

## The Impacts of Technology-based Communication on EFL Students' Writing

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### Abstract

Digital techniques play a significant role in stimulating EFL students' collaboration during the Covid-19 pandemic. The shift from face-to-face interaction to technology-based communication is regarded to foster language learning, especially writing classes. An action research design was employed to explore the influences of technology-based communication on either students' writing performances or their perceptions towards the new teaching method application. Data triangulation analyzed from three types of collecting instruments in terms of testing, questionnaire, and reflective journal indicates that the integration of Paragraph Punch, ProWritingAid, and LMS web-based platform boosts a more collaborative learning environment among online-engaging participants. The calculated mean scores indicated there was a decrease in students' difficulties regarding cognitive, emotional, and socio-cultural aspects after the intervention. Besides, it was respectively measured a potential trend on online collaborative group's writing performance concerning the task response, coherence & cohesion or the idea for writing development. Nevertheless, there was no significance in promoting students' lexical resources plus grammatical range and accuracy. The results also conveyed participants' optimistic feelings on technology-based communication, their higher self-confidence in accordance with positive attitudes towards writing lessons thanks to their awareness of their promoting critical thinking as well as error identification.

**Keywords:** LMS platform, Paragraph Punch, ProWritingAid, technology-based communication, writing skills.

### 1. Introduction

Technology is used in virtually every area of life, including education. As mentioned in the higher education curriculum, technology has become a new idea of teaching and learning activities (Kern, 1995; Quintero, 2008; Cifuentes & Shih, 2001; Pumjarean et al., 2017; Nasution & Fatimah, 2018). Universities have started offering technology-based courses where instructors educate students. According to Alias & Hussin (2002), Chau & Nguyen (2021), Bui et al. (2021), ICT has become a significant problem in many linguistic discussions nowadays. Chung et al. (2005) claim that the growing usage of computer-based learning resources helps

students gather proof of their use of information technology inside their subject study (in this instance, communication skills) rather than needing to do it separately. Van et al. (2021) state that when students utilize technology to communicate, such as email, they also demonstrate their communication abilities. The existence of coronavirus illness (COVID-19) has had a profound effect on human life across the globe (Nguyen et al., 2021). In education, the spread of this virus has had a fundamental influence. It exposes students to 'home-schooling conditions in every country, including the University of Economics - Technology for Industries (UNETI). This circumstance exposes students to the growth of online learning and the distant delivery of instruction through digital platforms. This forced digital transition is the most secure method of halting the spread of coronavirus outbreaks. As a result, the right of students to education remains paramount without jeopardizing their mental health or safety. For English as foreign language (EFL) students, navigating this online pedagogical environment throughout their term was also a problem.

In the writing course at UNETI, writing is a complicated skill that cannot be learned separately. Generally, students need a thorough grasp of writing theories and practical assistance from the instructor throughout their writing practice (Lin, 2009; Ndoricimpa & Barad, 2021; Le, 2021). They need guidance, criticism, and perhaps improvement throughout the writing process. Le (2021) and Nguyen et al. (2021) share the same view that long-distance learning from home is ineffective in assisting students in improving their writing abilities. According to Ly et al. (2021), this happens as a result of the short time available to students during virtual learning sessions with lecturers, errors in the presentation of content, and insufficient feedback on students' work. Meanwhile, online learning caused students to feel disconnected from their classmates and lecturers, less assisted by their professors, and disheartened by the technical demands associated with online study (Le, 2021). As a result, it requires suitable online writing tool platforms and websites to connect online learning activities between students and lecturers in order for students to get complete feedback and practice in online writing courses.

Elola & Oskoz (2010) and Ware & O'Dowd (2008) shed light on the improvement of students' fluency and accuracy with the assistance of peer-reviewing, thanks to online collaborative writing. Online discussions, stated by Black (2005), have the prospect to boost student curiosity and promote collaborative learning while also promoting reflection and critical thinking. Numerous studies by Chung et al. (2005), Cheung et al. (2006), Yunus et al. (2012), Khabbaz & Najjar (2015), Pumjarean et al. (2017), Ariyanto et al. (2019), and Ly et al. (2021) have investigated the effectiveness of technologies such as Paragraph Punch, ProWritingAid, and a web-based learning management system in increasing student involvement and simplifying the peer review process. Students in online learning communities may create, share information, critical practice reflection, negotiate meaning, test synthesis, and build agreement to the central content. Students' knowledge construction abilities may be honed via online collaborative writing assignments, debates, arguments, and group discussions. As a result, constructive criticism is said to enhance the quality of student-student or student-teacher discussion responses. The virtual learning environment has a variety of merits, including improved

feedback timeliness, additional learning opportunities for both feedback providers and recipients, humanization of the environment, and community building via online participation.

In the context of UNETI, utilizing technology in teaching writing skills has not been drawn much attention. Although lecturers are aware of the potential benefits of digital advances to the teaching and learning process, educators have not integrated technology into their writing classes. Not until the outbreak of Covid-19 has technology been applied into language classes. This urged the researchers to examine the effects of online writing tools concerning Paragraph Punch, ProWritingAid, and LMS platform on English – majored students' writing performance at the university as well as their perceptions towards writing English and technology-based communication.

## 2. Literature review

### 2.1. Writing as a process

To give meaning to the multitude of thoughts racing through our brains, Quintero (2008) defines writing as a process during which a writer connects lexis by using grammatical structures to make it meaningful. For Mitch (quoted in Quintero, 2008), it is a process of discovery and creation. Writing requires students to think critically about the process of writing, including task responses, coherence & cohesion, lexical resources, and grammar range and accuracy acquired via language exposure. Quintero (2008) notes that both instructors and students value excellent writing abilities.

The process of teaching can be quantified as a process-oriented writing approach. It is more focused on the production of meaning than the task's primary goal. Nowadays, many English instructors organize their courses using a process approach, which emphasizes the different phases of writing (Harmer, 2004). It also demands instructors and students to plan, draft, edit, and finalize their work.

*Planning:* Using essential words and terminology to start writing. Harmer (2004) claims participants select what material to discuss before writing or typing. Some participants may need extensive information, while others may just need a few notes (Harmer, 2004, p. 4). So, while planning, the writer must consider the goal, audience, and content structure which are regarded as key elements driving to the writing stage.

*Drafting:* A draft is the initial version of writing work (Harmer, 2004). During the writing step, competitors must persuade and demonstrate their ability to combine words logically. They may now reuse language and resources to enhance their paragraphs, improving their writing fluency.

*Editing:* It refers to students revising their work after getting instructor criticism. Editing means that the text will be changed as many times as possible before it is finalized. According to Harmer (2004), writers typically look it over to evaluate and locate its significance after writing a draft.

*Final draft:* Students have to complete the final writing version based on instructor input. At this level, students are required to write w, considering grammar, topic, and vocabulary. According to Harmer (2004), authors create their final version after editing their draft and making the required adjustments.

## *2.2. Online collaborative writing*

### *Definitions*

Ede and Lunsford (1990) define collaborative writing as any writing done with others. These include brainstorming, outlining, note-taking, organizational planning; writing; revising; editing; and publishing. Farkas (1991) proposes four kinds of writing collaboration when two or more people firstly compose a text, secondly contribute components to a document, thirdly edit or review other's textual form and finally work interactively and conduct drafting.

Serial cooperation is added by Jaszi (1994), which claims two or more individuals work sequentially to brainstorm, correct mistakes, and expound on common subjects at the same time. With the advent of the Internet, cooperative writing has evolved to include the Internet as a writing medium. That the human mind can control a networked computer as a mediator of communication may change the way writing is taught and learned. Writing courses use technology-based communication because of the interactive, dynamic, and collaborative learning opportunities it provides (Ede and Lunsford, 1990). The prospect of networked computer technology along with the researchers' definition of collaborative writing may be extended to online collaborative writing. Online collaborative writing is face-to-face interaction. However, any activities and communication happening before, during, or after the online collaborative writing process may be considered online collaborative writing, which definitely is part of technology-assisted collaborative learning.

### *Online collaborative learning benefits and difficulties*

In terms of cognitive aspects, Lindblom-Ylanne and Pihlajamaki (2003) investigating whether a computer-mediated learning environment that enables students to share drafts and get feedback enhances their compositions. This qualitative research included 25 law students. Interviews with students and teachers provided data for this research. The students gained knowledge, acquired critical and independent thinking abilities and self-regulatory skills. Implementing a technology-mediated class was also linked to excellent essay scores. Tuzi (2004) investigated the effect of electronic feedback on second-language authors' modifications. This research included 20 college authors. Students drafted, reacted, and edited on a database-driven website intended for writing. Students got spoken comments from friends and classmates, as well as face-to-face tutoring from university writing centers. Interviews, observations, written drafts, and participant answers were used to gather data. The research recognized students' preference towards vocal feedback, e-feedback but indicated their enhancement in revision via the process of focusing authors on uniting with new material to the

original work. Online feedback also influenced greater structural changes, such as sentence and paragraph alterations. Kern (1995) notes that networked computer systems have issues with grammatical correctness, conversation coherence, and continuity.

Regarding emotional aspects, Alias and Hussin (2002) investigated the efficacy of E-learning activities in students' writing processes. A stratified sample of 20 college students participating in an EFL writing course was chosen. The questionnaire was given out at the conclusion of each session, as were the logbooks containing student records of their online activities. A mood survey was also given at the start and conclusion of the program to assess the students' emotional changes. Email and online conversation increased students' drive, confidence and decreased anxiety. However, Alias and Hussin's (2002) research only had 20 individuals, which might not be generalized to other groups. Weasenforth and Meloni (2002) utilize constructivist concepts to assess how well-threaded conversations meet constructivist educational objectives. This qualitative research included 52 foreign students from advanced ESL reading/writing courses for three semesters. The research found that the technology reduced threatening emotions and increased motivation.

Concerning socio-cultural aspects, Beuchor and Bullen (2005) conducted a longitudinal study using a mixed-method approach to determine the amount and kind of interaction and interpersonal content in messages sent by online graduate EFL students. The qualitative data includes discussion forum content analysis. Quantitative data included counting and classifying content analysis units given to explanatory and response factors. This research included 16 doctorate students in education. The research found that fostering interactive and reactive online communications increases participation and debate depth, thereby facilitating online collective knowledge creation. The cultural problems of students' communication processes, for instance, interaction complexity and group cohesiveness, may influence their cognitive learning results. In an international languages class, Chung et al. (2005) used computer-assisted communicative activities to examine language acquisition as a socially mediated process. This research included 26 high school students. The research matched Korean and English-speaking classmates who worked together on chat homework tasks. The research found that online collaborative conversation helps cross-linguistic knowledge development. Using the meaning-making tools inside their local learning community, these students were encouraged to acquire and teach contextually relevant and acceptable language and social conduct. In other words, one partner's beliefs, language, and cultural practices may become the other's. Specifically, students gained self-awareness in regard to others. According to Cifuentes and Shih (2001), qualitative research was performed to identify certain online teaching methods, advantages, and limits of online education, as well as cultural factors connected with cross-cultural cooperation. 37 Taiwanese students were partnered with 37 American university pre-service instructors. Data were gathered through correspondence printouts, formative assessments, reflective diary entries, and surveys of Taiwanese partners. Participants highlighted difficulties related to virtual teaching and learning, such as reliance on an unresponsive partner and a feeling of alienation. Students were dissatisfied by the absence of quick or no peer response. A sense of alienation

caused by not knowing when an answer will arrive contributed to several students' complaints. Curtis and Lawson (2002) used a mixed-method approach to examine whether students' textual exchanges in an online learning environment revealed signs of collaborative learning. The research included 24 college students. The results showed that there are no visible difficulties in online contact since the majority of participants want to debate with what they agree, but they skim over concepts that contradict their background knowledge and are consequently unable to engage.

### *2.3. Paragraph Punch, ProWritingAid, and LMS platform as technology-based communication used in EFL writing classrooms*

First and foremost, online writing assistance Paragraph Punch may help youngsters learn to write from home. This method aids students in organizing their ideas and learning to express themselves through writing. Besides, Paragraph Punch is an online tool for improving paragraph writing skills (Yunus, Salehi, & Nordin, 2012). Providing students with writing processes from conception to publishing. One of the most obvious advantages is its free charge to utilize the trial version of this site. This site offers 15 writing topics, and 1,548 writing prompts to help students write. It teaches students to write paragraphs utilizing logic and facts as well as causes and effects. Paragraph Punch teaches learners efficient paragraph construction. On this site, prewriting is needed. The students choose their own subjects, which apparently encourages them to utilize current terms as well as offers questions to help students brainstorm. Unlike traditional courses, when students collaborate with the teacher, students on this site use writing software. Next, the program shows a sample topic sentence that could help start a paragraph. Moreover, lessons involve creating sentences using pre-written words, which encourages writers to bring them up to sentences. The sentences must also be arranged in a paragraph. Not only may overlong sentences be deleted, but Paragraph Punch also offers transition words as well. In addition, the program initially provides an example of a conclusion. The students are then asked to compose a conclusion. Input objects may be moved around the screen, so this content may be edited by students. Then they may save or print their work. Several studies indicate that Paragraph Punch improves writing skills. Lin (2009) states that ParagraphPunch helps with spelling and writing, Yunus, Salehi and Nordin (2012) claim that Paragraph Punch is a great way to teach writing to young children. Paragraph Punch teaches new writers how to create paragraphs step-by-step. Lin (2009) investigated the effect of Paragraph Punch and other technological aids on the self-perception of writing difficulties among English-language learners. She mentioned many benefits of Paragraph Punch, including spelling check and process reinforcement. Additionally, she discussed some of the software's shortcomings and the consequences of technology in the writing classroom (Lin, 2009). Nevertheless, this research maintains that it is crucial as the instructor's views of the software's value as a writing tool are no less significant than students' opinions, giving the teacher's pivotal role in the classroom. Sharing the same view, Yunus, Salehi, and Nordin (2012) examined pre-service instructors' views of Paragraph Punch for helping novice writers. This program was intended to assist English language learners in developing and organizing paragraphs for essay

writing. Through a questionnaire survey of third-year students at a public institution in Malaysia, this study ascertained their attitudes about the usage of Paragraph Punch as a possible writing aid. The data analysis revealed that respondents owned a favorable taste of this writing application for novice writers. The author additionally highlighted its design should be improved to be more interactive and visually appealing in ESL writing.

In the second place, ProWritingAid is a new free online tool that checks the text for correctness (Ariyanto, Mukminatien, & Tresnadewi, 2019). This program helps self-editing writers by assisting with SPAG evaluations (Spelling, Punctuation, and Grammar). Students may self-assess their writing skills by running this program and getting a report and score. To be more illustrated, ProWritingAid is a useful tool for students who study at home. This program enables students to revise and test their work without waiting for comments. They may instantly verify their piece of writing for spelling, grammatical, and punctuation problems. Additionally, students are corrected and explained their errors. Corrective feedback comprises the sign, correct form, and metalinguistic information regarding a student's linguistic mistake (Loewen & Erlam, 2006). As a result, they may self-evaluate their writing, which enriches students' writing development. Teachers and students alike praised ProWritingAid and instructor comments in class, according to Ariyanto, Mukminatien, and Tresnadewi (2019). It aided teachers in providing feedback and allowing them to devote more time to the content and organization of students' paragraphs and students in detecting, learning, and correcting their papers. ProWritingAid has been recognized the benefits of online writing tools to EFL students during the Covid-19 epidemic in Natution and Fatimah (2018) and Handayani (2020). Those researchers investigated that the difficulties students encountered while learning to write stem from the instructors who were not innovative in their approach to teach writing. ProWritingAid is tasked with the responsibility of resolving the issues. By incorporating professional writing assistance into the writing instruction process, students could become more engaging. The web was user-friendly and aided instructors in communicating with students about the contents. Teachers may successfully educate students about writing by using professional writing aids, and students can study on their own to acquire the knowledge as well.

Last but not least, LMS stands for Learning Management System, which is regarded a server-assisted software. To be more specific, LMS can tackle database information about users, courses, and material for a specific purpose, for instance, a business or education. Sidney Pressey invented the LMS in 1924, dubbed the "teaching machine. Whether open-source or proprietary, LMS software provides users with four primary features: content production, communication, assessment, and administration. As a result, instructors and administrators may effectively administer the LMS depending on their unique requirements. In the educational context, LMSs are developed in response to teachers' needs for managing students' paths of learning in an online classroom, monitoring their performance, creating and distributing content, organizing e-learning activities, evaluating, and providing tools for communication, collaboration, which means that LMSs are robust technologies that teachers can use to create their own online courses, administrative purposes, documentation, reports on activities, virtual

teaching, and learning activities, e-learning, and provision of training materials to their students. Additionally, this function of LMS, what they referred to as an e-learning platform, is a very flexible technology that enables teachers or lecturers to submit course content and manage a large amount of online course information in a single integrated LMS really offers space or atmosphere for virtual teaching, learning, and activities that is self-contained and devoid of time and space constraints. Additionally, the use of LMSs in the pedagogical field is well-known. Its benefits have been experimentally shown; particularly, language learning via LMS-based teaching materials impedes the procedure of becoming independent language learners (Khabbaz & Najjar, 2015). In Malaysia, LMS has aided higher-education students in improving their writing skills as well as their comprehension of certain subjects via explanations and examples provided by either classmates or professors (Hamat et al., 2014). Additionally, LMS has enabled a number of advantages over conventional systems for teaching a foreign language, most notably in arranging individual work. The use of LMS in writing class has resulted in good and encouraging student responses. This demonstrates that students in Hong Kong who used LMS truly appreciated the incorporation of technology (Cheung et al., 2006), in accordance with positive views about the use of LMS platform in productive-skill courses in Iran (Ma'azi & Janfeshan, 2018). Meanwhile, research conducted in Thailand by Pumjarean et al. (2017) discovered that LMS is a viable and affordable, and effective educational tool for improving EFL students' writing and grammar abilities in a blended-eLearning environment.

#### *2.4 Research Questions*

This research will discuss firstly the influences of online writing tools in terms of Paragraph Punch, ProWritingAid and LMS platform on English – majored students' writing performance at UNETI and secondly investigate students' perceptions towards writing English and technology-based communication. Hence, three research questions were addressed.

- a) What are students' perspectives towards writing in English at UNETI?
- b) To what extent does the use of Paragraph Punch, ProWritingAid, and LMS platform influence the students' writing performance at UNETI?
- c) What are the students' perceptions towards the use of Paragraph Punch, ProWritingAid, and LMS platform in writing classes at UNETI?

### **3. Methods**

#### *3.1 Pedagogical Setting & Participants*

The research included 18 UNETI English-major freshmen which are evaluated to be at a pre-intermediate level of English proficiency via the entrance exam and their academic transcript at high school. Their textbook is "Writing" published by Collins. They have to pass the V-step standardized exam at the end of the semester to accomplish this required subject. The writing exam assesses students' ability to construct basic phrases, compose memos, messages, postcards, letters, and emails. It lasts 35 minutes and has three tasks. Task 1 is building sentences in which test-takers complete five sentences with suggested words or phrases. Task



2 is writing a memo or a message that test-takers have to complete an everyday writing task, such as a short note, a memo or a message. Task 3 is writing a letter or a postcard: test-takers may complete a variety of communication tasks by writing a letter or email.

### *3.2 Design of the Study*

Creswell (2014) defines action research as combining research with action. Action research aimed at addressing issues, bringing about social change, or taking practical action should be done by all instructors at any time. To cope with multi-cultural groups, it included four steps: planning, acting, observing, and reflecting. Creswell (2014) examines action research's main features. Firstly, action research studies real-world problems and seeks to address them. Secondly, action research helps them better understand and enhance their teaching methods. Action research also includes numerous individuals and groups whose responsibilities may change and be negotiated. Furthermore, action research is a cycle of issue contemplation, data gathering, and action. Finally, action research findings are readily disseminated and utilized by teachers, school staff, parents organizations, and other stakeholders. On the basis of those typical characteristics, the researchers decided to investigate action research with the aim of exploring the use of technology-assisted communication on students' writing at UNETI.

### *3.3 Data collection & analysis and research procedure.*

#### *Data collection and analysis*

The first data collection instrument is a 42-item questionnaire that measured self-perception of writing problems on three scales: cognitive, emotional, and socio-cultural difficulties. Writing in a foreign language requires integrating cognitive and linguistic elements of writing concurrently, making an apparent distinction between linguistic and cognitive characteristics. There were 25 questions assessing the cognitive dimension, 5 measuring the social component, and 12 measuring the emotional dimension. The questionnaire ranged from "strongly disagree" to "highly agree." For each item, the highest score (6) represented the most difficulty in writing, while the lowest score (1) indicated the least difficulty. When a neutral opinion is provided, almost all the questionnaire-takers may prefer to accept this view; thus, no definitive opinion is expressed (Brown, 2001). To prevent this, the researchers gave responders an equal number of choices. A six-point Likert scale included (1) *Strongly Disagree*, (2) *Disagree*, (3) *Somewhat Disagree*, (4) *Somewhat Agree*, (5) *Agree*, and (6) *Strongly Agree*. Multiple versions of the questionnaire were evaluated, revised, and edited by lecturers from the Faculty of Foreign Languages to ensure content validity. Besides, the Cronbach's Alpha was calculated via SPSS version 22 at 0.81 to verify the reliability of the questionnaire, which is shown in Table 1

Table 1: Reliability statistics of the questionnaire.

Cronbach's Alpha	No. of items	Cronbach's alpha	Internal consistency
.81	42	$\alpha \geq 0.9$	Excellent
		$0.9 > \alpha \geq 0.8$	Good
		$0.8 > \alpha \geq 0.7$	Acceptable
		$0.7 > \alpha \geq 0.6$	Questionable
		$0.6 > \alpha \geq 0.5$	Poor
		$0.5 > \alpha$	Unacceptable

The second data set consisted of students writing tests. The researchers administered pre- and post- Vietnamese standardized writing tests of English proficiency (Vstep) to the participants to determine the differences between students' writing performances before and after the intervention with technology-based communication. The writing tests were academically chosen from the exam bank designed and revised by Faculty of Foreign Languages lecturers for Writing 1. The tests were assessed and evaluated with four criteria in terms of task response, coherence & cohesion, lexical resource, grammatical range, and accuracy.

Another important data collecting tool is the reflective journal. All reflection diaries were thoroughly reviewed several times and then classified. On the first reflection notebook, the researchers started by making notes on possible themes relating to writing problems and problem-solving methods. Following that, a separate list of topics for the second reflection diary was created. The two lists of emerged categories were found to be condensed when compared. First, the reflection journals were evaluated using this master list, and then additional categories were included as needed to support the research themes. To verify the data's reliability, the researchers had the coded data evaluated independently by one qualified qualitative analysis.

### *Research procedure*

The research was conducted as in the table below

Table 2: The procedure of the research

Week/ date	Class activities
Week 1 (March 29 <sup>th</sup> – April 3 <sup>rd</sup> )	Researchers: - Identified problem and planned the action research. - Introduced writing classes with technology-based communication. - Carried out the questionnaire and the pre-test.
Week 2 (April 5 <sup>th</sup> – April 10 <sup>th</sup> )	Writing instructions: - Teacher instructed students with specific topics writing tasks relating to the textbook. - Teacher guided students to use Paragraph Punch, ProWritingAid, and LMS.

Week 3 – Week 10 (April 12 <sup>th</sup> – June 19 <sup>th</sup> )	Students: - Used LMS to check for teacher's instruction, assigned tasks or requirements, online discussion, or conversation. - Practiced writing step-by-step with Paragraph Punch, completed the first draft. - Checked errors and mistakes on ProWritingAid. - Peter checked their mates' drafts. - Discussed the comments and feedbacks to find the most appropriate way to fix the errors. - Wrote the second draft. - Posted both drafts on LMS. - Wrote reflective journals every week.
Week 11 (June 21 <sup>st</sup> – June 26 <sup>th</sup> )	- Carried out post-test.

## 4. Results

### 4.1. Students' self-perceptions about writing in English.

The participants completed a questionnaire in which they were asked to rate items on a questionnaire titled 'Self-Perceptions of Writing Difficulties' from strongly disagree to strongly agree. The questionnaire assessed three facets of writing difficulty: emotional, social, and cognitive. Although some questions may span dimensions, they were classified in this questionnaire according to their literal meanings without regard for the interconnections between these three aspects of writing. Three open-ended questions were added to the questionnaire to allow for a more in-depth analysis of English writing problems. Table 2 presents descriptive statistics indicating the relative importance of specific items from the most difficult to the least in terms of three-dimensional aspects.

Table 3: Descriptive analysis of Self-Perceptions of Writing Difficulties

No.	Dimension	Items	Mean	Std. Deviation	Rank
1	Emotional	I like to write in English	3.03	1.31	34
2	Cognitive	It is easy for me to get started writing English	3.92	1.28	15
3	Cognitive	It is easy for me to keep my English writing going and write smoothly	3.92	1.02	15
4.	Cognitive	I write short and simple English sentences	3.88	1.30	20
5	Cognitive	It is easy for me to write my ideas into English paragraph	3.79	1.02	23
6	Cognitive	I find it difficult to generate ideas for writing	4.04	1.08	11
7	Cognitive	I find it difficult to use articles	3.50	1.45	28
8	Cognitive	I find it difficult to use prepositions	4.08	1.10	10
9	Cognitive	I find it difficult to use verb tenses within	3.04	1.12	33

		a paragraph			
10	Cognitive	I find it difficult to order words in English sentences	3.21	1.29	32
11	Cognitive	I have difficulty with word choice	5.01	.97	1
12	Cognitive	I find it difficult to use punctuation	3.33	1.34	30
13	Cognitive	I use few idioms	4.50	1.69	5
14	Cognitive	I find it difficult to sp correctly	4.21	1.18	7
15	Cognitive	I find it difficult to generate ideas for writing	4.04	1.08	11
16	Socio-cultural	I find it difficult to adjust my way of writing in native language writing	4.97	1.07	2
17	Cognitive	I am aware of what sentence fragments are, but I still use them	4.00	1.14	14
18	Cognitive	I am aware of what sentence fragments are, and I don't use them	3.58	1.35	26
19	Cognitive	I know what run-on sentences are, but I still use them	3.38	1.61	29
20	Cognitive	I know what run-on sentences are, and I don't use them	3.38	1.44	20
21	Cognitive	I find it difficulty to go from one paragraph to another with smooth, w-connected transitions	3.79	1.21	23
22	Cognitive	I feel that I find it hard to write logically and systematically in English	3.92	1.25	15
23	Cognitive	I find it difficult to write a topic sentence	4.21	1.18	7
24	Cognitive	I find it difficult to focus on the main points	3.92	1.10	15
25	Cognitive	I find it difficult to organize ideas	3.88	1.44	20
26	Cognitive	I find it difficult to summarize my points to conclude the writing	4.17	1.13	9
27	Cognitive	When writing a paragraph, I find it difficult to write a topic sentence, body sentences, and a concluding sentence	4.04	1.08	11
28	Cognitive	What I write in the beginning and at the end of the paper is not consistent and logical	3.54	1.22	27
29	Cognitive	I stop many times to think about what to write during my writing process	4.78	.87	3
30	Emotional	I am anxious when writing in English	4.58	1.18	4
31	Emotional	I am confident in my English writing	1.64	1.02	41
32	Emotional	I have confidence in English writing	3.71	1.49	25
33	Cognitive	I don't have enough time to finish my English writing papers	3.92	1.18	15
34	Emotional	I feel comfortable with reviewing my papers in English	3.33	1.31	30
35	Emotional	I like to use technology-based apps in my writing class	2.45	1.27	36
36	Cognitive	I am a skillful English writing	4.25	1.32	6
37	Socio-cultural	I feel comfortable with sharing my English writing with my peers	2.28	1.01	37

38	Socio-cultural	I like to share my English writing with my English teachers	1.68	.77	40
39	Socio-cultural	I feel comfortable with sharing my English papers with lecturers	1.92	1.06	39
40	Socio-cultural	I like to give feedback and comments to my peers' papers	2.03	1.07	38
41	Emotional	I think my writing papers are well-written and meaningful	2.47	1.35	35
42	Emotional	I am motivated to learn English writing in the future	1.27	.46	42

Participants agreed that the primary writing problem ( $M=5.01$ ;  $SD=.97$ ) was word choice. Participants stated in their open-ended responses that they typically looked up unfamiliar English terms in the bilingual dictionary when they were unsure. However, students often reported that translations from a multilingual dictionary came out as a mishmash of words.

Adapting to native thinking patterns ( $M=4.97$ ;  $SD=1.07$ ) was the second most challenging aspect of writing. Numerous participants stated that they struggled to adapt their native language writing styles to American thinking processes. Students continued to think in their original language and utilized their first language's rhetorical tendencies while writing English essays. Numerous students said that they struggled to transition from their native language's linear rhetorical aspects to English linear rhetorical ones. Because writing patterns or styles are either linguistic or culturally entrenched, several respondents in this research discovered that it requires some effort to adjust to new thought patterns while communicating in written English.

Writing fluency ( $M=4.78$ ;  $SD=.87$ ) was the third most challenging kind of writing. Students indicated that they often pause to consider what to write while writing English essays. They often ponder for long amounts of time yet come up with just a few words to describe a very complex concept; as a result, they have significant difficulties with fluency.

The least difficult item is defined by the mean score of all items that are less than or equal to 3 ( $3.54 - .44=3$ ). Participants generally struggled less with emotional and social elements of writing. For instance, students hardly find writing in international language tedious or meaningless ( $M=2.47$ ;  $SD=1.35$ ), nor did they hate technology-based apps ( $M=2.45$ ;  $SD=1.27$ ). Students had no difficulties sharing writing with other English language learners ( $M=2.28$ ;  $SD=1.01$ ), providing feedback to others ( $M=2.03$ ;  $SD=1.07$ ), or reviewing with professional writers ( $M=1.64$ ;  $SD=1.02$ ).

In general, participants dealt with the next eight elements of writing at the least frequency. The least challenging aspect of learning English writing was motivation ( $M=1.27$ ;  $SD=.46$ ). While participants are aware that they may not be excellent English writers, they are driven to improve their English writing skills in order to succeed in academic writing.

Confidence in native language writing ( $M=1.64$ ;  $SD=1.02$ ) was the second easiest writing

problem to solve. All participants said that they were more confident in their native language writing than they were in English writing. They had been writing in their original language for a lengthy period of time and were familiar with the structure, conventions, and vocabulary.

Sharing writing with English instructors was rated as the third least challenging writing problem ( $M=1.68$ ;  $SD=.77$ ). The majority of participants stated that they were used to writing for a grade and therefore had no reservations about allowing English instructors to view their work or sharing their essays with English teachers.

The mean for cognitive, emotional, and socio-cultural elements of writing was calculated using the average score of all 18 participants on questions classified in each of these categories. Table 4 demonstrates the mean score and standard deviation of three dimensions.

Table 4: Rank on the overall mean score and standard deviation of three dimensions

	<b>Overall Mean Score</b>	<b>Std. Deviation</b>	<b>Rank</b>
Cognitive Dimension	3.92	.54	1
Emotional Dimension	2.79	1.21	2
Sociocultural Dimension	2.56	1.02	3

Further examination of the questionnaire data demonstrated that students struggled the most with cognitive elements of writing ( $M=3.92$ ;  $SD=.54$ ). The emotional dimension of writing ( $M=2.79$ ;  $SD=1.21$ ) was the second-ranked writing difficulty categorization, followed by the sociocultural component of writing ( $M=2.56$ ;  $SD=1.02$ ).

#### *4.2. The influences of Paragraph Punch, ProWritingAid and LMS on students' writing performance.*

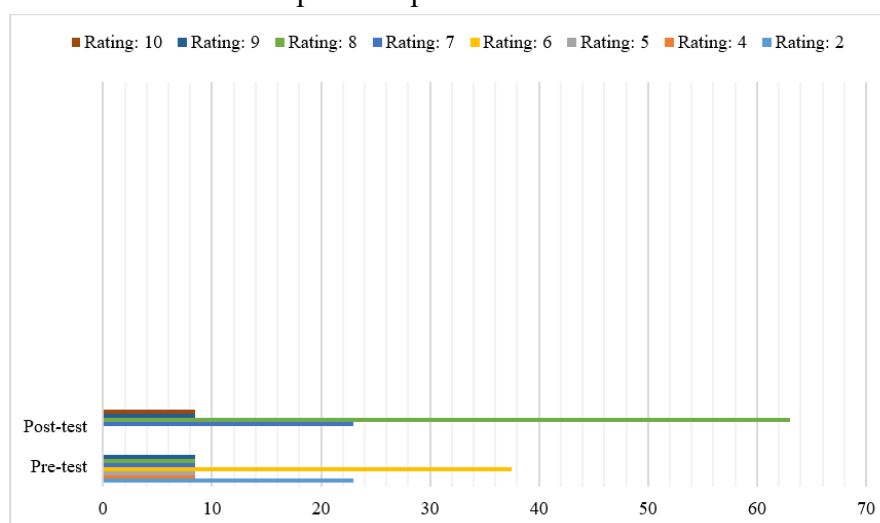
The Vstep standardized pre- and post-writing tests were analyzed to see if the participants scored substantially higher on the post-test. Students' pre-test and post-test were graded using the four-criteria assessing rubric. Table 4 shows the means and standard deviations for the pre- and post-test administrations of the writing performance measure, as was the % increase from pre- to post-test for the participants.

Table 5: Mean score, Standard Deviations and Percent Gain of the pre- and post- test

	N	Mean score	Std. Deviation	Percent Gains
Score on Test before treatment	18	2.64	1.13	51%
Score on Test after treatment	18	4.01	.42	

When the time effect was examined for the online writing students, the tests of within-subjects effects revealed a significant main influence for treatment over time,  $F = 37.63$ ,  $P = .00$  (.01), Partial Eta Square = .63. This indicates that the participants had substantially higher mean writing scores (performance) on the post-test than on the pre-test. Figure 1 displays the distribution of scores on pre- and post-intervention test. This distribution represents the change in rating scores from pre-intervention and post-intervention test.

Figure 1: Distribution of scores on pre- and post-intervention test



Comparing mean writing scores from pre-test to post-test, students' post-test writing paper demonstrated improvement in the following areas: ideas (from analyzing the topic and task, the restraints to addressing the requirement well); organization (from decent organization to well organized); and multiple opinions (from using insufficient to sufficient explanations, or details). Additionally, when raters' feedbacks about students' writing weaknesses and strengths between pre-test and post-test writing samples, it was discovered that students made progress in terms of ideas (84%), organization (100%), multiple perspectives (92%), and adequate arguments (92%) (100%). Students wrote more (the average amount of words written increased by 82% between pre-test and post-test). However, as shown by raters' remarks, students continued to struggle with word choice (100%) and grammar (articles and run-on sentences). 91.5% of participants continued to struggle with articles, while 77% struggled with run-on sentences.

#### *4.3. Students' perceptions towards the use of Paragraph Punch, ProWritingAids and LMS in writing classes.*

Through the analysis from reflective journals, most e-writing participants said that they promoted their views, reasoning, and substance in writing by reading from the writings of other people, from comments and feedback on the technology-based discussion forum, and from journal entries reflecting the activity on those online resources. Having comparable cultural backgrounds, the students were better able to grasp their roles and significance. Many students reported learning the concepts of organization, word choice, transitional words, coherence and cohesion, and grammar from reading online native speakers' feedback. The survey revealed that, in general, they felt that they had built up their organization, since their organization was quite similar to many other organizations they had encountered. But most thought it would take longer to enhance their writing by choosing better words, or by editing and revising. Even after considering a multitude of terms, they still found it difficult to choose the most suitable one. Students still struggled with how to properly use articles in run-on sentences. One of the students reported that:

*I always write what I believe. My reasoning, thoughts, and examples are often subjective. Reading other online posts frequently gives me additional arguments and instances to defend my own viewpoint. Also, some peers may point out my poor arguments or thoughts and propose ways to modify them to include other viewpoints. Other mates may grasp my meaning and culture better than I do. And then there are the online native-speaking instructors who give me advice on how to improve my grammar and organization. Online practice with corrected academic feedback is extremely beneficial. I frequently make these unintentional errors, and self-editing these errors is difficult for me. Online immediate feedback may help me improve my writing.*

In addition, these writing software programs assist writers in fixing fundamental grammatical mistakes and provide recommendations for improvement. Statements regarding spelling and grammar check were written as follow:

*As soon as I recognize the word's pronunciation, Paragraph Punch may verify my spelling and grammar. I don't have to stress spelling and punctuation.*

The process of brainstorming ideas, creating drafts, rewriting, editing, and posting online helped six participants develop the habit of writing.

*Paragraph Punch and ProWritingAids encourage me to compose a draft, rewrite, edit, and finally publish. It helps me develop the habit of writing. Writing takes time, but when you complete it, you feel accomplished.*

All nine participants' data collected in the writing program and online discussion helped them see trends in their writing faults. This type of writing mistake awareness lets individuals self-



evaluate their writing issues and find solutions.

*I used to think I had a problem with word choice. However, my Paragraph Punch error record and internet comments revealed that I have a lot of issues utilizing articles. My feeling of choosing the correct option is like speaking English with an accent.*

Most of the participants said that reading others' writing papers and responses on LMS-based forum gave them numerous ideas and insights. Online writing and conversation offered them more options for editing and enhancing their work than writing alone. Moreover, online comments and recommendations provided opportunities for correcting grammar, sentence structure, and word choice. Peer criticism and comments improved participants' knowledge of grammar rules.

*Online peers' comments may help me identify poor reasoning and instances and provide alternative suggestions. Some of my online peers even disagree with me. It helps me see things from a different viewpoint and get a better overall grasp of a situation.*

Several students said they liked threads. They said a comment thread from every draft they uploaded online helped foster critical thinking abilities. The numerous suggestions/comments from discussion topics/concerns helped them improve their critical thinking abilities. Participants typically have to read feedbacks and recommendations attentively, assess the input, and decide which suggestions to implement and which to reject. Participants had to think critically while providing constructive comments on other people's drafts and subjects to assist their peers in improving their writing quality and providing recommendations for writing issue solving methods. The online comments encouraged participants to think critically about how to improve their writing for their peers.

*Feedback and recommendations help me think about my exemplification in more critical ways and thoughts and select those that fit mine. To help me think critically and make choices, I sometimes study my subject on the Internet.*

In short, students' writing performance increased between pre-test and post- assignments. Paragraph Punch, ProWritingAid and LMS as online tools contributed to students' writing quality, organization, and utilization of various viewpoints. However, the technology-based communication had no effect on students' word choice, articles or run-on sentences.

Almost everyone stated they felt more relaxed and confident while writing and chatting online. It was important to them that they were able to communicate and share their thoughts. They were writing in an online setting, they did not have to worry about embarrassing themselves. One respondent stated:

*My criticism helps me improve my writing skills and understand why I make recommendations. It makes me question why these ideas are superior. Others may have*

*opposing views. They debate on the LMS forum. Like sharing ideas and resolving conflicts.*

They were able to think and write better after reducing their anxiety levels. It encouraged them to keep writing when they saw their ideas put down. So they started writing more like they were speaking, and they improved their online writing and conversation skills.

Participants are additionally more self-assured in their English writing. Most participants were insecure about their English composition before the intervention. They gained confidence in their English writing after participating in internet forums and writing contests. They realized they could benefit themselves by using online English websites. A collaborative online learning community where everyone may edit, rewrite, and improve English writing was created by Paragraph Punch, ProWritingAids and LMS.

Incorporating technology-based into writing teaching seems to be gaining popularity among students. Participants reported benefits in their writing processes as a result of technology-based techniques. Cognitive, emotional and socio-cultural aspects were all benefited. Grammar and spelling checks, writing process reinforcement, pattern recognition, strengthening various viewpoints, and critical thinking abilities are some of the cognitive merits. Structure and logic were gained by the socio-cultural component. Furthermore, the advantages of decreasing anxiety and boosting confidence were psychologically significant. The learning community discussed and exchanged problem-solving and writing techniques throughout the writing process. Online conversation and engagement helped foster metacognitive and higher-level cognitive skills. It also highlighted students' roles in classrooms. The instructor just facilitated, not designed activities and objectives individually. Students negotiated and contributed to their own learning objectives and activities.

## **5. Discussion**

Many of the top writing problems reported in this research match earlier results regarding students' writing difficulties, particularly linguistic (Lindblom & Pihlajamaki, 2003; Lin, 2009, Le, 2021) and rhetorical (Tuzi, 2004; Kern, 1995). students have unique writing requirements since they are transitioning from one writing culture to another. Students have the greatest challenges in terms of cognitive dimension (Handayani, 2020). Writing fluency was rated third in writing difficulty. Due to a lack of functional repertoire vocabulary, students had to pause often to choose an English term. Students also tended to think in their native language before writing in English. They often had to pause to consider word choice, word order, phrase structure, and organization. However, culturally engendered rhetorical problems go beyond cognitive limitations (Farkas, 1991). When students write, their vocabulary is restricted. They go to the bilingual dictionary because of the certainty in native language. Using a multilingual dictionary does not completely address the issue since they must again select between various interpretations of the term. The research found word choice to be the most challenging to write. Term choice demands authors to choose the word that best conveys the intended meaning. This

pick considers the word's meaning, the communication's goal, and the audience. Language must be chosen according to the goal and audience. This needs traditional and cultural information that may not be able to quickly learn (Jaszi, 1994). The majority of students struggle with this re-learning process. This study's results also indicate that students' second most significant writing challenge is emotional deficit. This supports earlier research (Alias & Hussin 2002; Weasenforth & Meloni, 2002) showing students were challenged with writing due to emotional issues. Writing anxiety is common among s due to a lack of confidence in English writing. Emotional issues may negatively affect s' writing processes and performances.

This study's results are consistent with prior research on students' writing problems. Most participants blamed their writing problems on cognitive deficiencies. The research found that students exhibited second-level involvement in affective writing inadequacies and third-ranked needs in socio-cultural writing issues. Few prior research focused on students' emotional or socio-cultural writing problems. This study's findings suggest that perceived writing problems are greatest in cognitive, second highest in emotional, and lowest in socio-cultural dimensions. The first reason is that most students' essays are graded and given feedback on cognitive elements of writing. Generally, students' writing experiences and views concentrate on performance and product writing.

The findings additionally show that when students are taught utilizing technology-based communication, there are statistically significant changes between pre- and post-test writing proficiency. Students improved in amount of writing, structure, topic sentence, concepts, spelling, and utilization of different viewpoints. Less fluency, organization, clear concepts, spelling, and numerous thoughts are associated with technology-based communication, according to prior research (Cifuentes & Shih, 2001; Lindblom-Ylanne & Pihlajamaki 2003; Tusi 2004). However, students' grammatical structures (run-on sentences and articles) and word choice did not improve. The findings partly support Kern's (1995) conclusions that networked writing settings have grammatical drawbacks due to the rapidity of writings. The impact of technology-based communication on students' writing performance may be explained in many ways. It could be explained that they were led to producing a paragraph via personalized online tutoring writing courses and activities like Paragraph Punch, ProWritingAids. Students stated they improved their writing skills in these areas because they were led step by step through the process of writing. Secondly, viewing their peers' online work and comments helped them revise and improve their own writing. Thirdly, students thought online writing was like chatting to friends. Thus they were less concerned about grammar and had stronger thinking-writing connections. In other words, seeing their thoughts in words encouraged them to keep writing and promote their writing skills. Fourthly, post-test data revealed that online writing students still struggled with the greatest difficulties in word choice. Students realized they had trouble with run-on phrases and articles. Few students had difficulties picking the proper terms since they were unfamiliar with the process in their own language. The word choice is also entrenched in culture and customs language, and they had known how to select acceptable terms in writing. It might possibly be explained that they frequently thought in their first language then

transcribed their thoughts into English, causing difficulties in sentence structure and writing faults in run-on sentences.

## 6. Conclusion

This study's main goal was to explore how students' interactions, communication, knowledge construction, and peer collaboration impacted their writing ability in the context of shifting from teacher-centered instruction to a student-centered model using digital technology and advancement. The technology-assisted devices utilized in this research were Paragraph Punch, ProWritingAids, and an online discussion forum (LMS). To enhance English writing processes and results, technology-based communication offered limitless class time and a learning environment.

The findings of the questionnaire revealed that most participants attributed their greatest writing problems to cognitive, emotional, and social limitations. After a technology-based communication intervention intended to address students' attitudes towards writing problems, socio-cultural, cognitive, and emotional elements of writing were decreased the most. There was an improvement in student writing performance. Students improved in writing volume, organization, subject phrase, concepts, and various viewpoints. However, most students' grammar (run-on sentences and articles) and word choice did not improve. Using technology-based communication in writing classes had some advantages. Students felt they improved in many perspectives, critical thinking, identifying writing errors, spelling, grammar, implementing writing processes, and adapting to native writing conventions.

Participants emphasized the benefits of writing on the brain. On the other side, cognitive drawbacks included contradictory input, revision time, and difficulty. The writing software lacked originality and versatility. It took considerably more effort to establish an e-community for effective assistance and information exchange. Initially, students were hesitant to share their English writing with their peers for fear of being judged or because they did not trust their peers' capacity to provide constructive or relevant comments and recommendations. Gradually, students formed an e-learning environment where they not only helped each other write, but provided emotional support by demonstrating empathy and proposing problem-solving methods as well. Students learned to use writing to communicate ideas, resolve conflicts, support others' emotional needs, and solve issues. Online discussion and engagement improved metacognitive and higher-order cognitive processes.

For further studies, teachers should continuously assess to determine if technology-based communication would assist in meeting students' needs and attain their own pedagogical goals. Moreover, while using those digital communications in the writing process, students would considerably be affected by their mindset and emotion. Hence, their writing habit or style would consequently be influenced. This could appropriately suggest lecturers directing students to be conscious of their target writing tasks and utilizing technology as a means of writing and interacting with others. Last but not least, technology-mediated communication should be

investigated more comprehensive insights for pedagogical purposes, not only in writing classes but in other language ones as well.

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