



## The Difficulties and Strategies of Asian EFL Learners in Studying Abroad Context

Aris Dwi Intan Aprianti, STKIP Paracendekia NW Sumbawa

Iwan Jazadi ✉, STKIP Paracendekia NW Sumbawa

✉ [iwanjazadi@gmail.com](mailto:iwanjazadi@gmail.com)

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**Abstract:** This article reports on the language learning of Asian English learners in Australia as a target language community. This study's research topic is the difficulties or challenges, and strategies used by the Asian students. Five international Master of Applied Linguistics and TESOL students from China, Japan, Myanmar, and Vietnam are the participants of this study. The data were collected through observation, interview and documentation. The findings of this qualitative study demonstrate that the participants faced some level of difficulty or struggle in all macro skills for a variety of reasons. Surprisingly, the majority of the individuals struggled in speaking skill in the target language community. In terms of learning strategies, the participants used a variety of strategies and made use of their social relationships to aid their learning. Their second preferred strategy is cognitive, followed by metacognitive, which is only used by two participants in dealing with their learning problems.

**Keywords:** Affordances, Learning Difficulties, Learning Strategies, Study Abroad Context

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**Abstrak:** Artikel ini melaporkan tentang pembelajaran bahasa mahasiswa bahasa Inggris Asia di Australia sebagai komunitas bahasa target. Topik penelitian ini adalah kesulitan atau tantangan, dan strategi yang digunakan oleh mahasiswa Asia. Lima mahasiswa internasional Master of Applied Linguistics dan TESOL dari China, Jepang, Myanmar, dan Vietnam menjadi peserta penelitian ini. Pengumpulan data dilakukan melalui observasi, wawancara dan dokumentasi. Temuan studi kualitatif ini menunjukkan bahwa para peserta menghadapi beberapa tingkat kesulitan atau kesulitan dalam semua keterampilan makro karena berbagai alasan. Anehnya, sebagian besar individu berjuang dalam keterampilan berbicara di komunitas bahasa target. Dalam hal strategi pembelajaran, para peserta menggunakan berbagai strategi dan memanfaatkan hubungan sosial mereka untuk membantu pembelajaran mereka. Strategi pilihan kedua mereka adalah kognitif, diikuti oleh metakognitif, yang hanya digunakan oleh dua peserta dalam menangani masalah belajar mereka.

**Kata kunci:** Keterjangkauan, Kesulitan Belajar, Strategi Belajar, Konteks Belajar di Luar Negeri

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## INTRODUCTION

### Background of the Study

Studying abroad (SA) in the target language community (TLC) is considered advantageous for a language learner since the environment can offer naturalistic language exposure. Hummel (2013) has confirmed that studying in TLC has been considered beneficial language learning environment by most of the participants in his study. As claimed by Li (2014), natural language environment can be a contributing factor to achieve a higher proficiency level. Considerable language practice and input in study abroad (SA) context are available and can benefit students for achieving significant gains in L2 skills (Collentine & Freed, 2004). Tsai (2012) found that SA context is rich with intercultural interaction that significantly affects learners' motivation.

However, studying abroad does not always guarantee a successful learning and desirable outcomes. Briggs (2014) claims that learners may not gain a higher proficiency level even though they are in the naturalistic settings if the learners cannot turn the available learning resources such as books, people or environment into affordances to support their language learning. Palfreyman (2014) claims that affordances that learners act on and recognize can facilitate access to learning resources such as motivation and knowledge that more directly contribute to language learning. Consequently, learners are responsible for their own learning by selecting a suitable strategy that effectively promotes their learning in the target language community.

We have studied abroad for some years and seen many international students who have succeeded in their learning of English. On the other hand, we also have seen some of the international students fail to achieve satisfactory results in their study or have seriously grappled with the English learning for more than a year before they are accepted to a degree program in a university. Therefore, we were interested in conducting research on the English learning affordances, difficulties, and strategies in the study abroad context as reported in this article.

### Learning Affordances

Affordances for studying a foreign language in the study abroad (SA) context refer the natural language environment and exposure considered the best context for language learners (Li, 2014). Affordances assume that naturalistic language learning beyond the classroom with a second language (L2) help learners to achieve higher levels of proficiency. Furthermore, the constant exposure of L2 has been the primary draw of studying abroad for L2 learners since it offers some promising opportunities to enhance and practice the L2. There are some studies on L2 affordances, as discussed below.

Kashiwa, Mayumi & Benson (2018) conducted a study by adopting an ecological perspective on context in L2 learning to investigate the Chinese learners' reconceptualization and constructions of their language environment in their first three months studying in Australia. This narrative inquiry study applying multiple research instruments such as observation, diary and longitudinal interview found that the learners' awareness of the affordances of the study abroad setting and their agency in creating opportunities for out-of-class learning are interrelated. The findings of this study offer some useful information about the construction of a language learning environment based on the affordances learners can utilize. Therefore, it shows the availability of learning supports largely provoked by the learners' view and conception of learning.

Furthermore, since the language context at the home country may affect learners' choice in opting out the learning strategy in the target language community context, Saud (2019) undertook a contrastive analysis of the learning strategies chosen by English as Second Language (SLA) and English as Foreign Language (EFL) learners, as measured by the Strategy Inventory for a Language Learning (SIIL). He provided the findings that EFL and ESL students diverged considerably at the individual strategy level. Meanwhile, at the category level, there were no significant differences where the metacognitive category was most frequently used,

followed by both affective and memory categories as the least frequently used strategy. However, while this study presents valuable information for this topic, the exploration of the factors affecting their choices of the strategy is absent here. The use of a mixed method might result in more informative finding since it will allow a thorough investigation of what may cause those strategies preferable to them.

Furthermore, Li (2014) compared the differences in the use of reading strategies between SA and at home (AH) context. Reading comprehension tests and strategy questionnaires were used to measure the product of reading. On the other hand, think-aloud protocols, observation, and interviews were applied to scrutinize the reading development process of the learners. Li's study indicated that the learners AH context mainly focused on the textbooks, whereas the SA learners had more chances to be exposed with a wide range of authentic materials in various reading activities such as texting message or emailing their colleagues in the target language and reading notices, which contributed to their reading development.

Montero (2017) also undertook another comparative study investigating the effects of learning context, particularly SA and AH course and the L2 exposure such as relationships, social networks, and leisure activities on the enhancement of communication strategies. The results suggested that non-language-oriented leisure activities may benefit both group students in AH and SA contexts in improving their language skills. However, when considering the factors that may affect learners' language skill in the SA context, Montero, Serrano & Llanes' (2017) study has given the idea that age also affects the strategy use. These researchers investigated the impacts of foreign language learning context (SA versus HA) and age (university students versus ten-twelve-year-old children) on the development of efficient foreign language communication strategies (CS) in monologue production. Pre-test and post-test were applied as the instruments to analyze participants' oral narrative performance before and after their learning period either studying target language AH or SA in the target language context. The findings implied that the SA experience impacted children learning positively in increasing their use of communicative strategies and decreasing L1-based strategies as compared to those who learned at-home context. Yet, it worked contrarily on adult learners, the influence of the learning context was not entirely noticeable. However, since this study was done in a short term of study, the result may be different when it is examined in the longer term of study. Also, the exploration of the L2 use may also be beneficial to find out possible patterns of strategy use in participants' learning.

### **Learning Difficulty in SA context**

Apart from the contributing factors that can improve learners' linguistics gain in the SA context, some studies were also conducted to find out learners' L2 learning difficulties. Nguyen (2011) investigated the difficulties encountered by learners from three Asian countries. This qualitative study found that plagiarism in writing and speaking were considered challenges by the learners. The researcher also found that pronunciation was significant challenges for the learners apart from the plagiarism in writing and speaking.

Yanaga & Baker (2016) used online questionnaires and face to face online interview to investigate the issues of language learning of Japanese students who were studying in Australia. The findings indicated that pronunciation followed by speaking and listening were the challenges students had to encounter. These kinds of difficulties and strategies are commonly found and suggested in language learning in AH contexts. Moreover, examining the challenges learners encountered in the SA context can pose a profound concept of learners' agency and learners' autonomy in adopting and applying suitable learning strategy in the SA context. However, the learners' strategies in overcoming their challenges were not examined in these studies. Therefore, this present study aims to fill the gaps of previous studies in language strategy especially in SA context.

### **Language Learning Strategy and Studying Abroad Context**

Strategy in language learning is defined as the actions consciously taken and chosen by the learners to make their learning more pleasant, more productive, faster, more comfortable and adjustable to the current situation (Oxford, 1990 as cited in Griffiths & Oxford, 2013, p.2). Language strategy is grouped into four categories in term of its types in language learning; cognitive, metacognitive, social and affective (Griffiths & Oxford, 2013). Cognitive strategy refers to the use of mind for learning in memorizing, guessing meaning, etc., metacognitive deals with the learning organization such as planning what to learn and how to learn a particular material, social strategy signifies the involvement of other people in learning for instance; having a network and interaction with the skillful speakers. Finally, affective strategy relates to the management of the emotional aspects of learning including clearing the mind before study or maintaining the focus during study. However, due to the shortage of recent research investigating the use of learning strategy in SA/ TLC context, the necessity to undertake the research is unstoppable. Nonetheless, some researchers have attempted to answer the queries of the linguistics behavior and pedagogical practices in their areas. Also, they unlocked the path for future research on the topic of learning strategy in the SA context.

Dewey, Brown & Eggett (2012) examined the social interactions of 204 Japanese learners who studied abroad in Japan by scrutinizing both social network development and language use. Taking an approach to gaging social networks that is popular in social network analysis and using a range of self-reports as well as then-now survey, these researchers found out from learners' report; the time spent speaking with native Japanese speakers as the social network members contributed to their language proficiency.

Baker-Smemoe, et al (2014) examined the variables affecting the L2 gains during study abroad using the pre and post-test and interview. The result of L2 gain in pre and post-test were compared to the variables using NEO Five-Factor Inventory to measure personality, Intercultural Development Inventory to measure intercultural sensitivity and other predictors such as social networks, amount of L2 use, gender, and age also analysed. The findings suggested that the strongest predictor of L2 gains in the SA context were cultural sensitivity and social network. These two studies relate one of the strategy categories with the L2 gains in SA context. Social network and awareness are contributing factors in effective learning.

Kurata (2010) argues that since learners are social being, so their relations with others is the main element of their language awareness, which is also liable to maximize L2 learning opportunity. Also, the situation where learners successfully create integration into their new learning environments is advantageous for creating the opportunity to enhance their language skills through meaningful interactions (Isabelli-Garcia, 2017).

Based on the background above, this present study aimed to explore the following questions: (1) What are the difficulties or challenges faced by EFL learners in study abroad contexts? (2) What are the learning strategies employed by EFL learners in study abroad contexts?

The purpose of this study is to examine the difficulties or challenges faced, and the strategies applied by EFL learners during their study overseas. This study aimed to contribute theoretically, practically and pedagogically to maximize the language learning through the exploration of studying abroad phenomena.

## **RESEARCH METHOD**

### **Research Participants**

The participants of this study were five Asian EFL learners (S1, S2, S3, S4 and S5) majoring in an Applied Linguistics and TESOL major in a university of Australia. They came from EFL contexts, namely Myanmar, Japan, Vietnam and China, and had studied at least for a year in Australia. The profile of the student participants is presented in Table 1.

**TABLE 1. Profile of learner participants**

No.	Student Code	EFL home context	Length of being in Australia
1.	S1	China	1 year
2.	S2	Vietnam	1 year
3.	S3	China	1 year
4.	S4	Japan	1 year
5.	S5	Myanmar	1 year

### Data Collection and Analysis

The present study used qualitative approach in order to obtain and analyse the data. Language learning history written as diary and semi-structured interview was used as the instruments. The language diary was used to gain the participants' learning English experiences and journey when they were in home country and in Australia. Semi-structured interview was used to explore learning experience in depth including the challenges they found in SA context as well as the strategies they applied to cope with those issues. These two instruments were used to seek supporting information that enables the researcher to create comparison of studying between at home (AH) and study abroad (SA) contexts based on participants' answers and their written experiences.

For the data analysis, this study used O' Malley & Chamot's (1990) theory in coding the data about language learning strategy, whereas the learning challenges were codified according to four macro skills including writing, reading, speaking and listening. Therefore, the data from semi-structured interviews were transcribed and codified before they were grouped into similar categories for the data analysis purpose.

### FINDINGS AND DISCUSSION

The findings about the challenges or difficulties faced by these students are summarised in Table 2, while the findings of the students' learning strategies in the SA context are presented in Table 3.

**TABLE 2. Students' learning challenges**

Student	Speaking	Reading	Listening	Writing
S1	<ul style="list-style-type: none"> <li>▪ Had difficulty in expressing ideas due to the lack of vocabulary</li> <li>▪ Had anxiety when communicating with foreign people</li> </ul>			<ul style="list-style-type: none"> <li>▪ Frequently was not sure about producing the correct and well-written essay</li> </ul>
S2	<ul style="list-style-type: none"> <li>▪ Unfamiliarity with Australian accent</li> </ul>		<ul style="list-style-type: none"> <li>▪ Had difficulty in understanding Australian accent</li> </ul>	<ul style="list-style-type: none"> <li>▪ Did not get used to writing essay and research report</li> </ul>
S3	<ul style="list-style-type: none"> <li>▪ Had difficulty to speak like local people</li> </ul>	<ul style="list-style-type: none"> <li>▪ Had difficulty in understanding academic readings</li> </ul>		<ul style="list-style-type: none"> <li>▪ Did not get used to writing report/ essays</li> </ul>
S4	<ul style="list-style-type: none"> <li>▪ Lack of background knowledge of the topic</li> <li>▪ Was not exposed much to casual language</li> </ul>		<ul style="list-style-type: none"> <li>▪ Did not get used to the speed of speakers in TLC</li> </ul>	

Student	Speaking	Reading	Listening	Writing
S5	<ul style="list-style-type: none"> <li>Had difficulty in responding others due to the unfamiliarity with Australian accent</li> </ul>	<ul style="list-style-type: none"> <li>Had difficulty in understanding academic readings</li> </ul>	<ul style="list-style-type: none"> <li>Was not familiar with various English accents</li> </ul>	

**TABLE 3. EFL students' learning strategies in SA context**

Student	Metacognitive	Cognitive	Social / Affective
S1	<ul style="list-style-type: none"> <li>Reading before class</li> </ul>	<ul style="list-style-type: none"> <li>Reading academic articles</li> <li>Watching movies to learn pronunciation</li> </ul>	
S2		<ul style="list-style-type: none"> <li>Learning Australian accent through movies</li> <li>Listening to music to learn vocabulary</li> </ul>	<ul style="list-style-type: none"> <li>Make friends and social interaction</li> <li>Consulting to learning advisors</li> </ul>
S3		<ul style="list-style-type: none"> <li>Watching movies and TV shows to imitate the pronunciation and sentences</li> <li>Reading English novel</li> </ul>	<ul style="list-style-type: none"> <li>Have friends to correct her mistakes.</li> </ul>
S4	<ul style="list-style-type: none"> <li>Finding a place to practice speaking</li> </ul>	<ul style="list-style-type: none"> <li>Reading English news to get the language exposure</li> <li>Listen to the podcast to train listening skill</li> </ul>	<ul style="list-style-type: none"> <li>Get along with friends to practice speaking</li> <li>Active involvement in classroom</li> </ul>
S5		<ul style="list-style-type: none"> <li>Take notes</li> </ul>	<ul style="list-style-type: none"> <li>Participating in online discussion</li> <li>Discussing with classmates</li> <li>Communicate with lecturers to ask for clarification</li> <li>Actively participating in classroom</li> </ul>

## DISCUSSION

### The Challenges/Difficulties Faced by Asian EFL Learners

As shown Table 2, most of students had problems in speaking and the causes are considerably various. S2, S3 and S4 revealed that they had to deal with unfamiliarity of Australian accent. While, S1 acknowledged that her difficulty was caused by the lack of vocabulary. She stated, "It's a little bit difficult for me to express my opinion very clearly sometimes, so that means when I have some questions relating to my major, I sometimes don't even know how to ask that question". However, a strong reason that cause another challenge in her speaking skill was speaking anxiety that affected her speaking confidence. As she also expressed, "I also want to talk and communicate with other people as much as I want, especially with foreign people but whenever I meet foreign people I feel nervous and anxious."

Interestingly, only S3 and S5 had difficulty in reading. The academic readings with complex and technical vocabulary were claimed as the main cause of the challenges they encountered. S5 said, "reading is the most problematic area because I've had never read that kind of academic readings or articles, research papers, not that much". This indicates that they did not get used to reading academic texts with technical words and complex sentences. Therefore, when they were required to read complex academic readings for their course their unfamiliarity with the vocabulary and structures cause the difficulty to understand the content.

In listening skill, S2, S4 and S5 had difficulty in this area. They shared relatively similar reasons for this problem such as difficulty in understanding the Australian accent and the speed of the speakers in the target language community. As S2 revealed, "when people talked to me at first, I felt so strange because I was not familiar with the voice, the Australian accent". For

language learners, the pace of native speakers' talk can be challenging to follow. S4 said, "Sometimes, the speakers speak so fast, so I am not really sure how to respond". Thus, it can cause other possible challenges for the learners in their comprehension as revealed by S5, "At first it was very difficult for me to catch or to understand and I did not even know what my friends mean, so I had to ask them again and sometimes I had to pretend that I understood". S5's response indicates that she also made some effort as the negation of the meaning making process, but when she failed she would pretend that she had understood. In fact, this can cause the misunderstanding between her and other interlocutors, which resulted in an ineffective and unsuccessful communication.

Finally, when it comes to writing, S1, S2 and S3 expressed their difficulty. The different education system has been the contributing factor affecting their writing performance. The requirements and assignment types make a huge difference in their writing practice when they compared the AH and SA context. As admitted by S2 "in Vietnam the education system is completely different, we do not have to write assignments, essay or do research". S3 also added a quite similar response, "I haven't learned how to write report or research in China but when I came here I have to write and no one taught me how to write a report." It shows that the assessment method in AH context did not promote the writing skill as they were not required to produce the same kind of writing in SA context. It can be seen from S1's response, "In China we normally take different exam like multiple choice or this kind of question". Furthermore, a student from Japan, S4 did not have problem in writing especially in the genres required by the university in the target language community as he is familiar with the genre since he was in AH context. As he reflected in his language diary, "I always felt motivated when my essay was introduced during his class". He refers to his best English teacher, "He himself was the best essay writer in English even though he had no experience in studying abroad". Therefore, his writing experience and education in AH context helped him in the SA context.

### **Strategies Employed by EFL Students in SA context**

To overcome the challenges or difficulties as well as to improve their language skills in SA context, these students had applied some learning strategies. Following the categories defined by O'Malley and Chomet (1990), these strategies are grouped into similar categories as presented in Table 3.

As Table 3 shows, most students used category strategy is cognitive ones and followed by social strategy, whereas the metacognitive is the least used strategy. Only S1 and S4 used metacognitive strategies in their learning. She read before class to make sure she is well-prepared in class and this strategy was used by her to address her problem of speaking anxiety and lack of vocabulary in relevant topics being discussed in the class. S1 revealed, "When you do not have enough language knowledge, the thing you can do is work hard and try to finish all the readings before the class. That is very useful". Similarly, in S4's case, he tried to find a good place to practice his speaking skill; he evaluated his learning space and tried to turn it into an effective language learning environment. He acknowledged, "If studying individually, I always look for some places to practice my speaking".

Furthermore, all students employed the cognitive strategy in their learning but interestingly, most of the strategies chosen by them are generally the same including watching English videos, reading English news and novel to enhance their pronunciation/ vocabulary. S1, S2, S3, S4 made use of movies and media to gain the L2 exposure as they considered these actions would provide them with natural and authentic language they needed. As expressed by S2, "I love watching movies and listening to songs in English because that is one of the natural ways you can acquire the language".

Finally, only three students applied social strategy even though they were in SA context. S2, S4 and S5 made use of the learning peers, L2 speakers and skilful people such as lecturers to maximize language learning. These students had turned their relationship with the people in the target language community into affordances that promoted their learning. S5 expressed, "I also

discuss with my close friends to be able to understand what we have to do, sometimes the readings are very difficult”.

The findings of this study indicate that students successfully turned their relationship with others into affordances that provide them the naturalistic L2 exposure, so they could obtain language input consciously and unconsciously. This situation benefited the learners to have a great amount of learning time.

## CONCLUSION

The Asian students encountered some challenges in SA context in all the macro skills. All of the students had speaking difficulty because they could not respond to their counterparts speaking with Australian accents. Their difficulty to understand their partner Australian accents also caused their listening difficulty. Speaking anxiety and lacking background knowledge are the other causes of their speaking difficulty. Some students encountered some issues in writing due to their educational experience in their AH context.

To address their difficulties, these students employed several strategy categories and made use of their social relationship with others to support their learning. Cognitive category is their second preferable strategy, followed by metacognitive that is only applied by two students. Therefore, TLC or SA context still provides students with some challenges in their language learning but their ability to turn the abundant resources in SA context to learn language has made their learning experience here much more effective and meaningful.

## REFERENCES

1. Baker-Smemoe, W., Dewey, D., Bown, J., & Martinsen, R. (2014). *Variables Affecting L2 Gains During Study Abroad*. *Foreign Language Annals*, 47(3), 464-486.
2. Briggs, J. (2015). A context-specific research tool to probe the out-of-class vocabulary-related strategies of study-abroad learners. *International Journal of Applied Linguistics*, 25(3), 291-314.
3. Dewey, D. P., Bown, J., & Eggett, D. (2012). Japanese language proficiency, social networking, and language use during study abroad: Learners' Perspectives. *Canadian Modern Language Review*, 68(2), 111-137.
4. Hummel, K. (2013). Target-language community involvement: second-language linguistic self-confidence and other perceived benefits. *The Canadian Modern Language Review / La Revue Canadienne Des Langues Vivantes*, 69(1), 65-90.
5. Isabelli-Garcia, C. (2017). Key concepts in applied linguistics: Second language acquisition and study abroad learning environments. *Estudios de lingüística inglesa aplicada*, 17, 273-283
6. Kashiwa, Mayumi, & Benson, P. (2018). A road and a forest: conceptions of in-class and out-of-class learning in the transition to study abroad. *TESOL Quarterly*, 52(4), 725-747.
7. Kurata, N. (2010). Opportunities for foreign language learning and use within a learner's informal social networks. *Mind, Culture, and Activity*, 17 (4), 382-396.
8. Li, L. (2014). Language Proficiency, Reading Development, and Learning Context. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 24, 73-92.
9. Montero, L. (2017). Developing effective L2 communication strategies abroad and at home. *The Language Learning Journal*, 1-11.
10. Montaña, G.J.X. (2017). Learning strategies in second language Acquisition. *US-China Foreign Language*, 15 (8), 479-492
11. Nguyen, C. T. (2011). Challenges of learning English in Australia towards students coming from selected Southeast Asian countries: Vietnam, Thailand and Indonesia. *International Education Studies*, 4(1), 13-20.

12. Palfreyman, D. (2014). The ecology of learner autonomy. In G. Murray (ed.), *Social dimensions of autonomy in language learning*. (pp. 175-191). Basingstoke: Palgrave Macmillan.
13. Saud, W. F. (2019). A contrastive analysis of ESL and EFL learning strategies. *Journal of Language Teaching and Research*, 10(2), 311-321.
14. Tsai, Y. (2012). The effects of intercultural learning on English learning motivation among students studying abroad. *New Horizons in Education*, 60(1), 23-34.
15. Yanagi, M., & Baker, A. (2016). Challenges experienced by Japanese students with oral communication skills in Australian universities. *TESOL Journal*, 7(3), 621-644.

**Bio-Profiles:**

**Aris Dwi Intan Aprianti** is a lecturer at STKIP Paracendekia NW Sumbawa. She graduated from the Master of Applied Linguistics and TESOL at Macquarie University, Australia. Her teaching and research specialisation involves Applied Linguistics and English Language Teaching. She can be contacted at arisdwiintana@gmail.com.

**Iwan Jazadi** leads and is an associate professor at STKIP Paracendekia NW Sumbawa. He obtained PhD in Education at the University of South Australia. His expertise includes curriculum and materials development, and Teaching English to Speakers of Other Languages. He is available at iwanjazadi@gmail.com (*Corresponding Author*).