

# Going Beyond Language Learning: A Microlearning Instructional Design to Promote EFL Learners' Collaboration Competency

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**Abstract**—This study proposes a structurally streamlined instructional design framework for an intensive online English course to facilitate holistic language learning in the microlearning context. With the support of collaborative technologies and the team project-based learning approach, this study also aims to develop learners' collaboration competency in the EFL learning contexts. Thirty-two technological college students from central Taiwan voluntarily participated in this intensive course. They were divided into two groups based on their language proficiency and majors to promote more cross-disciplinary interaction in the learning process. Empirical results from the survey indicate that learners' satisfaction with the novel microlearning instructional design is high. This study confirms that the proposed instructional design is highly positively correlated with learners' collaboration competency development. Furthermore, both higher- and lower-proficiency language learners benefit from this instructional design in terms of language learning and collaboration competency development. This study represents an innovative and positive contribution to the language field of microlearning, as its instructional design successfully connects discrete language chunk learning and pioneers the integration of collaboration competency development along with language learning.

**Keywords**—microlearning, EFL, collaboration competency, instructional design

## 1 Introduction

Envisaging the coming of a more rapidly changing world with information and communication technology (ICT), global organizations such as Organization for Economic Cooperation and Development (OECD) and higher education institutions have called for the need to redefine, revisit and reconstruct the learning in the current educational and workplace contexts for the 21st-century learners and employees [1 OECD]. As a recent top topic in educational and training research as well as being a newly predicted emerging educational trend, microlearning has received extensive attention and

has been practiced as a successful instructional design in diverse learning contexts, such as private learning, corporate training, and higher education [2–5]. Microlearning, an action-oriented and technology-enhanced learning pedagogy, is designed with “chunking,” a technique to break down complicated learning concepts into bite-size forms within which a specific learning outcome or learning goal can be achieved in a short period [2,6]. A plethora of evidence-based studies revealed that microlearning is an effective instructional design or intervention in higher education with different presentations of courses (e.g., online, hybrid, and blended courses) [2]. Microlearning also meets the learning attributes of the “new millennium learners” [1], for example, short attention span, needs for specific and in-time learning, and preference for instant feedback.

The chunking style and technology-mediated instructional design are also widely applied in language education. Reviewing the literature, [3] reported that language education took up 10.10% of microlearning publications in the Scopus database (to the end of 2021). Although these studies have revealed the effective uses of microlearning in language learning, most of them have focused primarily on the effectiveness of vocabulary or grammar structure learning of a context-specific topic [7,8], the evaluation of learning tools (e.g., platforms and technologies) [5,6,9], and the individual learner’s motivation or engagement enhancement [10]. For learners learning any language, their ultimate goal is to be able to communicate effectively in the real world. Researchers [11,12] indicate that microlearning in second language acquisition (SLA) should go beyond the scope of individualized learning and should react to the call to “incorporate elements of collaborative learning” [11] and to include social interactions [12] in its instructional design. Thus, to bridge the gap, the current study aims to present an alternative microlearning instructional design to enhance learners’ collaboration competency through the language learning process.

To reach a meaningful conclusion, the paper’s layout is organized as follows: a review of existing literature related to microlearning in SLA, the instructional design, the research questions, the introduction of methods, including the background of participants, and research instruments. Then, the empirical results are demonstrated and discussed, and the paper is concluded with this study’s practical implications and limitations.

## **2 Literature review**

### **2.1 Microlearning and second language acquisition**

As a newly emerging global educational topic, microlearning has received various definitions from different research focuses [13]. However, by common consent, microlearning is often attributed to a type of informal learning delivered by digital technologies or mobile devices to present well-planned learning chunking or micro contents and micro activities focused on one specific learning objective [2–6]. Microlearning, characterized by short duration, small learning steps, small learning units, and specific learning outcomes, is adopted flexibly in diverse contexts and disciplines. Among the disciplines and subjects in the microlearning publications, it was found that

language learning is one of the frequently mentioned fields in the titles or abstracts of the publications related to microlearning [3]. The first microlearning publication in the Scopus database was a book chapter related to second language learning [2]. In their book chapter titled *Integrated microlearning during access delays: A new approach to second-language learning*, [11] proposed to support repetitive learning through embedding “bits and pieces of learning” into daily routine with the use of technologies (e.g., computers or mobile devices) and claimed this design successfully harness learners’ learning motivation. In language learning, chunking doesn’t merely indicate small unit learning or small task completion in a short time. From the linguistic perspective, chunking is a very basic mechanism in SLA. Chunks may range from low-level binary chunks such as phonotactics, lexis, and collocations to high-level complex pragmatic contexts such as formulaic language. Familiarizing with the chunks is highly regarded as an effective technique for developing fluency, accuracy, and variation in language learning [14]. Combining the above two chunking concepts arouses SLA researchers’ interest in studying the effectiveness and impact of microlearning applications or integration on second language learning. Related studies include applying microlearning to improve vocabulary learning [7,8], integration into daily contexts [11], and location-based meaningful interaction contexts [15].

Microlearning is repeatedly highlighted as an effective instructional strategy that concurs with cognitive load theory. The “short format”—short time, small units, and specific objective—characterized by microlearning has shown evident to reduce both intrinsic and extraneous cognitive load and increase information retention, especially when applied with the use of the mobile devices in the learning process [2,9,16,17]. Like other learning approaches or strategies, microlearning has its strengths and pitfalls. It is frequently contested as stand-alone “fragment” learning [18], which is identified as a threat to the development of communication skills [9], lack of solid theories as its foundation and robust model [5,16], and lack of peer interaction in joint practice to facilitate collaborative or community learning [9,19]. In language learning, this low cognitive-demanded fragment chunking learning has been criticized as discrete language element learning and is often associated with the development of lower-order thinking skills—remembering, understanding, and applying mainly. This traditional rote language learning may not fulfill the modern integrative language education trend, which views “using the language to learn and learning to use the language” as the critical principle and aims to develop learners’ 21st-century skills by improving learners’ higher-order thinking skills along with language learning [20]. The above microlearning limitations in language learning has led a growing demand for a more holistic and logistically organized instructional design.

## **2.2 Developing collaboration competency via team project-based learning in microlearning context**

The other top topic in microlearning-related publications is learners’ learning engagement. However, most studies focus on the limited individual scale of engagement [9]. Exploring learners’ perceptions of interpersonal engagement in microlearning contexts is scarce. As collaboration competency has been included in several international

organizations such as OECD, UNESCO, Partnership for 21st-century skills, and so on, microlearning instructional design also calls for the need to incorporate collaborative learning through the application of collaborative technologies such as virtual learning and sharing platforms to promote learners' collaboration competency and communication skills [21–23]. Collaboration along with communication competencies have been cited as core learning goals in higher education institutions around the world in order to equip learners with sufficient ability to solve real-world problems [24]. To map 21st-century skills to the English education program, the Cambridge Life Competencies Framework has been created and promoted in global English learning contexts. This framework includes six major competencies: creative thinking, critical thinking, learning to learn, communication, collaboration, and social responsibilities. The definition of the collaboration competency in the Cambridge life competencies framework was adopted in this study. Accordingly, it defines collaboration competency as:

*“Learners work well together in groups through actively taking part in group activities, listening to others, sharing tasks, and finding solutions to problems.”*

This definition also aligns with the core concept of Team Project-Based learning (TPBL). TPBL is an integration of team-based learning (TBL) and project-based learning (PBL). TPBL has been flourishing in modern educational settings [25]. It is also adopted in second language learning scenarios, especially in communicative language learning and content and language integrated learning (CLIL), within which concepts of real-world use of language and the use of language to learn are emphasized. As one of the popular and widely used instructional pedagogies [26], TPBL asserts that learning should go beyond the cover of merely content learning but ensure leverage learning in small groups to achieve overall effectiveness in the aspects such as interpersonal communication, negotiation, collaboration, and so on. This paper argues that adopting TPBL in microlearning instructional design helps to close the gap of the lack of social interaction in the microlearning process and provides a holistic language learning environment.

Aside from the popular research interests in evaluating the effectiveness of adopting TPBL in different disciplines (e.g., effective TPBL model, grouping strategies, or strengths and pitfalls), rare research focus renders on its dynamic complexity of how learners with different levels (in terms of language education, high proficiency learners or low proficiency learners) achieve TPBL goals during the learning process. Researchers [17] indicate that there have been a few studies examining how low achievement can be improved, and due to very limited empirical literature tackling how high achievers attain the TPBL goals in the context, one study [25] was carried out to investigate “whether high achievers are not only successful in the cognitive outcome, but also in the cultivation of collaborative and communicative competencies” and concluded that high achievers failed the expectation of TPBL to achieve a high level of teamwork and collaboration competency owing to their perceptions of viewing TPBL from an individual-oriented instead of from a collaborative perspective. In this study, researchers were also interested in probing whether learners' language proficiency would be a crucial predictor for the collaboration competency development in microlearning-based TPBL.

Noticing the gap between the need and the limitation of microlearning on modern language learning, researchers of this study aimed to propose a more innovative cutting-edge framework and approaches which align with the shift to learner-centered, collaborative and technology-driven language courses in the EFL context. This study initiated by addressing a novel instructional design of microlearning by incorporating collaborative technologies (e.g., collaboration platforms, interactive whiteboards) and team project-based learning in an online short-term intensive EFL course to support the regular semester-based language learning in the higher education setting. Then, in this paper, the authors further investigated whether the new instructional design effectively developed EFL learners' collaboration competency. The research aimed to:

- (a) explore EFL learners' satisfaction with the proposed collaborative instructional design of microlearning.
- (b) assess the relationship between the proposed collaborative instructional design of microlearning with the development of EFL learners' collaboration competency.
- (c) investigate whether the EFL learners' language proficiency affects the development of collaboration competency in microlearning settings.

### **3 Microlearning instructional design for EFL learners**

#### **3.1 The principles that guided the construction of the proposed instructional design**

A successful course implementation relies on well-structured and clear instructional plans and steps guided by instructional theories. The purpose of microlearning is to help learners achieve learning of the micro-content of a specific objective in a short time. The recent literature on microlearning highlighted the three critical components in microlearning instructional design: technology, content, and learners [5]. The first step in instructional planning is identifying learners' needs [27]. In designing a micro-learning course, different flexible and feasible digital tools should be carefully selected to meet the needs of delivering micro-content and implementing micro activities to fit the modern learners, especially the digital generation's "inherent fragmentation of perception and attention deficit" [28]. Underpinned by the constructive learning theory and cognitive load theory, this study proposed the following microlearning instructional design by integrating collaborative technologies as (1) learning support tools for meaningful input (micro-content learning), (2) assessment tools for meaningful output (completion of micro-activities) and (3) interactive social tools for communication and negotiation with other learners. This instructional design also adopted TPBL in every stage of learning to encourage knowledge co-construction and it is expected that learners will be able to develop collaboration competency through the process. The microlearning instructional design framework is presented in Figure 1.

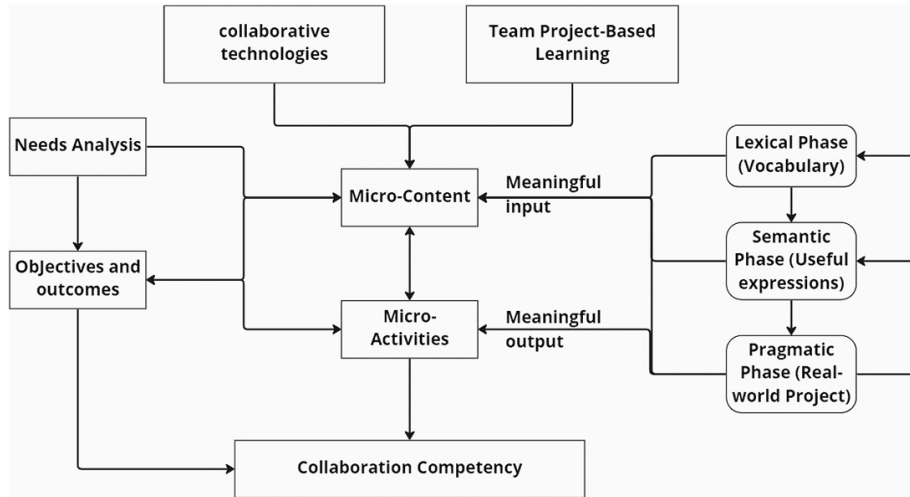


Fig. 1. Microlearning instructional design framework for developing collaboration competency

### 3.2 The novelty of the proposed instructional design framework

With microlearning’s “micro” and “short” characteristics, researchers of this study argued that effective microlearning would only be achieved when its “atomic” chunks are interconnected and presented structurally in the learning process, especially in the process of language learning. The novelty of the proposed microlearning instructional design is addressed as follows.

**Use each chunk learning as a scaffold for subsequent learning.** The study proposed an instructional design by presenting the learning chunks sequentially from the lexical phase (in terms of vocabulary learning), the semantic phase (sentence level and useful expressions) to the pragmatic phase (use the learned language to complete the real-world project). By following this streamlined roadmap, each precedent chunk serves as a “scaffold” for the latter learning steps, and learners will be able to learn each micro-content repeatedly in the learning process, and then each atomic chunk can be aggregated to form a bigger chunk; thus, in practice, learners will be able to accomplish a more significant learning task and to achieve the designated learning outcomes. Based on this principle, the instructional design of microlearning, thus, not only helps reduce cognitive overload but also makes the learning effectively retain and move to long-term memory.

**Redesign micro language learning with a holistic view to developing collaboration competency.** As microlearning is also acclaimed as outcome-oriented learning, the backward design and four strands of meaning-focused language learning proposed by [29] were adopted to guide our proposed instructional design to provide learners with opportunities to learn English in a holistic way. Given that, they will be able to use the language to learn and learn to use the language [20] in this micro-learning course. Also, to cope with the latest language learning trend, and go beyond the traditional language course design with the development of 21st-century skills [11], the microlearning

instructional design adopts essential constructivism principles [12], in which learners' efforts to co-construct knowledge through social interaction are emphasized and also by which collaborative technologies and Team Project-based learning are incorporated to enable this study to investigate learners' development of collaboration competency.

## **4 Methodology**

### **4.1 Participants**

The participants of this study were recruited from a technological university in central Taiwan. Due to the Covid-19 lockdown policy, participant recruitment was challenging, resulting in only 32 participants voluntarily participating in this 12-hour intensive microlearning language course. The majority of participants (31) were sophomores. Their language proficiency, which ranged from CEFR A1 to B1, was identified based on the result of a school-wide placement test administered at the beginning of their first year in college. The participants come from diverse academic backgrounds, representing 12 different departments from five different academic disciplines, including design, management, informatics, science and engineering, as well as humanities and social science. Participants were assigned to two groups based on both their language proficiency and academic major. First, according to their language proficiency, they were assigned to group A (higher-proficiency language learners) and group B (lower-proficiency language learners). Then, students with different academic majors were assigned to each group to provide them with more opportunities for cross-disciplinary communication and collaboration.

### **4.2 Data collection and analysis**

Data were collected quantitatively and qualitatively to answer the three research questions. First, a self-developed bilingual questionnaire consisting of two sections was developed and administered via Google forms to 32 participants at the end of the course aiming to elicit participants' demographic information, understand their satisfaction with the instructional design, explore their perception of the collaboration competency, and examine the further development of collaboration competency between two different language-proficiency groups. In addition, free-text responses to open questions were collected to triangulate the quantitative data. The Likert-type rating questionnaire included seven questions in the first section to explore learners' satisfaction with the learning design. The second part of the questionnaire was adapted from [30] team competency inventory. The original questionnaire includes nine questions evenly distributed to three dimensions: belief, communication, and negotiation. In this study, the fourth dimension, perception (with 3 items), was added in order to explore EFL learners' preferences and prior experience of online collaboration. The questionnaire used a five-point Likert scale, with 5 indicating strongly agree and 1 indicating strongly disagree. Two instructional design experts who also served as the course instructors reviewed and revised the 19 items in the questionnaire to ensure the clarity and appropriateness of each item. A pilot scheme for the questionnaire reliability was estimated based on



ratios of the variances of test items to total test score variance. The overall reliability (Cronbach’s  $\alpha$ ) of the questionnaire was .947. Although the 32 participants have varying language proficiency and study in different academic fields, the small sample size may limit the generalizability of this study’s results. Further research is planned to validate the current questionnaire by recruiting more participants and including more valid items in each dimension.

The data were collected for statistical analysis, beginning with the use of descriptive statistics (mean, standard deviation) to summarize the survey results of each dimension. Then, correlation analysis was conducted to identify the relationship between learners’ satisfaction with the microlearning instructional design and the four dimensions of collaboration competency development. In addition, a simple linear regression test was performed to understand the effects of the proposed microlearning instructional design on the four dimensions of collaboration competency. Lastly, multiple regression analysis was used to explore whether learners’ language proficiency would affect their collaboration competency development. Additionally, the responses to the open-ended questions were analyzed using content analysis to gain in-depth insight into the quantitative survey findings and to complement the quantitative results.

## 5 Results

### 5.1 EFL learners’ satisfaction with the microlearning instructional design

The first research question of this study aimed to understand learners’ satisfaction with the alternative microlearning instructional design (MID). The satisfaction questionnaire included 7 items and was designed based on the following three dimensions: the satisfaction of the instructional design, including materials, activities, and interaction with instructors (items 1–3), the satisfaction of the task and goal attainment (items 4–6), and their satisfaction with the overall microlearning experience. The survey results were analyzed statistically, and the results are presented in Table 1.

**Table 1.** Means and standard deviation of EFL learner’s satisfaction with the microlearning instructional design

Items of Satisfaction	Mean	SD
1. Microlearning Materials	4.50	.62
2. Microlearning Activities	4.38	.70
3. Interaction with the instructor	4.56	.50
4. Learning needs	4.25	.72
5. Task completion	4.38	.75
6. Objective attainment	4.53	.57
7. Overall microlearning experience	4.44	.67



The above descriptive statistical results reveal learners’ satisfaction with this alternative microlearning instructional design. The seven items begin with “I am satisfied with...” and learners marked their agreement with each statement on a scale of 1–5, with 5 indicating strong agreement. According to the mean reported in Table 1, it can be concluded that learners were highly satisfied with the course design, as each of the seven items received a mean higher than 4.25, and among the items, learners expressed great approval for microlearning materials (M = 4.5), and most of them self-reported that they had good interaction with peers and teachers (M = 4.56). Also, over 90% of learners showed that the learning objective was attained (M = 4.53). Last, about 88% of them revealed that they gained positive microlearning experience in this intensive course.

**5.2 The relationship between the proposed microlearning instructional design with the development of learners’ collaboration competency**

The second section of the survey examined the relationship between the microlearning instructional design and the development of learners’ collaboration competency. Thus, the means, standard deviations, reliabilities, and intercorrelations are shown in Table 2.

**Table 2.** Means, standard deviations, correlations between factors and correlation of Collaboration competency dimensions with Microlearning Instructional Design (n = 32)

Dimensions	<i>B</i>	<i>C</i>	<i>N</i>	#Items	mean	SD	Correlation with MID
Belief ( <i>B</i> )	–			3	4.458	.566	.798*** (.000)
Communication ( <i>C</i> )	.877*** (.000)	–		3	4.490	.515	.818*** (.000)
Negotiation ( <i>N</i> )	.901*** (.000)	.871*** (.000)	–	3	4.448	.526	.800*** (.000)
Perception online ( <i>P</i> )	.656*** (.000)	.573*** (.000)	.667*** (.000)	3	4.229	.750	.629*** (.000)

Notes: \*\*p < .01; \*\*\*p < .001, \*Microlearning Instructional Design was abbreviated as MID and it is used in the tables of this study.

Table 2 shows that the intercorrelations among the four dimensions consisting of the collaboration competency range from 0.573\*\* to 0.901\*\*. These figures indicate that the four dimensions are moderate to strong positive correlation with high statistical significance (p < 0.01). Additionally, the last column of Table 2 shows that all dimensions of the collaboration competency are highly positively correlated with the microlearning instructional design. The confirmed relationship model is presented in Figure 2.

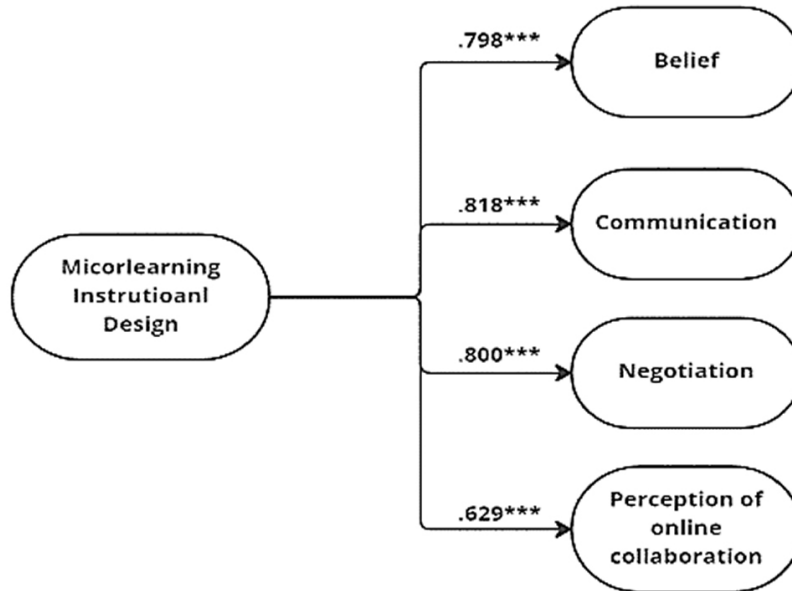


Fig. 2. The confirmed relationship model of MID and collaboration competency

Then, in order to understand the effects of the proposed microlearning instructional design on the four dimensions of collaboration competency, simple linear regression analyses were further used to check whether the microlearning instructional design can predict the development of the four dimensions of collaboration competency. Table 3 shows the results of the simple regression analysis between variables.

The results of Table 3 indicate that the microlearning instructional design had an impact on the four dimensions of collaboration competency. The explanatory power of belief, communication, negotiation, and perception of online collaboration has been found as  $R^2 = 0.637, 0.669, 0.640, \text{ and } 0.395$ , respectively. In addition, the results also reveal that microlearning instructional design significantly predicted the improvement of learners' communication skills ( $\beta = 0.818, t = 7.794, p < .05$ ), followed by the increase in ability to negotiate ( $\beta = 0.800, t = 7.298, p < .05$ ), their growth of positive belief toward online collaboration ( $\beta = 0.798, t = 7.257, p < .05$ ) and their perception of online collaboration ( $\beta = 0.629, t = 4.428, p < .05$ ).

**Table 3.** Simple linear regression analysis results between variables

Dependent Variable	Independent Variable	Model	B	S.E.	$\beta$	t-value
Microlearning Instructional Design	Brief	<b>Model 1</b>				
		(Constant)	.700	.521		1.343
		MID	.846	.117	.798	7.257*
		R = .798   R <sup>2</sup> = .637				
	Communication	<b>Model 2</b>				
		(Constant)	.988	.452		2.183*
		MID	.788	.101	.818	7.794*
		R = .818   R <sup>2</sup> = .669				
	Negotiation	<b>Model 3</b>				
		(Constant)	.950	.483		1.969*
		MID	.787	.108	.800	7.298*
		R = .818   R <sup>2</sup> = .640				
	Perception Online	<b>Model 4</b>				
		(Constant)	.310	.891		.348*
		MID	.882	.199	.629	4.428*
		R = .629   R <sup>2</sup> = .395				

Note: \* $p < .05$ .

### 5.3 The association of learners' language proficiency with the development of collaboration competency in microlearning settings

Since this microlearning instructional design was to examine learners' collaboration competency development in the EFL learning context, it was postulated that learners' language proficiency might impact their collaboration competency development. The paired-sample t-test was first performed, but the results of the two groups did not differ significantly in the four dimensions. Then, multiple regression analysis was run based on the learners' language proficiency to verify whether different effects of collaboration competency development would be found in the two language proficiency groups (high and low). Table 4 shows that aside from the dimension of perception of online collaboration of the low language proficiency group, the explanation power of each dimension in both groups is close and high ( $\beta$  ranges from 0.604–0.854,  $t$  ranges from 4.622–6.146,  $p < .05$ ). Thus, based on the results, it was found that EFL learners' language proficiency did not influence most of the dimensions of collaboration competency development. However, low language proficiency learners' explanation power ( $R^2 = 0.304$ ) of perception of online collaboration is the lowest among the all dimensions.

**Table 4.** Multiple regression results based on learners' language proficiency

Dimensions	Group A (High Language Proficiency)					Group B (Low Language Proficiency)				
	Model (Constant)	B	S.E.	$\beta$	t-value	Model (Constant)	B	S.E.	$\beta$	t-value
Belief	MID	.786	.170	.777	4.622*	MID	.877	.167	.815	5.269*
	R = .777	R <sup>2</sup> = .604				R = .815	R <sup>2</sup> = .665			
	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>
Communication	MID	.833	.136	.854	6.146*	MID	.746	.153	.794	4.892*
	R = .854	R <sup>2</sup> = .730				R = .794	R <sup>2</sup> = .631			
	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>
Negotiation	MID	.729	.139	.815	5.257*	MID	.803	.146	.827	5.507*
	R = .815	R <sup>2</sup> = .664				R = .827	R <sup>2</sup> = .684			
	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>
Perception Online	MID	.149	.911		.163	Course MID	.800	.324	.551	2.471*
	R = .783	R <sup>2</sup> = .613				R = .551	R <sup>2</sup> = .304			
	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>	<b>Model</b> (Constant)	<b>B</b>	<b>S.E.</b>	<b><math>\beta</math></b>	<b>t-value</b>

Note: \* $p < .05$ .

## **6 Discussion**

### **6.1 Learners' satisfaction with the collaborative microlearning instructional design**

Most current research on microlearning in SLA has focused on improving an individual learner's vocabulary or other discrete linguistic element learning [7,8]. This study proposed an alternative instructional design with a holistic view of integrating lexical, semantic, and pragmatic learning in the learning process. In addition, the specific design of each micro-activity aimed to promote collaborative learning to let a language course go beyond the learning of language merely and to develop learners' collaboration competency to cope with the trend of 21st-century language learning. The self-reported quantitative results indicate that learners' satisfaction with the instructional design is high (88% of learners were content with the overall microlearning process). Among the survey items, learners expressed the highest satisfaction with interacting with their course instructor (Mean = 4.56). According to [31], interaction with instructors is a critical factor affecting learners' satisfaction. This claim was also approved with learners' great satisfaction with this study's instructional design. However, discrepancies were discovered in learners' written feedback. The positive written feedback was in accord with the quantitative results, including "being able to use online resources for language learning as well as to utilize platforms or other digital tools for collaborative learning"; in contrast, a couple of learners mentioned the difficulties and unfamiliarity of using the digital tools during the learning process and expressed this hindered their completion of the collaborative tasks because they had to "spend extra time to fix the technical problems." This phenomenon was found in both high- and low-language proficiency groups. The encounter with technical problems in the learning process was also found in the microlearning-related literature [32].

Thus, in terms of the first research question raised in this study, we concluded that this alternative holistic language instructional design of microlearning, including the micro-contents, micro-activities, and specific tasks, received positive feedback; however, it strongly suggested instructors provide training to guide learners to use the selected technologies in advance to reduce the negative impact on collaboration among peers.

### **6.2 Collaborative instructional design of microlearning vs. the development of EFL learners' collaboration competency**

Language classrooms, with their nature of communication engagement and collaborative nature, are asserted as ideal learning contexts for developing collaboration competency. [14]. The purpose of this study is to explore learners' development of collaboration competency through an alternative microlearning instructional design. It is claimed that a well-planned structural instructional design leads the way to successful learning outcomes and attitude development [33]. Thus, in this part of the discussion, the correlation of how the proposed microlearning instructional design influenced the development of EFL learners' collaboration competency was first analyzed by reporting learners' self-perception toward the four dimensions of collaboration

(belief, communication, negotiation, and perception of online collaboration) during the microlearning process. The overall results indicate that the four dimensions are strongly and significantly intercorrelated and the proposed instructional design is also significantly correlated to developing the four aspects of collaboration competency. This result confirms what [33] claimed: an effective instructional design contributes to higher instructional goal attainment. Furthermore, this study intended to probe the instructional effect of each dimension of collaboration competency, and the results show that in addition to the variable of learner's perception of online collaboration, the instructional design had high explanatory power to all the other three variables (belief, communication, and negotiation). Learners' written feedback also reflects that they learned to negotiate and allocate their responsibility through completing collaborative tasks. One of the learners stated that "collaboration activities help me redefine my responsibility as a group member and promote my communicative ability." In contrast, some written feedback revealed EFL learners' uncertainty and concerns about the online collaboration as one learner stated, "I sometimes found it difficult to understand my group members' messages due to the lack of non-verbal information," and another learner's statement concluded that "online collaboration was more challenging." Again, a few learners addressed their concerns about their ability to use collaborative technologies effectively and preferred to accomplish the collaboration tasks face-to-face in physical classroom settings. The above-written feedback might explain the slightly low explanatory power of learners' perception of online collaboration. In addition, reviewing the demographic information of the learners, the researchers also found that most learners self-reported that they had little experience with online learning before. This might be contradicted by the instructional design assumption, which presupposed that after nearly a year of emergency remote learning (ERL) adopted to cope with the outbreak of Covid 19 pandemic, learners should be acquainted with the online learning contexts and be competent to use collaborative platforms or digital tools adequately. However, learners' preferences for online collaboration were not what the study had expected. This result is also consistent with the study of [34] that claimed learners' perception of online learning was a crucial factor toward the satisfaction score of the instruction design. To conclude the findings of this part, the study results showed that learners self-reported the instructional design helps foster their belief toward successful collaboration with their peers and helps improve their communication and negotiation skills in the learning process. However, the "short form and short-term" of microlearning might impact learners' perceptions of online collaboration. Thus, further research about extending this microlearning instructional design in a long-term integration to the formal semester-based language course is suggested in order to understand whether learners' perception toward online collaboration will be improved.

### **6.3 The influence of EFL learners' language proficiency on the development of collaboration competency in microlearning settings**

Findings of studies aiming to investigate the impact of learners' academic performance on collaboration competency development are controversial [25]. This study was also interested in exploring whether learners' language proficiency would be a

predictor of the development of collaboration competency in microlearning settings. The statistical results indicated that no significant difference was found between the high-proficiency and low-proficiency groups. This result contrasted the study of [25], which indicated that high achievers' collaboration competency in TPBL was not as high as expected. Researchers [25] further concluded that this phenomenon might have resulted in high achievers tending to take an individual-oriented instead of collaborative perspective in the teamwork process. However, among the four dimensions of collaboration competency in the current study, only the low language proficiency group showed that the instructional design had lower predictive power on the perception of online collaboration. This might again be verified with more negative written feedback being found from low language proficiency learners. The feedback included more difficulties collaborating with their members online, the inefficiency of obtaining detailed information from their members, and difficulty coming out with a decent discussion in the process. These findings showed that although language proficiency has no significant impact on the belief, communication, and negotiation development of collaboration competency within the proposed microlearning instructional design, low language proficiency affects learners' perception of online collaboration.

## **7 Conclusion**

The “micro” fragmented learning had no doubt an emerging educational and training trend for 21st-century learners. However, it could be a double-edged sword that brings both positive and negative impacts on language learning. To mitigate the negative effect of discrete chunk learning, which is claimed as an inappropriate way for “skill” development [9], this study proposed an alternative microlearning language instructional design with a holistic view by interconnecting the learning chunks to pave a structural microlearning path to develop learners' communicative ability as well as their collaboration competence. The quantitative results revealed that learners were highly contented with the overall microlearning process. Positive self-reported feedback with regard to the proposed instructional design, including the presentation of micro-content, the design of micro-activities, and micro-tasks, was found. This novel microlearning instructional design has also been proven to effectively develop learners' collaboration competency. In terms of the impact of learners' language proficiency on developing collaboration competency through the instructional design, no significant difference was found; however, one finding indicated that low-proficiency learners' perception toward online collaboration was not high, which might be ascribed to the lack of non-verbal messages. In sum, the proposed microlearning instructional design eliminates the concern of learning language elements discretely. With the adoption of selected collaborative technologies and team project-based learning approach, microlearning provides more flexible and diverse learning contexts for language learners to develop collaboration competency as well. One limitation of the current study is that this is a one-time small-scale intervention of microlearning to a semester-based language course; several regular-based iterations of informal microlearning integration into a formal language course with more participants should be planned for further research to explore its long-term influences on learners' perceptions toward online collaboration and their development of collaboration competency.



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