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# USING GOOGLE DOCS TO ENHANCE STUDENTS' COLLABORATIVE TRANSLATION AND ENGAGEMENT

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## ABSTRACT

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| Aim/Purpose | This study investigated the integration of Google Docs in facilitating undergraduate students' interactional collaboration in an online translation course. The study also explored the engagement patterns that emerge when students use Google Docs and evaluated their experience of using this platform in collaborative translation. |
| Background | Integration of technology in specialized English translation classes has become crucial to empower students with the required skills in the labor market. However, students might perceive specialized translation as a tedious and difficult process and become reluctant to engage in translation classes. Few studies have investigated students' performance and engagement aspects in online collaborative translation contexts. |
| Methodology | This study employed a mixed-method approach. Multiple sources of data were collected from translation tests, an engagement questionnaire, semi-structured interviews, and students' interactions on the online platforms. Ninety-three students majoring in business administration were purposefully assigned into a control group and two experimental groups. Throughout six weeks, students in the first experimental group collaborated on translation assignments via discussion forum boards on a Learning Management System (LMS), whereas students in the second experimental group used Google Docs to complete three translation assignments. Control group students completed the same assignments individually. |
| Contribution | This study contributes to the previous body of knowledge in the field of collaborative learning, translation, and educational technology by exploring the effectiveness of using Google Docs in improving students' collaboration and engagement in a specialized translation course. |
| Findings | One-way ANOVA for the translation post-tests showed a statistically significant improvement in the overall translation performance and translation sub- |

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| | skills of the experimental group who used Google Docs compared to the control group and the experimental group who interacted through discussion forums. Descriptive statistics of the engagement questionnaire revealed a significant statistical increase in the Google Docs group's behavioral, cognitive, and affective engagement. Content analysis of the qualitative data showed that students engaged behaviorally by giving and receiving feedback both at the global and local levels and cognitively through questioning, giving constructive comments, and justifying arguments. Students also engaged effectively and expressed positive feelings when collaborating online. Moreover, students reported the usefulness of using Google Docs in the collaborative translation process and expressed their satisfaction and confidence. |
| Recommendations for Practitioners | Practitioners should use collaborative technological tools to upgrade translators' skills and increase students' engagement. |
| Recommendations for Researchers | It is recommended that researchers compare students' engagement in different learning modalities and explore the relationship between students' translation competence and their engagement level. |
| Impact on Society | The society of specialized translation will be improved by implementing innovative pedagogical techniques in teaching and training translators. This research can raise awareness of the importance of online tools in exchanging learning experiences inside and outside the academic contexts. |
| Future Research | Future studies should explore the impact of implementing web/computer-based tools in the collaborative translation of different genres and various languages. |
| Keywords | Google Docs, collaborative translation, engagement, specialized translation |


## INTRODUCTION

Collaborative learning stems from the principles of sociocultural theory and the constructivist approach. Lawrence and Wah (2016) pinpoint that the term "collaboration" is generated from Vygotsky's (1978) theory of social development. According to Vygotsky (1978), cognitive development is the result of learners' interaction during collaborative activities to advance their Zone of Proximal Development (ZPD); the difference between what a learner can achieve individually and what he/she can attain due to guidance provided by more capable skillful peers. Yu and Lee (2016) highlight that the interaction between teachers (experts) and peers and the interaction among peers constructed learners' ZPD. Hence, it is vital to engage students from different ZPDs in collaborative dialogue and provide them with interactive tools to promote their student-centered learning.

Likewise, Wood et al. (1976) coined the scaffolding concept as the process of assisting other learners through dialoging interaction to achieve a particular task by providing gradual and contingent scaffolding. Collaborative learning contexts involve students' interaction in activities that require peer feedback, communication skills, and problem-solving. Web 2.0 applications like Google Docs provide students with platforms that encourage them to collaborate and share text documents. Google Docs, as a collaborative web-based version of Microsoft Word, provides users with multiple scaffolds that allow them to create and edit documents synchronously and asynchronously (Faulkner, 2019). In collaborative language learning situations, learners interact actively via web-based real-time platforms to share and construct linguistic knowledge and social skills. This process encourages students to ask questions, provide suggestions, request clarifications, and give collective knowledge (Sousa et al., 2019). The more that students engage in developing and evaluating their learning experience, the more they enhance responsibility for their learning (Holmes, 2012).

It becomes critical in today's digitally interconnected world to empower students with 21st-century skills to be able to compete in the workforce. Being one of the significant 21st-century skills in the workplace nowadays, collaborative online translation is gaining momentum. However, collaborative translation is a challenging process that needs creative efforts from translators (Kiraly, 2012). Thus, students in translation training programs and specialized translation courses fail to sustain their motivation and engagement in translation classes, which negatively affects their translation performance (Liu & Yu, 2019). Kargar et al. (2012) note that collaborative translation tasks in which students engage in peer feedback enhance their pragmalinguistic and sociopragmatic knowledge. Research on students' engagement with translation feedback has found that feedback promoted students' translation quality, active learning, and reflective practice (Washbourne, 2014). However, exploring students' interaction patterns in collaborative translation remained unexplored.

Hence, it is critical to investigate the effect of using web-based platforms such as Google Docs on students' translation quality in online collaborative translation settings. Additionally, the patterns of engagement when using Google Docs in collaborative translation and students' perception of this experience have not yet been explored. Therefore, the current study addressed this gap in the literature by identifying the role that Google Docs plays in upgrading students' translation quality when collaborating on translation tasks. The study also sought to investigate the engagement patterns that students demonstrate while collaborating on translation tasks using Google Docs. Finally, the study explored students' perception of their engagement and their attitude towards using Google Docs in collaborative translation.

## REVIEW OF LITERATURE

This section discusses the concept of collaborative translation, the definition and the importance of students' engagement, the studies that investigated engagement in collaborative translation, the applications of Google Docs in promoting students' translation, and the significance of using Google Docs in developing students' engagement. The section concludes by describing how this study addressed a gap in the literature of collaborative translation and students' engagement and broadened the understanding of the role of using a collaborative tool such as Google Docs in enhancing collaboration and engagement.

### *COLLABORATIVE TRANSLATION*

"Collaborative translation" is used to describe a multi-participant translation activity that is based on social networks. According to O'Brien (2013), collaborative translation is how translators work together to translate one product as collaborative translation. Pym (2014) notes that collaborative translation must be participative, volunteer, and user-generated. The term has been associated with other terms, such as community translation, social translation, volunteer translation, fan translation, and crowdsourcing. In educational settings, Thelen (2016, p. 254) states that collaborative translation "refers only to the activity of producing a translation, which can be done in groups of students as small as two students, but also in whole classes. Collaborative translation can be considered an instantiation of collaborative learning." Therefore, collaboration in translation indicates negotiation, discussion, and mutual agreement of participants who interact to translate one project or task. This interaction can be between human-human or human-machine. In this study, collaborative translation is defined as a collective activity of students working in groups to translate business articles and edit the target translation asynchronously and synchronously using Google Docs.

According to Al-Tuwayrish (2016), there are four kinds of translation: Human Translation (HT), Machine Translation (MT), Machine-Aided Human Translation (MAHT), and Human-Aided Machine Translation (HAMT). Except for the first type, the translator depends on software to translate a text from one language to another. A Human-Aided Translation Machine, a subtype of Machine Translation, depends on a machine translating the source text. The translator interacts with the software in the pre-editing and post-editing stages. In the pre-editing stage, the translator analyzes the text and

anticipates any linguistic problems. The translator in the post-editing improves the target translation quality and solves any ambiguities (Hedden, 1992-2010). The present study tackled Human-Aided/Assisted Machine Translation in which students collaborated online using Google Docs during the pre-editing and post-editing stages of the translation process.

## *Students' Engagement*

Engagement indicates how students participate in learning activities and embrace their attitudes to learning and responding (Zhang & Hyland, 2018). Thus, it refers to students' level of interest, interaction, and willingness to utilize language skills and learning strategies to achieve the learning outcomes. Learning engagement involves three domains: behavioral, affective, and cognitive. Zhang and Hyland (2018) define behavioral engagement as learners' behavioral response to feedback regarding feedback update and revision acceptance. While affective engagement includes learners' attitudes, emotional perception, and judgment, cognitive engagement refers to using mental effort and learning strategies to enable learners to revise the task based on the feedback.

Kim (2013) asserts that few studies have tackled students' engagement cognitively in online platforms, while the majority focused on investigating students' behavioral interactions. Research tackling engagement has focused on investigating the relationship between students' behaviors and their academic achievement (Yu et al., 2018; Y. Zheng et al., 2020). Y. Zheng, et al. (2020) note that students' engagement is a multi-dimensional process in which all aspects interact. Students' feelings impact revision behaviors and cognitive strategies in the feedback process. Likewise, Xu and Yu (2018) conducted action research with tertiary business students in China to develop their engagement in peer feedback writing projects through Computer-Mediated Communication (CMC) feedback. Interviews, written feedback, questionnaires, observations, and document analysis, were utilized to collect data. Findings showed that CMC feedback proved to be effective in enhancing students' engagement in peer-feedback activities.

A plethora of studies have investigated students' engagement in collaborative tasks (Saeed & Al Qunayeer, 2020; Woodard & Babcock, 2014). For example, Sousa et al. (2019) conducted a case study to determine the factors influencing students' interactions in a collaborative activity. They also explored students' perceptions of this experience. With the help of questionnaires, audio recordings of students' interactions, and interviews, the researchers found that dialogic interactions and mutual support enhanced students' autonomy. Using interviews, stimulated recalls, revised drafts, audio-recorded feedback conferences, and written feedback, Yu et al. (2018) collected data to examine the three aspects of academic writing engagement. Three master students at Macau University collaborated in peer feedback on drafts of their thesis. The results revealed that the three aspects of engagement were dynamic and interconnected. The affective engagement was found to be effective in influencing behavioral and cognitive engagement.

In online platforms, Morse (2021) points out that engaging students in online discussion forums have been an effective tool to support student-to-student collaboration in asynchronous settings. However, students' interaction through threaded discussion boards on LMS might lack meaningful contributions. If students do not reply to their peers' posts, they will miss the opportunity of engaging actively in learning. According to Gao et al.'s (2009) Productive Online Discussion Model, students discuss to comprehend, critique, construct, or share knowledge. Therefore, it is critical to explore the quality of students' collaboration and engagement in online platforms.

## *Engagement in Collaborative Translation*

Prieto-Velasco and Fuentes-Luque (2016) claim that students' motivation and self-confidence increase when they actively participate in authentic projects, and so do their translation competence. Similarly, Kiraly (2012) believes that translators' skills improve by engaging with peers and profes-

sional translators in meaningful interaction in authentic translation tasks according to the socio-constructivist approach to translator training. In this collaborative environment, web-based platforms serve as pedagogical scaffolding that facilitates interactions among participants and provides teachers with a record of dialogues and communications to identify behavior patterns. Kiraly (2012) has proposed a model for authentic, collaborative translation to promote translation skills by encouraging collaborative project-based translation. The teacher's role, in this case, includes organizing and encouraging students to engage in collaborative projects. Students exert effort to resolve translation problems during this collaborative experience and use proper techniques to promote their engagement and autonomy.

Few researchers have explored the effect of collaborative translation on students' translation performance and engagement. In their case study, Y. Zheng et al. (2020) explored Chinese undergraduates' engagement with teacher feedback on translation tasks. After analyzing data gathered from students' drafts, observations, interviews, and stimulated recalls, it was found that acceptance of feedback depends on teachers' beliefs and practices and students' individual behavioral and cognitive factors. Moreover, Yang et al. (2016) investigated the impact of the online cooperative translation in a specialized translation course at a college in China on EFL students' interaction and self-efficacy. The researchers used a questionnaire, interviews, content analysis of students' discussions, and a test. The results showed a significant improvement in students' interest and self-efficacy. It was also found that students' levels of engagement correlated positively with their self-efficacy in translation.

In the current study, students' engagement in collaborative translation situations was defined as the student's interaction in translation projects manifested in behavioral, cognitive, and affective aspects. Cognitive engagement entails students' mental effort and implementation of learning strategies in translation tasks. Behavioral engagement indicates students' willingness to interact with peers to complete the translation projects. Additionally, affective engagement is conceptualized in students' attitudes and emotional reactions to collaborate on translation tasks, whether positive or negative.

## *Google Docs in Collaborative Translation*

Google Docs has been used recently to translate documents from one language to another collaboratively. Users can import existing translation documents or create new ones to be edited and translated, so all users can edit and see the changes and revisions at the same time (Sofyan & Tarigan, 2016). Sudrajat and Purnawarman (2019) note that after creating a document, the owner of Google Docs can invite viewers or collaborators to "edit," "comment," and "view" the document. Any changes are saved automatically to the drive, and the document can be downloaded in different formats and all activities done by editors can be easily tracked.

Sudrajat and Purnawarman (2019) conducted a study to explore the effect of using Google Docs on undergraduates studying a specialized translation course at a university in Bandung. The findings showed that students perceived the use of Google Docs in translation class positively. Likewise, Pavlović and Hadžiahmetović Jurida (2019) examined the effects of in-class collaborative translation on university students' translation competence. The results showed that participants' translation abilities, autonomy, and social skills had improved.

## *Google Docs and Students' Engagement*

Google Docs has encouraged creativity, communication, and knowledge sharing among students (Sudrajat & Purnawarman, 2019; Woodrich, & Fan, 2016). The features of comments, track changes, and suggestions, enable users to communicate while keeping ownership over their work (Ebener, 2017). Google users engage in authentic group activities by editing documents synchronously and asynchronously where changes are automatically saved and easily tracked. There is a significantly growing interest to explore the impact of Google Docs on engagement. Morse (2021) compared

threaded discussion boards on the Desire2Learn platform to Google Docs for asynchronous collaboration in an online course. The researcher noticed an improvement in Google Docs students' quantity of discussion by 68% when compared to LMS discussion forums. Concerning quantity of engagement, students in Google Docs shared experiences and strategies more than their counterparts in the LMS discussion board group. He highlighted that revision history and track change were useful features in Google Docs to trace students' interactions. Furthermore, Alharbi (2019) used Google Docs with 10 Saudi university students in his qualitative case study. Through observations, analyzing students' comments and revisions, and interviews, he found that Google Docs facilitated micro and macro feedback from teachers and peers. Content analysis of students' comments showed variety in feedback type given by peers and instructors. Generally, students had positive attitudes towards using Google Docs. Likewise, Faulkner (2019) investigated the impact of using Google Docs in increasing secondary technical school students' collaboration, interpersonal engagement, and writing. The results of the interviews and focus group discussions with eight students and two teachers showed that Google Docs was perceived as an effective tool to promote collaboration and engagement.

Moreover, Steinberger (2017) investigated students' use of Google Docs synchronously to identify aspects of collaborative tasks and their perception of this experience. Analysis of revision and comments and a post-activity survey showed students' active engagement in the collaborative tasks. The focus of peer feedback was on the content and languaging, which promoted their language awareness. Collaboration was found to be a basic pattern to solve the tasks. Similarly, Al-Chibani (2016) used questionnaires to examine students' motivation and engagement after using Google Docs collaboratively in writing projects. Quantitative data analysis revealed that students' engagement, writing, and communication skills had developed. They also perceived Google Docs as user-friendly.

Based on this review, it is apparent that few studies have investigated the effect of using Google Docs on students' translation in collaborative settings (Hadžiahmetović Jurida, 2019; Sudrajat & Purnawarman, 2019). Both Sudrajat and Purnawarman (2019) and the present study evaluated students' experience of using Google Docs in collaborative translation tasks. However, none of the existing research has examined the impact of Google Docs on translation quality and the engagement patterns that students demonstrate when collaborating on translation tasks. To investigate the patterns of engagement that emerge during collaborative translation, this study used instruments similar to those utilized by researchers in the previous studies (e.g., questionnaires, interviews, and content analysis of students' comments). To that end, the present study compared students' engagement in the threaded discussion boards on LMS to their engagement while using Google Docs in online translation assignments. Therefore, the present study addressed the following research questions:

1. How did students' translation quality change after using the online platforms (Google Docs and discussion forums on LMS)?
2. How did students perceive their engagement after the experiment?
3. What were the engagement patterns that emerged as a result of students' online collaboration on translation assignments?
4. How did students perceive the experience of using Google Docs in online collaborative translation?

The next section explains the context of the study, the research procedures, and the data collection methods.

# METHODS

## *CONTEXT AND PARTICIPANTS*

During the second semester of the academic year 2019/2020, 102 business major freshmen registered in the Business Specialized Translation as an elective course at Sadat Academy for Management

Sciences in Egypt. This course aimed to develop specialized translation competence for business administration majors. Students studied the terminology in the business field and were trained to translate from English to Arabic and vice versa. However, the study focused only on translation from English to Arabic due to the limited study duration. The course was initially taught face-to-face, but when Covid-19 hit, the course shifted to an online distance course.

Participants of this study were 93 undergraduates who completed the required translation assignments. The researcher assigned them purposively into a control group (33 students), and two experimental groups (30 students each) based on their familiarity with Google Docs. Thus, students who had previous experience of using Google Docs were assigned to the experimental group (GD), while students who hadn't used Google Docs before were placed in the control group (CG) or the second experimental group (Discussion Forums; DF). To homogenize the participants, the language proficiency of the students who took part in this study was between B1 and B2, according to the Oxford Online Placement Test (www.oxfordenglishtesting.com). Among the 93 students, 51 were males (54.8%), and 42 were females (45.2%). The students' average age was 18.97. They were bilingual (Arabic-English) who were native speakers of Arabic. All participants completed a consent form to indicate their willingness to take part in this experiment.

## *Research Design and Procedures*

This study adopted a mixed-method approach with two experimental groups and one control group. This method suited the study's aims as the researcher gathered the quantitative data from tests and questionnaires to explore students' translation performance and perception of their engagement in collaborative translation. She also collected qualitative data through content analysis of students' interactions on discussion forums and Google Docs, and semi-structured interviews to investigate students' engagement patterns and the potentials of using Google Docs in collaborative translation. Figure 1 describes the experimental design and the data collection methods of this study.

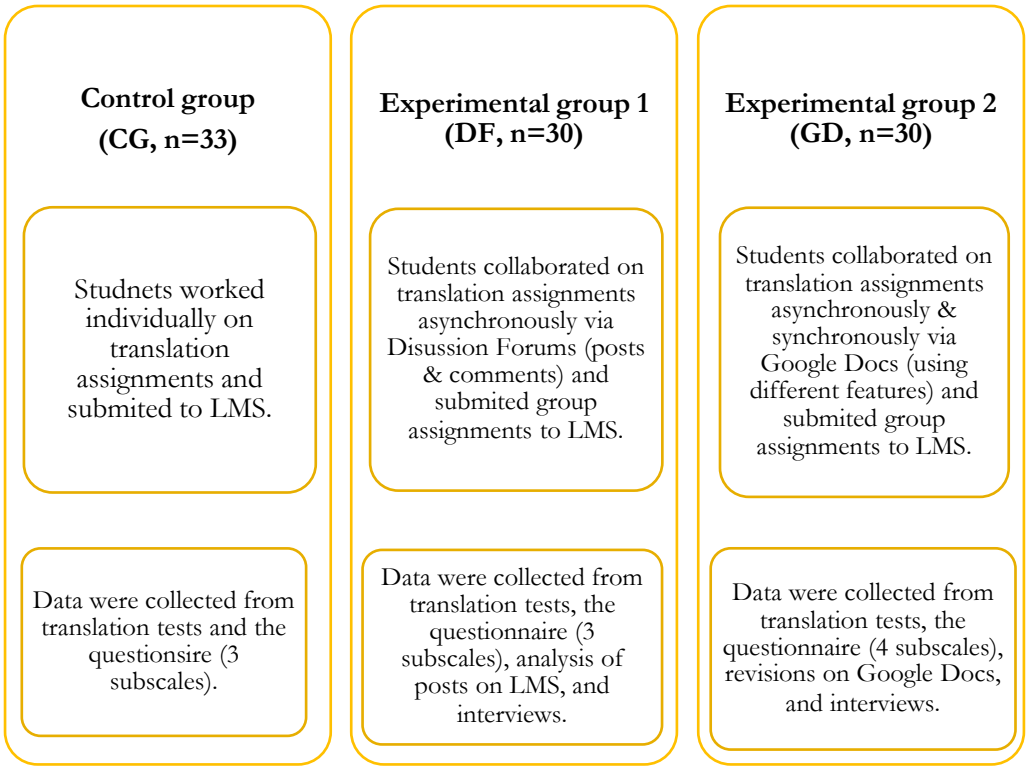


**Figure 1. Research design and data collection methods**

The study duration was six weeks, from March 15 to April 30, 2020. The researcher taught the three groups via Zoom for two hours twice a week. Students of the control group (CG) were instructed to submit individual translation assignments, whereas students in the experimental group who used threaded discussion forums (DF) were assigned into six groups of five and were oriented on using the discussion forum boards in Moodle, the Learning Management System of the Academy. Through discussion boards, students collaborated on translation assignments by posting comments and replying to peers' revisions on the translation assignments. Furthermore, the second experimental group (GD) was oriented on using Google Docs to collaborate on translation projects. Students in this experimental group were assigned to six groups of five and asked to collaborate using Google Docs.

The researcher assigned DF group students into fixed groups on Moodle then created a single simple discussion for each group for every assignment so only members in this group can collaborate asynchronously on translation assignments. These posts started with the source text to be translated and students could reply and attach files. This kind of discussion forum was the best to keep a discussion focused since only members of the same group could see the posts and interact with their peers. The researcher activated the forced subscription mode to allow participants to receive notifications via email of new posts to discussions. Each translation assignment had a separate discussion forum created by the researcher with the title of the assignment and the number of the group. Although students had the option to attach files, they agreed to post the target translated texts in posts rather than files to avoid technical issues encountered in downloading and uploading files.

Additionally, students in the GD group were asked to comment, use track changes, do direct revisions, or annotate to improve the quality of the translated texts. The researcher created a separate Google document for each translation assignment and asked students in their groups to collaborate on these documents, which can be only accessed by members of the group. All Google Docs were saved to a folder carrying the name of the course. Moreover, students in the GD group followed a three-stage collaborative translation process. In the first phase, students collaborated synchronously to analyze the texts and check unknown words or terminologies. In phase two, students collaborated either synchronously or asynchronously to translate the source texts using Google Docs. The third stage took place asynchronously to edit the translated texts by using comments, annotation, and track changes to produce the first draft.

The researcher provided feedback to the control and experimental groups on translation drafts, and they had to revise their drafts to formulate adequate final translations. The groups were assigned the same translation articles which were all business-related of medium difficulty and length (700-1000 words). Students in the three groups were required to submit a translation assignment every two weeks via Moodle. While each student in the control group submitted a total of three translation assignments, students in the experimental groups turned in three collaborative assignments from each collaborative group.

## *Data Collection*

Data of this study were collected from multiple sources. Translation tests were utilized to gather quantitative data from the three groups to examine their translation performance before and after the treatment. A questionnaire was also used to collect quantitative data about the perceived engagement of the three groups after the online course. Qualitative data were collected from analyzing students' revisions and feedback through posts to discussion forums on the LMS and comments and track changes via Google Docs. To get a deep understanding of students' engagement while collaborating using the two web-based platforms, the researcher conducted semi-structured interviews with the experimental groups.

### Translation tests

The researcher created two equivalent forms of translation tests to be conducted as a pre- and post-tests to evaluate students' translation quality. The pre-test was conducted to examine the homogeneity of the groups regarding translation proficiency before the experiment, while the post-test assessed participants' improvement in translation after the experiment. Each test contained three short texts (average 300 words each) of medium difficulty to be translated from English to Arabic. The source texts included from 60 to 75 specialized terms in business, commerce, and human resources. The tests were uploaded to the LMS, and the students took them online. The total score of each test was 75, in which each text is graded out of 25. Two assessors – the researcher and another instructor – graded the tests with the help of an assessment scale adapted from Dadour et al. (2014, p.103), which comprised five sub-skills: overall quality of target language, specialized content and terminology, overall comprehension and meaning, target mechanics, and register and style. Each subskill was graded out of 5. The pre-test was administered to the study participants before the orientation session, whereas the post-test was carried out after the last session.

To check content validity, the researcher submitted the tests to a jury of three EFL professors to review them. She made necessary modifications by, for example, shortening the length of some passages. The test-retest reliability method was used by piloting the test twice on a sample of 39 first-year students in Sadat Academy rather than the present study participants. The Pearson correlation coefficient equaled 0.9, which showed high reliability. The optimum time for answering each test was 60 minutes.

### Engagement questionnaire

The researcher adapted Gasmi's (2017) and Woodrich and Fan's (2016) self-report questionnaires to suit the translation course. The quantitative data gathered from the questionnaire helped to explore students' perception of their engagement with translation tasks. The questionnaire included 30 items and followed a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire consisted of 4 subscales: behavioral engagement (8 items), cognitive engagement (6 items), affective engagement (6 items), and engagement using Google Docs (10 items). The questionnaire was uploaded on Google Forms and the link was sent to students via LMS. The experimental and control groups took the questionnaire once by the end of the semester. Only GD group students responded to the four subscales, while students in the CG and the DF groups responded to the first three subscales (behavioral, cognitive, and affective). The jury validated the questionnaire and suggested simplifying a few items. The questionnaire reliability was found to be 0.80, which indicated adequate reliability.

### Semi-structured interviews

After the post-test, six students from each experimental group were chosen randomly to participate in the interviews to reflect on their engagement in the collaborative translation experience using online platforms. Interviews were conducted in English and lasted 10 minutes each. Interviews were video recorded via Zoom meetings then transcribed verbatim. The interviews included five questions that investigated the engagement aspects, the benefits, and the challenges of using the discussion forums or Google Docs in collaborative translation. With the help of another rater who was experienced in analyzing qualitative data, the researcher analyzed the transcript of the interviews. The inter-rater reliability was 0.93.

### Students' interactions on platforms

The researcher used the Interaction Analysis Model's (IAM) (Lucas et al., 2014) for content analysis. The IAM model was chosen because it is convenient to the purpose of the study and the nature of online interactions. The model comprised five phases: (a) data collection and comparison, (b) data exploration, (c) meaning negotiating, (d) data examination and synthesis, and (e) code agreement and

implementation. Participants' comments, posts, discussions, and revisions were collected, examined, and categorized into units of analysis and codes. Three threaded discussion forums for each group in the DF were collected and analyzed in light of predetermined codes. Similarly, three Google Docs from each group in the GD were analyzed against the same codes. To facilitate the data collection process, the researcher assigned students of each experimental group a corresponding code (e.g., DF-G1-S1 through DF-G6-S30; GD-G1-S1 through GD- G6-S30).

# RESULTS

To answer the first and second research questions, a quantitative analysis of the data collected through translation tests and an engagement self-report questionnaire was conducted. To answer the third and fourth research questions, qualitative analysis was employed to the data collected from students' interactions on Google Docs and discussion forums. The researcher also analyzed the interviews to get insights into students' engagement via the two web-based platforms. SPSS V.17 was used to analyze quantitative data, and NVivo 10 was utilized to analyze qualitative data.

## *QUANTITATIVE DATA ANALYSIS*

### Translation tests

To ensure the homogeneity of the experimental and control groups on translation performance before the experiment, the researcher administered a translation pretest and run one-way ANOVA to the pre-test data. Table 1 displays the descriptive statistics of the three groups on the pre-test.

**Table 1. Descriptive statistics of pre-test by groups**

| Groups | N | Mean | Std. Deviation | Std. Error | F | Sig. |
|---|---|---|---|---|---|---|
| **CG** | 33 | 52.03 | 5.341 | .930 | 3.614 | .406 |
| **DF** | 30 | 54.07 | 5.010 | .915 | | |
| **GD** | 30 | 55.80 | 6.310 | 1.152 | | |
| **Total** | 93 | 53.90 | 5.730 | .594 | | |

*The mean difference is significant at the 0.05 level

Table 1 indicates that the differences in means on the translation pretest of the three groups were almost similar (CG mean=52.03; DF mean=54.07, GD mean=55.80). The homogeneity of variances test showed a significance value of 0.406, which is higher than 0.05. Moreover, the results of one-way ANOVA showed F = 3.614, which confirmed that there was no significant difference across the control and the two experimental groups. The researcher also conducted one-way ANOVA to the post-test results to compare differences in groups' performance on the post-test and explore whether the differences between the three groups were statistically significant. The results obtained are demonstrated in Table 2.

**Table 2. One-way ANOVA for the translation post-test by groups**

| | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| **Between Groups** | 4308.573 | 2 | 2154.286 | 68.209 | .000 |
| **Within Groups** | 2842.545 | 90 | 31.584 | | |
| **Total** | 7151.118 | 92 | | | |

As shown in Table 2, the results of ANOVA analyses revealed that (F=68.209, p = .000 < 0.05) p-value is lower than the alpha level of 0.05, which indicated a noticeable significant difference in students' translation performance across the three groups. Eta-squared was also calculated to identify the size of the differences among the groups. Eta$^2$ was found to be 0.60 of the total variance, which indicated a large effect size among the three groups. To identify the location of these differences among the groups and which group has significant differences, the researcher run a Tukey post-hoc test (Table 3).

**Table 3. Tukey HSD test multiple comparisons**

| (I) groups | (J) groups | Mean difference (I-J) | Std. error | Sig. | 99% confidence interval | |
|---|---|---|---|---|---|---|
| | | | | | Lower bound | Upper bound |
| **CG** | **DF** | -4.994* | 1.418 | .002 | -9.23 | -.76 |
| | **GD** | -16.261* | 1.418 | .000 | -20.50 | -12.02 |
| **DF** | **CG** | 4.994* | 1.418 | .002 | .76 | 9.23 |
| | **GD** | -11.267* | 1.451 | .000 | -15.60 | -6.93 |
| **GD** | **CG** | 16.261* | 1.418 | .000 | 12.02 | 20.50 |
| | **DF** | 11.267* | 1.451 | .000 | 6.93 | 15.60 |

*The mean difference is significant at the 0.05 level

Table 3 displays the multiple comparisons among the groups. The second column shows the differences between the means, where statistically significant differences are marked with an asterisk. Therefore, the mean difference between the discussion forum (DF) group and the control group (CG) was -4.994 and p=.002 < .05, indicating the existence of a significant difference. Moreover, using Google Docs (GD) in collaborative translation showed a statistically significant effect (mean difference -16.261; p= .000). There was also a difference in the means between collaborating via discussion forums and using Google Docs (mean difference= -11.267; p=.000). This result confirmed that there were statistically significant differences between the control group and the two experimental groups in the translation performance after the treatment. Table 4 represents the homogenous subset for the groups.

**Table 4. Homogeneous subset for the groups**

| | Groups | N | Subset for alpha = 0.01 | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| **Tukey HSDa** | **CG** | 33 | 52.94 | | |
| | **DF** | 30 | | 57.93 | |
| | **GD** | 30 | | | 69.20 |
| | **Sig.** | | 1.000 | 1.000 | 1.000 |

The results of the homogenous subset revealed a significant difference between the groups on the translation post-test (alpha=0.01). To determine the difference between the groups on the translation subskills (overall quality of target language, specialized content and terminology, overall comprehension and meaning, target mechanics, and register and style), one-way ANOVA was run for each subskill with the three groups. Tables 5 presents the descriptive statistics of the post-test results by subskills.

**Table 5. Descriptive statistics of the post-test by subskills**

| Subskills | Groups | M | Std. Deviation | Std. Error | F | Sig. |
|---|---|---|---|---|---|---|
| **Overall Quality** | CG | 10.42 | 1.032 | .180 | 34.946 | .000 |
| | DF | 11.93 | 1.660 | .303 | | |
| | GD | 14.07 | 2.318 | .423 | | |
| **Specialized terminology** | CG | 10.48 | 1.253 | .218 | 23.717 | .000 |
| | DF | 12.57 | 1.851 | .338 | | |
| | GD | 13.70 | 2.423 | .442 | | |
| **Overall comprehension** | CG | 10.42 | 1.921 | .334 | 59.966 | .000 |
| | DF | 12.50 | 2.030 | .371 | | |
| | GD | 15.17 | .986 | .180 | | |
| **Mechanics** | CG | 10.12 | 1.635 | .285 | 75.265 | .000 |
| | DF | 12.57 | 2.192 | .400 | | |
| | GD | 15.27 | .907 | .166 | | |
| **Register & Style** | CG | 9.82 | 1.530 | .266 | 55.824 | .000 |
| | DF | 12.90 | 2.187 | .399 | | |
| | GD | 14.90 | 2.040 | .296 | | |

*The mean difference is significant at the 0.05 level

The results showed that there were statistically significant differences at $p > 0.05$ level among the three groups in the overall quality of translation ($F$=34.946, $p$ =0.000), wherein the means were ($M$ = 10.42, $SD$ =1.032) for the CG, ($M$ =11.93, $SD$ =1.660) for the DF group, and ($M$ =14.07, $SD$ = 2.318) for the GD group on the post-test. The post-hoc test showed the Google Docs group outperformed the control group and the discussion forum group. Additionally, ANOVA results showed statistical differences at $p > 0.05$ level among the three groups in using specialized terminology ($F$=23.717, $p$ =0.000), wherein the CG ($M$ =10.48, $SD$ =1.253), DF group ($M$ =12.57, $SD$ =1.851), and GD group ($M$ =13.70, $SD$ =2.423) on the post-test. The post-hoc test showed that Google Docs group had performed better than the other two groups. Moreover, the results of the overall comprehension and meaning subskill showed a statistically significant difference at the $p > 0.05$ level among the three groups. The means were 10.42, 12.50, and 15.17 for the CG, DF, and GD groups respectively. As for mechanics, ANOVA results showed a highly significant difference at $p > 0.05$ level

among the three groups, where CG achieved (*M* =10.12, *SD* =1.635), while the DF group (*M* =12.57, *SD* =2.192) and GD group (*M* =15.27, *SD* =.907) achieved higher on the post-test. Finally, the GD group outweighed CG and DF group on register and style with differences in means equaled 5.08 and 2.00 for the two groups respectively.

## Engagement questionnaire

To answer the second research question concerning the perceived engagement of the groups after the experiment, the researcher analyzed data from the questionnaire using one-way ANOVA. Figure 2 displays the descriptive statistics of the three groups on the three engagement subcases.

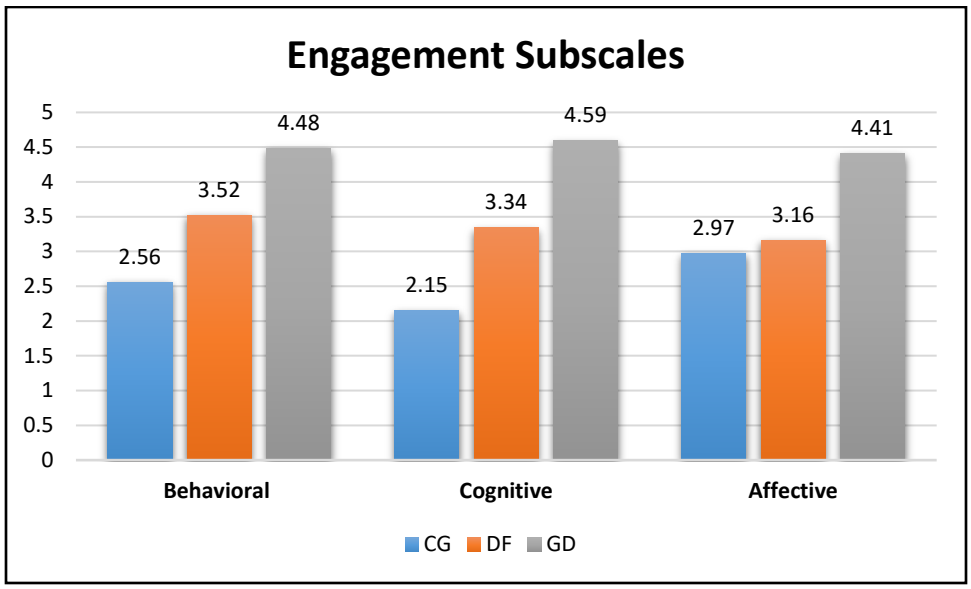


**Figure 2. Descriptive statistics of the three engagement subscales by groups**

There were statistically significant differences among the overall mean scores of the three groups on the behavioral engagement subscale (CG: *M*=2.56, *SD*=1.621; DF: *M*=3.52, *SD*=1.384; GD: *M*=4.48, *SD*=.743). This indicated that using Google Docs enhanced students' behavioral engagement in the translation course. Regarding the cognitive engagement, students of the GD group (*M*=4.59, *SD*=0.830) outperformed the CG (*M*=2.15, *SD*=1.302) and the DF group (*M*=3.34, *SD*=1.317). As for the affective engagement subscale, the GD group outweighed the CG and the DF groups with differences in means equaled 1.44 and 1.25 respectively.

The results of the ANOVA analyses indicated that the F test value for the three engagement subscales was 229.559 and the homogeneity of variances test was 0.000, which is smaller than the alpha level of 0.05. Therefore, there was a significant difference in GD group students' engagement at the three levels. To measure the proportion of variance and the effect size that is accounted for the treatment, the researcher calculated Eta-squared. It was found that $Eta^2$ equaled 0.83 of the total variance, which means that using Google Docs attributed by 83% to the increase of engagement level of the GD group.

The fourth subscale of the engagement questionnaire aimed to examine students' engagement with translation projects using Google Docs. Figure 3 presents the results related to this subscale.

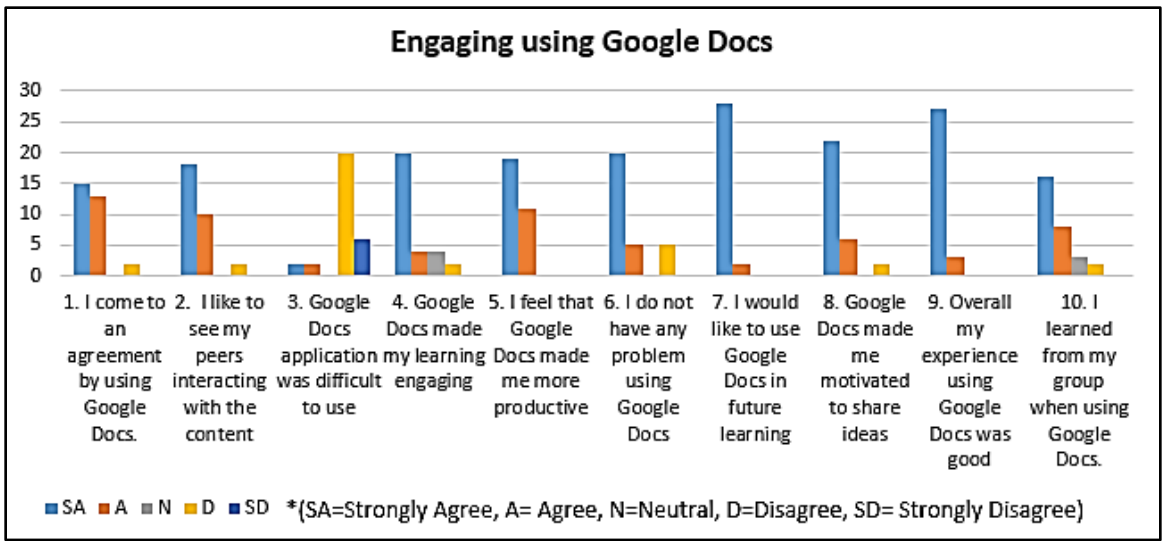


**Figure 3. Students' responses to the fourth engagement subscale**

Almost all participants (93.3%) agreed with the first and second statements concerning the flexibility of reaching an agreement using Google Docs and the desire to interact with peers on the content posted on Google Docs. Only 6.7% disagreed with these two items. Students' responses to the third statement showed that the majority of the participants (86.7%) opposed the idea that Google Docs was challenging to use, while few (13.3%) reported that Google Docs was difficult to use. Moreover, 80% asserted that using Google Docs made them more engaged, 13.3% were neutral, and 6.6% disagreed. Regarding the fifth statement, all students agreed that working with Google increased their productivity. It was also clear that 83.3% of the students agreed with statement six that they did not have problems using Google Docs, whereas 16.7% stated that they had problems. All participants positively responded to statement seven regarding using Google Docs for future learning. Only two participants disagreed to statement eight, whereas the others (93.3%) admitted that using Google Docs increased their motivation and interaction. All respondents perceived their learning experience using Google Docs positively. As for the last statement, most of the participants (80%) decided that collaboration on Google Docs helped them exchange learning.

## *Qualitative Data Analysis*

Qualitative data were gathered from the posts and discussions of experimental groups' interactions on the discussion forums and Google Docs, and the interviews collected from the two groups, to get a deeper understanding of the interaction patterns on these online platforms. Content analysis was conducted and codes were refined till an agreement was reached with a second coder. The inter-rater agreement was 86.6%. Consequently, three main themes related to engagement patterns emerged: behavioral engagement, cognitive engagement, and affective engagement. One additional theme was added to interpret data related to using the two online platforms.

### Theme 1. Behavioral engagement

The researcher analyzed data from the discussion forums and Google Docs in terms of quantity and quality. To identify the quantity of students' collaboration in each platform, all posts or comments per student for each assignment were counted. The total number of posts per topic was already provided by the LMS. As for Google Docs, the researcher manually counted the number of comments/revisions per student.

Regarding the quality of students' participation in each platform, students' contributions were analyzed in light of the themes identified by the two coders. The researcher used two levels of analysis:

the macro-level and the micro-level. While the macro-level analysis identified types of feedback given by participants, the micro-level analysis focused on the quantitative analysis of engagement and participation frequencies. The researcher coded each input according to its focus area (global and local). Global feedback included content, comprehension, and meaning, while local-level feedback involved language and conventions, and style and register.

Concerning the DF group students' collaboration on the LMS, the total number of posts/comments related to the translation tasks were 382. Of the six groups collaborating on the discussion forums, Group 3 had the highest number of posts (*n*=88), followed by Group 1 (*n*=83), Group 5 (*n*=72), Group 2 (*n*=55), Group 4 (*n*=44), and finally Group 6 (*n*=40). It was found that 60.5% of the posts focused on local issues while 39.5% targeted global issues.

Additionally, students in the GD group posted an overall number of 1299 revisions in the form of comments, track changes, and suggestions. The number of feedback revisions that focused on local issues was *n*=744, accounting for 57.3% of the overall revisions, and global exchanges of *n*=555, accounting for 42.7%. Hence, most of the comments given by GD students focused on local issues. Group 5 students exchanged the greatest number of feedback (*n*=268), followed by Group 1 (*n*=220), Group 4 (*n*=212), Group 2 (*n*=208), Group 6 (*n*=201), and Group 3 with the least revisions (*n*=190). Table 6 summarizes the contribution of each group in DF and DG groups in giving global and local feedback on translation assignments.

**Table 6. Number and percentage of revisions by groups**

| **Groups** | **DF group** | | **GD group** | |
|---|---|---|---|---|
| | **Local** | **Global** | **Local** | **Global** |
| **Group 1** | 48 (57.8%) | 35 (42.2%) | 122 (55.5%) | 98 (44.5%) |
| **Group 2** | 39 (70.9%) | 16 (29.1%) | 144 (69.2%) | 64 (30.8%) |
| **Group 3** | 51 (57.9%) | 37 (42.1%) | 102 (53.7%) | 88 (46.3%) |
| **Group 4** | 27 (61.4%) | 17 (38.6%) | 113 (53.3%) | 99 (46.9%) |
| **Group 5** | 44 (61.1%) | 28 (38.9%) | 153 (57%) | 115 (42.9%) |
| **Group 6** | 22 (55%) | 18 (45%) | 110 (54.7%) | 91(45.3%) |
| **Overall** | 231 | 151 | 744 | 555 |

The researcher used Morse's (2021) method of calculating students' participation average on the two platforms. To calculate the average number of posts or comments shared by each student, the actual number of participating students in each group was divided by the number of translation assignments. Thus, the average number of participants on the LMS board ranged from 5.6 to 6.3. To get the average number of posts for each student, the total number of posts was divided by the participation average. The overall average of posts per student in the discussion forums was 5.9. The average number of comments and revisions in Google Docs per student was calculated the same way and it was found that the average number of participants ranged from 9.6 to 10, and the overall average of posts per student was 9.7.

The first interview question addressed the groups' involvement in the collaborative tasks using discussion forums or Google Docs. Two students (GD-G1-S3 & GD-G2-S6) from the GD group indicated high engagement in the collaborative tasks. S6 commented: "*I spent about an hour every day to work on the assignments as I believe this will develop the way I solve translation problems, and I worked hard to complete assignments on time*." Similarly, three students (GD-G3-S11, GD-G4-S16, & GD-G5-S22) reported that

they were moderately involved in the tasks. However, one student (GD-G6-S29) reported that he was reluctant to interact in the first draft and said that he sometimes needed the researcher to guide him and confirm being on the right track.

Moreover, three students from the DF group (DF-G1-S3, DF-G3-S17, & DF-G5-S23) reported their willingness to participate in the discussion forums to improve the quality of the translated texts. For example, S23 said, "*I find commenting in others motivating to make the translation better*". However, three interviewees indicated their reluctance to participate in collaborative tasks and their preference for face-to-face interactions. One student (DF-G6-S30) commented, "*I prefer communicating face-to-face on translation as it is difficult to do so on forums and to know exactly what to correct and how to correct each part*".

## Theme 2. Cognitive engagement

Cognitive engagement is manifested in using strategies like asking questions, answering questions with explanation, answering questions without explanation, agreement to revisions, rejecting revisions, negotiating meaning, clarifying meaning, and using dictionaries. Cognitive strategies were demonstrated in students' use of words such as "I think," "because," "Why?" "I agree," and "I am not sure." Analyses of the posts/comments of the DF group and GD group showed that students frequently used words like "I believe," "I think," "what about," "why don't you …?" and "I suggest." They also inserted a link to definitions of words in online dictionaries. Although most of the replies shared by DF students were short (average 31 words), students built on each other's ideas to reach an agreement. Students in the two groups also asked questions to clarify, make judgments, or negotiate or infer meaning. Therefore, students in the two experimental groups shared nearly the same cognitive strategies when collaborating on translation tasks. Table 7 presents the cognitive contributions by percentage for each experimental group.

**Table 7. Cognitive contributions by experimental groups**

| Strategy (codes) | Examples | DF (%) ($n$=382) | GD (%) ($n$=1299) |
|---|---|---|---|
| **Asking questions that need explanation (QwE)** | "*What is the best translation of this sentence? Why?"* | 15% | 16% |
| **Asking questions that need no explanation (QwnE)** | "*Can we change it to "marketing" instead of "to market"?* | 16% | 5% |
| **Answering with elaboration (AwE)** | "*I think the author is talking about "freedom of discussion" and not about "freedom of thinking", this is clear if you check the topic sentence of this paragraph and examples he gives"* | 8% | 17% |
| **Answering with no explanation (AwnE)** | *"Yes, I think so"* | 18% | 7% |
| **Agreement to revisions (Ag.)** | *"I agree to this modification because…"* *"Let's go for the second translation, sounds natural"* | 10% | 6% |
| **Rejecting revisions (Rej.)** | *"No, I disagree with this modification….this is inaccurate"* | 11% | 6% |
| **Negotiating meaning (Neg.)** | *"… this one is Ok but why don't we …"* | 6 % | 12% |

| Strategy (codes) | Examples | DF (%) (*n*=382) | GD (%) (*n*=1299) |
|---|---|---|---|
| **Clarifying (Clar.)** | *"Do you mean that the tense needs to be changed?"* | 7% | 9% |
| **Using dictionaries (Dic.)** | *"… check the definition of this word in dic. Here's the link …"* | 4% | 4% |
| **Making modifications/revisions** | *"رؤية واضحة" وضوح الرؤية* | 5% | 18% |

The results revealed that the highest contributions by the DF group were by responding to peers' questions without providing explanations (18%), followed by asking questions that didn't require explanations like yes/no questions (16%), and questions that require explanations (15%). On the other hand, the GD group students contributed by making modifications and revisions (18%), responding to questions that need explanations (17%), and asking questions that require elaboration (16%). The lowest contributions by the two groups (4%) were in using dictionaries to look up meanings of unknown words.

Similarly, students of the GD group discussed the differences to agree on the most accurate words. For example, participants in Group 3 discussed translating titles or company names. A student suggested keeping the literal translation by Google, while others read the whole passage to choose the best translation representing the passages' content. This exploratory nature of the interaction is evident in the following extract:

> *S11: I think "Inner space" should be kept in English as it is a name of a place.*
>
> *S12: I agree ... especially we have many names as it will be difficult to translate them into Arabic ... some will be nonsense.*
>
> *S13: Why? ... we can write "انرسبيس" ... we translate names of people and places. I am not sure, though.*

From this comment thread, it is evident that students built on the exchanged ideas, added new ones, and provided reasons. Some comments were implicit, like when a student in Group 1 pinpointed a grammatical error by justifying. Other comments were more explicit such as when students explain or correct.

Concerning the second interview question "Describe the strategies that you used during editing the collaborative translation projects", three students in the DF group (DF-G1-S3, DF-G2-S8, & DF-G5-S23) reported engaging via discussions in posting comments, asking questions, and asking for modifications. For example, S8 said, "*I can comment, give suggestions, or edit directly, and other members can easily respond.*" Moreover, three students (DF-G3-S12, DF-G4-S19, & DF-G6-S30) gave no reason for the given input and said accepting all comments that mainly focused on grammar and mechanics. They reported that they rarely disagreed with the members of the group.

As for interviewees from the GD group, four students (GD-G1-S3, GD-G3-S11, GD-G4-S16, & GD-G5-S22) reported that they moderately understood the given feedback before accepting and revising. S16 commented, "*I used to discuss with my group and annotate sentences. I can customize my text's font and color, so it easy to mark each friends' comments with a color. It is useful to redo and undo actions".* Furthermore, two interviewees tended to ask the researcher or other classmates, read about the topic, check online resources or dictionaries, and use Grammarly to check mechanics.

### Theme 3. Affective engagement

Students' cognitive and behavioral engagement significantly affected their affective engagement. Participants showed affective engagement through emotional reactions, whether positive or negative. No

data were interpreted from students' interactions in the two platforms that indicated affective engagement. Therefore, data collected from interviews were the main source to understand students' affective engagement. The third question in the interviews, "How did you feel working on translation assignments using discussion forums/Google Docs?", investigated students' feelings to collaborate using the web-based platforms. In the interviews with GD students, three students (GD-G1-S3, GD-G4-S16, & GD-G5-S22) reported that they felt confident and secure. S22 stated, "*I am more confident of my translation skills and not afraid of making mistakes or giving feedback to friends*." Two students (GD-G2-S6 & GD-G6-S29) highlighted that although they gained knowledge, they sometimes felt anxious because some were authoritative and uncooperative. S6 commented, "*The thing that annoyed me was that two members in my group were always trying to impose their opinions which made me nervous, but I felt better when I read the comments more than when I participate*." S29 reported his trust in the feedback given by other group members as he believed that peers were "proficient" in translation.

In interviews with the DF group, four participants (DF-G1-S3, DF-G3-S12, DF-G4-S19, & DF-G6-S30) expressed positive feelings when collaborating online via discussion forums. They felt that they gained knowledge and became confident and more interested in the collaborative tasks. Meanwhile, two students (DF-G2-S8, & DF-G5-S23) expressed anxiety, dissatisfaction, and boredom, which reflected negative affective engagement, as when S8 said, "*It takes time to agree on something and resolve a problem in translation. So, translating alone is much faster*". Similarly, S23 replied, "*I sometimes felt bored or anxious when we couldn't agree on one opinion.*"

### Theme 4. Evaluation of using the online platforms in collaborative translation

In the interviews, interviewees responded to the fourth interview question describing their experience of the online platforms in the Specialized Translation Course. Interviewees in the DF group highlighted the accessibility of the posts and the interactive nature of the discussion forums in collaborating in translation tasks. A student (DF-G3-S12) commented, *"We assign roles so that one looked up words, another proofread and edit, and so on ..."* Another student (DF-G4-S19) pointed out that collaborating on tasks improved their motivation as a team: *"We recognized how people see our work, and how can they help us to improve the translated work and increase productivity."*

Moreover, participants in the GD group mentioned some advantages of using Google Docs, including the interactive nature of the collaborative activity, distribution of tasks among group members, communication and support from members of the group in the different stages of the translation process, sense of ownership of the work, and producing a better-quality translation. Two commented saying:

> *S3: "I learned to work in a team, negotiate and communicate, and be a good listener, which I think are valuable life skills."*
>
> *S11: "I find translating alone is boring and stressful, but collaborative translation with all useful features of Google is interesting and free of stress."*

All interviewees in the GD group highlighted some features of Google Docs that facilitated their collaboration including track changes that made editing traceable. Four students (GD-G1-S3, GD-G3-S11, GD-G4-S16, & GD-G5-S22) reported that the text revision history feature enabled them to track any changes made with the time of change/entrance marked in minutes with the proper order with the user's name. Since these changes were color-coded, they could distinguish different users and editors. Five interviewees (GD-G1-S3, GD-G2-S6, GD-G3-S11, GD-G4-S16, & GD-G5-S22) agreed that the comment feature allowed them to highlight a portion of text to write a statement with the commenter's name, which allowed them to reply to the comments, delete and add more words.

Responding to the fifth interview question, "What challenges did you face in using discussion forums/Google Docs on collaborative translation projects?", all interviewees from the DF group reported that discussion forums did not encourage interactivity from all participants of the group. A

student (DF-G6-S30) commented: *"It is boring to follow all the threads and posts. Each time. I was responsible for editing the translation drafts and it was so tiring to check the comments and edit the drafts*". Another (DF-G1-S3) added, "*I got lost on the comments and sometimes I found it difficult to discuss a specific modification*".

Additionally, interviewees in the GD group noted a few disadvantages and challenges in using Google Docs in collaborative translation represented in the following comments:

> *S3: "Some members were dependent and relied on others even after we assigned roles, and this was not fair."*
>
> *S6: "It was confusing and difficult sometimes to explain what I mean and convince others. I found some difficulty at first dealing with Google Docs for the first time."*
>
> *S11: "It was time-consuming to read the comments and check the changes."*
>
> *S16: "I had to agree with the group on one thing, and this was difficult."*
>
> *S22: "Having few technical issues when using Google Docs, especially when the internet connection is slow or heavy."*
>
> *S29: "The formatting of the text in Microsoft Word is much easier than in Google Docs. I found it annoying to copy the text to Word then paste it to Google Docs".*

Figure 4 visually summarizes the themes and the techniques or features employed by students in each theme.

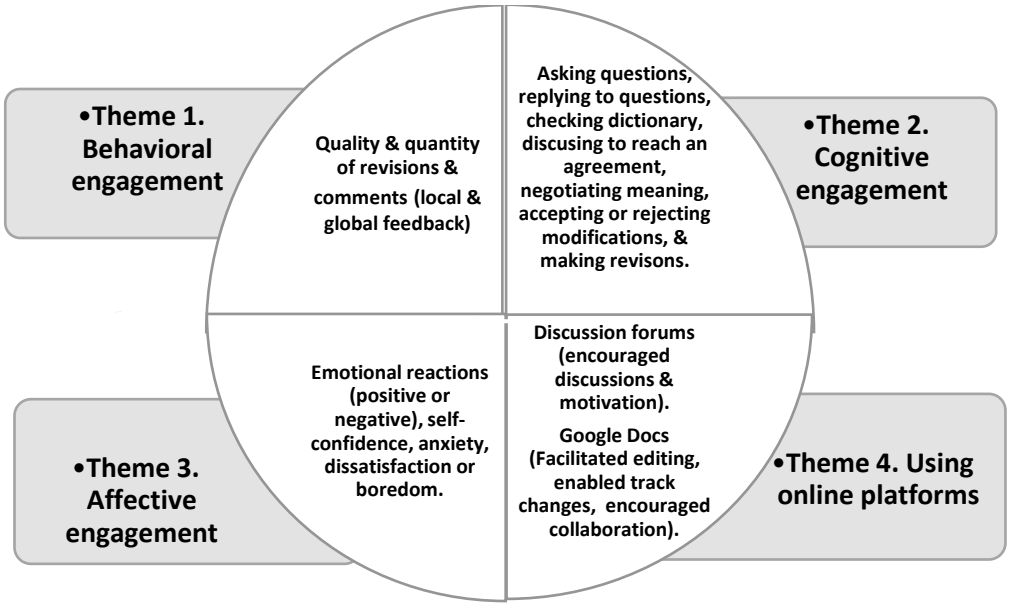


**Figure 4. Graphical representation of the qualitative themes**

As presented in Figure 4, four themes emerged from analyzing the qualitative data: behavioral engagement, cognitive engagement, affective engagement, and perceptions of using the online platforms.

The following discussion section addresses the findings in light of the research questions and the contribution of the present study to the existing literature.

## DISCUSSION

The study compared undergraduates' collaborative experience and engagement in translation tasks through two web-based platforms: Google Docs and threaded discussion forum boards on LMS.

Data were collected through quantitative and qualitative measures to provide an in-depth interpretation of students' interaction during translation tasks. The study also examined the students' experience after using Google Docs in collaborative translation. The findings of the current study supplement the literature on translation and students' engagement. The society of translation will prosper by integrating innovative, collaborative techniques in teaching and training translators. The study identified patterns of engagement that students demonstrated when working on collaborative translation projects. Researchers will benefit from understanding these interaction patterns to pursue research in this area and foster students' engagement. Educators will improve their instructional practices and incorporate Google Docs in translation classes to enhance their perception and attitudes toward using Google Docs in collaborative translation.

Findings showed statistically significant development in translation performance among the control group (M=52.94, SD=5.147), the experimental group who used discussion forums (M=57.93, SD=7.211), and the experimental group who used Google Docs (M=69.20, SD=4.097) on the translation post-test. The findings of the one-way ANOVA test revealed a significant improvement in Google Docs' group translation quality in terms of overall quality of target language, specialized content and terminology, overall comprehension and meaning, target mechanics, and register and style. Google Docs students' performance on the translation subskills outweighed the performance of the other two groups at $p > 0.05$ level. This improvement might be attributed to students' meaningful collaboration via Google Docs during the collaborative translation process to detect errors, solve translation problems, and enhance translation quality. This finding was supported by Tai et al. (2015) and Steinberger (2017), who argued that peer feedback was effective in improving students' translation performance through discussion, commentary, and negotiation. This result also agreed with Insai and Poonlarp (2017) who found that participants in translation training contexts collaborated and detected local and global errors and manifested higher decision-making and problem-solving level. Likewise, Huang et al. (2020) asserted that participants' translation skills have significantly improved in the post-test due to working on collaborative translation projects.

In response to the second research question, participants' responses to the questionnaire showed statistically significant differences among the three groups on the three engagement aspects in favor of the Google Docs' group. The majority of the participants in this group positively perceived their engagement via Google Docs to complete the translation assignments. Participants' behavioral engagement was manifested in their willingness to work hard and spend more time discussing the drafts to improve the translation quality. Students reported using a variety of cognitive strategies that kept them actively involved in the translation tasks such as asking questions and checking different resources. Additionally, students in this group expressed emotional engagement by showing interest in working on translation projects on Google Docs. Moreover, respondents reported high satisfaction with using Google Docs for facilitating discussion to reach an agreement on translated revisions, encouraging interaction with peers, making them more productive, and helping them exchange learning experiences. This is in line with the findings of Godwin-Jones (2018) and Sudrajat and Purnawarman (2019) who concluded that students perceived using Google Docs as easy and friendly. This result was also supported by Pavlović and Hadžiahmetović Jurida (2019), who emphasized the relaxing and communicative aspect of the collaborative activity in which students negotiate and respect each other's ideas.

To answer the third research question regarding the engagement patterns, the behavioral engagement was analyzed both qualitatively and quantitatively. Participants' contributions via Google Docs and the discussion forums were measured quantitatively by counting the number of posts per topic for each student. It was found that the Google Docs group made 1,299 revisions in the form of comments, track changes, and suggestions, whereas students who used discussion forums contributed by making 382 posts and comments. The overall average of posts per student in the discussion forums was 5.9, and in Google Docs it was 9.7. Hence, the average number of posts shared per student in the Google Docs group was 38% higher than the average number of posts shared per student in the

discussion forum group. This result was in accordance with Morse (2021) who found that the number of contributions by the Google Docs' students outperformed those provided by the discussion forum group by 68% in three discussion topics.

Additionally, participants' posts and comments were analyzed in terms of their focus, addressing local or global issues in the translated texts. Feedback given by the discussion forum on the global level was found to be 39.5% of the overall revisions, whereas feedback provided by the Google Docs' group at the same level was 42.7% of the overall revisions. As for revisions at the local level, the Google Docs' group provided 57.3% of the overall modifications, while the discussion forum group contributed 60.5% of the overall modifications. Therefore, the two groups provided modifications at the local level that outnumbered the revisions they made at the global level. This result could be due to teachers' focus on form over meaning in giving feedback on students' drafts and limited linguistic knowledge, as concluded by Tai et al. (2015). This might be also attributed to the difficulty that students with limited language proficiency encounter while revising global issues as suggested by Saeed and Al Qunayeer (2020). This finding agreed with Godwin-Jones (2018) who found that students in their collaborative work focused more on forms than meanings. Hence, Alharbi (2019), Ebadi and Rahimi (2017), and Woodard and Babcock (2014) emphasized the role that Google Docs plays in enhancing students' abilities to provide feedback on global and local issues.

Furthermore, findings showed that participants who used Google Docs and discussion forum boards engaged cognitively by asking questions that need explanations, giving examples and reasons, agreeing or rejecting modifications, providing justifications and explanations, making explicit and implicit revisions, and using dictionaries and resources. This result is in line with Goodale (2019) and Yu and Lee (2016), who reported that participants used different strategies specific to the given task. According to Helme and Clarke (2001), questioning, sharing ideas, providing constructive comments and explanations, and justifying arguments were indicators of cognitive engagement in collaborative activities. Insai and Poonlarp (2017) also found that participants used questions frequently to solve translation problems and were actively engaged in the translation process. Based on the extent of engagement, students varied in utilizing these cognitive strategies. Students who used Google Docs engaged highly in translation tasks by utilizing a variety of strategies that encouraged active participation and meaningful involvement. On the other hand, students who collaborated using discussion forums replied to comments by asking questions that require no explanations, replied to questions that provided no explanations, and agreed to suggestions with no justifications. Morse (2021) justified this difference in using cognitive strategies by students' tendency to contribute to the discussion forums as being a requirement. Thus, they were reluctant to read their peers' posts and contribute significantly to the discussions. Likewise, Kew and Tasir (2021) reported that participants preferred to reply simply to posts without providing clarifications or justifications due to their limited prior knowledge of the discussion topics.

Moreover, students expressed their effective engagement and satisfaction with the collaborative experience as they felt more confident and relaxed. Interviewees from the Google Docs group showed more interest in engaging in collaborative tasks and expressed their trust in working with capable peers in a stress-free environment. The researcher attributed this to the students' perception of this learning experience as being meaningful and worthwhile; therefore, they effectively engaged in translation tasks. Although participants expressed a positive attitude when using Google Docs, few reported their doubt and anxiety when collaborating with peers in translation tasks. The researcher of the current study attributed this result to the small number of translation assignments and the limited time of using a new technological tool. This result is consistent with Alaskari (2017), who found that students showed positive attitudes regarding using the wiki while expressing unstable perceptions toward the collaborative translation process.

Concerning the fourth research question and students' evaluation of the experience of using Google Docs in facilitating collaborative translation, the majority of participants reported that Google Docs was convenient and user-friendly. They expressed their satisfaction with using Google Docs. This

finding agrees with Moonen (2015) and Y. Zheng et al. (2020), who found that participants were enthusiastic and positive in the collaborative process using Google Docs to improve their final products. Similarly, B. Zheng et al. (2015) concluded that students felt that Google Docs helped them to be more organized and facilitated the process of editing and making revisions. They also reported that students provided more feedback when they used Google Docs than when they worked individually.

However, a few participants felt that collaborative translation using Google Docs was time-consuming and sometimes technically challenging. Likewise, Sousa et al. (2019) and Yu-Fen and Shan-Pi (2011) reported some difficulties in using Google Docs in peer feedback, like disagreements and lack of clear communication to resolve any problem. L. Wang et al. (2017) concluded that the collaborative process was problematic when students had different levels of language competence and engagement. K. Wang and Chong (2013) highlighted that, although students benefited from peer feedback in revising their translation drafts, they found peer-editing in translation time-consuming.

On the other hand, participants who used discussion forum boards in collaborative translation expressed their overall satisfaction in using this platform. However, they found it tedious and challenging in terms of following and reading a high number of threads of discussions. This result agreed with Gao et al. (2013) and Morse (2021) who highlighted some constraints of using discussion forums in collaboration if compared to Google Docs. They believed that the structure of Google Docs encouraged participation since all the comments and revisions were included in the same document and no need to review tens of posts or follow a high number of conversation threads one at a time. They recommended using Google Docs over other web-based discussion platforms to support synchronous collaboration and avoid duplication in reviewing peers' contributions. The researcher of this study agrees with Morse (2021) in that some features in Google Docs, like revision history, comments, and track changes, were useful in enhancing students' interaction. This might influence the quality as well as the number of students' contributions in a significant way and ensure effective communication.

The study is not without limitations. It did not include an observation of the actual practices of translation strategies by the participants. Moreover, the study duration was short (6 weeks), and the number of participants was limited (93 students majoring in business with the same language proficiency level). The study was also restricted to quantitative and qualitative data collection instruments (analysis of students' contributions, interviews, translation tests, and questionnaires). Furthermore, this study's participants translated only business-oriented articles from English to Arabic and worked collaboratively on three projects using discussion forums on LMS and Google Docs.

## Conclusion and Recommendations

It was concluded that using Google Docs in an online collaborative translation course was more effective than working individually or collaborating via discussion platforms in improving students' translation quality. Findings showed that the group who used Google Docs outperformed the group who used discussion forum boards and the control group on the translation post-test in terms of overall quality of target language, specialized content and terminology, overall comprehension and meaning, target mechanics, and register and style. It was also found that the engagement level of the Google Docs group improved in the three engagement aspects when compared to the engagement level of the discussion forum group and the control group. Participants engaged behaviorally using Google Docs by frequently posting comments focusing on local as well as global-oriented revisions. Moreover, they engaged cognitively by asking questions, clarifying, responding to feedback, discussing, and making revisions. Most participants felt confident and secure in using Google Docs. The study also indicated that participants in the Google Docs group had a positive attitude towards using Google Docs in collaborative translation for being user-friendly and flexible. However, a few participants reported that reaching consent with the group members regarding the translation projects was time-consuming and boring.

Notably, the results provide valuable insights for educators, curriculum designers, and teachers to promote students' performance and motivation in specialized translation courses and translation training programs. It is crucial to design translation training courses to accommodate students' proficiency levels and technological backgrounds. Students should be trained on revision practices and feedback giving using web/computer-based tools to empower them with the labor market skills. Instructors should supervise students' interactions and provide them with necessary help and feedback. It is also recommended to use innovative translation activities to increase students' engagement and motivation in specialized translation classes.

It would be a worthwhile endeavor to replicate the study in different contexts and avoid limitations. Further research can compare students' engagement and interaction patterns in various modalities, such as face-to-face, blended, and online settings. It is noteworthy to investigate the relationship between students' translation competence and their engagement level. Future studies should explore the effectiveness of using Google Docs in the collaborative translation of different genres and languages. Researchers can investigate the influence of variables like self-efficacy, motivation, tolerance of ambiguity, and risk-taking on collaborative translation. It is also recommended to examine the impact of teacher feedback and peer feedback on students' translation competence and level of engagement.

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