the Use of Translation and FOMT in Language Teaching

Solmaz Ryan[1]*

[1]University of Ottawa, Canada
*Corresponding author: Solmaz Ryan: solmaz.ryan@senecacollege.ca

Abstract: Even though the use of Free Online Machine Translation (FOMT) tools is commonly discouraged in L2 classrooms by educators, the persistence of English as a Second Language (ESL) students in utilizing the tools has inspired many scholars to investigate whether it is helpful to develop effective strategies that transform FOMT into a teaching/learning tool in the ESL classroom. Specifically, scholars have examined how FOMT can impact the writing quality of ESL students' compositions in terms of coherence and cohesion. In line with the same research interests, this project examined ESL students' typical coherence/cohesion challenges in academic writing at an Ontario post-secondary institution offering courses in French. The study employed a mixed-methods research design and collected survey data, writing samples, and screen recordings from 6 high-intermediate-level ESL students. Survey data was also collected from twenty-three ESL instructors about ESL students' tool use. Semi-structured interviews were conducted with the students and three instructors who evaluated the writing samples. Based on the survey results, all the students demonstrated a positive attitude toward FOMT tools, while the instructors reported divided opinions about such tools for ESL writing purposes. The results showed that instructions and FOMT can assist students with improving their text quality in terms of coherence and cohesion.

Keywords: Coherence, Cohesion, Translation, Academic Writing.

Introduction

Machine Translation (MT) and Free Online Machine Translation (FOMT) tools have become the focus of much research as they have gained popularity among student writers, teachers, and translators alike. While from a more traditional perspective, scholars have observed that these tools produce imperfect output (Arnold, 2003; Bentivogli et al., 2016; Hutchins, 2005; Koehn & Knowles, 2017; Popescu-Belis, 2019), recent research (including that on neural MT [NMT]), has reported that the quality of MT output demonstrates ongoing improvements (Bentivogli et al., 2016; Munz et al., 2022; Park et al., 2021; Park & Lim, 2020; Sennrich et al., 2015; Sun et al., 2020). Despite the debate, and the fact that the use of these tools has often been discouraged in the classroom (Jolley & Maimone, 2022), FOMT is widely used by English as a Second Language (ESL) students. The persistence of ESL students in using FOMT has led some scholars to hypothesize that it may be helpful to develop effective strategies that transform FOMT into a teaching/learning tool in the ESL classroom, particularly in English for Specific Purposes (ESP) contexts (Lee, 2021; Lee, 2020; Lee & Briggs, 2021). The next section will discuss the motivation for this research, including my personal observations as well as the background literature.

Research Motivation

This study is an action research project which has been inspired largely by observations classified into two major categories: a) my workplace observations as an ESL/ESP instructor and b) my observations as a doctoral student in Translation Studies and as a former graduate student in Applied Linguistics and Discourse Studies (ALDS). Academic literature also serves as another factor that has motivated this project. With respect to academic literature, I consider two main angles: academic writing and translation, and language teaching approaches and translation. The successful communication of meaning in terms of coherence and cohesion has been highlighted in academic writing (Hinkel, 2001; Liu & Braine, 2005; Paltridge, 1992; Rezaei & Lovorn, 2010; Tywoniw & Crossley, 2019), summary writing (Šnajder et. al., 2019), L2 summary writing (Golparvar & Khafi, 2021; Strobl, 2017; Wang et. al., 2012), texts translated by humans, (Angelelli, 2009; Hatim & Mason, 2014; House, 1986; Krein-Kühle, 2002; Williams, 2001, 2009, 2010, 2013), and MT output (Xiong et al. 2013).

Research Questions

Considering the established role of coherence and cohesion in the ESL classroom and their place in the curriculum, I will seek to answer a series of research questions:

1. What are ESL students' typical coherence/cohesion challenges in academic writing?
2. What writing behaviours, such as the use of technologies including FOMT, influence these challenges?
3. Can ESL students be trained to better achieve coherence/cohesion in academic writing? How does this training affect writing behaviours, such as the use of technologies including FOMT?

The first research question will investigate students' current level of coherence and cohesion. The second research question will seek to identify the behaviours influencing the challenges involved, while the third research question will investigate changes in texts and behaviours and/or perceptions after the initial tutorial session. These stated questions give rise to several hypotheses that are informed by the general literature on the subject, my professional experience, discussions with colleagues and students, as well as the pilot projects I conducted as a graduate student in Translation Studies. These will be addressed in the section that follows.

Hypotheses

The hypothesis corresponding to the first research question is that ESL students' understanding of coherence and cohesion may be limited, making it challenging for them to construct coherent and cohesive texts. The hypotheses relating to the second research question are that ESL students commonly translate by composing in their L1 and translating—especially by resorting to FOMT—into their L2, and that some ESL students may not execute adequate editing skills to construct coherent and cohesive texts, particularly when they employ FOMT in producing their drafts in English. However, for some ESL students, composing in their L1 and then translating into their L2 with the help of MT may result in more coherent, more developed, and better organized texts than composing directly in their L2. The hypothesis corresponding to the third research question is that the teaching of coherence and cohesion can result in more coherent and cohesive texts. For some ESL students, composing in their L1 and then translating into their L2 may remain as a preferred option and result subsequently in more coherent, developed, and better organized texts than composing directly in their L2. Some ESL students will demonstrate more developed levels of (post-) editing skills after instruction.

Methodology

This study employs a mixed-methods research design that probes the above-mentioned issues qualitatively and quantitatively. After the analysis of curriculum and course documents from the Institution, the collection of empirical data began. I designed three workshop sessions to collect data. The pool of participants comprised instructors and students who, respectively, taught or were enrolled (in a specific program) in this institution.

Data Collection
  The collection of data was completed through the following phases.
Pre-instruction
  To answer the first research question, I collected the first set of writing samples for levels of coherence and cohesion, and they were evaluated. To answer the second research question, I observed student writing behaviour using screen recording, and I gathered perceptions of students and supporting information of instructors through online questionnaires.
Post-instruction
  To address the third research question, the following five methods were employed.

1. I observed student writing behaviour using screen recording
2. I collected and evaluated the second set of writing samples for levels of coherence and cohesion before instruction
3. I gathered changes in students' opinions and perceptions of the use of various tools in ESL writing and reactions to the project activities via a post-survey
4. I studied students' reactions to the project activities and (perceived) differences in writing via one-on-one interviews
5. I explored judges'/evaluators' opinions and perceptions about any differences in writing via one-on-one interviews

Data Analysis
  The analysis of data consists of four sections: survey analysis (quantitative and qualitative), text/writing sample analysis (quantitative and qualitative), screen-recording/video analysis (quantitative and qualitative) and interview analysis (qualitative). The qualitative analysis is based on data from the semi-structured interviews and open-ended questions on the surveys, as well as observations made by coding and identifying common themes in the writing samples and videos. Additionally, the quantitative data that emerged from the evaluation grid, including coherence and cohesion analyses, informed a qualitative analysis describing changes in the overall text quality of the samples gathered. The section that follows sheds light on the analysis of collected data.

Results

Writing Analysis Pre- and Post- Instruction
  A comparative analysis of the students' baseline writing performance with the post-instruction performance reveals that while students, overall, have shown progress in terms of their coherence and cohesion scores, there is still scope for improvement in these two areas and in implementing a wider variety of cohesive devices (CDs) in their texts (Table 1, Table 2, and Table 3)**Error! Reference source not found.Error! Reference source not found.Error! Reference source not found.**.

Table 1

Comparison of Sentence and Paragraph Coherence Scores (Pre-and Post-Instruction)

	Average	
	Pre-	Post-
Sentence coherence (1200)	700 (58%)	807 (67%)
Paragraph coherence (900)	561 (62%)	678 (75%)
Total (2100)	1261 (60%)	1484 (71%)

Table 2

Comparison of Cohesion Scores (Pre- and Post-instruction)

	Average	
	Pre-	Post-
Cohesion scores (Total=1800)	975 (54%)	1182 (66%)

Table 3

Comparison of Variety of CDs (Pre- and Post-Instruction)

	Average (pronoun references)		Average (lexical references		Average (junctions)	
	Pre-	Post-	Pre-	Post-	Pre-	Post-
A (300)	179 (60%)	206 (69%)	176 (59%)	210 (70%)	168 (56%)	194 (65%)
V (300)	155 (52%)	190 (63%)	148 (49%)	196 (65%)	141 (47%)	177 (59%)
Total (600)	334 (56%)	396 (66%)	324 (54%)	406 (67%)	308 (51%)	372 (62%)

Video Analysis

On average, a comparative analysis of the videos collected in the pre-instruction stage and post-instruction stage demonstrate that the post-stage drafting time using MT shows moderate increase compared to the pre-stage drafting time using MT. As well, participants tended to use the tools slightly more (**Error! Reference source not found.**)

Table 4

Comparison of Student Behaviour (Pre- and Post-Instruction)

	Average	
	Pre-	Post-
Uses of FOMT (n)	13	17
Uses of FOMT per 100 words	8	9
Uses of FOMT per 10 min.	4	3
Time spent on drafting using FOMT	8%	11%
Time spent on manual drafting in French	21%	17%
Time spent on manual drafting in English	71%	72%

Survey Analysis

Based on comparing students' post-reports with their initial reports and the instructors' reports, two main themes emerged. The researcher observed similarities between the students' and instructors' perceptions regarding a) frequency of tool use highlighting that students are frequent users of such tools, and that b) they prefer to use it for translating from L1 to L2. The results show that both students and instructors believed that such tools ease the students' writing process and make the process of writing faster than if they write on their own. Both students and instructors referred to some disadvantages as well. For instance, they mentioned that there are issues in terms of meaning and syntax in the MT generated output.

However, based on the survey reports, students and instructors demonstrated some disagreements as well. While students regarded such tools as useful in assisting them with organization of ideas, instructors reported that these tools prevent students from "decent" learning.

Interview Analysis

An analysis of interviews with student participants and judges sheds light on some similarities and differences in their opinions. Both groups agreed that students use such tools frequently, for different purposes and from L1 to L2 in most cases. They also mentioned that, for the purpose of this project, the tools assisted students in creating more coherent and cohesive texts. In addition, both groups highlighted the lack of a clear policy in using the tools in ESL classrooms. In a like manner to survey reports, they shared different opinions on the usefulness of such tools for learning purposes.

Discussion

In response to the first and second research questions (*what are ESL students' typical coherence/cohesion challenges in academic writing?* and *what writing behaviours, e.g., use of technologies such as FOMT, influence these challenges?*), study data showed a) limited knowledge about CDs, b) prevalence of translation in completing the summary texts, c) challenges of FOMT in laying the foundations for critical evaluation, and d) students' perception of the tool use as not necessarily reflective of their actual use.

In response to the third research question (*can ESL students be trained to better achieve coherence/cohesion in academic writing?* and *how does this training affect writing behaviours, e.g., the use of technologies such as FOMT?*), the results suggest that using the tools for the purpose of this project showed a) development of L2 coherence and cohesion (e.g., knowledge about CDs), b) prevalence of translation in completing the summary texts, c) development of critical evaluation, and that d) students' performance during the writing process was impacted by some influential factors.

Conclusion

Addressing the first and second research questions, the data supports these hypotheses: a) students possess limited understanding of coherence and cohesion, b) students commonly translate by writing in L1 and then translating—especially via FOMT—into their L2, and c) there is a need to improve editing skills particularly when students employ FOMT. Addressing the third research question, the data would support the hypotheses that a) the teaching of coherence and cohesion can help students construct better-quality texts, and b) composing in L1 and then translating into L2 could remain as a preferred option and result subsequently in more coherent, developed, and better organized texts than composing directly in L2. In addition, it was revealed that c) some students demonstrated more developed levels of (post-) editing skills after the instructions compared to the others, and finally d) composing in L1 and then translating into L2 could result in more coherent, developed, and better organized texts than composing directly in their L2.

Note1: To maintain confidentiality, the institution's name will remain anonymous, referred to from here on as the *Institution.*

Availability of data and material
The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author's contributions

The author conceptualized, designed, and wrote the manuscript, as well as contributed to manuscript drafting and revision and approval of the final version.

Conflict of Interest

The author declares no conflict of interest.

Ethics Approval

Ethics approval was not acquired for this publication.

References

Angelelli, C. V. (2009). Using a rubric to assess translation ability. *Testing and Assessment in Translation and Interpreting Studies: A Call for Dialogue between Research and Practice, 14*(13). https://doi.org/10.1075/ata.xiv.03ang

Arnold, D. (2003). Why translation is difficult for computers. In H. Somers (Ed.), *Computers and Translation: A Translator's Guide, Amsterdam, and Philadelphia* (pp. 119-142). John Benjamins. DOI:10.1075/btl.35.11arn

Bentivogli, L., Bisazza, A., Cettolo, M., & Federico, M. (2016). Neural versus phrase-based machine translation quality: a case study. In *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing* (pp. 257–267). Austin, Texas: Association for Computational Linguistics.

Golparvar, S. E., & Khafi, A. (2021). The role of L2 writing self-efficacy in integrated writing strategy use and performance. *Assessing Writing*, *47*(1). DOI:10.1016/j.asw.2020.100504

Hatim, B., & Mason, I. (2014). *Discourse and the Translator.* London: Routledge.

Hinkel, E. (2001). Matters of cohesion in L2 academic texts. *Applied language learning, 12*(2), 111-132.

House, J. (1986). Acquiring translational competence in interaction. *Interlingual and Intercultural Communication: Discourse and Cognition in Translation and Second Language Acquisition Studies* (pp. 179-191). Juliane House, Shoshana Blum-Kulka Gunter Narr Verlag.

Hutchins, J. (2005). Current commercial machine translation systems and computer-based translation tools: system types and their uses. *International Journal of Translation*, *17*(1-2), 5-38.

Jolley, J. R., & Maimone, L. (2022). Thirty years of machine translation in language teaching and learning: A review of the literature. *L2 Journal*, *14*(1). https://doi.org/10.5070/L214151760

Koehn, P., & Knowles, R. (2017). Six challenges for neural machine translation. In *Proceedings of the First Workshop on Neural Machine Translation* (pp. 28–39). Vancouver. Association for Computational Linguistics.

Krein-Kühle, M. (2002). Cohesion and coherence in technical translation: The case of demonstrative reference. *Linguistica Antverpiensia, New Series–Themes in Translation Studies, 1*. https://doi.org/10.52034/lanstts.v1i.5

Lee, S. M. (2020). The impact of using machine translation on EFL students' writing. *Computer Assisted Language Learning*, *33*(3), 157-175.

Lee, S. M. (2021). The effectiveness of machine translation in foreign language education: a systematic review and meta-analysis. *Computer Assisted Language Learning*, 1-23. 10.1080/09588221.2021.1901745

Lee, S. M., & Briggs, N. (2021). Effects of using machine translation to mediate the revision process of Korean university students' academic writing. *ReCALL*, *33*(1), 18-33.10.1017/S0958344020000191

Liu, M., & Braine, G. (2005). Cohesive features in argumentative writing produced by Chinese undergraduates. *System, 33*(4), 623-636. https://doi.org/10.1016/j.system.2005.02.002

Munz, T., Väth, D., Kuznecov, P., Vu, N. T., & Weiskopf, D. (2022). Visualization-based improvement of neural machine translation. *Computers & Graphics*, *103*, 45-60. https://doi.org/10.1016/j.cag.2021.12.003

Paltridge, B. (1992). EAP placement testing: An integrated approach. *English for Specific*

Purposes, 11(3), 243-268. https://doi.org/10.1016/S0889-4906(05)80012-2

Park, C., & Lim, H. (2020). A study on the performance improvement of machine translation using public Korean-English parallel corpus. *Journal of Digital Convergence*, *18*(6), 271-277.

Park, C., Park, K., Moon, H., Eo, S., & Lim, H. (2021). A study on performance improvement considering the balance between corpus in Neural Machine Translation. *Journal of the Korea Convergence Society*, *12*(5), 23-29.

Popescu-Belis, A. (2019). Context in neural machine translation: A review of models and evaluations. *arXiv preprint arXiv:1901.09115*.

Rezaei, A. R., & Lovorn, M. (2010). Reliability and validity of rubrics for assessment through writing. *Assessing writing, 15*(1), 18-39. https://doi.org/10.1016/j.asw.2010.01.003

Sennrich, R., Haddow, B., & Birch, A. (2015). Neural machine translation of rare words with subword units. In *Proceedings of the 54th Annual Meeting of the Association for Computational Linguistics (Vol. 1: Long Papers)* (pp. 1715–1725). Berlin, Germany. Association for Computational Linguistics.

Šnajder, J., Sladoljev-Agejev, T., & Vehovec, S. K. (2019). Analysing rhetorical structure as a key feature of summary coherence. In *Proceedings of the Fourteenth Workshop on Innovative Use of NLP for Building Educational Applications* (pp. 46-51). Florence, Italy. Association for Computational Linguistics. DOI: 10.18653/v1/W19-4405

Strobl, C. (2017). The potential of automated corrective feedback to remediate cohesion problems in advanced students' writing. *CALL in a climate of change: adapting to turbulent global conditions (Short Papers)* (294-299). EUROCALL 2017. DOI:10.14705/rpnet.2017.eurocall2017.729

Sun, Z., Zhang, J. M., Harman, M., Papadakis, M., & Zhang, L. (2020). Automatic testing and improvement of machine translation. In *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering* (pp. 974-985). DOI:10.1145/3377811.3380420

Tywoniw, R., & Crossley, S. (2019). The effect of cohesive features in integrated and independent L2 writing quality and text classification. *Language Education & Assessment*, *2*(3), 110-134.

Wang, Y., Harrington, M., & White, P. (2012). Detecting breakdowns in local coherence in the writing of Chinese English learners. *Journal of Computer Assisted Learning*, *28*(4), 396-410. https://doi.org/10.1111/j.1365-2729.2011.00475.x

Williams, M. (2001). The application of argumentation theory to translation quality assessment. *Meta: journal des traducteurs/Meta: Translators' Journal, 46*(2), 326-344. https://doi.org/10.7202/004605ar

Williams, M. (2009). Translation quality assessment. *Mutatis Mutandis, 2*(1), 3-23.

Williams, M. (2010). Translating metadiscourse: An explanatory analysis of problems in students' work. *Mutatis Mutandis: Revista Latinoamericana de Traducción, 3*(1), 73-90.

Williams, M. (2013). A holistic-componential model for assessing translation student performance and competency. *Mutatis Mutandis: Revista Latinoamericana de Traducción*, *6*(2), 419-443.

Xiong, D., Ding, Y., Zhang, M., & Tan, C. L. (2013). Lexical chain based cohesion models for document-level statistical machine translation. In *Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing* (pp. 1563-1573). Seattle, Washington: Association for Computational Linguistics.