# "Effectiveness of Using Computer-Mediated Communication in Developing EFL Prospective Teachers' Use of 21st Century Learning Skills"

**By**

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## Abstract

The present study was carried out to investigate the effectiveness of using Synchronous Computer-Mediated Communication (SCMC) in promoting 21st Century learning Skills, i.e. Critical Thinking (CT) skills and Collaboration, of EFL prospective teachers at the Faculty of Education, Minia University. A quasi-experimental pretest-posttest control group research design was employed. Participants of the study were sixteen female and male EFL professional diploma students. Tools of the study included three main questionnaires: the first was on critical thinking skills and sub-skills, the second was on domains of collaboration skills and the third one used to examine students' knowledge on SCMC. A language teaching SCMC manual based on CT and collaboration skills was developed by the researcher and used with the study group; a pre-post Collaboration skills Scale and a pre-post CT Test were also used in the study. Analysis of data obtained from students' responses using Wilcoxon Singed Ranks Test (z-value), revealed that SCMC was significantly effective in nurturing EFL prospective teachers 21st Century learning Skills, in particular, CT and Collaboration skills. Students' post performance surpassed their pre performance in both variables. Discussion of these findings, recommendations and suggestions for further research are presented.

**Key Items: SCMC, 21st learning Century Skills, CT and Collaboration.**

## ملخص البحث

# "فاعلية استخدام الاتصال المتزامن بواسطة الكمبيوتر في تنمية استخدام معلمي اللغة الإنجليزية المحتملين لمهارات التعلم للقرن الحادي والعشرين"

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**كلية التربية – جامعة المنيا**

أجريت هذه الدراسة لبحث فاعلية استخدام الاتصال المتزامن بواسطة الكمبيوتر (SCMC) في تعزيز مهارات التعلم في القرن الحادي والعشرين، أي مهارات التفكير الناقد والتشاركيه، لمعلمي اللغة الإنجليزية المحتملين بكلية التربية، جامعة المنيا. استخدمت الدراسة المنهج شبه التجريبي لتحقيق أهداف البحث. اشترك في الدراسة ستة عشر طالبا وطالبة دبلوم مهني في اللغة الإنجليزية. اشتملت أدوات الدراسة على ثلاثة استبيانات رئيسية: الأول كان حول مهارات التفكير الناقد والمهارات الفرعية، والثاني حول مجالات مهارات التشاركيه، والثالث يستخدم لفحص معرفة الطلاب حول SCMC. تم تطوير دليل SCMC مبنيا على مهارات التفكير الناقد ومهارات التشاركيه من قبل الباحثه وتم استخدامه مع مجموعة الدراسة؛ كما تم استخدام مقياس قبلى وبعدي لمهارات التشاركيه وإختبار قبلى وبعدي للتفكير الناقد. تحليل البيانات التي تم الحصول عليها من إستجابات الطلاب باستخدام اختبار وليكوكسون، كشفت أن SCMC كان فعال بشكل كبير في تحسين مهارات التعلم في القرن الحادي والعشرين لمعلمي اللغة الإنجليزية المحتملين، ولا سيما مهارات التفكير الناقد والتشاركيه. تجاوز أداء الطلاب البعدي أدائهم القبلى في كلا المتغيرين؛ وقد تم عرض النتائج ومناقشتها. كما اشتملت الدراسة على أهم التوصيات والمقترحات لبحوث مستقبلية.

**الكلمات المفتاحية: التواصل المتزامن؛ مهارات التعلم للقرن الواحد والعشرين؛ التفكير الناقد والتشاركيه.**

# Effectiveness of Using Computer-Mediated Communication in Developing EFL Prospective Teachers' Use of 21st Century Learning Skills

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## Introduction

Embedding 21st century skills in Teacher Education programs has become inevitable due to the dramatic change of the learning and teaching perspective. This innovative vision required a new generation of prospective teachers with unique qualifications who are able to compete with such challenges in this digitalized world.

## 21st Century learning Skills

Responding to the changing and growing requirements of the 21st century and the announcement of 2030 vision in Egypt, learners should be equipped with certain basic skills that enable them to embrace their new role in this digital era. According to Bakri, et al. (2021), Information and Communication Technology (ICT) is considered as one of the core skills of the 21st century that prospective teachers should possess. Enhancing novice teachers' competency to use digital and technological tools is vital in their preparation phases. Whereas, Baran-Łucarz & Klimas (2020) highlighted other skills such as decision making,

creativity, computer literacy, negotiation, problem solving, self-knowledge and analyzing information for a successful adaptation to the changing world. Indrawati (2021) stated that students need to apply engagement, exploration, explanation, elaboration and evaluation in learning activities.

It is also stated that 21st century skills are basically classified into three broad components as: (1) learning and innovation skills, (2) information, media and technology skills, and (3) life and career skills. A large number of scholars (e.g Kocak & Goksu (2020), Soderlund (2020), Sahin& Han (2020), Omiles, et al.( 2019), Bedir (2019) and Ganayem, & Zidan (2018) placed greater emphasis on the 4Cs (Communication, Critical thinking, Collaboration and Creativity) as key innovative learning skills to be incorporated within any Higher Education institutions, particularly Teacher Education programs. They should tend to reshape the learning environment which enables prospective teachers to work creatively, communicate, think critically and collaborate. Hence, Critical thinking and Collaboration are considered the main concern of this study.

**Critical Thinking**

Critical thinking (CT) is a highly valued one of the 21st century learning skills that regarded as a strong evidence of learners' abilities in analyzing and providing logical views (Indrasiene, et al. 2021). It is the ability to understand a piece of information at a deep, meaningful level and judge the credibility of its source (Halpern & Dunn, 2021). CT is also perceived as individuals' ability to solve and deal effectively with novel

problems that they are encountered in daily life and to provide good reasoning (Nickerson, 2020).

**Collaboration**

The importance of collaboration among learners and teachers is widely acknowledged as an essential 21st century learning skill. Through collaboration, teachers' expertise and relationship with learners are enhanced, whereas, learners are provided with more opportunities for exploring information and skills, communicate, discuss, and co-operate (Mahato, 2021). Creating a collaborative environment is essential where productivity is increased and more tasks are completed for gaining mutual benefit, receiving peer support and feedback and achieving a common shared goal (Arinaitwe, 2021).The sense of cooperation, responsibility and accountability is implied and learners' social, personal and cognitive skills are enhanced as well (Unal, 2020). Therefore, it is increasingly vital to prompt critical thinking and collaboration skills through using a technological medium for a successful adaptation of 21st century's expectations.

**Synchronous Computer-Mediated Communication (SCMC)**

A dramatic change occurred in the learning/teaching activities due to the pandemic Covid-19 all over the world. In Egypt, both the Education and Higher Education systems transformed learning from face-to-face to online models (blended learning). This increased the attention towards Computer-Mediated Communication whether Synchronous (online) or Asynchronous (offline). Computer-Mediated Communication has become one of the most prevailing medium of interaction because of the spreading incorporation of technology in education. SCMC is the

type of simultaneous interaction among individuals through different digital platforms (e.g. WhatsApp, Facebook, Google chat, e-mail) which facilitate the communication, participation and discussion among users (Nejad, Golshan & Naeimi, 2021). SCMC is highly recommended in learning for the greater opportunities it offers for students to work in a more comfortable and a less threatening environment where barriers of classroom interaction could be minimized and learners are engaged in meaningful communication (Kessler, Loewen & Trego, 2021). Such an environment stimulated learners to get support from instructors and peers which could increase their competency to implement critical thinking and develop their cognitive skills. It also enables learners to engage in peer debates and collaborative activities which enrich their involvement and participation (Bates & Donaghue, 2021).

## Literature Review

A large body of literature investigated the impact of SCMC on different aspects of learning and teaching process. Some studies referred to its effectiveness in improving students' learning outcomes including achievement of oral pronunciation proficiency (Nejad, et al. 2021), promoting vocabulary acquisition and retention (Soliman, 2019), improving linguistic capacity (both lexical and grammatical aspect) and communicative performance, increasing speaking competency and language learning interests (Aqeel & Al-Fatlawi, 2019 & Schenker, 2017). Other studies utilized it as a peer observation tool for actively sharing reflections and supporting reflective practices (Bates &

Donaghue, 2021), as a method to boost students' motivation and interaction (Tahriri, Hassaskhah, & Mozafarian, 2015).

Much research has also been dedicated to explore the beneficial role of SCMC for fostering 21st century kills, particularly, CT skills and Collaboration, the target of the current study. Kessler, Loewen & Trego, (2021) were interested in exploring the relevance of using synchronous video computer-mediated communication (SVCMC) in language classroom. Providing an overview of literature, they pointed out that SVCMC was incredibly beneficial for developing different language aspects, communicative competence, collaborative, creative and CT skills. Hanon (2021) highlighted the enriching environment SCMC platforms provided, which enabled students to improve such CT skills including analyzing, negotiating and interpreting meanings. The study also referred to the utility of SCMC for increasing communicative interactions, collaborative work and discussion among students. Zoom and Google classroom were used as SCMC platforms to achieve study's purpose. Data was collected from a seven part questionnaire and students' recordings. In the same line, Lee (2021) utilized Zoom videoconferencing as a synchronous platform in EFL classes where students' satisfaction of learning was gauged. A survey, an interview and a focus group were used to collect data of the study. Results showed that students were highly satisfied when using Zoom videoconferencing synchronous learning as it gave them more chance for communication, interaction, engagement, collaboration and feedback in the same time with each other. In another study, Liang & Fung (2021) utilized SCMC (online discussion forum) aiming to explore its effect on students' CT

skills. Data was collected through CT tests, online recordings of group discussions, students' written work and interviews. Finding of the study showed students' ability to display some CT skills including reasoning, analyzing arguments and exploratory talk in group discussions. Indrawati (2021) analyzed the effect of archiving video media and online learning on students' learning and innovation skills, particularly, 4Cs (Critical Thinking, Collaboration, Communication, Creativity). Using a questionnaire and an achievement test, analysis of their data provided an evidence of improvement of vocational students' learning and 4Cs skills.

Piniuta (2019) sought to explore using different CMC platforms such as Google Docs and Meeting Words web applications to develop collaborative skills among learners. Using a survey based on concepts like equality, participation and shareness, study results proved the significant impact of the platforms on boosting learners' willingness to participate, interact and share ideas and files with each other. This is seen as an indication of enhancing their collaborative skills. Ganayem & Zidan (2018) conducted a study to find out students' perspectives about the role of technology on improving their 21$^{st}$ century skills. To achieve this, they used Face-to-face, Asynchronous and Synchronous modes. Findings revealed that the majority of students preferred the online mode, whether Asynchronous or Synchronous, highlighting its impact on some skills such as group collaboration, ICT, higher order thinking and multicultural awareness. The impact of SCMC mode on EFL learners' collaboration was investigated by Mozafarian & Tahriri (2016) through a three-part Likert-scale questionnaire. The study referred to students' eagerness and willingness to work together and cooperate within the

collaborative leaning environment which SCMC mode offered to them. It also referred to students' remarkable change from fear and hesitation to learn through SCMC mode to keenness and interest.

Within the Egyptian context, Soliman (2019) investigated the effect of SCMC on the improvement of learners' lexical skills in a private university in Cairo in comparison to the face-to-face mode. To achieve this purpose, two tests were administered: a pre and post vocabulary acquisition and delayed post vocabulary retention tests. Findings of the study revealed that SCMC was found to be more successful and effective in improving learners' vocabulary acquisition and retention than the regular face-to-face class discussion, especially when learners were reluctant to participate.

Khamis (2011) made another comparison but between Asynchronous and Synchronous modes of CMC interactions among EFL university students. The study was an attempt to estimate the effect of SCMC (written chat) Asynchronous (threaded discussion) on four communication strategies i.e hypothesis testing, forward inference, topic continuation, and off-task discussion. A computer based questionnaire consisted of six areas was used to collect data of the study. The areas were: working with others and computers in general; medium preference; medium and task fit; satisfaction with task completion; group dynamics and strategy use. Statistical analysis of data revealed a significant variation in communication strategy use in SCMC which was not found in Asynchronous mode. Students favored SCMC which gave them a large space for interaction, elaboration of ideas and receiving mutual humorous comments.

**Commentary**

The aforementioned literature showed that several studies have highly recommended the implementation of 21st century skills into EFL module intensifying the use of innovative technological devices and online platforms. Studies also provided promising results of the impact of CMC, particularly synchronous mode, on enriching learning environment and fostering students' instruction, interaction, collaboration, communication and critical thinking. However, still these studies are insufficient and not largely available in Egypt (e.g. Soliman, 2019 & Khamis, 2011). Thus, it is worthwhile exploring the effectiveness of SCMC in developing students' use of 21st century learning skills, particularly, CT and Collaboration skills to fill this literature gap.

## Context of the Problem

To scrutinize students' need for the current study, a pilot study was conducted on a random sample of 27 EFL postgraduate students (professional, general and special diploma) at the Faculty of Education, Minia University during the second term of the academic year 2020-2021. Three questionnaires were administered for this purpose. The first questionnaire aimed to examine EFL prospective teachers' knowledge about CT skills and sub-skills. The second questionnaire measured their collaboration skills and sub-skills and the third one examined their knowledge on SCMC. Analyzing the responses to the questionnaires, it was apparent that EFL professional prospective teacher lacked the essential skills of CT and collaboration. It also showed that students did not have any prior knowledge about SCMC proclaiming that despite

using online learning for most of the academic modules they had never used SCMC in learning. To document the problem of the study, a CT test was administered in which students obtained very low scores. Validity and reliability of the instruments were tested during the pilot study.

## Statement of the Problem

The problem of the present study could be manifested that EFL prospective teachers exhibited weakness in some of 21st century learning skills i.e. CT and collaboration skills. Such weakness may be attributed to the insufficient training and unsuitable strategies given to them in which the implementation of different CT and collaboration skills was not available. Prospective teachers are in mere need to enhance their 21st century learning skills to support them for life learning and career readiness. Hence, the present study endeavored to examine the effectiveness of using SCMC in enriching EFL prospective teachers' use of 21st century skills in particular CT and collaboration.

## Questions of the Study

The present study was conducted to answer the following question:

What is the effectiveness of using SCMC in enriching EFL prospective teachers' use of 21st century learning skills, particularly, CT and collaboration?

The following minor questions emanated from the above major one:

1. What is the effectiveness of using SCMC in enriching EFL prospective teachers' CT skills?
2. What is the effectiveness of using SCMC in enriching EFL prospective teachers' collaboration skills?
3. What is the correlation between CT and collaboration**?**

## Objectives of the Study

The current study attempted to:

1. Identify the use of SCMC for enhancing EFL prospective teachers' CT skills.
2. Identify the use of SCMC for enhancing EFL prospective teachers' collaboration skills.
3. Identify the kind of correlation between CT and collaboration.

## Hypotheses of the Study

1- There would be a statistically significant difference between the study group's mean scores of the Critical Thinking pre-posttests (in favor for the post-test).

2- There would be a statistically significant difference between the study group's mean scores of the collaboration scale pre-posttests (in favor for the post-test).

3- There would be a positive correlation between the study group's mean scores of the Critical Thinking and Collaboration.

## Significance of the Study

The significance of the study lies on:

- The current study aimed at shedding light on 21st century **learning** skills, in particular, CT and collaboration that mostly needed by prospective teachers in such a changing world.
- The study might be significant to pre-service students as it provides an instructional strategy based on using SCMC to develop their CT and collaboration skills.
- The study tried to fill the gap in the review of literature in Egypt.

- The present study offered an online manual on 21st century **learning** skills, a CT test and a collaboration scale.
- The present study provided opportunities for students to enhance their computer skills.

## Delimitations of the Study

1. The study was delimited to 16 (whole number) EFL prospective teachers (professional diploma) at the Faculty of Education, Minia University. The number of students was suitable for the purpose of this sort of study.
2. The study was implemented in the "Active Learning" module in the second term of the academic year 2020-2021. The intervention of the study lasted for twelve weeks in addition to two weeks for conducting the pre-post administrations of the study tools. The participants were randomly assigned to four virtual mixed groups and completed their collaborative tasks via Facebook application. The study group received intensive online sessions four hours per week (the allocated time of the lecture on their academic timetable) each time and were trained on different CT and collaboration skills through using SCMC.
3. In this Active Learning course, professional diploma students study innovative strategies and techniques for learning which are compatible with the current study.
4. CT skills were limited to the sub-skills that were suitable for the students of the research. These skills were: Making Interpretation, Drawing Inference, Recognizing Assumptions, Analyzing Arguments and Underlying Deductions.

5. Collaboration skills scale was divided into three basic domains: Team Spirit and Communication, Shareness and Contribution and Monitoring and Constructive Feedback.

## Definitions of Terms

### 21st century learning skills

Indrawati (2021) referred to the term 21st century skills as essential and innovation skills of students that can be used for developing the quality of human resources which have four main indicators commonly called 4C, including skills of communication, critical thinking, collaboration, and creativity. Baran-Łucarz & Klimas, (2020) stated that 21st century skills is a set of knowledge, skills or traits necessary which students need to make their way in a complex and constantly evolving future and to function effectively in today's world.

The procedural definition of 21st century learning skills is the novel set of skills, basically critical thinking and collaboration, that learners should master to be in harmony with the growing social needs and changes.

### Critical Thinking

Halpern and Dunn (2021) defined CT as students' competency to judge the credibility of an information source, recognize regression to the mean, understand the limits of extrapolation, rate the strength of reasons that support and fail to support a conclusion. Nickerson (2020) perceived CT as "the ability to learn, to reason well, to solve novel problems, and to deal effectively with novel problems, often unpredictable, that confront one in daily life."

The procedural definition of CT is students' ability to use the learnt knowledge reasonably and meaningfully, through making interpretation, drawing inference, recognizing assumptions, analyzing arguments and underlying deductions.

**Collaboration**

Collaboration is viewed as "a process that facilitates teacher development, serves to generate knowledge and understanding, come up with the vision and helps to develop collegiality (Mahato, 2021).

The procedural definition of Collaboration is students' ability to work within a team spirit and share ideas and thoughts alongside with other members and provide constructive feedback to complete a joint task.

**Synchronous Computer- Mediated Communication**

SCMC is defined as a type of immediate communication (i.e. text, voice or video based) between teachers and students which facilitates students' monitoring of language through increased participation and interaction via different digital platforms (Nejad, Golshan & Naeimi, 2021). SCMC is viewed as "involving multiple students in isolated locations and with different technological backgrounds where they need to cooperate and work together in virtual, simultaneous and communicative space" (Hanon, 2021).

The procedural definition of SCMC is an online (alive) text based communication occurred among learners, via networked computers which, requires their presence in the same real time for interaction and chatting.

## Research Design

A quasi-experimental design was employed as it was suitable for the nature of the study. The one group pretest-posttest design was chosen to determine the intervention or the treatment on the study group. A SCMC manual, for nurturing CT and collaboration skills, was developed by the researcher. The study group was exposed to pre-post means of collecting data and was taught the "Active Learning" course using text based mode of SCMC.

## Variables of the Study

### Independent Variable

- Using a SCMC manual.

### Dependent Variables

1- Developing students' critical thinking skills.

2- Developing students' collaboration skills.

### Control Variable

All students were newly qualified EFL postgraduates studying in professional diploma module**.**

## Instruments of the study

The researcher developed the following Instruments

1. A 21st century learning skills questionnaire
2. A CT skills questionnaire
3. A collaboration skills questionnaire
4. A SCMC knowledge questionnaire
5. A CT skills test.
6. A collaboration skills scale

## I-The Questionnaires

In order to answer the questions of the study, the researcher developed four questionnaires. The first questionnaire aimed at specifying the 21st century learning skills which prospective teachers need to acknowledge and apply in different modules. The purpose of the second and the third questionnaires were to explore the basic skills and sub-skills of CT and collaboration that are most needed by EFL prospective teachers. The fourth one endeavored to figure out students' knowledge about the SCMC technique. Building the questionnaires went through the following steps:

- Reviewing the literature related to the field of 21st century, CT and collaboration skills.
- Stating the objectives of the questionnaires.
- Stating the sub- skills.
- Identifying the opinions of the jury members.

### 1. The 21st century learning skills questionnaire

Reviewing the literature, a large number of 21st century skills were presented but mainly focused on 4Cs; Critical thinking, Collaboration Communication and Creativity. Critical thinking and Collaboration were confirmed and approved by the jury members and postgraduate students to be mostly desirable and compatible with the challenges of new changing educational settings. For final form see Appendix (A).

### 2. The CT skills questionnaire

This questionnaire was basically designed to find out how far EFL prospective teachers were familiar with different CT skills and sub-skills

and how far they applied them in courses. The questionnaire consisted of five basic domains with ten indicators each that were found mostly prevailing in literature. The five main skills were: (1) Making Interpretation; (2) Drawing Inference; (3) Recognizing Assumptions; (4) Analyzing Arguments and (5) Underlying Deductions. The statements are assessed in a grid according to the questionnaire: Strongly Agree, Agree, Disagree, Strongly Disagree, or Undecided. For final form see Appendix (A).

**3.The collaboration skills questionnaire**

The purpose of this questionnaire was to figure out the different collaboration skills and sub-skills that EFL prospective teachers should acquire to survive in the new innovative educational environment. It also aimed to measure their ability to implement them in different courses before and after the submission of the training via SCMC manual. The questionnaire was divided into three basic domains with ten indicators each. These domains are: (1) Team Spirit and Communication; (2) Shareness and Contribution, and (3) Monitoring and Constructive Feedback. The statements are assessed in a grid according to the questionnaire: Strongly Agree, Agree, Disagree, Strongly Disagree, or Undecided. For final form see Appendix (A).

**4.The SCMC knowledge questionnaire**

This questionnaire was basically designed to identify students' background knowledge about the SCMC technique; its utility and effectiveness. It also aimed to explore how far students were familiar with the technique or not. This questionnaire was sent to participants via Google forms at https://docs.google.com/forms/. There were eighteen

statements assessed in a grid according to the questionnaire: Strongly Agree, Agree, Disagree, Strongly Disagree, or Undecided. For final form see Appendix (A).

**Validity of the questionnaires**

A panel of TEFL specialists, the jury members, approved the face validity of the questionnaires, their suitability, utility, and necessity for the participants.

## II. Critical Thinking skills Test

This test was designed to:

1. Measure EFL prospective teachers' performance in implementing different CT skills in situations.
2. Measure the degree of improvement after the administration of the treatment.

**Test Construction**

The test comprises five main sections (as mentioned above) with different topics encompassing various passages followed by 10 MCQ items for each one. The test was piloted by administering it to 27 male and female EFL general, professional and special diploma students, enrolled in the same module, who were excluded from the intervention. Time of the test was calculated and was 90 minutes. One point was given for each correct answer, so the total score was (50). For final form see Appendix (A).

**Validity of the test**

**Face Validity:** The test was submitted to a panel of qualified and experienced TEFL specialists. They were requested to judge the linguistic stating of the items, appropriateness, clarity of the test

instructions, the difficulty level, applicability, fitness of the items for target study group. The jury confirmed the suitability and applicability of the test, hence confirmed its validity.

**The Internal Consistency of the Test Items**

Pearson correlation formula was used to determine the internal consistency of the test items. Correlation coefficient between each test item and the total sheet ranged from 0.556 to 0.888 (See Appendix B). Correlation coefficients between each domain and the whole sheet ranged from 0.753 to 0.916. This indicated that the test had a high validity as shown in the following table:

**Table (1): Correlation Coefficients between each domain and the total sheet of the CT Test N= 27**

| No | Domain | R |
|---|---|---|
| 1. | **Making Interpretation** | **0.916*** |
| 2. | **Drawing Inference** | **0.753*** |
| 3. | **Recognizing Assumptions** | **0.786*** |
| 4. | **Analyzing Argument** | **0.841*** |
| 5. | **Underlying Deductions** | **0.811*** |

***Significant at 0.05 level**

**Reliability of the test**

The data obtained was computed to calculate the reliability coefficient. To establish the reliability of the test, Alpha Cronbach formula (α) was calculated and its value was α =0.932 significant at 0.01 level. This showed that the CT test enjoyed a high degree of reliability (See Appendix (B).

**Item Discriminating Power**

Responses to individual items were analyzed to determine item difficulty and facility index and discrimination power of this test. The

difficulty index of each item ranged from 0.30 to 0.70. Hence, the difficulty index of the items of this test was acceptable. Item Discrimination was calculated to determine how well each item discriminates between high and low achievers. To achieve this purpose, the researcher separated the highest and the lowest scores on the test. The discriminating items are those answered correctly by more of the higher group than of the lower one. Discrimination power ranged between 0.25 and 0.75

## III. The collaboration skills scale

It was a thirty item scale, constructed according to three basic domains emphasized in the literature and in the light of TEFL experts and specialists' view about collaboration main skills. Each domain was represented by some sub-skills in the scale as mentioned above. A five-point scale of the Likert type ranging from (Strongly Agree) to (Strongly Disagree) was used. The students' role is to choose the alternative that best suits their view about collaboration. The ratings of the scale were numerically treated. Each item was given a score from one to five. Consequently, the total score was the same as the total number of points given for each statement regarding students' view of collaboration (150 score). Forty five minutes were assigned for responding to the scale. For final form, see Appendix (A).

### Validity of the scale

The scale was submitted to jury of TEFL experts to assess its validity according to the following criteria: linguistic stating of items, its applicability, relatedness and fitness. The jury confirmed the suitability and applicability of the scale, hence, confirmed its validity.

**The Internal Consistency of the Scale Items**

The validity of the test was determined by computing internal consistency of each domain which was calculated by using Pearson correlation formula. The correlation coefficients between each scale items and the total sheet ranged from 0.645 to 0.941. Correlation coefficients between each domain and the total sheet of collaboration scale were found to be 0.966 for Team Spirit & Communication domain, 0.961 for Shareness & Contribution domain and 0.943 for Monitoring & Constructive Feedback domain. They were all significant at 0.01 levels. This showed that the scale enjoyed a high degree of validity (See Appendix (B).

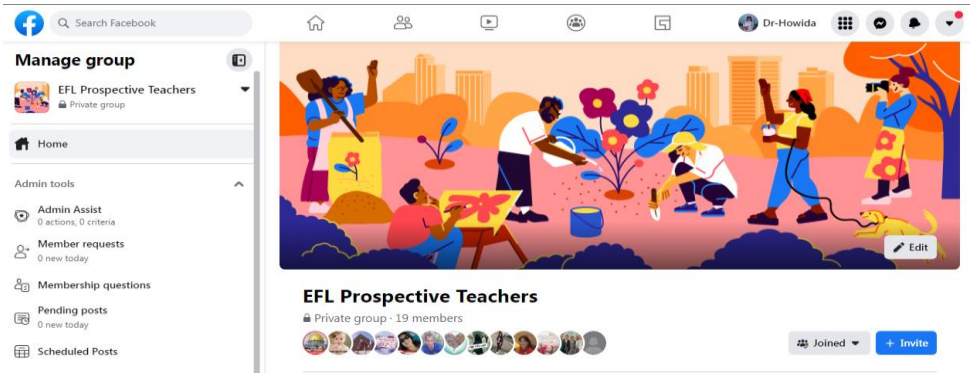
**Reliability of the scale**

To estimate the reliability of the scale, Alpha Cronbach formula (α) was calculated. The value of the reliability coefficient was found α= 0.923. This showed that reliability of the collaboration scale was high (See Appendix (B).

## Teaching and Training the Study Group

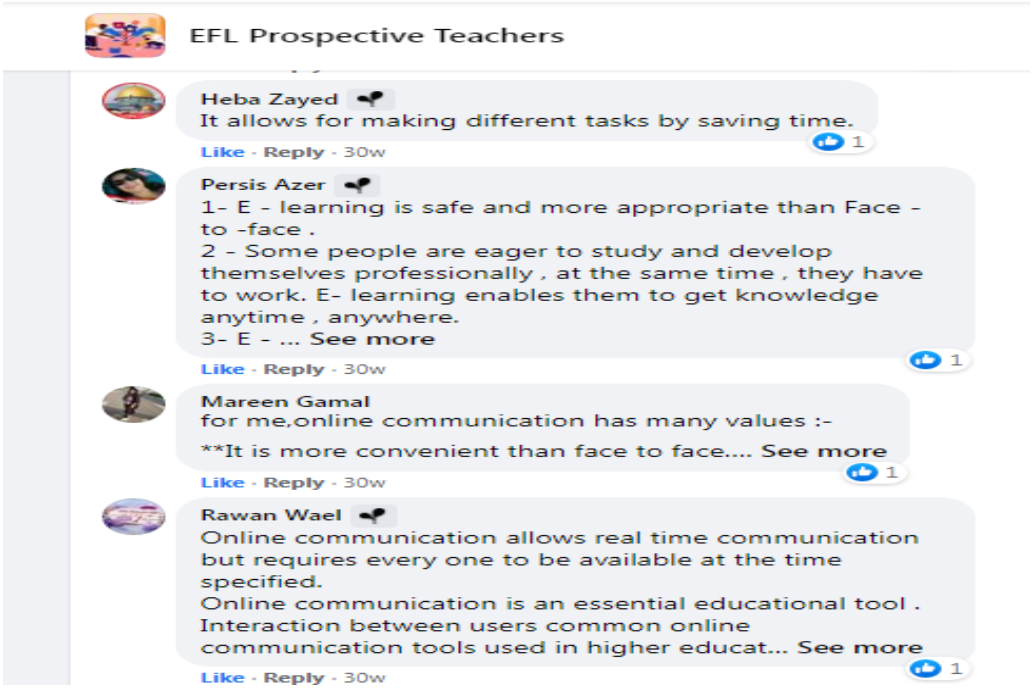
- Before the start of the implementation, pre-administration of CT test and collaboration scale was applied on participants to explore their actual level.
- Then, participants were randomly assigned to mixed groups to permanently work together. The researcher started with a face to face orientation session in the computer lab which aimed to set instructions and introduce the specific steps of organizing work among participants throughout the intervention.

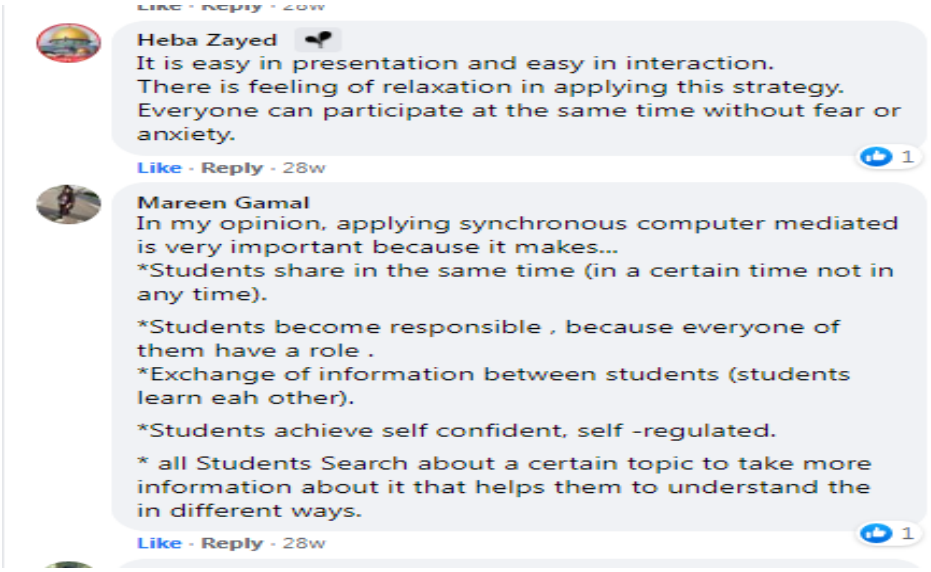
- The objectives of using SCMC in "Active learning" course were presented referring to what students would gain as a result of exposure to the intervention.
- The researcher provided the students with a number of platforms (e.g. Google Talk, Skype, Zoom, WhatsApp, Facebook MS) and different modes of SCMC (i.e., text, audio or video) to choose the most convenient for them. There was a consensus among participants to choose Facebook application with text based mode as the computer-mediated tool for communication.
- With the presence of the students in the lab, the researcher created a private group on Facebook and asked them to get access through https://www.facebook.com/groups/302183488168188.




- Then, the students had to interact with each other through the site for the rest of the intervention where they work together to execute a specific activity or task. Each session took the duration of 70 to 90 minutes two times per week.
- The instructional online materials were presented in the form of different posts, images, PDF files, and videos for students to interact, interpret, argue, analyze, provide assumptions and add comments.

- The online session started with posing a question on how the students perceive online communication for the purpose of learning. Then, the students reacted immediately and wrote their responses where they viewed each other comments simultaneously.

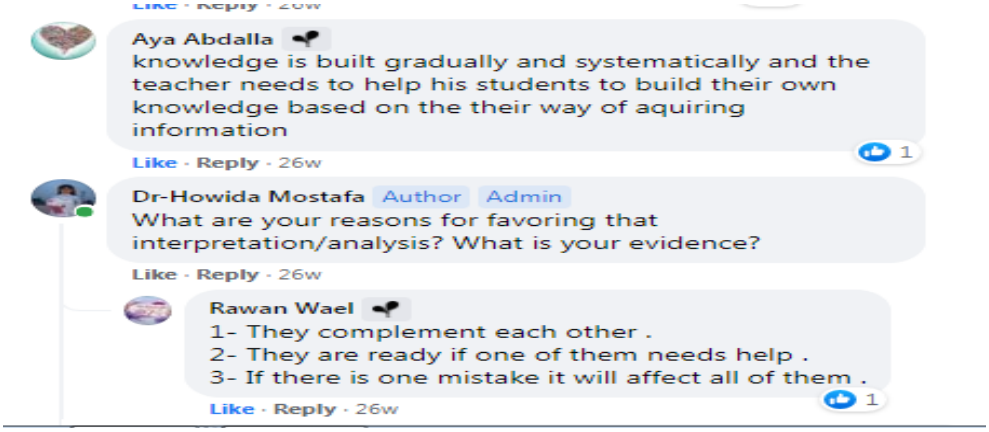





- When illuminating such a skill, e.g. making interpretation, the instructor sometime upload an image for students think deeply and give their interpretations.

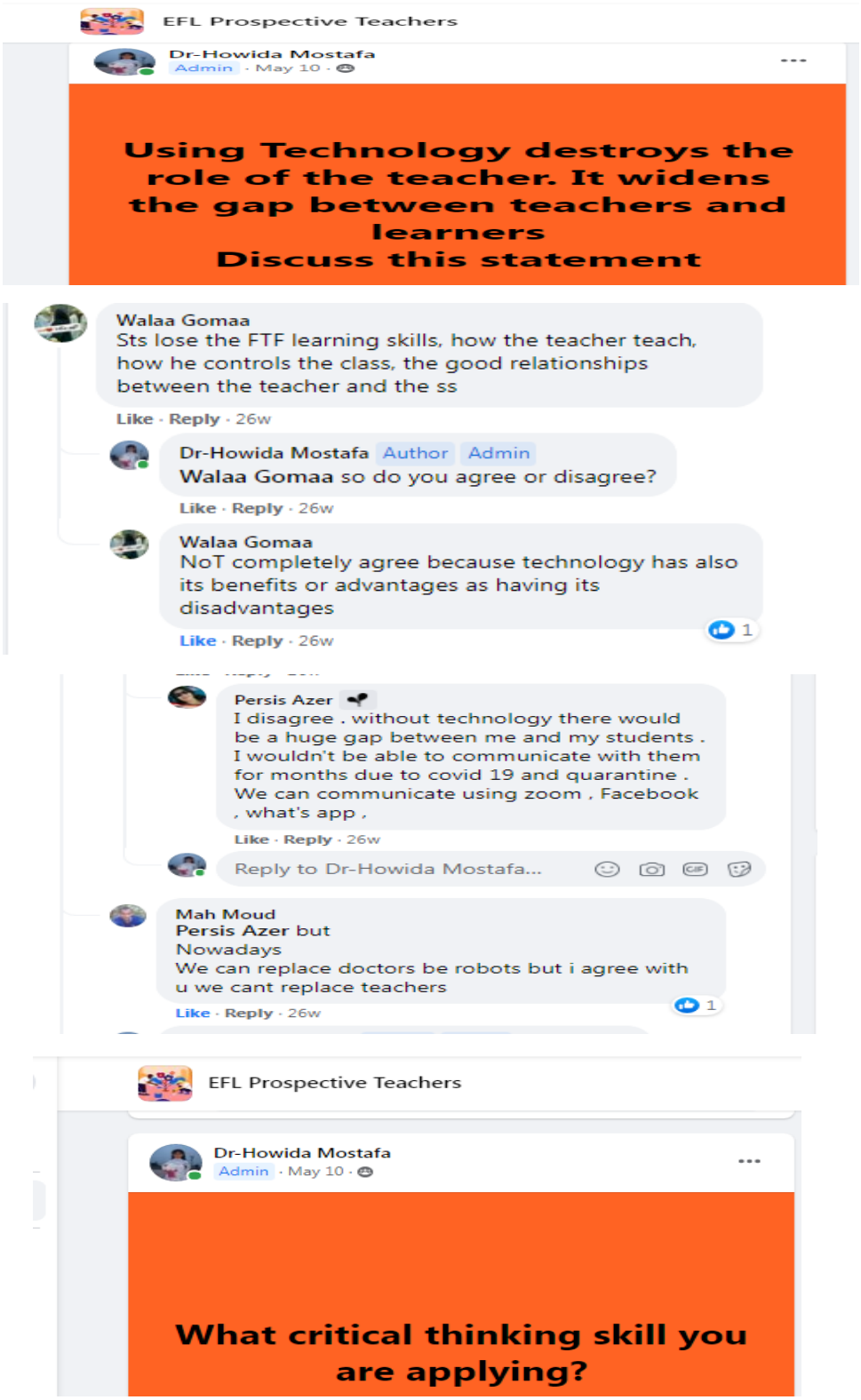
- The students were endeavoring to write down their own ideas, assumptions and interpretation looking at peer's ideas from a

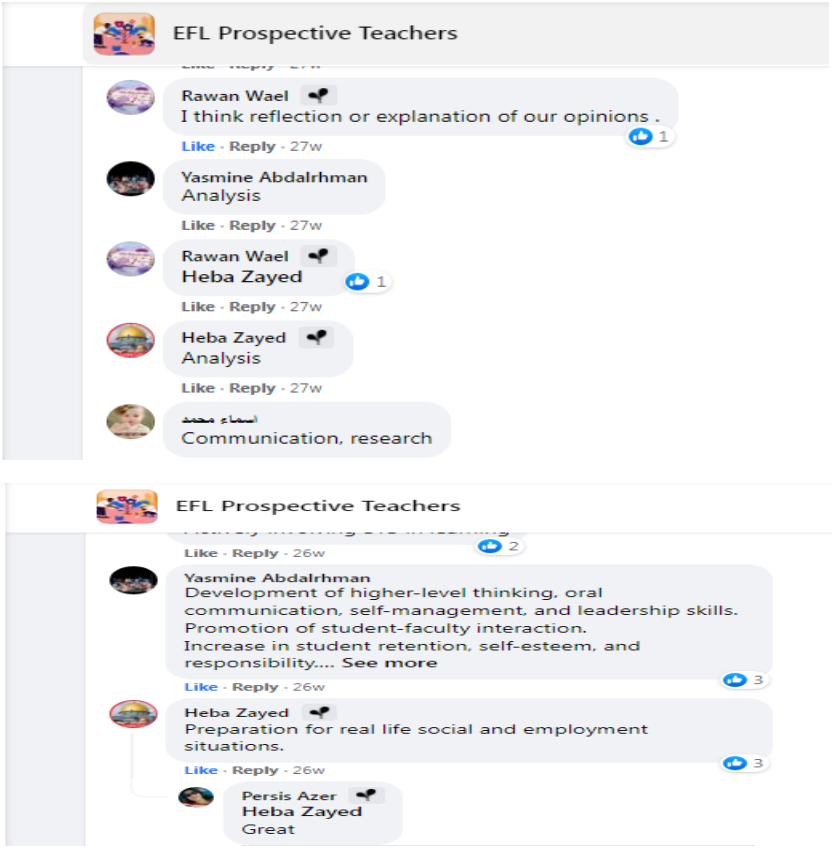
critical vision.



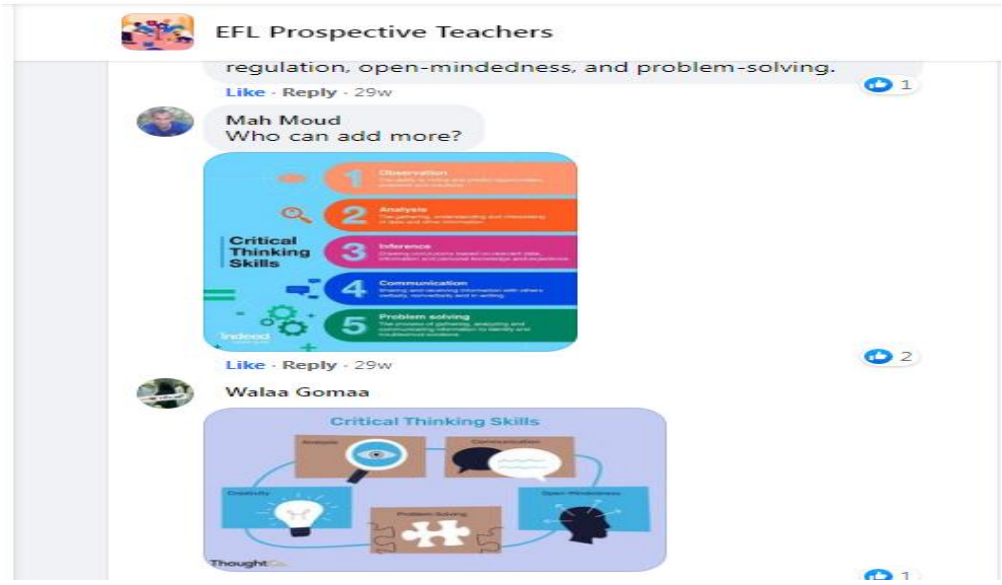

- The students, sometimes, asked each other for more clarification and explanation if the ideas were not clear enough. They were asked to think critically and select the nearest interpretation of the provided images mentioning reasons for their choice.

- Students were also asked to write their viewpoints of ideas discussed whether they agree or disagree on the argument and refer to the strongest one mentioning the reasons for their choice.


EFL Prospective Teachers
Dr-Howida Mostafa
Admin · May 10 ·
Using Technology destroys the role of the teacher. It widens the gap between teachers and learners
Discuss this statement
Walaa Gomaa
Sts lose the FTF learning skills, how the teacher teach, how he controls the class, the good relationships between the teacher and the ss
Like · Reply · 26w
Dr-Howida Mostafa Author Admin
Walaa Gomaa so do you agree or disagree?
Like · Reply · 26w
Walaa Gomaa
NoT completely agree because technology has also its benefits or advantages as having its disadvantages
Like · Reply · 26w
1
Persis Azer
I disagree . without technology there would be a huge gap between me and my students . I wouldn't be able to communicate with them for months due to covid 19 and quarantine . We can communicate using zoom , Facebook , what's app ,
Like · Reply · 26w
Reply to Dr-Howida Mostafa...
Mah Moud
Persis Azer but
Nowadays
We can replace doctors be robots but i agree with u we cant replace teachers
Like · Reply · 26w
1
EFL Prospective Teachers
Dr-Howida Mostafa
Admin · May 10 ·
What critical thinking skill you are applying?

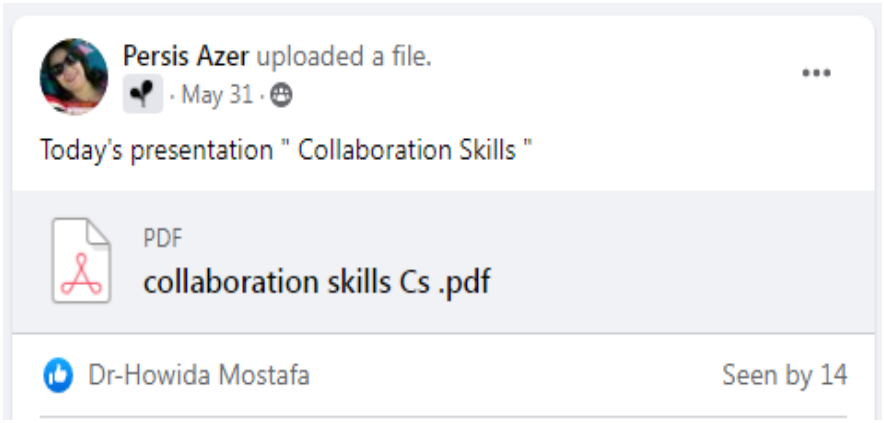



- Students were stimulated to enlarge the discussion and add information on the topic to share with each other. Therefore, they uploaded videos, images and sometimes PDF files to enrich their thinking. Students were provided with extra activities to do and were required to point to partners who participated in completing the task and who were not active within the group for checking collaboration. This process was done repeatedly till the end of the intervention.

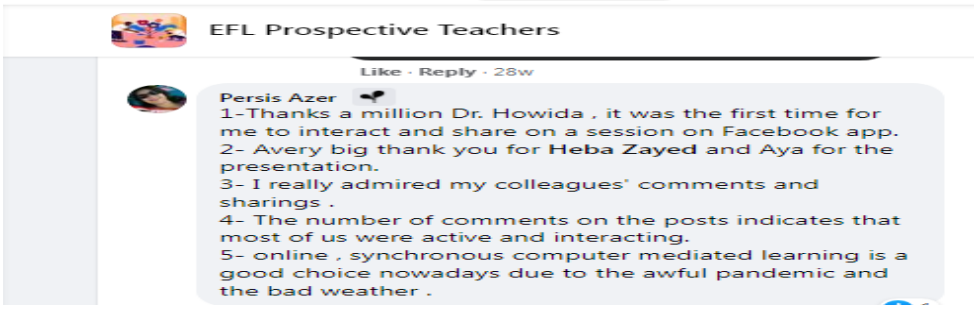

EFL Prospective Teachers
regulation, open-mindedness, and problem-solving.
Like · Reply · 29w
1
Mah Moud
Who can add more?
Critical Thinking Skills
1 Observation
2 Analysis
3 Inference
4 Communication
5 Problem solving
Like · Reply · 29w
2
Walaa Gomaa
Critical Thinking Skills
1

-
EFL Prospective Teachers
Aya Abdalla
· April 26 ·
since you all seem to lose focus, this a video about our next point.
watch it and let's discuss it
how can you improve your own critical thinking?
PONZI

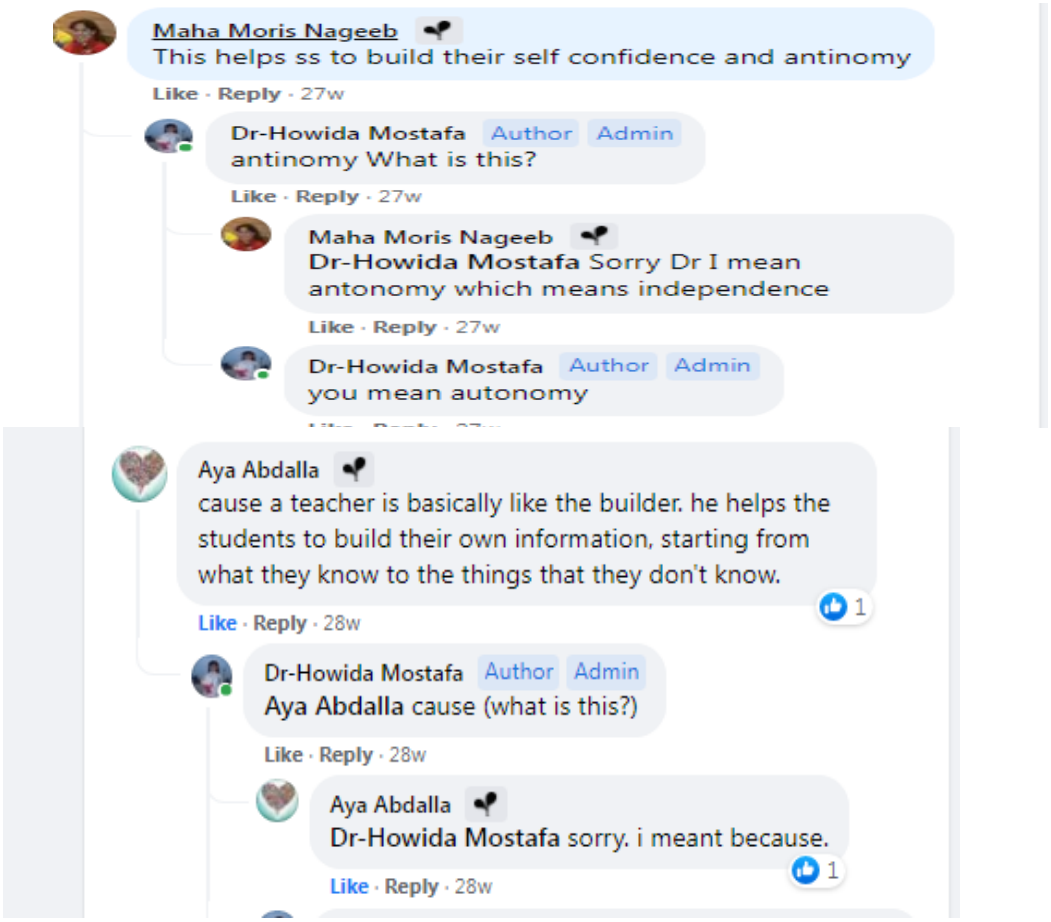
EFL Prospective Teachers
Joined
+ Invite
Maha Moris Nageeb shared a link.
· May 31 ·
Finally let's watch this video that explains the collaboration skills
YOUTUBE.COM



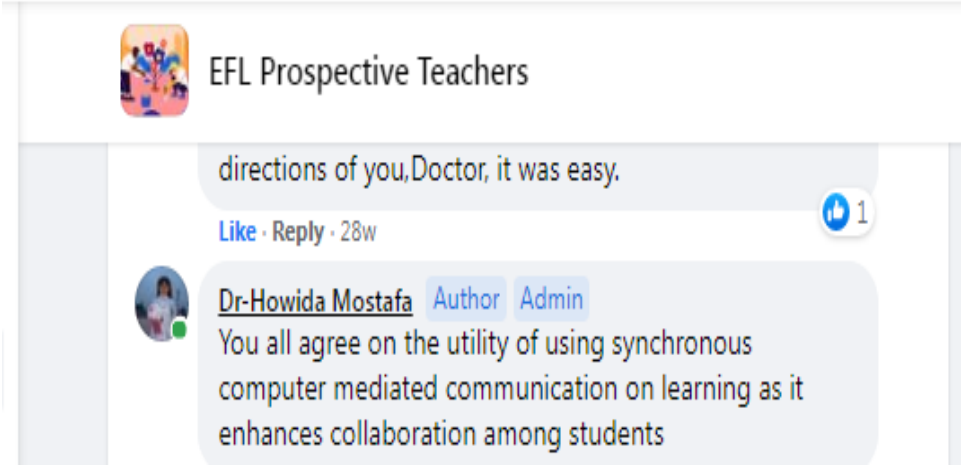

- Students were asked to sum up the basic ideas presented in the sessions evaluating and reflecting on their own and peer's different tasks.



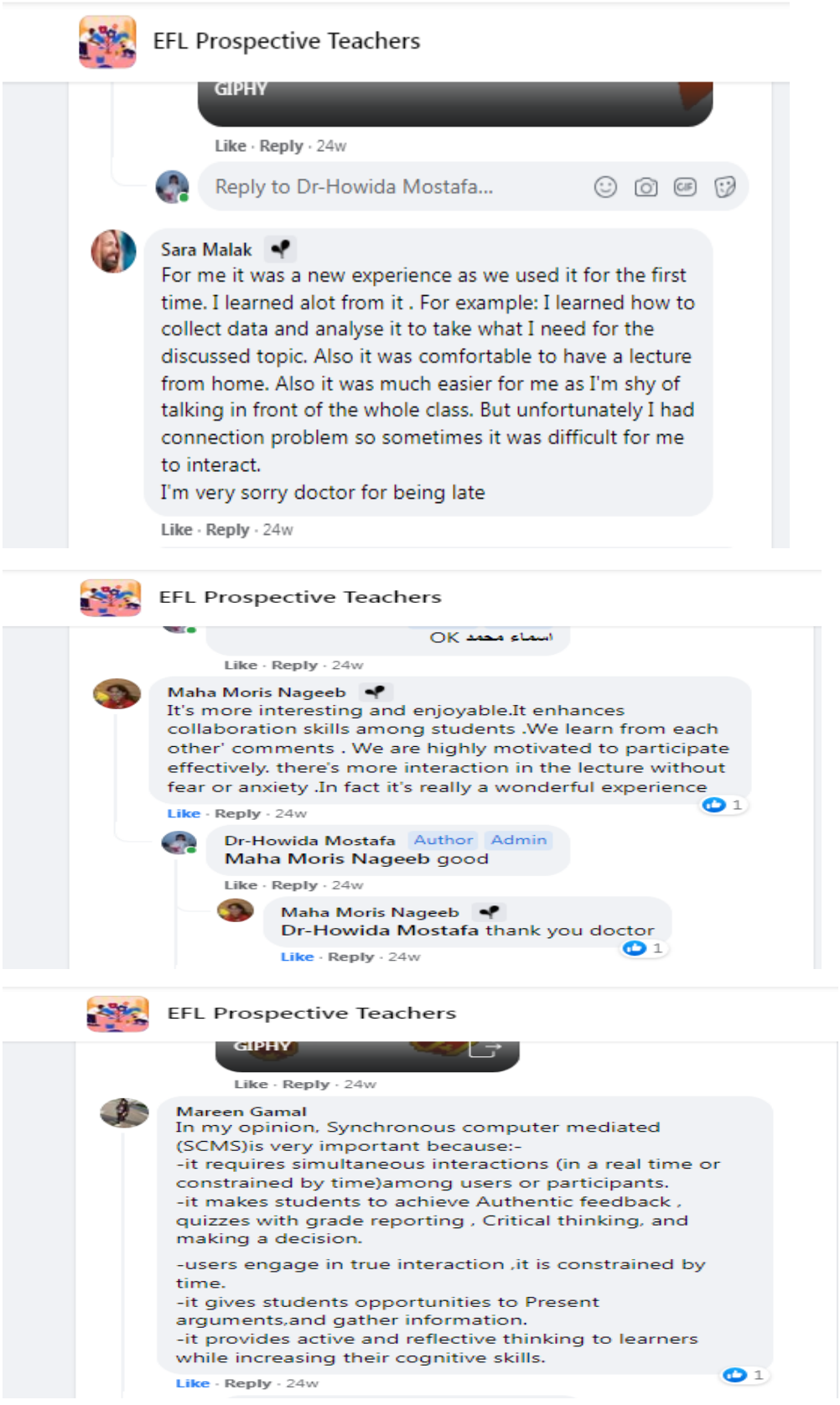

- The instructor intervened when necessary to add more information, clarify and support ideas, give feedback, correct mistakes, give rewards for completed task and when there was no interaction among students or they spent much time on discussion.

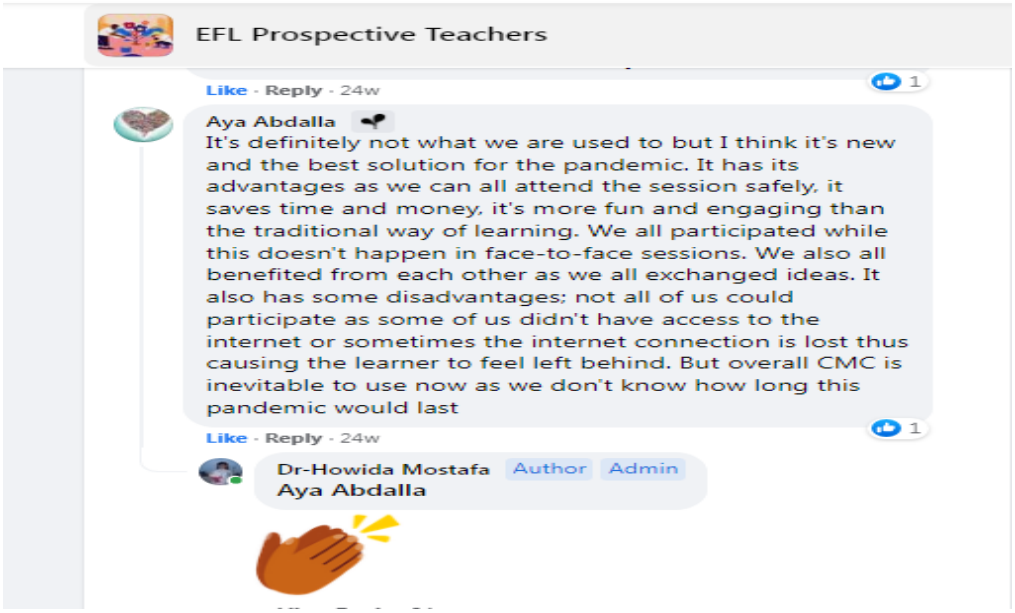

Maha Moris Nageeb
This helps ss to build their self confidence and antinomy
Like · Reply · 27w
Dr-Howida Mostafa Author Admin
antinomy What is this?
Like · Reply · 27w
Maha Moris Nageeb
Dr-Howida Mostafa Sorry Dr I mean antonomy which means independence
Like · Reply · 27w
Dr-Howida Mostafa Author Admin
you mean autonomy
Aya Abdalla
cause a teacher is basically like the builder. he helps the students to build their own information, starting from what they know to the things that they don't know.
1
Like · Reply · 28w
Dr-Howida Mostafa Author Admin
Aya Abdalla cause (what is this?)
Like · Reply · 28w
Aya Abdalla
Dr-Howida Mostafa sorry. i meant because.
1
Like · Reply · 28w

EFL Prospective Teachers
Like · Reply · 29w
Dr-Howida Mostafa Admin
move to the next point Heba
Like · Reply · 29w
Heba Zayed Author
Dr-Howida Mostafa okay Dr




- Finally, students were encouraged to write down their impressions on the innovative experience they undertaken throughout the different sessions in this learning journey. They were as presented in the following comments:


EFL Prospective Teachers
GIPHY
Like · Reply · 24w
Reply to Dr-Howida Mostafa...
Sara Malak
For me it was a new experience as we used it for the first time. I learned alot from it . For example: I learned how to collect data and analyse it to take what I need for the discussed topic. Also it was comfortable to have a lecture from home. Also it was much easier for me as I'm shy of talking in front of the whole class. But unfortunately I had connection problem so sometimes it was difficult for me to interact.
I'm very sorry doctor for being late
Like · Reply · 24w
EFL Prospective Teachers
OK اسماء محمد
Like · Reply · 24w
Maha Moris Nageeb
It's more interesting and enjoyable.It enhances collaboration skills among students .We learn from each other' comments . We are highly motivated to participate effectively. there's more interaction in the lecture without fear or anxiety .In fact it's really a wonderful experience
Like · Reply · 24w
1
Dr-Howida Mostafa Author Admin
Maha Moris Nageeb good
Like · Reply · 24w
Maha Moris Nageeb
Dr-Howida Mostafa thank you doctor
Like · Reply · 24w
1
EFL Prospective Teachers
GIPHY
Like · Reply · 24w
Mareen Gamal
In my opinion, Synchronous computer mediated (SCMS)is very important because:-
-it requires simultaneous interactions (in a real time or constrained by time)among users or participants.
-it makes students to achieve Authentic feedback , quizzes with grade reporting , Critical thinking, and making a decision.
-users engage in true interaction ,it is constrained by time.
-it gives students opportunities to Present arguments,and gather information.
-it provides active and reflective thinking to learners while increasing their cognitive skills.
Like · Reply · 24w
1




- At the end of the implementation, students were undergone through the administration of the post CT test and the collaboration scale.
- Data were treated statistically as presented in the following section

## Results

This study endeavored to investigate how far SCMC was effective on enhancing EFL professional diploma students' 21st century learning skills, in particular, CT and collaboration. For the small size of the study sample (16), Wilcoxon Singed Ranks Test (z-value) was utilized for the analysis of data obtained from the CT test and the collaboration scale. The effect size was calculated using Eta- squared ($\eta^{2)}$ formula to guarantee the effectiveness of SCMC. Scores of the students for the pre-post design were analyzed and compared.

### Testing Hypothesis One

This hypothesis predicated that there would be a statistically significant difference between the study group's mean scores of the CT

pre-posttests (in favor for the post test). Analysis of the collected data showed that this hypothesis was confirmed and accepted as the post mean scores of students was higher and the calculated z-value according to Wilcoxon Singed Ranks Test was (-3.52) and its significant level was 0.008 (Asymp. Sig.(2-tailed)) which is less than (0.05) level. Eta-squared ($\eta^2$) was also found significantly high as it reached (0.927). Therefore, students' post testing surpassed their pre testing as shown in the following table:

**Table (2): Means, Standard Deviation, $\eta^2$ & z-value (Non-Parametric Tests) between mean scores of the Study Group in the Pre- Post-CT Test (No=16)**

**Descriptive Statistics**

| No | Study group | Mean | SD | Min | Max | $\eta^2$ |
|---|---|---|---|---|---|---|
| 16 | Pre | 21.94 | 4.08 | 17 | 29 | 0.927* |
| | Post | 42.69 | 3.78 | 35 | 48 | |

**Wilcoxon Singed Ranks Test** ***Significant at 0.05 level**

**Ranks**

| Diff | 19 | 19 | 19 | 20 | 20 | 21 | 21 | 22 | 23 | 24 | 23 | 22 | 21 | 21 | 19 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ranks | 3.5 | 3.5 | 3.5 | 6.5 | 6.5 | 9.5 | 9.5 | 12.5 | 14.5 | 16 | 14.5 | 12.5 | 9.5 | 9.5 | 3.5 | 1 |
| Sign | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | N | Mean Ranks | Sum of Ranks |
|---|---|---|---|
| Post-Pre Negative ranks | 0[a] | 0.00 | 0.00 |
| Positive ranks | 16[b] | 8.5 | 136 |
| Ties | 0[c] | | |
| Total | 16 | | |

a. Post < Pre
b. Post > Pre
c. Post = Pre

**Test Statistics[b]**

| | Post- Pre |
|---|---|
| Z-value | -3.52[a] |
| Asymp. Sig (2-tailed) | 0.008 |

a. Based on Negative ranks
b. Wilcoxon Signed Rank Test

Statistical analysis also indicated that there was a positive change of students' mean scores in each domain of the CT pre-posttests favoring the post test. Students' mean scores remarkably increased and η2 ranged from 0.962 to 0.987 which was considered high. They got higher marks on particular CT skills such as their means and $\eta^2$ were significantly higher as shown in the following table:

**Table (3): Means, Standard Deviation & $\eta^2$ between mean scores of the Study Group in the Pre- Post- CT test domains (No=16)**

| Domain | Mean Pre | Mean Post | SD Pre | SD Post | $\eta^2$ |
|---|---|---|---|---|---|
| 1. Making Interpretation | 4.81 | 8.63 | 0.882 | 0.927 | 0.980* |
| 2. Drawing Inference | 4.56 | 8.38 | 0.998 | 0.992 | 0.962* |
| 3. Recognizing Assumptions | 4.38 | 8.50 | 1.22 | 0.866 | 0.979* |
| 4.Analyzing Argument | 4.19 | 8. 44 | 1.07 | 0.933 | 0.970* |
| 5. Underlying Deductions | 4.00 | 8.75 | 1.06 | 0.968 | 0.987* |

*Significant at 0.05 level

## Testing Hypothesis Two

This hypothesis predicated that there would be a statistically significant difference between the study group's mean scores of the pre-post- administration of collaboration scale (in favor for the post test). Analysis of the collected data showed that this hypothesis was confirmed and accepted as the post mean scores as the post mean scores of students was higher and the calculated z-value according to Wilcoxon Singed Ranks Test was (-3.52) and its significant level was 0.002

(Asymp. Sig.(2-tailed)) which is less than (0.05) level. Eta-squared (η2) was also found significantly high as it reached (0. 966). Hence, students' post testing exceeded their pre testing as shown in the following table:

**Table (4): Means, Standard Deviation, $\eta^2$ & z-value (Non-Parametric Tests) between mean scores of the Study group in the Pre-Post- Collaboration Scale (No=16)**

**Descriptive Statistics**

| No | Study group | Mean | SD | Min | Max | $\eta^2$ |
|---|---|---|---|---|---|---|
| 16 | Pre | 79.69 | 7.73 | 66 | 94 | 0.966* |
| | Post | 136.38 | 6.90 | 125 | 147 | |

**Wilcoxon Singed Ranks Test** ***Significant at 0.05 level**

**Ranks**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diff | 53 | 55 | 60 | 58 | 57 | 57 | 57 | 55 | 55 | 55 | 56 | 56 | 56 | 60 | 58 | 59 |
| Ranks | 1 | 3.5 | 15.5 | 12.5 | 10 | 10 | 10 | 3.5 | 3.5 | 3.5 | 7 | 7 | 7 | 15.5 | 12.5 | 14 |
| Sign | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | N | Mean Ranks | Sum of Ranks |
|---|---|---|---|
| Post-Pre | 0[a] | 0.00 | 0.00 |
| Negative ranks | 16[b] | 8.5 | 136 |
| Positive ranks | 0[c] | | |
| Ties | 16 | | |
| Total | | | |

a. Post < Pre
b. Post > Pre
c. Post = Pre

**Test Statistics[b]**

| | Post- Pre |
|---|---|
| Z-value | -3.52[a] |
| Asymp. Sig (2-tailed) | 0.002 |

a. Based on Negative ranks
b. Wilcoxon Signed Rank Test

Statistical analysis also indicated that there was a positive change of students' mean scores in each domain of the collaboration pre-posttests

favoring the post test. Students' mean scores remarkably increased and η2 ranged from 0.967 to 0.980 which was considered high. They got higher marks on particular collaboration skills as their means and η2 were significantly higher as shown in the following table:

**Table (5): Means, Standard Deviation & η2 between mean scores of the Study group in the Pre-Post Collaboration Scale domains (No=16)**

| Domain | Mean Pre | Mean Post | SD Pre | SD Post | $\eta^2$ |
|---|---|---|---|---|---|
| **1. Team Spirit & Communication** | **26.38** | **44.19** | **2.71** | **2.55** | **0.980*** |
| **2. Shareness & Contribution** | **26.75** | **47.25** | **2.66** | **1.79** | **0.967*** |
| **3. Monitoring & Constructive Feedback** | **26.56** | **44.94** | **2.78** | **2.90** | **0.968*** |

***Significant at 0.01 level**

## Testing Hypothesis Three

This hypothesis predicted that there would be a positive correlation between the study group's mean scores of the CT and collaboration. Statistical analysis showed that this hypothesis was confirmed and accepted as the value of Pearson Correlation (0.976) was considered of high significance which emphasized the strong correlation between CT and collaboration (Table 6).

**Table (6): Correlation Coefficient between mean scores of the Study group in the CT Test & Collaboration Scale (No=16)**

| No | Study group | R |
|---|---|---|
| 16 | **CT** | 0.976* |
| | Collaboration | |

***Significant at 0.01**

## Discussion

The results of the current study provided empirical an evidence that using SCMC for enhancing CT and collaboration skills of EFL prospective teachers (professional diploma Students) was remarkably effective and beneficial. Students did better and scored higher in their post-performance compared with the pre-performance. This enhancement and superiority could be attributed to the well-planned intensive training manual which proved to have a significant impact on improving students' post enactments in both variables.

This study provided data on the positive influence of using SCMC in higher education. The findings indicated that the use of SCMC resulted in higher implementation of CT and collaboration skills which are recognized as essential for students to master in the 21st century. The friendlier and exciting environment which SCMC provided to students contributed to developing and acquainting these types of skills. SCMC proved to be one of the effective ways of attracting and stimulating student skills and supporting not merely learning but teaching processes as well. This real time computer mediated communication created a space for more engagement in authentic contexts away from face-to-face environment which stimulated students' motivation and autonomous learning. SCMC was beneficial on providing opportunities for interaction, communication, interpretation and negotiation of different topics. The suggested text-based mode of SCMC helped directing students' attention to some linguistic features while discussing topics and executing tasks. These findings resonate with previous scrutinized studies (e.g. Indrawati, 2021, Hanon 2021, Liang & Fung, 2021, Lee, 2021, and

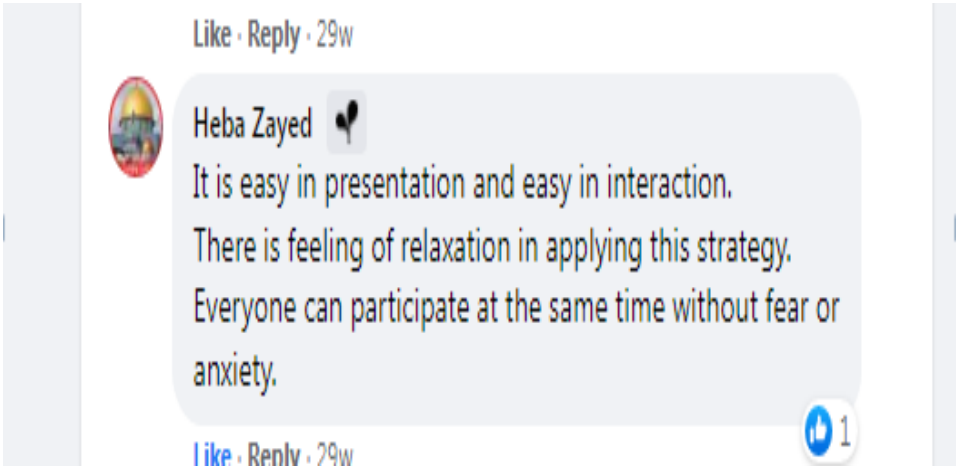
Soliman, 2019). It is worth saying that Facebook was found to be an effective application that facilitated the implementation of the study as it was also the case with Ozudogru & Akkus-Cakır (2021).

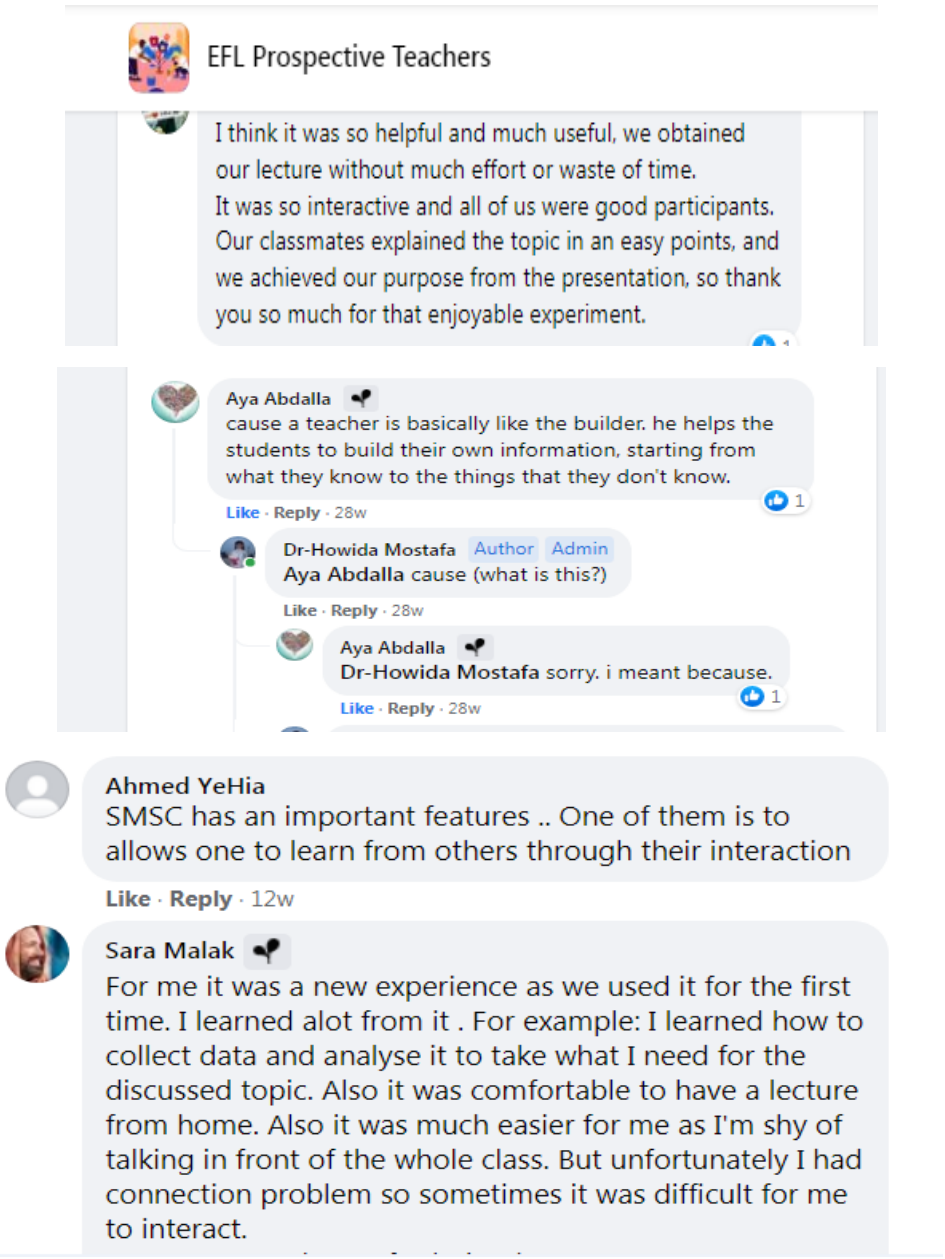
A closer look at the obtained data of this study, it is plausible to state that SCMC played as an effective tool for enriching EFL professional diploma students' CT and collaboration skills. Results revealed that SCMC provided a positive scaffolding atmosphere where students managed to practice and implement different CT skills such as making interpretation, challenging arguments, recognizing assumptions, drawing inferences, underlying conclusions and providing evidence to support their ideas. The nature of SCMC provoked students to get information immediately in real time with their peers and instructors, hence, increased the opportunity for more and better communication and involvement. It gave them enough time to examine their ideas and think critically before participating in the discussion in the form of typing out messages.

SCMC provided a setting for students where they are engaged in tasks to solve problems, find correct information, express opinions and to reason. This as well provided students with abundant opportunities for deep reflections and revision of thoughts which in turn enhanced their writing skills and facilitated the development of CT. The absence of non-verbal signals in this text-based mode pushed students to put more effort to negotiate and convey the intended meaning. It also created a pleasurable environment where students met their instructional needs because they did not hold competition over turn taking or had speech day and interruption. Hence, the anxiety level was reduced and reluctant or silent students were willing to participate in the discussion. This was in

line with Lee, 2021, Foo & Quek, 2019 and Soliman, 2019. Results also revealed that students outperformed and favored domains over others which indicated the effectiveness of the training in changing their performance positively and significantly.

The small number of participants, which is a prerequisite in SCMC (Lee, 2021), boosted a space for more interaction, discussion, negotiation of ideas and raising arguments among students. Having a large number of students could be considered overwhelming, perplexing and exhausting, hence would not achieve the purpose of the current study. Also the presence of the instructor simultaneously with the students enabled her to communicate and interact efficiently, decide who needed feedback, direct their attention towards key points and bring them back to focus on the discussion. It enabled her to see all posts at the same time and respond to students' individual comments. This established a relaxed enjoyable atmosphere for learning which promoted active participation and engagement as presented in the following screenshots:

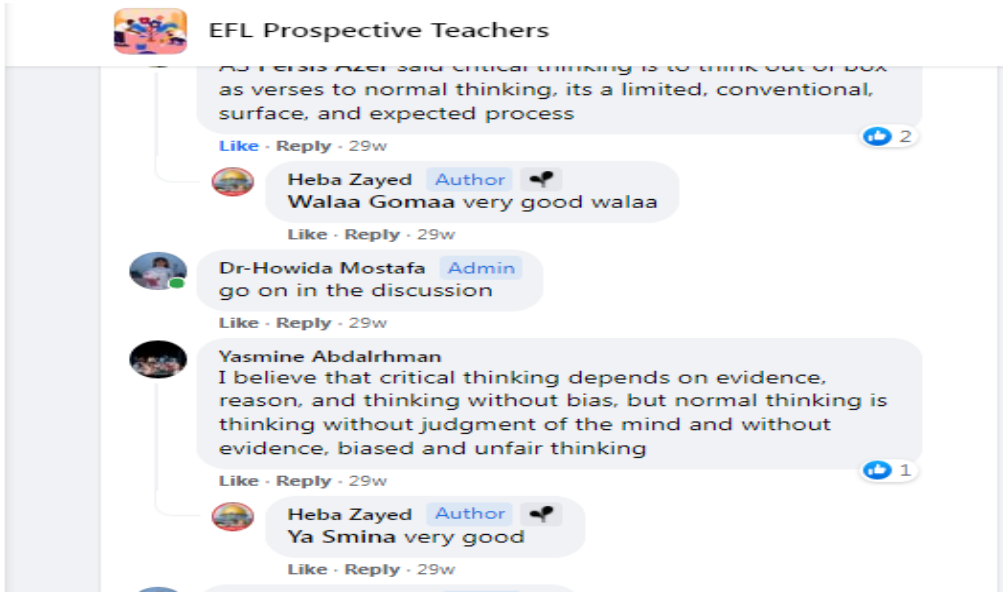


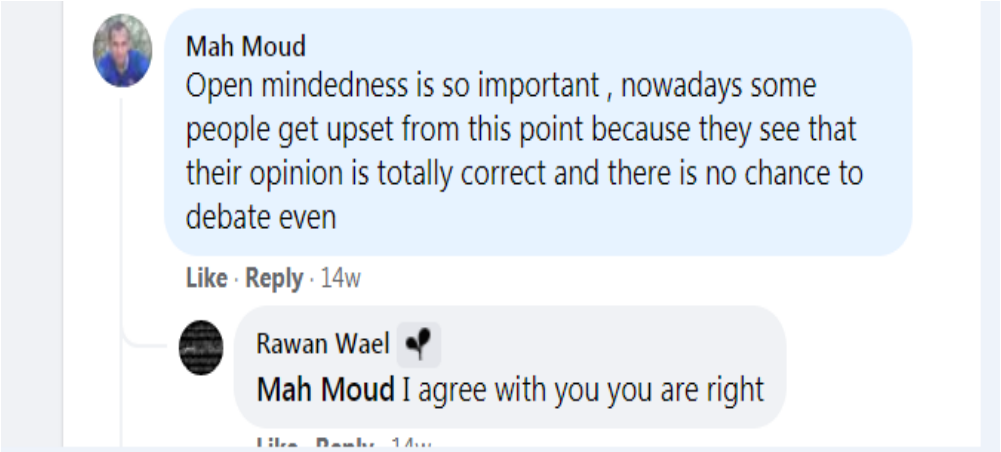



With regard to collaboration, SCMC created new opportunities for students to communicate and cooperate with each other. SCMC provided a learning setting with unique features which encouraged productivity and facilitated collaboration between the researcher and students, and also between students themselves. Through collaboration and working as a team, students began to have a stronger sense of responsibility and

closeness. Collaboration occurred as long as students kept arguing, debating, interacting with each other. Team spirit, contribution and shareness were prevailing among students to complete a task, reach a consensus on an issue and develop assumptions to challenges. Peer feedback was so effective in promoting their performance and it provoked students to learn from each other.

The collaborative learning process via SCMC enabled students to gain experiences, acquire knowledge and skills, and develop new ideas. On top of that, working together with a common goal in mind to achieve and brainstorming as a group was so supportive in enriching students' collaboration skills, increasing motivation and engagement, encouraging them to take their peers' comments into account and editing their misconceptions. Sometimes, students pushed each other for more interaction and discussion as shown in the following screenshots:


EFL Prospective Teachers
as verses to normal thinking, its a limited, conventional, surface, and expected process
Like · Reply · 29w
2
Heba Zayed Author
Walaa Gomaa very good walaa
Like · Reply · 29w
Dr-Howida Mostafa Admin
go on in the discussion
Like · Reply · 29w
Yasmine Abdalrhman
I believe that critical thinking depends on evidence, reason, and thinking without bias, but normal thinking is thinking without judgment of the mind and without evidence, biased and unfair thinking
Like · Reply · 29w
1
Heba Zayed Author
Ya Smina very good
Like · Reply · 29w


Mah Moud
Open mindedness is so important , nowadays some people get upset from this point because they see that their opinion is totally correct and there is no chance to debate even
Like · Reply · 14w
Rawan Wael
Mah Moud I agree with you you are right

EFL Prospective Teachers
Like · Reply · 24w
Walaa Gomaa
I completely agree that it was so helpful and much useful, we obtained our lectures without much effort or waste of time.
It was so interactive and all of us were good participants. Our classmates explained all the curriculum topics in an easy points, and we understood the topics as if we were in the class , also all the presentations were so organized, limited by time.
This experiment of SCMC also promotes our critical thinking and preparation skills
Like · Reply · 24w
1

Analysis of the obtained data provided a rational evidence of the strong relationship between CT and collaboration. The calculated correlation coefficient was very high as shown in the findings. The collaborative learning provoked students to think deeply of their responses since the posts would be viewed by peers and the instructor. Receiving peer comments and feedback and sharing ideas with each other was an indication of occurring interaction and dialogue among them which supported the positive correlation between CT and collaboration as it was the case with Kocak & Goksu's study (2020).

## Conclusion

It is plausible to conclude that productive results obtained from the current study determined the efficacy of SCMC on enriching EFL prospective teachers' 21st century learning skills, particularly, CT and collaboration. The present study contributed to the body of literature which indicated the benefits of SCMC in education setting. The willingness of the students to be engaged and supported by each other led to the success of the intervention in promoting not only the targeted skills of the study but also computer and some of the writing skills. SCMC proved to be rich with other favorable features that added a significant value for the study. It enabled the instructor to build up rapport with her students through sending emoji, rewarding stickers and attractive images which supported the enjoyable learning environment. Students managed to gain new perspectives, smooth communication experiences and knowledge which could help them to survive and thrive in this rapid changing world.

**Suggestions for further Research**

Studies could be done to investigate:

1. The effect of using SCMC on developing students' critical writing and critical reading skills.
2. The effect of using SCMC on developing students' digital and critical literacy skills.
3. The effectiveness of using SCMC in improving students' learning attitude and autonomy.
4. The effectiveness of using SCMC in enhancing students' cultural awareness and values.
5. The effectiveness of using SCMC in enhancing students' speaking and listening skills.

## References

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