A Challenge Based Learning Program to Develop General Diploma Students' Research Skills and their Satisfaction

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Abstract

The Present study aimed at developing general diploma students' research skills and their satisfaction through the use of challenge based learning training program . Participants of the study were randomly selected (N=40) from general diploma students enrolled in Faculty of Education, Fayoum University. The researcher prepared a research skills cognitive test , a research skills performance test, a research skills rubric, a satisfaction checklist and a program . Having pre administered the study instruments, the experimental group was taught using a challenge based learning training program . The same instruments were readministered at the end of the treatment. The results showed that the program proved to be effective in developing general diploma students' research skills and their satisfaction. The study concluded with some recommendations and suggestions for the students and faculty members. Also, suggestions for further research were provided.

Keywords: challenge based learning, research skills, satisfaction, general diploma students

الملخص:

هدفت الدراسة الحالية إلى تنمية مهارات البحث لدى طلاب الدبلوم العام باستخدام برنامج تدريبى للتعلم القائم على التحدى ورضائهم عنه ، وتكونت عينة الدراسة من (٤٠) طالباً تـم اختـــارهم بـــشكل عشوائى من طلاب الدبلوم العام بكلية التربية جامعة الفيوم.وقامت الباحثة بإعداد اختبار معرفى لمهارات البحث.كما قامت بإعداد اختبار مهاري لمهارات البحث ومقياس لمهارات البحث ، وقائمه لرضا الطلاب وبرنامج تدريبى للتعلم القائم على التحدى . وبعد تطبيق ادوات الدراسة قبلياً تم التدريس لعينة الدراسـة باستخدام البرنامج التدريبى، ثم تم تطبيق الادوات بعدياً. كشفت الدراسة عن النتائج الإيجابية للبرنـــامج على تنمية مهارات البحث والرضا لدى عينة الدراسة. واختتمت الباحثة بتقديم مجموعـــة مـــن التوصيات التى تفيد الطلاب، والمعلمين ، و مصممى المناهج هذا بالإضافة إلى اقتراح بعض الدراسات و البحوث المستقبلية.

الكلمات المفتاحية: التعلم القائم على التحدى – مهارات البحث – الرضا – طلاب الدبلوم العام

Introduction

Challenge Based Learning (CBL) is a collaborative and hands on learning experience in which students are asked to work with other students, their teachers, and experts in their communities to develop deeper knowledge of the subjects they are studying, identify and solve challenges, make a difference in their community, and share their results with the world. (Apple Inc, 2011).

CBL is a multidisciplinary approach to the learning process that supports students to leverage the technology they use in their daily lives to solve real world challenges/problems. CBL gives students the opportunity to focus on a challenge of global significance and apply themselves to developing local solutions. It creates an educational atmosphere that encourages students to direct their own research and think critically and creatively about how to apply what they learn. (Johson & Adams, 2011).

CBL can be described as extended problem- based learning, but it contains also some components from the experiential, project- based and decision- based learning perspectives (Baloian, Breuer, Hoeksema, Hoppe & Milrad, 2015). It is an effective learning framework initiated at Apple, Inc. and used in various schools, universities, and institutions around the world. The framework is informed by innovative ideas from media, , recreation, technology, education, entertainment, workplace and society. It builds on the foundation of experiential learning and leans heavily on the wisdom of a long history of progressive ideas proving that learning can be deep, meaningful and purposeful (Nichols, Cator & Torres, 2016). It aims to enable students to conduct research by integrating practices with theory and applying of knowledge and skills, such as collaboration and taking action in the community context (Santos, Sals, Fernandes & Kroll , 2018).

Johson and Adams (2011) pointed out that CBL has many advantages. Firstly, it builds 21st century skills such as leadership, creativity, media literacy, problem solving, critical thinking and flexibility developing a framework for life- long learning. Secondly, it helps learners feel that they have learned more than what is required of them, and that they are part of solving a big problem, working harder than they normally do. Thirdly, teachers find that it is effective in engaging students in learning , helping them master the material- and making good use of

their limited time. In addition, it is suited to teaching in a technological rich environment.

According to Nichols et al. (2016) CBL is helpful as it provides 1) a flexible and customizable framework that can be implemented as a guiding pedagogy or integrated with other progressive learning approaches, 2) a free and open system with no proprietary ideas, 3) a process that places all learners in charge, and responsible for the learning, 4) a focus on global ideas, meaningful challenges and the development of local and age appropriate solutions, 5) an authentic relationship between academic disciplines and real world experiences , 6) a way to document and assess both the learning process and products and 7) an environment for deep reflection on the learning process.

Premsmith, Wannapiroon and Nilssok (2015) and Nichols et.al (2016) state some features of CBL. A key feature of CBL is the diversity of possible solutions and strategies, resources and relationships, opportunities to develop opinion, talent and basic skills to management. In addition, it provides students with opportunities to do something rather than learning in class documenting the experience gained from solving challenge and

finding information 24 hours a day. Another feature is that it emphasizes exploring topics from different angles and through the lens of multiple disciplines allowing learners to recognize existed connections between content areas.

This multidisciplinary approach is important as it encourages students to work collaboratively with their classmates, ask questions, develop a deeper understanding of the subject area and take actions in solving real-world problems. It works well when teachers from different disciplines work together. Teachers who have implemented CBL in teams report that collaboration with other teachers is one of the most beneficial and enjoyable aspects of this approach (Apple Inc, 2011).

CBL approach vs. traditional approaches

Among the biggest differences between CBL and traditional approaches are the roles of schools, teachers and students. Schools evolve from being information repositories to creative environments. Learning is a collaborative learning experience in which teachers and students work together to learn about compelling issues, propose solutions to real problems, and

take action. Teachers, using such approach, become more than information experts. They become collaborators in learning who leverage the power of students, seek new knowledge alongside students, and model positive habits of mind and new ways of thinking. They focus on steering a knowledge path. Students, following such approach, reflect on their learning and publish their solutions to worldwide audiences (Santos et. al, 2018).

CBL approach extends the classroom environment and necessitates access to real world communication. Participation from a large group of stake holders including families and community members are co-learners at the beginning of the learning experience. This approach makes the solving of real problems the center of the curriculum. It gives students access to digital age tools, requiring them to work collaboratively and manage their own time and learning. Also, it allows students to direct the course and engage teachers in a supportive, essential role as guides (Nichols et al. ,2016 and Johnson et al. , 2011).

O'Mahony, Vye, Bransford and Sanders (2011) conducted a comparative research involving lecture and challenge-based approaches to learning.

Participants of the study were The Boeing Company employees. Results confirmed that the challenge-based group performed significantly better on post test items requiring integration and synthesis of concepts. In addition, challenge-based instruction showed greater interaction and more sharing of knowledge related to the course content among participants in the challenge-based group.

CBL is proved to be effective in developing language skills. This is confirmed by the study of Ali (2019) that aimed at developing the academic speaking skills for university students by utilizing CBL strategy. Participants of the study were 70 university students from various majors, yet with the same English level. Results of the study showed that CBL strategy had a large effect size on developing university students' academic speaking skills and interactivity in academic context. She recommended with utilizing CBL strategy for developing academic writing skills.

CBL phase

CBL consists of three interconnected phases: engage, investigate and act. Each phase includes activities that prepare the learners to move to the next stage. The first phase includes big ideas,

essential questioning and the challenge. Big ideas are broad concepts that are explored in multiple ways and are relevant to the learners and the larger community. Essential questioning allows the learners to personalize the big idea. Challenge turns the essential questions into a call to action by charging participants to learn about the subject and develop a solution.

The second phase, investigation, includes guiding questions and activities. Guiding questions point towards the knowledge the learners will need to develop solutions to the guiding questions that will continue to emerge throughout the experience. Guiding activities and resources are used to answer the guiding questions developed by the learners.

The third phase, action, includes evidence-based solutions, implementation and evaluation. Solution concepts emerge from the findings made during the investigation phase. Using the design cycle, the learners will prototype, test and refine their solutions. The depth and breadth of the implementation of solutions depend on the age of the learners, the amount of time and resources available. Evaluation provides the opportunity to assess the effectiveness of the solution, make adjustments and deepen subject area knowledge (Apple Inc ,2011 and Nichols, et al . ,2016).

Research skills

The development of information technology makes it necessary for students to access and search for information. Research is a systematic process of collecting and analyzing information to increase understanding of the phenomenon under study. It is an objective activity to find the truth and solving or answering a problem (Prahmans, 2017). The researcher's main function is to understand the phenomenon and to communicate that understanding to others (Paul & Jeanne, 2004).

More emphasis on research is given at the university. Universities now a days require students to take courses on the use of computer for seeking information and also compulsory courses on research skills methodology in order to be able to benefit of available information. Universities have put substantial resources and personnel in order to help the students to acquire research skills (Meerah & Arsad , 2010). However, the training in research should have been started at elementary school . If students have research experience at various educational levels before

advancing to graduate studies, they will acquire the skills of observation, manipulation and coordination. Also, they will internalize the habit of inquiry or problem solving and become clever researchers. (Meerah, Osman, Zakaria, IKhsan, Krish, Lian & Mahmod, ,2011a).

Research skills are the abilities needed to undertake a research, including strategies and tools which can be acquired. They include problem solving, critical thinking, analysis and dissemination. These skills are important for pre-service teachers since developing such skills would help them build a strong intellectual and practical connection between research and their own learning process(Prahmana, 2017). Research skills enable learners to identify a problem, collect informational resources that can help address the problem, evaluate these resources for quality and relevance and come up with an effective solution to the problem (Reaching Boutique Educational Advisory , 2016).

Meerah et al. (2011b) point out that research skills include the following skills: 1) Research methodology skills that involve identifying appropriate research procedures, understanding the limitations and scope of research design. 2) Information seeking skills : the awareness of various sources of information involving the ability to search, use, and evaluate information. 3) Problem solving skills : the ability to identify, define and analyze problems, create solutions and evaluate the best solution for a specific context. Problem solving involves the background skills of imagination and creativity, logic and reasoning, data collection, conceptual thinking, reflection and feedback , and scientific experimentation.4) Statistical / quantitative analysis skills : the ability to carry out data collection procedures including planning and selecting appropriate data collecting instruments as well as identifying an appropriate method (quantitative and qualitative) for interpreting data. 5) Communications skills : the ability to write and present the research and its findings including the ability to communicate the purpose, objectives, conclusions of the research, and tailor the communication to the needs and level of the audiences.

Research – based learning is a kind of students' activity under the lecturer's guidance in order to help them construct their knowledge and develop their skills (Prahmana, 2017). The term students as researchers refers to a pedagogic approach to support

students in their engagement with undergraduate research with the aim of furthering their own knowledge and understanding of the broader knowledge base of their discipline (Walkington, 2014). So, research skills development can be seen as an essential principle of the learning process. Students should be encouraged to ask research questions of increasing sophistication, specificity, depth and breadth that set them on a journey towards making the unknown known.

Whittaker (2012) points out that there are six key terms in research: data , methodology, research approach, research participants and epistemology. Data refers to the information that the researches collect to answer the research question. Methodology refers to the totality of how the researcher is going to undertake his research, including the research methods used. Research approach refers to the traditional division between quantitative traditions in research. Research participants refer to the process of selecting the participants involved in the study. Epistemology is the study of knowledge addressing the question of what counts as legitimate knowledge.

Stages of research

Whittaker (2012) states six stages of research. The first stage is choosing a research topic and formulating a specific research question. The second stage is choosing the research approach, design, methods and sample. The third stage is undertaking the literature review. The fourth stage is collecting data. The fifth stage is analyzing data. The last stage is writing up the research presenting its findings.

The initial stage of the research process is choosing a research topic and developing it into research question. It is important that the research question should not be so broad that is unrealistic to be answered or so narrow that it lacks sufficient substance. After formulating a research question, the researcher has to generate research hypotheses. A hypothesis is a prediction of what is expected to occur or a relationship between concepts of interest. The hypothesis is typically tested with some form of experiment (Hapuhinna, 2015).

Kumar (2011) states that there are several methods for collecting data such as observation, interviewing and questionnaire. Observation is a purposeful and systematic way of

watching and listening to an interaction or phenomenon as it takes place. There are two types of observation: participant observation and non – participant observation. Interviewing is another method of collecting data. It is a verbal interchange in which an interviewer tries to elicit an information, belief or opinion from another person. There are two types of interview: unstructured interviews and structured interviews. Questionnaire is an effective method of collecting data. It is a written list of questions, the answers to which are recorded by respondents. The choice of any method depends upon the purpose of the study, the available resources and researcher's skills.

Kothari (2012)states that research can be approached in three ways: quantitative/ qualitative, applied/ basic and deductive/ inductive. Quantitative research focuses on collecting and analyzing numerical data concentrating on measuring the scale , range and frequency of phenomena. On the other hand, qualitative research involves examining and reflecting on the less tangible aspects of a research subject, e.g. values, attitudes and perceptions. Basic research aims to improve knowledge generally without any particular applied purpose whereas applied research is designed to apply its findings to a particular situation. Deductive approach offers researchers a systematic way of testing established ideas on a range of people whereas inductive approach may lead to arrive at a new definition of the word.

A research design is the framework of plan for a study that is used as a guide in collecting and analyzing data (Pandey & Pandey , 2015). Walliman (2011) states a list of the most common research designs. It includes historical, descriptive, correlation, comparative, experimental, simulation, evaluation, action, ethnological , feminist and cultural research designs. The choice of which design to apply depends on the nature of the research problem.

Sampling is a process that allows researchers to infer information about a population based on results from a subset of the population. The selected sample should be representative of the whole population. Sampling methods include simple random sampling , systematic sampling , stratified sampling and clustered sampling (Hapuhinna , 2015).

Walliman (2011) states that one of the first steps in planning a research project is to do a literature review. This means trawling

through all the available information sources in order to track down the latest knowledge and to assess it for relevance, quality, controversy and gaps. Doing a literature review involves an objective critique and evaluation of the strengths and weaknesses of the collected information. Kumar (2011) states that review of literature enhances and consolidates the researcher knowledge base, integrates the researchers findings with the existing body of knowledge, brings clarity and focus to research problem and improves research methodology.

Data analysis requires a number of related operations such as establishment of categories to raw data through coding, tabulation and then drawing statistical inference. Analysis work is based on the computation of various percentages, coefficients etc. through applying various statistical formulae . In the process of analysis, relationships of differences supporting or conflicting with a study hypothesis should be subjected to tests of significance to determine conclusions (Pandey & Pandey , 2015).

Walliman (2011) points out that writing up the research report is the last skill of a research. Academic research consists of the following elements: the title, aims of the research, the background to the research, previous research, a definition of the research problem, outline of methods of data collection and analysis, possible outcomes, timetable of the project and description of resources required and list of references.

As a result of the importance of research skills, several studies are conducted with the aim of developing students' research skills as the study of Meerah and Arsad (2010).They examined students' research skills through a project work. Participants were Malaysian secondary schools students studying social science subjects .The findings of the research showed that the students not only enjoyed the task but also found the course to be useful. They acquired some research skills and gained the experience of doing a good research.

Henderson, Nunez-Rodriguez and Casar (2011) conducted a study with the aim of enhancing research skills through a team-based research project. Participants of the study were Community College science students studying General Biology I (between 25 and 30) and II (and between 15 and 20) over a two-semester sequence during three academic years. Results of the study showed that students were

appreciative of the experience and their research skills improved.

Satisfaction

In human psychology, satisfaction is a person's assent to the reality of a situation, recognizing a process or condition without attempting to change it (Li, 2016). Weerasinghe and Fernando (2017) define learners' satisfaction as a short-term attitude resulting from an evaluation of learners' educational experience, services as well as facilities. It represents learners' perception of the quality of the leaning process.

learners' satisfaction is a key factor in the success of any learning process as satisfied learners are more successful and persistent than their unsatisfied ones(Alsadoon, 2018). Satisfaction with learning experience is considered an essential variable in assessing the effectiveness of instruction. It gives invaluable information about learners' acceptance and the quality of learning experience. When the learner is satisfied with the learning experience, he attributes a high value to learning which ,in turn, affects positively in his future learning (Yalcin,2017).

Factors influence learners' satisfaction

Appleton-Knapp and Krentler (2006) point out that learners' satisfaction is a multidimensional process that is influenced by numerous personal, social and environmental factors. They identified two groups of factors that influence learners' satisfaction in higher education: personal and instructional. Personal factors include age, gender as well as learning style. Instructional factors include quality of instruction, clarity of expectation, teaching style, quality of classroom, available learning materials and equipments, library facilities as well as university status and prestige.

Mclaren (2010) states two factors in aiding learners' satisfaction: the teacher and the course. The teacher/instructor is a key factor that affects learners' satisfaction. Teachers who provide learners with immediate and detailed feedback keep learners more motivated and engaged in the learning process. Teachers' enthusiasm and rapport have a high correlation with learner satisfaction. Learners' satisfaction is highly influenced by their attitude towards the teacher. Thus, learners' satisfaction is in part due to the perceived quality of teacher-learner interactions. Course structure is another factor that affects learners' satisfaction. Learners who are satisfied with the course structure report high levels

in perceived knowledge and satisfaction.

Alsadoon (2018) points out that social presence is a significant factor that impacts learners' satisfaction. Social presence refers to learners' perception of the quality and quantity of interpersonal communication, learner-learner or learner- teacher interaction, in learning environment. It gives learners the feeling of existing with the teacher and their classmates encouraging them to exchange information with others and learn better. Social presence has a great impact on learners' enjoyment and the quality of the learning experience that directly improves learners' satisfaction.

Several studies confirm that learners' satisfaction impacts learners outcomes such as achievement and motivation. Satisfied learners, who feel that the course meets their needs and expectations, learn easily , become more motivated to learn and develop positive attitude towards the course as well as the learning experience (Uka,2014). In addition, learners' satisfaction is linked to their performance and positively associated with academic achievement. Learners' satisfaction increases their motivation, success and course

grades (Naog, Nachouki & Ankit, 2012)

Students' satisfaction can be developed through utilizing CBL. This is proved in the study of Gabriel (2014) who investigated the effect of a modified CBL approach on developing students' satisfaction and engagement. Participants of students were senior Biochemistry students enrolled in a capstone course in the Spring of 2014 at Viterbo University. Results of the study showed that CBL design for the course increased students' interest and engagement, resulting in increased learning and satisfaction.

As a result of the importance of students' satisfaction at all learning stages especially higher education , several studies are conducted to identify the factors that affect students' satisfaction in higher education institutions such as the study of Deuren and Lhaden (2017) .They conducted a comparative study on two colleges (a state and a private college) in Bhutan aiming at determining factors of students' satisfaction in the two colleges and providing necessary recommendations. Results confirmed that overall student satisfaction does not differ ,but the perception of factors quality contributing to satisfaction differs. Another study is conducted by Yalcin(2017) who investigate

the factors that affect online learners' satisfaction with the learning experience. Participants consisted of higher education students who were enrolled in fully online courses in the Spring 2017. Results showed that, self-efficacy beliefs for interacting with the instructor and peers, self-regulation, learning design, task value beliefs and perceived learning are essential factors to be considered in online learning settings in terms of learners' satisfaction with the learning experience.

Context of the problem

In spite of the importance of research skills to students in general diploma,(who did not study educational, psychological, or methodology courses), the researcher noticed while teaching them "Methods of teaching course", that they lack research skills. Reviewing literature and related studies, the researcher to her best knowledge found one study conducted by Meerah et al.(2011a) who observed that EFL learners have weak prior knowledge and skills in conducting research and that they need further enhancement of the research training to produce knowledgeable and skillful researchers.

Also, she conducted a pilot study where a research skills test (the cognitive component) was administered to a group of general diploma students (N=15). They were asked to answer some questions that measure their research skills. The results of the pilot study revealed that the majority (85%) have poor research skills.

Statement of the problem

In spite of the importance of research skills to all students especially postgraduate students, general diploma students lack essential research skills including the inability to collect and analyze data , write a research report, etc. That is why the present study attempted to help them develop their research skills and their satisfaction with CBL training program.

Questions of the study

The main question could be stated as follows:

What is the effectiveness of using CBL training program on developing general diploma students' research skills and their satisfaction?

This main question can be divided into the following sub-questions:

1. To what extent do general diploma students have research skills?

2. What is the effectiveness of using a CBL program in developing general diploma students' overall research skills?

3. What is the effectiveness of using a CBL program in developing general diploma students' each of the following research skills (information seeking, research methodology, problem solving and communication skills)?

4. To what extent are general diploma students satisfied with the CBL program in developing research skills ?

Hypotheses of the study

To achieve the aim of the study, the following hypotheses were formulated:

1. There is a statistically significant difference between the study groups′ mean scores in the pre/post research skills (cognitive component) test in favor of the post test.

2. There is a statistically significant difference between the study groups′ mean scores in the overall pre/post research skills performance test in favor of the post test.

3. There is a statistically significant difference between the study groups′ mean scores in each of the research skills

components performance test in favor of the post test.

4. There is a statistically significant difference between the study groups′ mean scores in the pre/post administrations of satisfaction checklist in favor of the post administration.

Significance of the study

The present study might help:

1- develop EFL general diploma students' research skills and their satisfaction using CBL based program.

2- direct faculty members' attention to the use of CBL in EFL teaching and learning

3- open new avenues to researchers in EFL teaching and learning.

Delimitation of the study

The present study is delimited to:

1. Some research skills: information seeking, research methodology, problem solving and communication.

2. EFL general diploma students (N=40) Faculty of Education, Fayoum University.

3. The first semester of the academic year 2019-2020.

Definition of terms

Challenge Based Learning (CBL)

The researcher defined CBL as a collaborative learning experience in which the researcher and students work together to solve EFL classroom real challenges and share their results with the world.

Research skills

The researcher defined research skills as skills needed to help general diploma students to identify a problem, collect data, analyze collected data and come up with an effective solution to the problem. Research skills was one of the topics of "Methods of teaching course" that general diploma students studied. The researcher ,who taught this course to such students, aimed at developing these skills through using CBL program.

Satisfaction

The researcher defined satisfaction as general diploma student's attitude that reflects their positive feelings and interest in CBL program.

EFL general diploma students

EFL general diploma students are graduates of different faculties other than the faculty of education who join Faculty of Education, Fayoum University to study psychology, education and methodology to be educationally prepared for the teaching profession.

Method

A. Participants

The participants of the current study were EFL general diploma students (N =40) enrolled in the Faculty of Education, Fayoum University, Egypt.

B. Design

The researcher used the quasi experimental with one group pre/post design.

C. Instruments

To fulfill the aim of the current study, the following instruments were designed: an EFL research skills checklist, a research skills (cognitive component) pre-post test, a performance research skills pre-post test, a research skills rubric, a satisfaction checklist and a CBL program.

1- EFL research skills cognitive pre-post test

After making research skills checklist(see appendix 1)and validating it by a panel of jury members,the researcher prepared an EFL research skills cognitive pre-post test.

1.1- The aim of EFL research skills cognitive pre-post test

The aim of this test was to measure the study group's cognitive level in research skills before intervention. It was used as a pre- post test . As a pre test, it aimed at determining the study

group's current cognitive level in research skills. As a post test, it aimed at investigating the effectiveness of CBL training program in developing the study group's cognitive level in research skills.

1.2- Description of the test

EFL research skills cognitive pre-post test consisted of two parts described as follows:

- In part one, students were asked to determine whether some statements are true or false and correct false ones.
- In part two, students were asked to complete some sentences.
- In part three, students were asked to answer Wh questions about research skills (see appendix 2).

1.3- Validity of the test

EFL research skills (cognitive component) test was submitted to a panel of EFL specialists (N=7) (see appendix 3). They were asked to judge test validity in terms of clarity and suitability for the students' level . They were requested to add, remove or modify any part as they see fit. Some valuable remarks were provided, and then taken into consideration (Face Validity). The test was developed in the light of an organized and accurate review of the items to establish content validity. This organized, accurate and systematic review determined the form of the test, and how it should be scored. Therefore, the content of the test was representative of the skills that were intended to be measured. Thus , the test was valid.

1.4- Reliability of the test

The test reliability was measured by using the test – retest method. The test was administered to (15) EFL general diploma students enrolled in Faculty of Education, Fayoum University, Egypt other than those who participated in the intervention. Then, it was readministered to the same group after two weeks . The calculated Pearson correlation between the two administrations was (0 .81) at the 0.01 level reflecting that the test was reliable.

1.5-Piloting and scoring the test

Piloting the test aimed at determining clarity, reliability and estimating the time needed for taking the test. The test was piloted on (15) students other than those of the main treatment. To estimate the time of the test , the researcher recorded the time taken by each student. Then, the following formula was used:

T1+T2/2. So, the time of the test was 60 minutes.

2- EFL research skills performance pre-post test

After designing the research skills checklist and the cognitive research skills test, the researcher prepared an EFL research skills performance pre-post test.

2.1- The aim of the EFL research skills performance pre-post test

The aim of this test was to measure the study group's performance level in research skills. It was used as a pre- post test .

2.2- Description of the test

EFL research skills performance pre-post test is a real EFL classroom challenge. The researcher asked students to write a research report about writing problems. Then, the researcher collected their final research products to evaluation their use of research skills (see appendix 4).

2.3- Validity of the test

EFL research skills cognitive test was submitted to a panel of jury members. They were asked to determine the validity of the test (challenge) in terms of clarity and suitability for the students' level . They indicated that the test (challenge) and instructions were clear and suitable for the students' levels.

2.4-Scoring the test

Two taters rated students' research papers giving a score out of ten to each skill. The total mark of the test is 40.

2.5- Inter-rater reliability of the test

To ensure test reliability, inter-rater reliability was used in which two different raters (the researcher and her colleague) assessed students' research products focusing on the application of research skills. The reliability of the rubric was found to be (0.74) which is an acceptable level of reliability.

3- A research skills rubric

A rubric was prepared by the researcher to score the test. The rubric consists of four skills. Each skill includes a number of sub-skills. The scale includes three points: Excellent, satisfactory and insufficient. The preliminary version of the rubric was submitted to the jury panel to judge its validity. After making the recommended modifications, the final form of the rubric was prepared (see appendix 5).

4-A satisfaction checklist

After designing the research skills checklist, the cognitive research skills test and the performance research skills test, the researcher prepared a satisfaction checklist.

4.1- The aim of the satisfaction checklist

The aim of this checklist was to measure the study group's satisfaction with CBL training program. It was administered before and after the treatment.

4.2- Description of the satisfaction checklist

The satisfaction checklist includes 17 items where students were asked to tick ($\sqrt{}$) in the suitable place which best match their level of satisfaction (see appendix 6).

4.3- Validity of the satisfaction checklist

The satisfaction checklist was submitted to a panel of jury members. They were asked to determine the validity of the checklist in terms of clarity and suitability for the students' level . They indicated that the satisfaction checklist is valid after making the required modifications.

4.4- Reliability of the satisfaction checklist

The checklist reliability was measured by using the test – retest method. It was administered to (10) EFL general diploma students enrolled in Faculty of Education, Fayoum University, Egypt. Then, it was readministered to the same group after two weeks . The calculated Pearson correlation between the two administrations was (0 .82) at the 0.01 level reflecting that the checklist was reliable.

4.5-Piloting and scoring the satisfaction checklist

Piloting the checklist aimed at determining clarity, reliability and estimating the time needed for taking the checklist. The checklist was piloted on (15) students other than those of the main treatment. The required time for the checklist was 15 minutes. Each item in the checklist is given a mark from 0-2 according to students' answers.

5- CBL training program

5.I Aim and objectives of the CBL training program

The program aimed to develop EFL general diploma students' research skills and their satisfaction with CBL (see appendix 7).

Objectives

By the end of the sessions, students would be able to:

- state the research problem.
- identify the research main question.
- identify the research sub questions.
- formulate the research hypotheses.
- collect data using various resources.

- analyze collected data using appropriate methods.
- discuss research results in the light of the research hypotheses and the results of previous studies.
- write a research report.
- share research results with the whole community.
- work collaboratively with the teacher and their peers to solve a certain challenge.
- use technology effectively.

5.2-Content

The researcher taught a number of topics that reflected real EFL classroom problems (challenges). The researcher asked students to read about the problems using various resources. Then, students were encouraged to express the suitable solutions to the problems. At the end, the researcher and students select the best solution and shared it with the whole community. The sessions were shown in the following table:

Table (1) Sessions of the CBL training program

Sessions	Title
1	Diversity of cognitive abilities in EFL classroom
2	
3	Diversity of socio-economic status in EFL classroom
4	
5	Anxiety in EFL classroom
6	
7	Diversity of learners' epistemological beliefs in EFL classroom
8	

These sessions were preceded by a session devoted to the pre administration of the study instruments and followed by another session devoted to the post administration of the study instruments. The total sessions were 10.

5.3-Activities and techniques

The researcher used many individual and group work activities throughout the program.

Students searched individually for the assigned tasks at home. Then, they worked in groups at school to discuss and analyze the collected data sharing their ideas and solutions. Finally, the researcher and students argued the available solutions deciding the best solution to the challenge.

5.4-Evaluation

The researcher used the two types of evaluation: formative and

summative evaluation. The formative evaluation was represented in the main question, sub-questions and activities that helped students to solve the challenge. The summative evaluation was represented in the post tests administered to the students at the end of the sessions.

Experimental procedures

1. Pre-testing

   The pre-testing of the study instruments took place on 4th October 2019. This was done to recognize students entry level before the treatment.

2. Teaching the students sessions based on the elicitation techniques .There were 8 sessions devoted to enhance the study group's research skills and satisfaction. They took place on 8th October 2019and ended on 18th April 2019. In the first session the researcher introduced the CBL training program to the students defining CBL and research skills, and explaining what they are going to do.

3. Post-testing

   At the end of the treatment, the researcher administrated the study instruments with the aim of investigating the effectiveness of CBL training program in developing study group's research skills and satisfaction .

   Data were treated statistically and the results and discussion will be dealt with in the following section.

Findings of the study:

The findings of the present study are presented in the light of the hypotheses using the statistical package for social sciences (SPSS) version 22.

1-The first hypothesis

The first hypothesis states that " There is a statistically significant difference between the study groups′ mean scores in a pre/post research skills cognitive test in favor of the post test".

Table (2)" t" value of the study group in the pre and post administration of research skills cognitive test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	2.022	1.517	5.152	29	0.01
post	40	3.659	1.461			

Table (2) shows that study group students' posttest scores are significantly higher than their pretest ones in research skills cognitive test. They attained a higher mean score in the posttest(3.659) than that of the pretest (2.022). T – value is

(5.152) and this difference is significant at (.01) level .Thus, the first hypothesis of the study was supported.

2-The second hypothesis

The second hypothesis states that " There is a statistically significant difference between the study groups′ mean scores in a pre/post overall research skills performance test in favor of the post test".

Table (3)" t" value of the study group in the pre and post administration of overall research skills performance test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	15.03	8.92	4.619	29	0.01
post	40	24.70	7.20			

Table (3) shows that study group students' posttest scores are significantly higher than their pretest ones in overall research skills performance test. They attained a higher mean score in the posttest(24.70) than that of the pretest (15.03). T – value is (4.619) and this difference is significant at (.01) level .Thus, the second hypothesis of the study was supported

a- There is a statistically significant difference between the study groups′ mean scores in a pre/post information seeking skill performance test in favor of the post test".

Table (4)" t" value of the study group in the pre and post administration of information seeking skill performance test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	2.80	1.56	2.46	29	0.05
post	40	3.67	1.12			

Table (4) shows that study group students' posttest scores are significantly higher than their pretest ones in information seeking skill performance test. They attained a higher mean score in the posttest(3.67) than that of the pretest (2.80). T – value is (2.46) and this difference is significant at (.01) level .Thus, this sub-hypothesis was supported.

b- " There is a statistically significant difference between the study groups′ mean scores in a pre/post research methodology skill performance test in favor of the post test".

Table (5)" t" value of the study group in the pre and post administration of a research methodology skill performance test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	2.00	1.24	2.55	29	0.05
post	40	2.87	1.07			

Table (5) shows that study group students' posttest scores are significantly higher than their pretest ones in research methodology skill performance test. They attained a higher mean score in the posttest(2.87) than that of the pretest (2.00). T – value is (2.55) and this difference is significant at (.01) level .Thus, this sub- hypothesis of the study was supported.

C-"There is a statistically significant difference between the study groups′ mean scores in a pre/post problem solving skill performance test in favor of the post test".

Table (6)" t" value of the study group in the pre and post administration of problem solving skill performance test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	1.67	1.42	3.61	29	0.01
post	40	3.00	1.44			

(.01) level .Thus, this sub-hypothesis was supported.

d- " There is a statistically significant difference between the study groups′ mean scores in a pre/post problem communication skill performance test in favor of the post test".

Table (6) shows that study group students' posttest scores are significantly higher than their pretest ones in problem solving skill performance test. They attained a higher mean score in the posttest(3.00) than that of the pretest (1.67). T – value is (3.61) and this difference is significant at

Table (7)" t" value of the study group in the pre and post administration of a communication skill performance test.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	1.67	1.42	3.61	29	0.01
post	40	3.00	1.44			

Table (7) shows that study group students' posttest scores are significantly higher than their

pretest ones in communication skill performance test. They attained a higher mean score in the

posttest(3.00) than that of the pretest (1.67). T – value is (3.61) and this difference is significant at (.01) level .Thus, this sub-hypothesis supported.

3-The fourth hypothesis

The fourth hypothesis states that " There is a statistically significant difference between the study groups′ mean scores in pre/post administrations of satisfaction checklist in favor of the post administration".

Table (8)" t" value of the study group in the pre and post administration of satisfaction checklist.

Group	N	Mean	S.D	T-Value	D.F	Sig.
pre	40	2.613	1.382	5.271	29	0.01
post	40	4.363	0.492			

were involved in individual as well as group work receiving sufficient feedback.

CBL changes the traditional concept of learning environment that is teacher-centered to a student-centered one. It encourages learners to be dependent language learners and search for new information developing inquiry habits. Also, CBL provides a new learning environment that focuses on the use of technology and digital age tools promoting student-student and teacher - student interaction.

Moreover, the study group confirmed that CBL helps them to master the course content. Collecting a great amount of data from different angles/fields to answer guiding questions and activities deepens learners' understanding of the course content. Analyzing and evaluating the collected data help learners to

Table (8) shows that study group students' posttest scores are significantly higher than their pretest ones in satisfaction checklist. They attained a higher mean score in the posttest(4.363) than that of the pretest (2.613). T – value is (5.271) and this difference is significant at (.01) level .Thus, the fourth hypothesis of the study was supported.

Discussion of the Results

The aim of the present study was to develop EFL general diploma students′ research skills and satisfaction through using CBL training program. The study results confirmed that the CBL training program improved the study group's overall research skills and their satisfaction with the program. This is due to the fact that CBL helped learners to learn in a collaborative, flexible, enjoyable and technological environment . In addition, they

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program proved to have a high effect on developing general diploma students' research skills and their satisfaction. These results are in line with the findings of Ali (2019) that aimed at investigating the use of CBL strategy in developing students' academic speaking and concluded that CBL strategy significantly enhanced the students' speaking skill .

Conclusion

The results of the study revealed a noticeable development in study groups' research skills and satisfaction due to the implementation of the CBL program. It was concluded that a CBL program was effective in developing general diploma students' research skills and satisfaction.

Recommendations of the study

In the light of previous results, the following recommendations could be presented:

1- New approaches such as CBL of teaching research skills should be considered, utilized and examined.

2- The importance of using CBL in EFL classrooms for developing language skills should be taken into account.

3- CBL should be emphasized in different educational stages.

reach to the best solution/answer developing their problem solving skills.

In addition, the study group pointed out that CBL increases their satisfaction with the learning experience. They felt that the course met their needs and expectations as it tried to solve real EFL classroom challenges which ,in turn, helped them develop a positive attitude towards the learning experience in general. Also, they were satisfied with interpersonal communication in learning environment whether it can be learner-learner or teacher-learner. They were satisfied with researcher's timely and detailed feedback on assignments and teaching style, quality of instruction , available learning resources and activities and the use of research skills. Some of students' comments are the following:

- *"My interactions with my classmates and the lecturer helped me to share my experiences with them and vice versa"*;

- *"The program helped us to be more involved to get data"* and

- *"Positive encouragement given to me helped me feel good about what I was doing"*.

The results of the study revealed that CBL training

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4- Teachers should encourage students to search for information developing inquiry and life-long learning habits.

5- The movement from teacher centered classroom to student-centered classroom should be emphasized.

Suggestions for further research

Based on the findings of the current study the following suggestions are presented.

1-Investigating the effect of CBL on developing productive language skills such speaking and writing.

2-The effect of using CBL on enhancing learners' autonomy and motivation

3- Using CBL to develop college students' critical thinking and problem solving skills.

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