

Evaluating the Chinese-English Translations in Duolingo

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Abstract

Duolingo is a gamified language-learning app that mainly uses grammar translation method. The main weakness of Duolingo method is that Duolingo frequently offers only one acceptable translation, thus restricts the possibility of other variations. This study aims to evaluate the translation accuracy of Duolingo against the students' translations. The participants for this study were 20 Chinese Department students and 15 English Department students at a private university in Jakarta. The materials for testing were a Chinese lesson about sports in Duolingo, which was played in real time in the classrooms. As the focus of this study is on translation, only the translation of full sentences from Chinese to English and from English to Chinese were taken as the data. The translation results were analysed qualitatively to find out the structural and semantic differences between the students' and the Duolingo's translations. The results showed that students' translations are considered incorrect by Duolingo because of their inadequate knowledge of Chinese and English sentence structure and the word-by-word translation technique used. However, some alternative translations are unaccepted by Duolingo since they are not following the standard Duolingo translation. The results imply that Duolingo needs to cater for more variations instead of only accepting one variety as correct.

Keywords: Duolingo; Structure; Translation; English; Chinese.

1. Introduction

Duolingo is the most popular language-learning platform and the most downloaded education app worldwide for learning many languages (Inayah *et al.*, 2020). Duolingo offers 100 total courses across more than 40 distinct languages, from Spanish, French, German, Chinese to Yiddish. However, most of these languages can be learned through English since Duolingo was primarily developed for English-speaking people who want to study other languages. For example, Indonesian people who want to study Finnish should learn that language through English. Thus, English language knowledge is the basic requirement for anyone using the app for learning.

Duolingo was introduced in 2011 by Louis von Ahn and Severin Hacker from Cambridge Mellon University for learning foreign languages (Shortt *et al.*, 2023). Until now, based on 2023 statistics, Duolingo has more than 500 million users, with 74.1 million monthly active users (Dehganazadeh, 2020). This data indicates that Duolingo method is believed to enable people to learn other languages successfully. It is in line with Duolingo's goal: bringing high-quality education to everyone on the planet by harnessing the power of technology (Shortt *et al.*, 2023). Until now, Duolingo is viewed as the most representative gamification in MALL platform (Dehganazadeh, 2020).

The bite-sized language lessons in Duolingo are developed using a grammar-translation method. Duolingo takes an implicit cognitive approach as its learning principle that guides students step-by-step through sequenced tasks, mostly based on translation (Piedrahita, 2024). In its lesson, Duolingo gives a sentence to be translated into a sentence in other languages. For example, when we are learning Chinese, the exercises include translating English sentences into Chinese, or Chinese sentences into English. Learners have to do these translation exercises until all the items are answered correctly. The lessons are given gradually so that it feels like playing a game. Duolingo incorporates some gamification elements to motivate and engage learners (Jiang *et al.*, 2020).

The translations provided by Duolingo were structurally pre-designed from the very simple into the more complex sentences, related to the vocabulary and grammatical structures previously provided. Garcia (2013) stated that some sentences were translated well using word-by-word translations. The translations seem to be following a structural translation strategy, in which sentence constituents in one language are replaced with those in another language (Sakalauske and Leonavičiūtė, 2022). The sample translation is exemplified by in this table:

Table-1. Literal translation

Languages	Subject NP	Verb	Object NP
English	My little sister	likes	traveling
Chinese	Wǒ de mèimei	xǐhuān	lǚyóu

In some languages, simple sentences may have similar structures, so learners can easily fill in the correct translations, based on their knowledge of English sentence structure. However, as they progress, sentences given are more complex and varied, resulting in learners' inability to form correct translations.

The courses in Duolingo expose learners to words and grammar in sentences in the target language, which allow them to infer linguistic patterns by themselves (Jiang *et al.*, 2020). Unfortunately, not many students are able to make correct inference of the sentence structures and the feedback given by Duolingo also lacks grammatical explanations (Margues-Shafer and Orlando, 2018). Consequently, learners often make grammatical mistakes in translation, and this will obstruct the learners' progress in learning that language.

The present study will explore the differences between the students' translations and the Duolingo's translations (from Chinese to English, and vice versa), and whether these differences cause syntactic or semantic errors.

2. Literature Review

2.1. Duolingo Learning Method

When Duolingo was first developed, its founder Louis von Ahn stated in his TED talk, "People really can learn a language with it (with Duolingo, by translating sentences). And they learn about it as well as (with) leading language learning software" (Louis, 2011). With this bold statement, von Ahn emphasized his belief that learning a language can be done by translating sentences from one language to another.

In language acquisition studies, however, translation has gained a bad reputation in foreign language learning and teaching. This method is associated with the Grammar Translation Method which has been applied for centuries in the field of language teaching (Aliyeva, 2024). This method was then gradually replaced by the communicative methodologies in the 1960s. Nowadays, Garcia (2013) mentions that there is a growing number of voices that suggest the introduction of the Grammar Translation method. Garcia (2013) also claimed that the translation method comes back forcefully with Duolingo, and it reclaims its center stage.

The grammar translation method adopted by Duolingo is considered helpful for beginner-level learners (Garcia, 2013). By this method, learners are expected to translate sentences in the target language by memorizing the vocabulary and the grammar structure simultaneously. Learners, therefore, constantly transfer from their L1 (their native or first language) to L2 (the foreign or target language).

In this method, the learners are introduced to a new grammar pattern in sentences which are similar to the ones from the learners' first language (Freeman *et al.*, 2023). Thus, analogy and contrast are used across exercises to expose learners to new grammatical patterns.

Analogy and contrast in translation will work well for beginner level learners. For upper-level learners, the translation will become more challenging. As an illustration, the Direct-Translation method can be successful in the beginner level where the learners only have to translate the words in both languages. However, as the level increases, the learners have to translate phrases and sentences. The complication will arise as the learners should deduce the grammatical construction of the target language by themselves. Complicated grammatical features cannot be fully understood simply by translating a complex sentence in L1 into the one in the target language.

2.2. Duolingo Translation Accuracy

The translation adopted by Duolingo follows what (Baker, 2018) claimed as a grammatical equivalence translation approach. Grammatical equivalence is conducted by comparing the grammar of both languages. Grammar is the set of rules that determine how words and phrases can be combined in a language. Thus, the translation is done by comparing the syntactic structures (the grammatical structure of words, phrases, and clauses) that are allowed in a given language. The syntactic structure of a language imposes some restrictions on the way messages may be organized in that language. Moreover, the order of the functional elements (such as subject, predicate, and object) may be more fixed in some languages than in other languages.

The structural translation method is relatively easier for the learners. They just have to find words that can fill a similar structure. For example, the Chinese sentence "Ta bu shuo Hanyu" which consists of four constituents has the English translation which also consists of four parts: he-doesn't-speak-Chinese. The meaning of a sentence in English depends entirely on which elements are placed (for instance 'the man ate the fish' differs from 'the fish ate the man'). Chinese also have a similar word order to English.

The structural translation adopted by Duolingo requires an accurate rendition of the target language with rigid grammatical rules. As a result, minor mistakes such as missing an article will be considered incorrect. For example, a sentence will be regarded as incorrect if the article "la" in French is translated as "a" or "an" instead of "the". Duolingo gives feedback in the form of correct or acceptable translation, but it does not specify why specific form is acceptable and the other is not. Even though learners can use Duolingo discussion forum, not many users know about this forum and use it (Margues-Shafer and Orlando (2018)).

In terms of translation of vocabulary, Duolingo seems to choose vocabulary on a more general level. Khayrallah *et al.* (2020), found that Duolingo system prefers the less common version of the polysemous words. For example,

the word ‘glass’ is more likely used for ‘drinking container’ rather than ‘eyeglasses.’ Therefore, users are expected to understand sentences in L2 if the meaning of each word is given in L1 (Savvani, 2022).

3. Methodology

3.1. Research Design

The present research paper uses a descriptive qualitative method, which takes the data from test result. This study may be classified as a case study because the number of participants is small and there are a limited number of data to be analysed. This study involves testing the students’ ability to translate from Chinese to English, and from English to Chinese using the Duolingo application in the classroom. The analysis of translation errors is considered qualitative data.

3.2. The Participants

The subjects of the study are 20 Chinese Department students and 15 English Department students at a private university in Jakarta, Indonesia. They are all in their second semester. The Chinese Department students admitted that they did not learn English formally besides the obligatory English lessons during their high school. Similarly, the English Department students had not learnt any Chinese in their previous education.

3.3. Data Collection Procedure

The test materials were taken from Duolingo Chinese lesson unit 19 level 2 about sport. Duolingo lessons consist of various test types, however, since this paper focuses on translation, only translation test items were taken.

To get the data the researcher played a Duolingo lesson using the computer where the test items were projected onto the classroom’s whiteboard. Simultaneously, the students write their answers on a sheet of paper. The test items in Duolingo lessons are always changing even though we are learning about the same topic, therefore the test materials cannot be pre-selected and prepared beforehand. The tests for this study were carried out twice, one for the Chinese students and one for the English students. From these two tests, 15 sentence translation items were selected to be analyzed further. The tests consist of 7 English to Chinese translation and 8 Chinese to English translation. The test items can be seen in the table below.

Table-2.. Sentence Translation Data

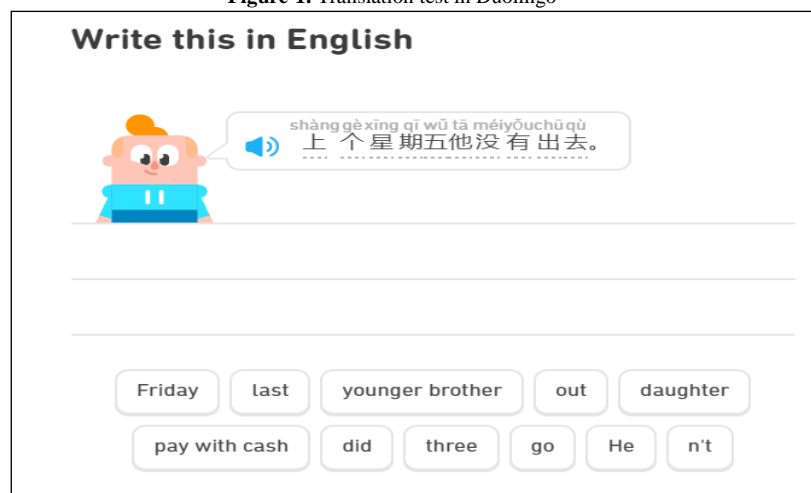
Translation	Groups	English	Chinese
English to Chinese	Chinese students	I’m sick, I cannot attend your party	Wǒ shengbingle, bùnéng cānjiā nǐ de paidui 我生病了，不能参加你的派对
		They lost, I am very disappointed	tamen shule, wo feichang shiwang 他们输了，我非常失望
	English students	Come on faster	kuai yidianr, 快一点儿
		My younger sister runs every night	Meitian wanshang wo de meimei paobu 每天晚上我的妹妹跑步
		Who plays soccer the best?	shei ti zuqiu ti de zuihao? 谁踢足球踢得最好"
		I don’t want to go out this weekend	Zhège zhōumò wǒ bùxiǎng chūqù 这个周末我不想出去
		I play soccer for two hours every Wednesday.	mei ge xing wu wo liǎng gè xiǎoshí ti zúqiú 每个星期五我两个小时踢足球
Chinese to English	Chinese students	We are confident that we will win this match	Women you xinxin hui ying zhege bisai 我们有信心会赢这个比赛
		Is this the second time you come to China?	这个是你第二次来中国吗？ zhege shi ni di er ci lai zhongguo ma
		Today we have a match, luckily it is not raining	今天我们有比赛，好在没有下雨 jintian women you bisai, haozai meiyou xiayu
		playing volleyball is my favorite sport	打排球是我最喜欢的运动 da paiqiu shi wo zui xihuan de yundong
	English students	He didn’t go out last Friday	shang ge xing qi wu ta meiyou chuqu 上个星期五他没出去
		Last Wednesday I went running	Shàng ge xingqisān wǒ hé nǚ péngyǒu

		with my girlfriend	yīqǐ qù pǎobù 上个星期三我和女朋友一起去跑步
		I want to go swimming tomorrow evening	míngtiān wǎnshàng wǒ xiǎng qù yóuyóu 明天晚上我想去游泳
		Riding horses is her favorite sport	Qímǎ shì tā zuì ài de yùndòng 骑马是她最爱的运动

4. Results

In Duolingo translation test type, the instruction is written in bold "Write this in English". Then the avatar of Junior (or any other avatars) pronounces the Chinese sentence (by clicking the speaker icon), which is written in Pinyin as well as the Chinese characters. Similarly, for Chinese to English translation, the instruction is : Write this in Chinese. The blank space is given to drag the words that will constitute the answer. The translation is given in the form of jumbled English or Chinese words. The number of words given is usually more than the number of words needed for the answers. Therefore, users need to be able to choose which words are needed and arrange the words to form grammatical sentences in the target language. The sample of the translation test in Duolingo is shown in the following figure.

Figure-1. Translation test in Duolingo



4.1. English - Chinese Translation

There are seven English sentences that should be translated into Chinese. Duolingo offers the correct translation for each sentence. Therefore the students' translations were compared against the Duolingo translations. English and Chinese students made different mistakes when translating these sentences. To illustrate the structural differences found in the translations, four sentences were discussed below.

Data 1: Chinese Student Translation 1

English : They lost, I'm very disappointed

Chinese : Tāmen shūle, wǒ fēicháng shīwàng 他们输了，我非常失望。

The grammatical meaning of "le" is "the occurrence or completion of an event ". It is the main and most basic function word and should be introduced first in teaching Chinese as a foreign language. However, it should be noted that although it is very similar to the past tense in English, "了" is only used for "events" and not for "modality". This is something that must be specially mentioned in teaching Chinese as a foreign language. As for what "complete" means, Chinese people have a sense of language and are familiar with the various uses of "le", so they generally do not think too much about the true meaning of "complete". However, this concept is very important for foreign students to learn the word "le". Since the actions in sentences using "le" often occur before speaking, it is easy for foreign students to mistakenly associate "complete" with the past tense and think that the "completed" action has ended. 了 at data 1 sentence describes an event that happened in the past and thus acquires a simple past tense form in the English translation (Wang, 2018). Yet, Chinese students still forget this rule. Thus, most of the errors happen because of missing the word 'le'.

Data 2: Chinese Student Translation 2

English : I'm sick I can't attend your party

Chinese : Wǒ shēngbìng le, bùnéng cānjiā nǐ de páiduì 我生病了，不能参加你的排队

Besides indicating tenses, 'le' is also used after adjectives such as 'shēngbìng' (sick). The errors in this sentence are also caused by missing the word 'le'. Additionally, since the English sentence is in the present tense (I'm) some students also add the word '正在' (zhèngzài: currently) in the translation. 正在 indicates that the action started at an uncertain time in the past and is still in progress at the time of speaking, emphasizing the current situation and

expressing the "present tense" (Savvani, 2022). Students do not have enough understanding of the difference between 了 and 正在 so they use the word 正在 to replace the word 了.

Data 3: English Student Translation 3

English : My younger sister runs every night.

Chinese : Meitian wanshang wo de meimei paobu 每天晚上我的妹妹跑步

English students are not familiar with the Chinese sentence structure. Thus, even though the meaning of each word is provided in Duolingo, they often fail to construct a grammatical structure. English sentences typically follow Subject-Verb-Adverb pattern as shown in this sentence. Therefore, they mostly translate it into 'wo de meimei paobu meitian wanshang', which is incorrect in Chinese, which often places the time phrase (meitian wanshang) at the beginning of the sentence following the Time-Subject-Verb pattern.

Despite their structural differences, both sentences the same information. The Chinese sentence starts with the time phrase (每天晚上), immediately setting the context, while the English sentence places the adverbial phrase at the end for emphasis on the activity. However, in Duolingo, following the English structure is considered incorrect.

Data 4: English Student Translation 4

English : Who plays soccer the best?

Chinese : shei ti zuqiu ti de zuihao? 谁踢足球踢得最好

The English question contains a superlative form (the best), which directly modifies the verb (play soccer). In Chinese, superlative form is constructed by repeating the verb 'kick' (踢ti) followed by the superlative marker 得 (de), and then the superlative adjective 'best' (最好 zuihao). This construction of superlative form is unique to Chinese. Literally the Chinese sentence can be translated as "who-kick-football-kick-of-the best". Using the verb "kick" (踢ti) twice may seem redundant but it is necessary for correct grammatical structure. The first verb describes the action (kick soccer), the second one introduces the quality of the action (kick the best). Because of the differences in superlative form, many English students made erroneous translations such as 'shei tizuqiu zui hao' or 'shei zui hao tizuqiu', which are the straightforward translations of the Chinese sentence.

4.2. Chinese to English Translations

There are 8 sentences that should be translated from Chinese to English. For Chinese students, translating to English is not too difficult for them since they have already learnt English since Elementary School. At least, Chinese students still retain some knowledge of English that enable them to provide the correct translations. Similarly, English students, who have not learnt Chinese before were getting advantages from their knowledge of English syntax and grammar. By knowing the structural patterns of English, they were able to provide correct translation. However, some problematic sentences for both groups are discussed here.

Data 5: Chinese Student Translation 5:

Chinese: Wǒmen yǒu xìnxīn huì yíng zhège bǐsài 我们有信心会赢这个比赛

English: We are confident that we will win this match

In this sentence, the noun phrase 'yǒu xìnxīn' (have confidence) is translated into adjective phrase (are confident). For this sentence, 13 students made correct translations. Yet, their errors were not caused by the structure. Instead, they made mistakes by translating 'bǐsài' into 'game match' or 'competition', which are unacceptable by Duolingo. However, this translation can actually be acceptable because *bǐsài* can also be competition. In this case, the word choice given by Duolingo is limited so that the correct translation is considered incorrect. In other words, Duolingo's translation can sometimes be unreliable to get the equivalents for Chinese to English sentences.

Data 6: Chinese Student Translation 6

Chinese: Zhège shì nǐ dì èr cì lái zhōngguó ma? 这个 是你第二次来 中国 吗

English: Is this the second time you come to China?

In Chinese, yes-no question is formed by adding particle 'ma' at the end of the declarative sentence. It functions like tag question in English. Chinese students mostly know that a yes-no question in English is formed by putting the auxiliary at the beginning, so they all begin their sentences with "is this (the) second time...? The errors occur in the last part 'you come to China', which was written as 'you come China', 'you second time come to China', or 'second time come China'. These errors occur because of their unfamiliarity with word order in English sentence and its word form. Moreover, it will be incorrect if they translate the sentence into 'the second time you coming'. The lack of possible acceptable translations becomes one of Duolingo's weaknesses (Sakalauski and Leonavičiūtė, 2022).

Data 7: English Student Translation 7

Chinese : Qímǎ shì tā zuì ài de yùndòng 骑马是她最爱的运动

English: Riding horses is her favorite sport.

The Chinese sentence consists of a verb phrase (Qímǎ – ride horses), verb (shì – is), noun phrase (tā zuì ài de yundong – her most loved of sport). This is translated literally into English as 'Riding horses is her favorite sport'. Generally the structure is similar in two sentences. There are two differences, however. The first is on the subject position. In Chinese the verb phrase (qi ma) can function as the subject without any modification, but in English the verb phrase should be changed into a noun phrase by changing the verb into a gerund form, thus it should be 'riding horses' instead of 'ride horses'. Secondly, the formation of the noun phrase 'her favorite sport', in Chinese it should consist of pronoun "ta", adjective phrase "zui ai", linking word "de" and noun "yundong", which is quite

complicated for English students. But, since this is a Chinese to English translation, the students can arrange the jumbled words into the correct translation.

Data 8: English student translation 8

Chinese: 上个星期五他没有出去" (shang ge xing qi wu ta meiyou chuqu)

English: He didn't go out last Friday

In Chinese, time expression is placed at the beginning of the sentence to emphasis when the action happened, but when it is translated to English, time adverb can be placed at the end of the sentence. Structurally, the students have no difficulty in placing the time adverb in English. The adverb of time in English has a variable position. It can be placed before the subject, or at the end of the sentence. On the other hand, in Chinese, the adverb of time cannot be positioned at the end of the sentence. Because of this placement difference, some students made translation errors that are unacceptable by Duolingo. Duolingo in this case only offers the standardized translation with a limited choice of sentence structure. Therefore other possible translations that are not within the Duolingo standard are not considered correct.

5. Discussion

The comparison of English and Chinese sentences provided in Duolingo shows how even seemingly straightforward translation can reveal the nuanced differences in grammar and syntax between the two languages. It exemplifies the linguistic flexibility and distinct logical structures present in English and Chinese.

From the exercises used in this study, the participants (either the English or Chinese students) commonly made translation errors because of the structural differences between English and Chinese.

1. The placement of Time Phrase.

In Chinese, the time phrase typically comes at the beginning of the sentence to set the context. For example, 上个星期五他没有出去 (shang ge xing qi wu ta meiyou chuqu) — "Last Friday he didn't go out". In contrast, in English the time phrase often appears at the end of the sentence, but it can also be placed at the beginning. Therefore, the sentence "He didn't go out last Friday" or "Last Friday, he didn't go out" is acceptable.

2. Subject-Verb-Object Order.

Both English and Chinese sentences frequently follow a Subject-Verb-Object order. However, when there is a time phrase, Chinese requires a time phrase to be placed before or after the subject. For example, 每天晚上我的妹妹跑步 (Meitian wanshang wo de meimei paobu) — "Every night my younger sister runs". This fix position usually causes troubles for English students, as English allows variable positions for time phrase.

3. Incorrect use of 'le' 了.

Particle 'le' is problematic even for Chinese students. 'le' can be used to emphasize as in 我 生病了 (wo shenbing le - I am sick). In English, the word 'le' is not translated. JIN (2019), stated that 'le' is one of additional words in Chinese that strengthen the sentence. In poetry, such words appear repeatedly at the end of every sentence to display musical sound and rhythm in the source language.

4. Adjective placement

In English, adjectives, including superlatives, precede the nouns they modify. For example: "her favorite sport", "the best book". In Chinese, conversely, the superlative is formed by placing the superlative form, followed by "的" (de) to link to the noun. Thus the translation of "her favorite sport" is 最爱的运动 (zui ai de yundòng) — "most loved sport."

5. Literal or word by word translation

According to Umesh and Gupta (2022) it is not always easy to get an appropriate Chinese character corresponding to each English word of the same part of speech. For example, this English sentence "we (noun) are (aux verb) confident (adjective) that (pronoun) we (subject) will (aux verb) win (adjective) this (determiner) match (noun)". If it is translated literally into Chinese using the same part of speech, it will become unintelligible like this: "women (noun) shi (aux verb) xinxin (adjective) - (pronoun) women (subject) hui (aux verb) ying (adjective) zhege (determiner) bisai (noun)". The acceptable translation is "Women you xinxin hui ying zhege bisai 我们有信心会赢这个比赛". In Chinese it is possible to delete the second subject (women), but in English the subject in the subordinate clause is necessary.

Conclusion

The present study was set out to find out the differences between students' and Duolingo's translations of Chinese and English sentences in Duolingo app, a mobile language learning platform.

The findings of this study show that in the English to Chinese translations, students' translations were considered incorrect because of several reasons such as their inadequate knowledge of the use of the grammatical particle 'le' and the positioning of the adverb of time. On the contrary, in Chinese to English translations, errors occur because of the placement of the adverb of time, word ordering of questions, and word by word translation.

However, in some cases, the students' translations can actually be considered correct as they convey the same meaning. These results imply that there are other possibilities of acceptable translations beside those specified by Duolingo.

We noticed several things regarding Duolingo translation exercises. First, the heavy reliance on translation exercises can lead to a simplistic understanding of the target language. Moreover, Duolingo often provides only one

version of a correct translation, which can be limiting. In real life, multiple translations can be correct as long as the message is conveyed across languages. Finally, the grammar concepts in Duolingo are introduced gradually, and the explanations are brief and lack depth. These things can be challenging for learners who need a more comprehensive understanding of grammar rules and structures of the target languages.

This study is limited in terms of the number of participants and test materials that we cannot achieve the generalizability of the results. For future research, the number of participants and test variabilities can be significantly increased to represent a wider learners' demography and to increase the validity of the assessment.

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