Utilizing Infographics to Develop EFL Functional Writing Skills of Prospective Teachers

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ABSTRACT

This study examined the effect of infographics on developing EFL functional writing skills of prospective teachers at Faculty of Education. The one group pre-posttest quasi experimental design was utilized to investigate the effect of the suggested infographics-based education on prospective teachers' functional writing. The sample of the study consisted of seventy third year prospective teachers enrolled, in the academic year 2021/2022, in the English Department, Faculty of Education, Port Said University. They were taught to present required written productions, including reports, research projects, formal e-mails, lesson plans, written instructions, summaries, formal letters, and curriculum vitae, in the target language competently. The instrument included pre-posttest of EFL functional writing skills that was prepared and administered by the researcher to investigate the development in the participants' functional writing skills before and after the administration of the infographics-based education. A rubric was prepared to assess participants' responses to the pre-post EFL functional writing test in relation to three main categories: designing of format, composition of content, and appropriateness of language. The results of the study revealed that infographics were effective in developing EFL functional writing skills as they helped prospective teachers write more systematically and logically. The changes in the participants' written production demonstrated competent comprehension of the required format, content, and language.

KEYWORDS: functional writing, prospective teachers, infographics, TEFL

الملخص

تحققت الدراسة الحالية من أثر استخدام الانفوجراف على تنمية مهارات الكتابة الوظيفية باللغة الإنجليزية كلغة أجنبية لدى الطلاب المعلمين بكلية التربية جامعة بورسعيد. اتبعت الدراسة المنهج شبه التجريبي تصميم المجموعة الواحدة ذات الاختبار القبلى/ البعدي للتحقق من أثر التعليم القائم على الانفوجراف على الكتابة الوظيفية للطلاب المعلمين. تكونت عينة الدراسة من سبعين من الطلاب المعلمين الملتحقين بالفرقة الثالثة قسم اللغة الإنجليزية بكلية التربية ببورسعيد والذين درسوا كيفية تقديم أنماط كتابية وظيفية تشمل الملخصات والتقارير والمشروعات البحثية والرسائل الرسمية وخطط الدروس والسيرة الذاتية. و تمت الدراسة في الفصل الدراسى الأول من العام الدراسى ٢٠٢١/٢٠٢٢. وتضمنت أداة الدراسة اختبار الكتابة الوظيفية من تصميم الباحثة والذى تم تطبيقه قبليا وبعديا للتحقق من تنمية مهارات الكتابة الوظيفية لدى الطلاب المشاركين فيما يخص ثلاثة جوانب رئيسة: تصميم الشكل وتكوين المحتوى ومدى ملاءمة اللغة. استخدمت الدراسة اختبار(ت) لمقارنة نتائج الطلاب فى كل من التطبيقين القبلى والبعدى لتحديد فعالية الانفوجراف على تنمية مهارات الكتابة الوظيفية لديهم. كشفت نتائج الدراسة أن الانفوجراف له فعالية في تنمية مهارات الكتابة الوظيفية لأنه ساعد الطلاب المعلمين على الكتابة بشكل أكثر منهجية ومنطقية. ووفقًا لذلك ، أوصت الدراسة باستخدام الانفوجراف فى تدريس اللغة الإنجليزية كلغة أجنبية بجمهورية مصر العربية لتحقيق أغراض تربوية متعددة.

الكلمات المفتاحية:

الانفوجراف، الكتابة الوظيفية، الطلاب المعلمون ، تدريس اللغة الإنجليزية كلغة أجنبية .

INTRODUCTION

Writing is an advanced language skill that includes the ability to produce coherent fluent extended written forms. The ability to write well is essential as it influences personal success, development, and relations with others. In the EFL context, in order for learners to communicate freely and competently in all sorts of discourse, they should acquire the ability to write in English various written form correctly.

Writing, as agreed by many researchers, is the most difficult language skill for EFL learners to master (Tsao, Tseng, and Wang, 2017; Jabali, 2018; Awada, Burston, and Ghannage, 2019; Ghoneim and Elghotmy, 2019). To write competently, there are various abilities that EFL learners need to possess. Morris and Sharplin (2013) and Wu, Quentin Dixon, Sun, and Zhang (2019) illustrate that writing is a difficult process that involves finding words to represent ideas, crafting sentences to express those ideas, and applying both logical and narrative structure to organize the sentences all at the same time.

Generally, writing has two types functional and creative, as confirmed by Praminatih, Kwary, and Ardaniah (2019) and Viana and Zyngier (2019). Functional writing refers to the type of writing that is intended to convey a specific, direct, and clear message to a particular audience including areas such as writing instructions, notes, and reports. Creative writing, on the contrary, is a form of writing by which learners express their feelings, emotions, and ideas in a literary style.

Concerning functional writing, many researchers have marked problems in EFL learners' writing performances at various educational levels (Grami, 2010; Erkan and Saban, 2011; Al-Asmari, 2013; and Jabali, 2018). Reviewing previous studies, many researchers such as Maroko (2010), Abdallah (2013), Salem (2013), and Díaz Ramírez (2014) suggested treatments to develop EFL writing skills. Examples of these treatments, listed in order, include: authentic materials, collaborative writing, connective writing, writer's workshop approach, project work and process approach.

However, the researcher found that an education based on infographics, which proved effective recently in various educational fields (Yildirim, 2016; Alrwele, 2017; and Alqudah, Bidin, and MdHussin, 2019) may be useful for developing EFL writing skills.

Infographics, according to Krum (2013, p.6), refer to large graphic designs that combine data visualizations, illustrations, text, and images together into a format that tells a complete story. Infographics can help EFL learners, EFL prospective teachers included, write comprehensively and systematically. By combining data such as illustrations and images, learners study various written productions in an attractive and easy to understand way. With the utilization of infographics, information that can

be presented on many pages can be presented in only one large graphic design that explains the information using both texts and figures.

On the grounds of these reasons, the present study sought to examine the effect of infographics on developing EFL functional writing of prospective teachers, and offer insights into the preparation, implementation, and evaluation of infographics in the TEFL classes.

1.1   CONTEXT OF THE PROBLEM

The problem of the present study was derived from the following resources:

First, due to working as a staff member at faculty of education, the researcher encountered with prospective teachers' weak EFL writing performances such as their reports, assignments, mails, and research projects. They lack major writing skills as reflected in their assignments. This problem was widely recorded during the evaluation of prospective teachers' written research projects in the second term of the academic year 2019/2020, wherein the results of these research projects were the standard to pass to the next year in their academic preparation program.

Second, reviewing previous research showed that many researchers have marked problems in EFL writing skill at various educational levels, college level included (Abdallah, 2013, 2014; Salem, 2013; Ghoneim and Elghotmy, 2019).

Third, to confirm the problem and pinpoint the writing skills that prospective teachers lack, the researchers conducted a pilot study. A writing test was applied on forty third year EFL prospective teachers at Port Said faculty of education at the beginning of the first term in the academic year 2020/2021. Evaluating prospective teachers' performance in the test revealed their weak writing skills in areas such as choice of words, organization of ideas, and writing a comprehensive content.

Thus, it is a necessity for EFL prospective teachers, as well as all EFL learners, to write competently especially with the recent change in the educational situation which involves the orientation to use writing assignments/projects extensively for evaluation. The lack of major EFL writing skills may affect the accomplishment of these assignments/projects.

1.2 STATEMENT OF THE PROBLEM

The problem of the study thus can be identified as follows: EFL prospective teachers lack major functional writing skills. Their writing production is weak and incompetent. Hence, this study sought to find answers to the following questions:

1- What are the EFL functional writing skills that prospective teachers need to possess?

2-What are the main features of an education based on infographics?

3- How far is an education based on infographics effective in developing prospective teachers' EFL functional writing skills?

1.3 HYPOTHESIS OF THE STUDY

The present study tested the following hypothesis:

There is a statistically significant difference between the mean scores of prospective teachers in the pre-test and the post-test of EFL functional writing in favor of the later.

1.4 PURPOSE OF THE STUDY

The purpose of the study was to determine the effect of an education based on infographics on developing EFL functional writing skills of third year prospective teachers.

1.5 SIGNIFICANCE OF THE STUDY

The significance of the study stemmed from the following considerations:

- The suggested infographics-based education and the writing test presented in the study might be beneficial to EFL researchers, teachers, and course designers.
- The study might provide guidelines upon which further treatments may be designed to improve EFL functional writing skills.
- The study might provide guidelines upon other EFL skills that may be developed through the application of infographics.
- The study might provide EFL teachers with guidelines on how to adopt infographics for developing EFL learners' writing skills.

1.6 DELIMITATIONS OF THE STUDY

This study was restricted to:

- The application of infographics to develop EFL functional writing skills including competent writing of: reports, research projects, formal e-mails, lesson plans, written instructions, summaries, formal letters, and curriculum vitae.
- An EFL functional writing test designed by the researcher to examine the effect of the suggested infographics-based education on developing prospective teachers' EFL functional writing skills.
- A sample of seventy third year prospective teachers enrolled in the English department, faculty of education, Port Said University.
- A limited duration for implementing the suggested infographics-based education (six weeks in the first term of the academic year 2021/2022).

1.7 DEFINITION OF TERMS

Some terms were repeatedly used in the present study. The following are definitions of these terms.

Functional Writing Skills

Functional writing skills, as mentioned by KIE (2006, p.82), refer to that type of writing which includes the competent writing of agenda, notifications, reports, e-mail, notices, advertisements, forms, lists, journals, directions, instructions, notes, and posters.

As for Abdallah (2014, p.11), functional writing skills are perceived as those tangible, concrete aspects/components of linguistic performance that indicate a learner's mastery of functional writing in English for realistic everyday-life purposes.

In the present study, EFL functional writing skills refer to the abilities required to be attained by prospective teachers in order to write assignments, e-mails, research proposals, reports, and other required writing production in the target language competently.

Infographics

Infographics according to Krum (2013, p.6), are large graphic designs that combine data visualizations, illustrations, text, and images together into a format that tells a complete story.

Similarly, Wertz and Saine (2014, p. 80), Rezaei and Sayadian (2015, p. 79), and Parkinson (2016, p. 27) refer to an infographic as a composition of concise explanatory text and visual representations, including pie charts, bar graphs, zoom boxes, histograms, icons, line charts, tree diagrams, and even pictures, that are blended to convey a story-like message that is attractive and easy to understand.

In the present study, infographics are defined as graphic designs that combine data visualizations, illustrations, text, and images together into attractive easy to understand formats that help prospective teachers present the required writing production in English comprehensively and competently.

2 REVIEW OF LITERATURE

In the following section the researcher sheds more light on the concepts of functional writing and infographics.

2.1 Functional Writing

Functional writing is that kind of writing which aims at conveying a specific, direct and clear message to a specific audience. It includes several areas such as writing instructions, formal letters, notes, and reports (Shorofat, 2007). For all EFL learners, and prospective teachers are no exception, it is a necessity for academic achievement and tasks completion to possess adequate functional writing skills. According to Abdallah (2014, p.7), prospective teachers' need for developing their functional writing

skills is so persistent as they will be required to write down lesson plans, short reports, summaries, and narratives. Moreover, they might need to simplify (in writing) some difficult English passages to their students or teach some functional aspects of the English language to their students to help them write reports, descriptions, letters, and e-mails. This necessitates that they themselves should possess reasonable levels of competency in functional writing. The following figure lists some areas wherein EFL functional writing is pivotal:

Figure1. EFL Functional Writing Areas
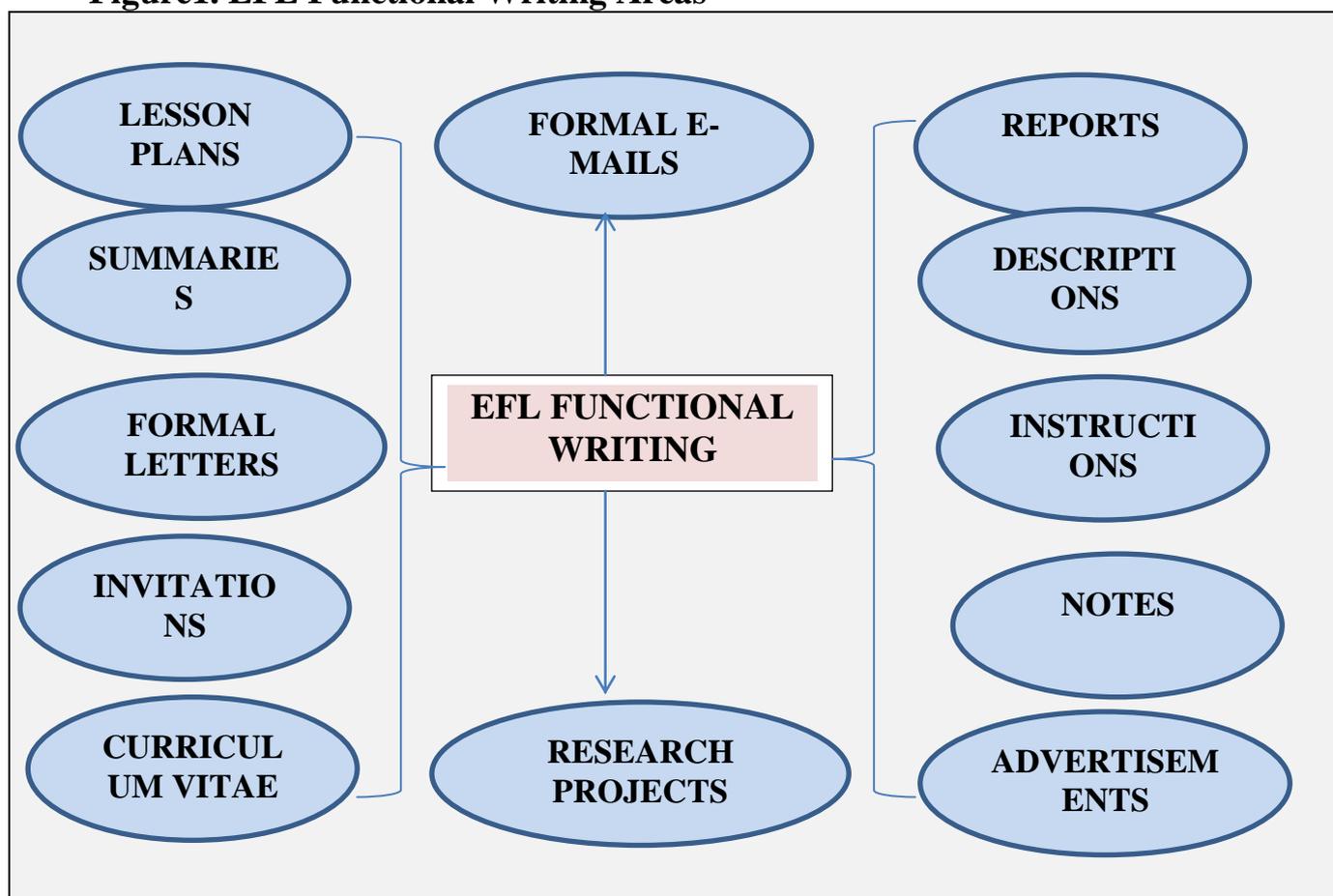
 (Source: Original)

However, EFL functional writing is a problematic area as recorded by many researchers. According to Jabali (2018, p.1), writing in a foreign language has always been seen as the most troublesome and challenging area of language learning for all students without exception. As for Grami (2010), Erkan and Saban (2011), and Al-Asmari (2013), many students do not possess adequate EFL writing skills which may negatively affect their academic achievement. Also, most students get low grades in their writing exams, as Samah (2020, p.51) mentions. Furthermore, as Abdallah (2014, p.7) confirms, many prospective teachers of English experience difficulties with functional writing elaborating that mastering functional writing skills

implies that language should be approached from a pragmatic perspective that recognizes its functional use to meet realistic communicative goals .

The challenge in writing is due to the fact that writing requires a combination of various cognitive, memory, linguistic, and motor systems, each of which makes its own unique contribution to the writing process and the text that gets written (Singer, 2004, p.2). To improve functional writing skills, two processes are required: the identification of the students' functional needs/requirements and the fulfillment of these needs in realistic situations.

One prominent list of EFL functional needs was presented by Abdallah (2014, p.24) including: writing for formal and academic purposes, writing for self-expression and social interaction, writing to summarize and criticize, writing to provide descriptive accounts, writing to guide and direct others, writing to inform and communicate specific information to others, writing for planning purposes, writing to report something , and writing for reflective purposes. Another important specification of functional writing needs is presented by Ssonko (2018, p.4) as follows: writing minutes of a meeting, writing C.V, writing formal email, general report writing, writing an academic report, and writing a proposal.

As for Onchera and Manyasi (2013, p. 844), a very important requirement in functional writing is the mastery of accuracy and the arrangement of words, phrases sentences to communicate effectively. Such needs should be approached by applying writing to real examples, situations and tasks. Accordingly, as noted by Department for Education and Employment (2007, p. 92), learners could produce realistic and meaningful documents. In the present study identification of functional skills/requirements and representation of these requirements in an actual situation using realistic visual designs are taken into account.

Reviewing previous research shows that functional writing received proper attention among EFL researchers. There are many studies that sought the development of EFL functional writing using various suggested treatments. Some of these studies are presented in the following lines:

Maroko (2010) explored the effect of authentic materials approach in teaching functional writing in the classroom. This study proposed an authentic text-based teaching and learning methodology that can be used in the acquisition of functional writing skills in the classroom.

As for Abdallah (2013), the researcher investigated the possibility of integrating new pragmatic forms of online writing in English (e.g. collaborative writing and connective writing) into a pre-service EFL teacher education programme through a community-of-practice design facilitated by online social-networking (i.e. Facebook), in order to develop pre-service teachers' required writing practices.

Similarly, to improve pre-service teachers' functional writing skills, Salem (2013) employed a writer's workshop approach to develop some functional writing skills of pre-service primary English language teachers in Hurgada faculty of education.

In an action research study conducted by Williamson (2013), the researcher focused on stressing the importance of improving functional writing. The study examined whether the achievement levels in L2 functional writing ability/skills can be raised, following observation of functional skills English practice. The main conclusion was that a new focus on developing functional writing skills was needed.

In the same concern, Abdallah (2014) sought to identify the important functional writing skills needed by EFL student teachers and suggest some methods/techniques for teaching functional writing in English language courses at Egyptian public schools. To reach this two-folded objective, the researcher employed a *mixed-method* research design that included both *quantitative* and *qualitative* data collection and analysis methods/techniques. The study reached a final list and taxonomy of those items and proposed a set of methods/techniques to be used for teaching functional writing at Egyptian public schools.

Moreover, Díaz Ramírez (2014) performed a case study to investigate the effect of project work and process approach on improving EFL writing production in the required tasks in an class (n=24) of Colombian University. Based on data collected, four factors were developed when project work and the writing process method were implemented on the participants who had weakness in accomplishing writing tasks: accuracy, fluency, integrative language skills, and a positive perception towards writing.

In a recent study conducted by Ahmad (2020), the effect of using cloud-based collaborative writing on EFL students' writing quantity and quality was probed. Twenty-one EFL students studying at Jubail College of Education were pretested in writing quantity and quality before the treatment then they practiced cloud-based collaborative writing for a whole semester before being posttested. Results revealed no significant difference between the pretest and the posttest regarding writing quantity whereas it revealed a significant difference with regard to writing quality.

The aforementioned studies are examples of recent research conducted to improve EFL functional writing skills. They, as well as the present study, confirm the necessity to adopt new treatments to develop functional writing among EFL/ESL learners. However, in the present study the researcher suggests an education based on infographics to develop functional writing in the EFL context which, as far as the researcher knows, was not conducted before in previous research. The rationale supporting the

suggested infographics-based education is discussed in detail in the following section.
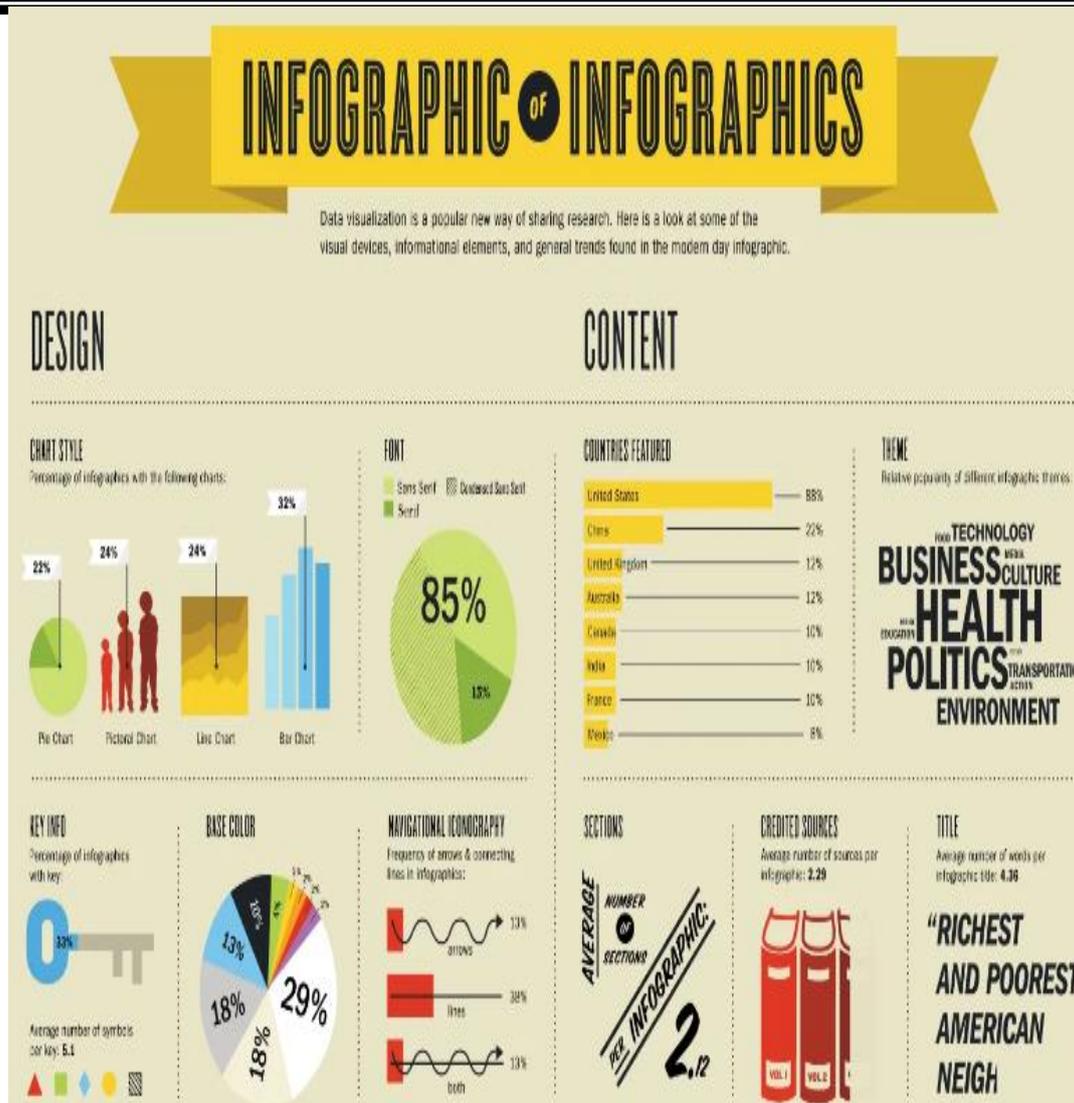
2.2 INFOGRAPHICS

In the educational environments, it is very important to use teaching materials. Among important teaching materials, visuals receive considerable attention. Visuals achieve many benefits in the educational situation as they allow information to be visualized and organized using visual components (Yildirim, Yildirim, Celik and Aydin, 2014). Studies that compare visual and verbal communications claim that visual communication is more effective than verbal communication because the human mind is capable of perceiving visual representation "in a short time and in a more efficient and permanent way compared to written or verbal information" (Dur, 2014, p. 40). Visuals, according to Williams (2002, p.4), have taken its place between the new trends of contemporary learning approaches.

According to Yildirim (2016, p.98), infographics are one of the new educational environments used to provide information in a visual way using various visuals such as texts, pictures, drawings, diagrams, graphs, etc. With the utilization of infographics, information that can be presented on many pages can be transferred in an easy way and with very little explanation.

Originally, derived from the phrase information graphics, infographics refer to the visual representation of data. The term "instructional infographics" emerged in 2014, when reports and studies investigated the efficacy of infographics in an instructional context (Alrwele, 2017, p. 106). Recently, the definition evolves to refer to a larger graphic design that combines data visualizations, illustrations, text, and images together into a format that tells a complete story (Krum, 2013, p.6). The following figure illustrates the type of data that can be included in an infographic:

Figure2. Infographic of Infographics

(Source: Visually, 2012, p.1)

In relation to the preparation of infographics, Yildirim (2016, p.98) mentions that Although infographics are so new among educational materials, the components used to prepare them are not that new as they include images, drawings, figures, symbols, graphics and texts. In the past, only designers and professionals created infographics because they were created using specialized, complicated, and expensive software such as Microsoft Publisher, InDesign, Adobe Illustrator, and Scribus (Guevara and Moore, 2013, p. 12). Currently, because of the advent of web applications, several easy and low-cost or free tools have emerged, many of which can be used without prior training. Infographics can be created through popular image processing programs (Photoshop, Picasa, etc.), special software (SmartDraw etc.), and specific websites (infogr.am, visual.ly, piktochart etc.). Moreover, Infographics can be created using various formats. The following figure shows the most common infographics formats:

Figure3. Infographics Formats
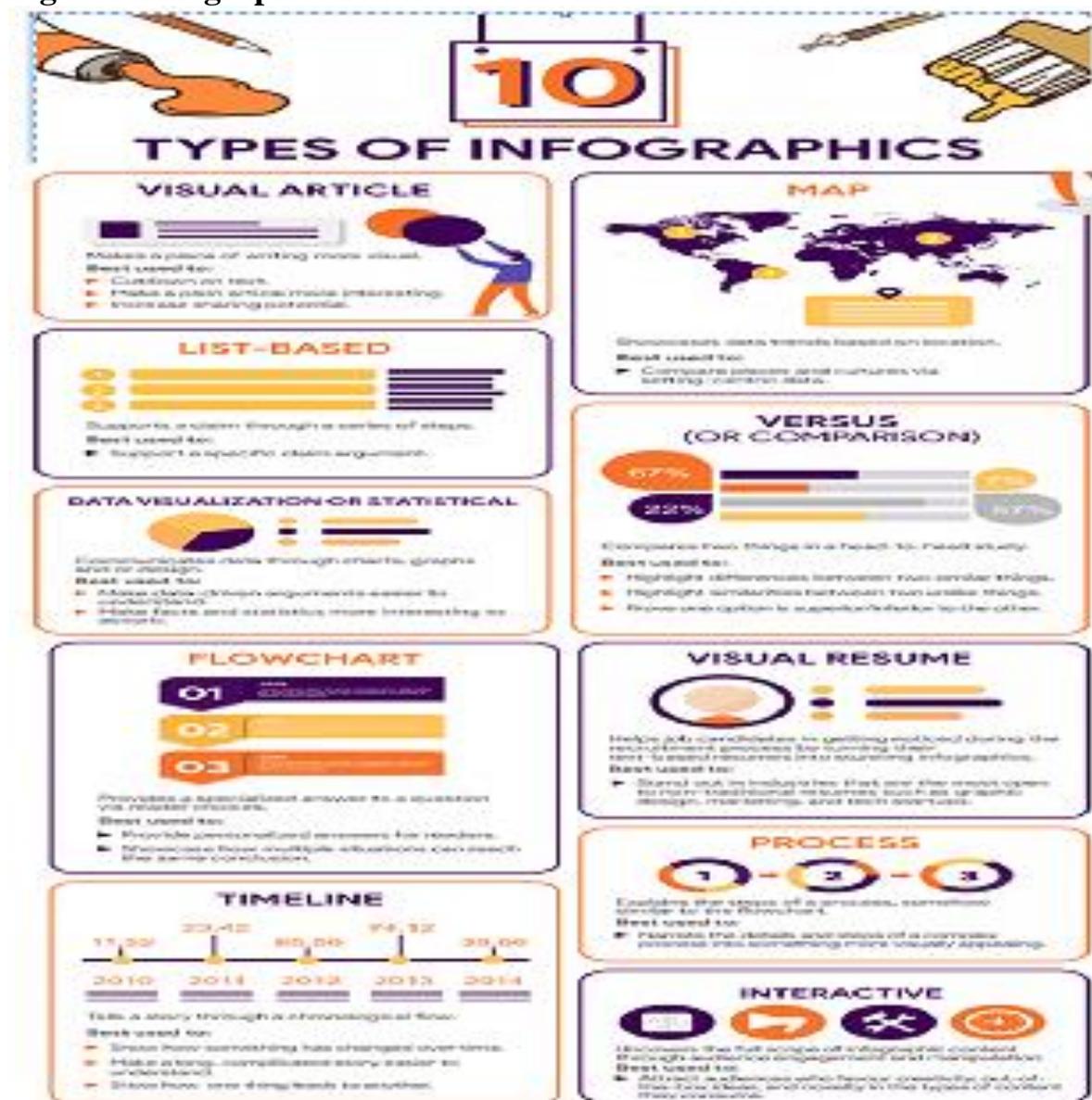
(Source: Easelly Infographic Maker Tool, 2020, p.1)

Whatever the medium used to create infographics, the instructor has to consider specific points. Davis and Quinn (2013, p.17), list the steps to prepare good infographics, the one that supports students' development, as follows: identification of the purpose, deciding on the components that can be used in infographics, determination of the type of infographic to be created, and presenting the information in a way that allows learners to understand the subject. Similarly, Kineapple (2019, p.1) summarizes the steps to create infographics in the following figure:

Figure4. Summary of Infographics Making Steps

(Source: Kineapple, 2019, p.1)

Reviewing previous research shows that infographics received the attention of many EFL researchers. In the following lines some of the studies that were conducted to examine the effect of infographics are presented:

In the study of Yildirim (2016), the views of those who used infographics for educational purposes are analyzed. The study was conducted with a total of sixty four participants including thirty seven female and twenty seven male students at Ataturk university, Kazim Karabekir education faculty. According to the results of the study, participants find infographics instructive and prefer to use them in basic learning processes.

Alrwele (2017) conducted a study to examine the effects of infographics on university students' achievement and the students' perceptions of the impacts of infographics. Using a quasi-experimental design, the study was conducted with one hundred sixty five participants divided into two groups: experimental (N = eighty three) and control (N = eighty two).The treatment lasted for nine sessions each of two hours duration. Data were collected using achievement tests and a questionnaire. The results revealed significantly higher achievement in the experimental group than in the control group, and the majority of the participants reported that infographics had a positive impact on their intellectual, life skills, and affective development.

Alqudah, Bidin, and Md Hussin, (2019) conducted a study that aimed to evaluate the effect of employing infographics in higher education. The participants were one hundred thirty eight students enrolled in two experimental and two control groups. Infographic materials were developed by the researcher and guided by (ASSURE) instructional model to present the lectures to the two experimental groups. Meanwhile, the two control groups were taking the same courses in deferent class by conventional method. A post-test questionnaire was involved to measure interaction and perception of the experimental groups. The findings of this study show that infographics have a positive and strong impact on students' interaction and perception.

3 METHOD

3.1 Design of the Study

The design in the present study was the one group pre-posttest quasi experimental design wherein the participants (n=70) were pre-tested and post-tested to investigate the effect of the suggested infographics-based education on the development of their EFL functional writing skills.

3.2 Participants

The participants in this study included seventy third year prospective teachers enrolled in the English department, faculty of education, Port Said university. Prospective teachers received an education based on infographics for six weeks in the first term of the academic year 2021/2022 with the purpose of developing their EFL functional writing skills.

3.3 Instruments of the Study

The Pre-posttest of EFL Functional Writing

The instrument of the study included an EFL functional writing test designed by the researcher to examine the development in the participants' functional writing skills due to the administration of the infographics-based education, a rubric was used for assessing the test scores. The pre-posttest of functional writing was graded out of 96. It contained 8 questions. Each question was graded out of 12 and tested the participants' ability to present a certain written production including reports, research projects, formal e-mails, lesson plans, written instructions, summaries, formal letters, and curriculum vitae (For more details see Appendix D).

The researcher confirmed test validity by submitting the test to a jury of four experts in the field of curriculum and instructions. This is to ensure that the test measures the skills it was purports to measure, state how far the test measures the target functional writing skills, and make the necessary modifications.

Moreover, to assess the test reliability, the test re-test method was used. The test was administered twice to the same participants (seventy third year prospective teachers enrolled in the English department, faculty of

education, Port Said university). Test reliability was estimated by comparing participants' scores in both the first and the second administrations (applied at the beginning of the first term in the academic year 2021/2022). The correlation coefficient was calculated using Pearson's correlation coefficient ratio. The reliability co-efficient was (R= 0.9984), verifying the test reliability.

A rubric was prepared and used together with the pre-and-post writing test for assessing the participants' EFL functional writing skills. The rubric was a four-point scale in which (4) means distinguished, (3) means proficient, (2) means basic, and (1) means unsatisfactory. The rubric evaluated the participants' responses in relation to three main categories: designing of format, composition of content, and appropriateness of language. Before using the rubric, it was presented to a panel of jury of specialists in English curriculum and instruction (N.4) and their comments were taken into consideration. Moreover, a specialist colleague participated in the evaluation of the students' responses to the test. (For more details see Appendix E).

3.4   The Treatment

The treatment in the present study is based on infographics. Data about appropriate format, content, and language of specific written productions are presented.   The researcher utilized the visual data included in infographics because visual representation is a more efficient and permanent way of conveying information compared to the verbal way. It was convenient for prospective teachers to learn all about the required written productions through designs that combine illustrations and figures. This infographics-based education saved time and effort of prospective teachers in the process of acquiring necessary functional writing skills.

The treatment lasted for six weeks in the first term of the academic year 2021-2022. With the purpose of improving their functional writing skills, the participants were taught how to use infographics for each type of writing and they studied and discussed together each design.   As for the evaluation system, the improvement in writing skills was measured by the writing pre-posttest applied before and after the administration of the infographics-based education.

The following table summarizes the procedures followed during infographics-based education administration:

Table1. The Procedures of the Infographics-Based Education

Phase one Preparation/ Pre-test	-Designing infographics for writing reports, research projects, formal e-mails, lesson plans, written instructions, summaries, formal letters, and curriculum vitae. -Preparing the pre-posttest of EFL functional writing and the rubric to assess participants' test scores. -Applying pre-test.	
Phase two Application	**Sessions 1-6**	**Procedures** • **Presenting infographics of the required written productions through designs that combine illustrations and figures.** • **Prospective teachers study and discuss infographics.** • **Prospective teachers follow model examples and present their own writings.**
Phase three Posttest/ Analysis	-Applying posttest. -Comparing scores of pre-posttest of EFL functional writing to identify significant differences.	

Following are two examples of the utilized infographics (other infographics included in the treatment are available at request):

Figure5. Exhibits of the Utilized Infographics.

(Source: original)

4 RESULTS AND DISCUSSION

4.1 Results of the Functional Writing Test

In this section, results will be presented along with a discussion based on the statistical analysis of the collected data as well as the research questions.

In response to the first research question: "What are the EFL functional writing skills that prospective teachers need to possess?" , review of literature related to EFL functional writing and previous studies that aimed at developing EFL functional writing of learners at various educational levels including prospective teachers revealed that functional writing skills are perceived as those tangible, concrete aspects/components of linguistic performance that indicate a learner's mastery of functional writing in English for realistic everyday-life purposes. As for prospective teachers, EFL functional writing skills refer to their abilities to write summaries, lesson plans, e-mails, research proposals, reports, and other required/professionally related written productions in the target language competently. Reviewing literature formed a basic rationale for the functional writing skills checklist that was prepared and modified according to its suitability to the present study.

In response to the second research question: "What are the main features of an education based on infographics?", review of literature related to infographics showed implementation procedures and other considerations that helped the researcher identify the features of the infographics-based education (purpose, phases, teaching steps, duration, and evaluation system).

In response to the third research question: "How far is an education based on infographics effective in developing prospective teachers' EFL functional writing skills?", the researcher followed these procedures: applied the pre-test, administered the suggested infographics-based education, applied the posttest, and analyzed the results.

The researcher used t-test for paired samples to report significant differences between pre-post results. It was found that there were statistically significant differences at 0.0001 level between the means of the total scores of the participants in the pre-posttest. Table (2) shows means of the participants in the functional writing pre-posttest.

Table2. Results of Comparing the Means of Participants (n= 70) in the Pre-posttest

	M	SD	DF	t-value
Pre	52.33	9.73	69	41.0865
Post	83.57	5.49		

*Significant at 0.0001

As indicated in Table (2) above, the paired t-test results were: concerning P value and statistical significance, the two-tailed P value was less than 0.0001. According to conventional criteria, this difference was considered to be extremely statistically significant. The obtained t value was 41.0865, a significant value at the level of 0.0001, indicating the significant influence of the suggested infographics-based education on developing prospective teachers' functional writing. Apparently, there is a significant increase in the total score mean participants achieved regarding the two tests (from 52.33 to 83.57). This indicates that participants gained abilities to write competently specific writing formats due to the administration of the suggested treatment. Thus, the study hypothesis was verified as results showed that there is a statistically significant difference between the mean scores of prospective teachers in the pre-test and the post-test of functional writing skills in favor of the later.

4.2 DISCUSSION

The writing skills test results show that there is a development in prospective teachers' writing skills. In the pre-test, their responses to the test question reflected weak writing skills. While in the post-test, they achieved significant improvement as they presented coherent comprehensive pieces of writing. This is remarkably appear from comparing the means of the participants' scores in each of the functional writing skills in the pre-posttest, in relation to designing of format, composition of content, and appropriateness of language, as follows: writing instructions from 5.36 to 10.24, writing mails from 7.23 to 11.03, writing letters from 7.31 to11.16, writing summaries from 6.49 to10.59, writing reports from 4.31 to 10.03, writing lesson plans from 8.84 to 11.10, writing research projects from 4.30 to 8.41, and writing C.V from 8.47 to11.01.

The lack of major EFL writing skills affected the accomplishment of writing assignments/projects. However, it was a necessity for prospective teachers to write competently not only to accomplish tasks and pass to the next year, but also to master a major language skill to become better teachers.

Through the administration of the infographics-based education prospective teachers learned to write specific forms of writing including reports, research projects, formal e-mails, lesson plans, written instructions, summaries, formal letters, and curriculum vitae that should be mastered by them for professional needs. They were taught to consider designing of format, composition of content, and appropriateness of language when they present the required writing forms.

Specifically, Infographics were beneficial for the following reasons:

-The designs that combine illustrations, figures, and example formats introduced all about each writing form in a summarized version and that was very helpful in saving the time and effort of prospective teachers.

-During the sessions, prospective teachers studied the infographics and discussed the details of design, content, and language. Paying adequate attention to these standards stimulate them to present competent forms of writing.

- In each session, prospective teachers were asked to present their own writing forms after the discussion they participated in and the modeling they received. Clearly, the infographics-based education considered the variety in the participants' learning styles. Visual, auditory, and kinesthetic learners' preferences were fulfilled to a great extent.

According to test results, there was an in increase in the participants' EFL writing skills. Thus the result of the study coincides with the findings of Maroko (2010), Abdallah (2013), Salem (2013), and Díaz Ramírez (2014). These studies suggested new treatments for writing skills difficulties, based on using modern strategies/techniques, including authentic materials, collaborative writing, connective writing, writer's workshop approach, project work and process approach, and these treatments proved to be effective.

5 CONCLUSIONS, RECOMMENDATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 Conclusions

In the present study, third year prospective teachers received an education based on infographics to help them improve their EFL functional writing skills. Utilizing infographics provided opportunity for the participants to learn, study, and apply specific writing forms. The results of the study indicated that infographics were effective in developing the students' writing skills. Based on the study results, there is a considerable basis that infographics could develop different skills in the EFL context.

5.2 Recommendations

In the light of the study findings, the researcher recommends the following:

- The students' needs should be the basis for designing educational programs.

- EFL faculty staff and teachers should be provided with professional development training on how to use infographics to develop the students' language skills.
- Evaluation of EFL prospective teachers should be comprehensive, measuring their performance in all language skills.

5.3 Suggestions for Further Research

Based on the study result, the researcher suggests the following:

- More studies testing the effectiveness of infographics in developing EFL language skills are needed to be implemented at various educational levels.
- More studies that investigate students' needs are required so as to consider these needs in designing the educational programs.
- Studies that aim at improving productive language skills are required in prospective teachers' preparation program.

REFERENCES

Abdallah, M. (2013). A Community of Practice Facilitated by Facebook for Integrating New Online EFL Writing Forms into Assiut University College of Education. *Assiut University New Valley College of Education Journal*, 12(1).

Abdallah, M. (2014). Teaching and Learning English Functional Writing: Investigating Egyptian EFL Student Teachers' Currently-Needed Functional Writing Skills. *Research Paper Presented at the International Educational Conference: 'Colleges of Education & Restructuring Education'*, College of Education, Assiut University, Assiut, Egypt.

Ahmad, S. (2020). Cloud-Based Collaborative Writing to Develop EFL Students' Writing Quantity and Quality. *International Education Studies*, 13(3), 51-64.

Al-Asmari, A. (2013). Investigation of Writing Strategies, Writing Apprehension, and Writing Achievement among Saudi EFL Major Students. *International Education Studies*, 6(11), 130-143.

Alqudah, D., Bidin, A., & Md Hussin, M. (2019). The Impact of Educational Infographic on Students' Interaction and Perception in Jordanian Higher Education: Experimental Study. *International Journal of Instruction*, 12(4), 669-688.

Alrwele, N. (2017). Effects of Infographics on Student Achievement and Students' Perceptions of the Impacts of Infographics. *Journal of Education and Human Development.*6 (3), 104-117.

Awada, G., Burston, J., & Ghannage, R. (2019). Effect of Student Team Achievement Division through WebQuest on EFL Students' Argumentative Writing Skills and their Instructors' Perceptions. *Computer Assisted Language Learning*, 1-26.

Davis, M., & Quinn, D. (2013). Visualizing Text: The New Literacy of Infographics. *Reading Today*, 31(3), 16-18.

Department for Education and Employment (2007). *The Functional Skills Support Programme*, Education and Skills, Managing Delivery of Functional Skills. Sudbury: DfES Publications.

Díaz Ramírez, M. (2014). The Impact of Project Work and the Writing Process Method on Writing Production. *HOW,* 21(2), 31-53.

Dur, B. (2014). Data Visualization and Infographics in Visual Communication Design Education at the Age of Information. *Journal of Arts and Humanities*, 3(5), 39-50.

Easelly Infographic Maker Tool (2020). Types of Infographics. Retrieved December 20, 2020 from http://www.easel.ly/.

Erkan, D., & Saban, A. (2011). Writing Performance Relative to Writing Apprehension, Self-efficacy in Writing, and Attitudes towards Writing:

A Correlational Study in Turkish Tertiary-level EFL. *Asian EFL journal*, 5(4), 164-192.

Ghoneim, N. and Elghotmy, H. (2019). Utilizing Ergonomics Based Instruction to Develop College Students' EFL Creative Writing Skills. *Faculty of Education Journal Menoufia*, 34(3), 1-29.

Grami, G. (2010). *The Effects of Integrating Peer Feedback into University-level ESL Writing Curriculum: A Comparative Study in a Saudi context* (Unpublished Doctoral Dissertation). Newcastle University.

Guevara, S., & Moore, M. (2013). Infographic Tools for the Non-designer. *Information Outlook*, 17(3), 12-14.

Jabali, O. (2018). Students' Attitudes towards EFL University Writing: A Case Study at An-Najah National University, Palestine. *Heliyon*, 4(11), 1-25

KIE (2006). *Secondary English Teachers Handbook*, KIE, Nairobi

Kienapple, B. (2019). How to Create Infographics. That'll Supercharge Your Content Marketing Strategy in 2019 [Infographic]. Retrieved December25,2020fromhttps://www.business2community.com/infographics.

Krum, R. (2013). *Cool Infographics: Effective Communication with Data Visualization and Design*. John Wiley & Sons. NJ. Indiana, US.

Maroko, G. (2010). The Authentic Materials Approach in the Teaching of Functional Writing in the Classroom. In: Reinelt, R. (ed.), *The New Decade and (2nd) FL Teaching: The Initial Phase*, Rudolf Reinelt Research Laboratory EU Matsuyama, Japan, 71 – 87.

Morris, G., & Sharplin, E. (2013). The Assessment of Creative Writing in Senior Secondary English: A Colloquy Concerning Criteria. *English in Education,* 47(1), 49-65.

Onchera, P., & Manyasi, B. (2013). Functional Writing Skills for Effective Communication: The English Language Classroom in Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)*, 4(6), 842-847.

Parkinson, M. (2016). Infographic Tips and Tools. *Talent Development*, 70 (5), 26-28.

Praminatih, G., Kwary, D., & Ardaniah, V. (2019). Is EFL Students' Academic Writing Becoming more Informal? *Journal of World Languages*, 1-12.

Rezaei, N., & Sayadian, S. (2015). The Impact of Infographics on Iranian EFL Learners' Grammar Learning. *Journal of Applied Linguistics and Language Research*, 2(1), 78-85.

Salem, A. (2013). The Effect of Writer's Workshop Approach to Develop Functional Writing Skills of Primary Stage Pre-service English Language Teachers in Egypt. *International Journal of Applied Linguistics & English Literature (IJALEL)*, 5(2), 70- 80.

Shorofat, A. (2007). *The Effect of Using the Brainstorming Strategy on Developing Ninth Grade Students' Creative Writings Skills in Arabic language*. PhD Dissertation, the University of Jordan.

Singer, B. (2004). Writing: Why Kids Struggle and What to Do about it. Article for Learning. LLC. Retrieved September 3, 2020 from http://www.chinaelg.com.

Ssonko, A. (2018). *Functional Writing Simplified Guide: A Vital Life Skill*. Mogadishu, Somalia.

Tsao, J., Tseng, W., & Wang, C. (2017). The Effects of Writing Anxiety and Motivation on EFL College Students' Self-Evaluative Judgments of Corrective Feedback. *Psychol Rep*, 120(2), 219-241.

Viana, V., & Zyngier, S. (2019). Creative Writing and Iconicity in English as a Foreign language. *New Writing,* 16(1), 38-49.

Visually (2012), Infographic of Infographics. Retrieved December 19, 2020 from https://www.wired.com/.

Wertz, J., & Saine, P. (2014). Using Digital Technology to Complement Close Reading of Complex Texts. *New Englandand Reading Association Journal*, 50(1), 78- 85.

Williams,   M. (2002). Diversity, thinking styles, and infographics. *12th International Conference of Women Engineers and Scientists*, *Memorial University*, 1-5.

Williamson, L. (2013). *Can Action Research Reveal How to Raise Attainment Levels in L2 English Functional Skills Writing?* Institute for Learning (IfL). Retrieved September 3, 2020 from: www.ifl.ac.uk.

Wu, S., Quentin Dixon, L., Sun, H., & Zhang, P. (2019). Breadth or Depth: The Role of Vocabulary in Chinese English-Language Beginning Writers' Development. *International Journal of Bilingual Education and Bilingualism*, 1-17

Yildirim, S. (2016). Infographics for Educational Purposes: Their Structure, Properties and Reader Approaches. *TOJET: The Turkish Online Journal of Educational Technology*, 15(3), 98-110

Yildirim, S., Yildirim, G., Celik, E. & Aydin, M. (2014). Bilgi Grafiği (Infografik) Oluşturma Sürecine Yönelik Oğrenci Görüşleri, *Journal of Research in Education and Teaching*, 3(4), 247-255.